

Pain estimation by others: An experimental investigation

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GENERAL INTRODUCTION

*“To have great pain is to have certainty,
to hear that another person has pain, is to have doubt.”*

(Scarry, 1985, p. 6-7)

PAIN: A MAJOR HEALTH COMPLAINT

Pain is the most common health complaint (Crombie, Croft, Linton, LeResche, & Von Korff, 1991). Point prevalence rates of pain vary considerably depending on the methodology used, the sample population and the type of pain. For example, Helme and Gibson (1999) report a point prevalence of pain in adulthood that varied between 1% and 88%. Although there are many taxonomies to distinguish between different forms of pain, in general, pain is classified according to its duration. In this respect, the International Association for the Study of Pain defines acute pain as pain that lasts for less than three months, often characterized by clear physiological damage, while chronic pain is considered to persist beyond the normal healing time (International Association for the Study of Pain Task Force on Taxonomy, 1994). Pain experiences relate to all body parts but the head, lower back, and joints appear to be most affected (Watkins, Wollan, Melton, & Yawn, 2008). Pain is not only highly prevalent; pain may also have major personal impacts (Breivik, Collet, Ventafridda, Cohen, & Gallacher, 2006). For example, pain is often associated with anxiety and depressive disorders (Beesdo et al., 2010), and with restrictions in working life (Breivik et al., 2006). Even more, pain entails enormous financial costs, especially through work absenteeism (Dagenais, Caro, & Haldemen, 2008). These findings indicate that pain cannot solely be considered as a sensory experience, but one that is interwoven with suffering and disability. In line with this reasoning are the findings that treatments for pain are often unsatisfactory (Spacek, 2006). For example, analgesics, including strong opioids, do not lead to pain relief for a large proportion of patients with acute (Ribeiro et al., 2012) or chronic (Reid et al., 2011; Watkins et

al., 2008) pain. However, not all persons in pain suffer or are disabled to the same extent. In fact, relationships between pain, disability and suffering may vary considerably. Observations of high variability in pain, suffering and disability have led to fundamental changes in the theoretical conceptualization and management of pain.

CONCEPTUALISATIONS OF PAIN

The Cartesian model, formulated by Descartes in 1664 (Descartes, as cited in Main & Spanswick, 2000) is one of the precursors of the biomedical model which posits that the perception of pain is a direct representation of the sensorial input, i.e., the physiological damage. In line with Descartes' philosophy, a distinction was made between 'real' pain ('organic' pain) and 'imagined' pain ('psychogenic' pain). Many theories were developed to support the biomedical model, such as the specificity theory of Von Frey (Melzack & Wall, 1965), which posits that the human body has specific pain receptors that are directly related to specific pain centers in the brain. In other words, a direct and unchangeable relationship between sensorial input and the experience of pain was presumed. The biomedical model, however, could not fully explain the human pain experience. During the 20th century, research pointed to the role of psychological factors in the individual's pain experience. The most pioneering work in this domain is the work of Beecher (Beecher, as cited in Morley & Vlaeyen, 2010). In particular, Beecher found that some of the wounded soldiers who survived the battlefield complained relatively little about their pain shortly after injury, but complained much more about minor procedures in the following days. The underlying idea was that the emotional state of the soldiers was important in their experience, so that the pain was secondary to having survived in the first instance, but a primary concern once in a safe setting. Gradually, people acknowledged that the biomedical perspective was unsatisfactory in explaining the human pain experience: there is no absolute relationship between physical damage and the experience of pain. A biopsychosocial perspective upon pain was put forward as a better framework to understand the human pain experience. According to this

perspective, pain experiences are influenced by biological, psychological and social factors. One of the first theories that paved the way towards this biopsychosocial perspective is the gate control theory of Melzack and Wall (1965). This theory posits that there is a gate at the posterior horn of the spinal cord through which information about the pain passes. Importantly, the theory presumes that both afferent nerves (the sensorial input) and efferent nerves (descending from the brain) control the opening and/or closing of this gate. The gate control theory differs from a strict biomedical model: it acknowledges that the relationship between physical damage (injury) and the pain experience is variable, i.e., dependent on the influence of several (psychological) brain processes.

At present, a biopsychosocial perspective on pain is widely acknowledged in the scientific literature (Gatchel, Peng, Fuchs, Peters, & Turk, 2007). This is apparent in the considerable research that focused on several psychological factors that are related to the individual's pain experience (e.g., Gatchel & Turk, 1999). For example, research has demonstrated that catastrophizing (i.e., the degree to which pain is perceived as highly threatening) is positively related to the experience of pain (Keefe et al., 2000; Sullivan, Rouse, Bishop, & Johnston, 1997). Further, abundant research, although inconclusive, has focused on the role of the patients' attentional processes towards pain (e.g., Eccleston, 1995; McCaul & Haugtvedt, 1982; McCaul, Monson, & Maki, 1992; von Leupoldt, Seemann, Gugleva, & Dahme, 2007). The International Association for the Study of Pain (IASP) also defines pain as "*an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage*" (International Association for the Study of Pain Task Force on Taxonomy, 1994, p. 210). This definition acknowledges that pain entails not only a particular sensory aspect, but also an affective one. Further, according to the definition, there is not necessarily a relationship between tissue damage and the experience of pain. This implies that pain can exist or persist in the absence of physiological damage. This is in line with considerable research indicating the high prevalence of pain that is not understood medically (e.g., Hiller, Rief, &

Brähler, 2006; Jacobi et al., 2004; Lahmann, Henningsen, & Noll-Hussong, 2010; Lieb, Pfister, Mastaler, & Wittchen, 2000; Rief, Hessel, & Braehler, 2001).

Although the biopsychosocial perspective on pain has been increasingly acknowledged in scientific literature, the biomedical model is still widely endorsed in Western society, both in lay observers (e.g., Eccleston & Crombez, 2007; Goubert, Crombez, & De Bourdeaudhuij, 2004), and healthcare practitioners (e.g., Kent, Keating, & Taylor, 2009). That is, many individuals are convinced that a patient's pain is always explained by clear physiological or tissue damage. Consequently, patients with pain that is not understood medically are a particular vulnerable patient group. Specifically, although pain is a private and subjective experience, it is embedded in a wider social context with other people perceiving and responding towards this pain (Hadjistavropoulos et al., 2011). The absence of medical evidence, and other factors which will be outlined below, may profoundly impact on these observer responses, e.g., the observers' estimates of the patients' pain.

A comprehensive understanding of pain as a *social* experience, i.e., the dynamic interplay between a person's pain experience and the social environment in which pain emerges, requires consideration of social or communication features of pain. The communications model of pain (Hadjistavropoulos et al., 2011) and the empathy model in the context of pain provide heuristic frameworks that assist in understanding the complex social interactions among persons with pain and observers.

THE COMMUNICATIONS MODEL OF PAIN

Pain is an inherently interpersonal experience with the individual in pain communicating his/her pain to others. The communications model of pain has been formulated by Hadjistavropoulos et al. (2011) and is based on and consistent with Rosenthal's (1982) model that describes the process of communication as a three-step process. The first step refers to the internal pain experience of the individual with pain (step A). This internal pain experience is encoded by the individual into expressive pain behaviors (step B), for example, by means of

verbal or written self-reports. However, individuals may also express their pain experiences by means of nonverbal pain behaviors: the individuals' facial pain expressions and their full body pain behaviors (e.g., guarding or rubbing). The expressive pain behaviors of individuals with pain are decoded by the observer (step C). This decoding may, in turn, through behavioral responses, influence the individual's pain experience (see Figure 1; Hadjistavropoulos et al., 2011). Important inferences that are made during this decoding phase entail the observers' estimates of the individual's pain intensity. These judgments are challenging given that the pain experience is primarily a subjective experience to which observers do not have entire or direct access. However, observers' pain estimates are crucial, given their potential influencing role in pain management (e.g., reactions of significant others, treatment decisions, drug therapy, waiting lists). In what follows, the focus will be on the observers' pain estimates as a core aspect of observers' inferences about others' pain.

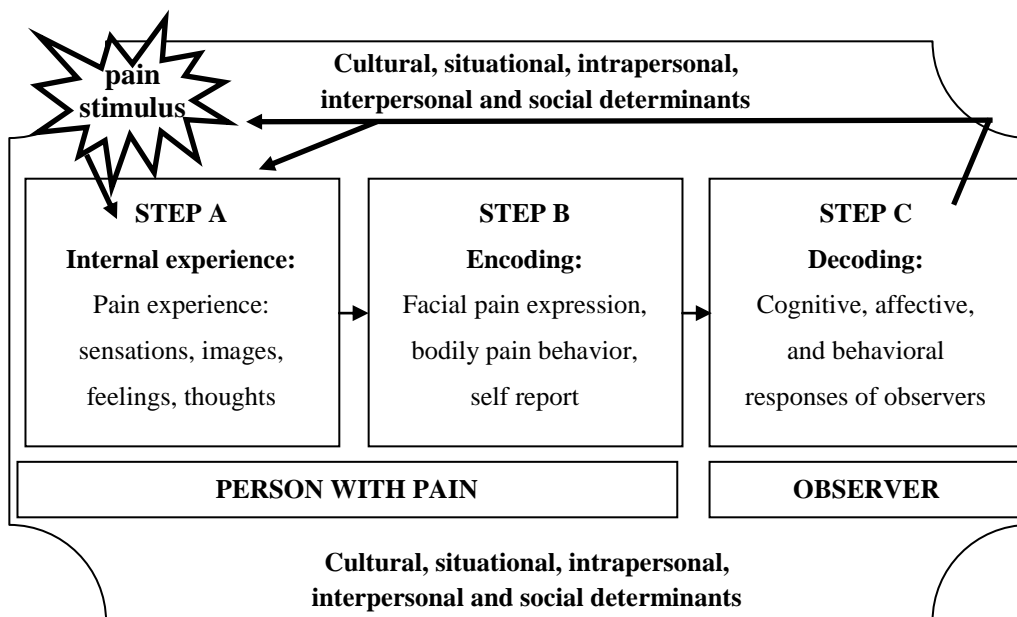


Figure 1: The communications model of pain (adapted from Hadjistavropoulos et al., 2011).

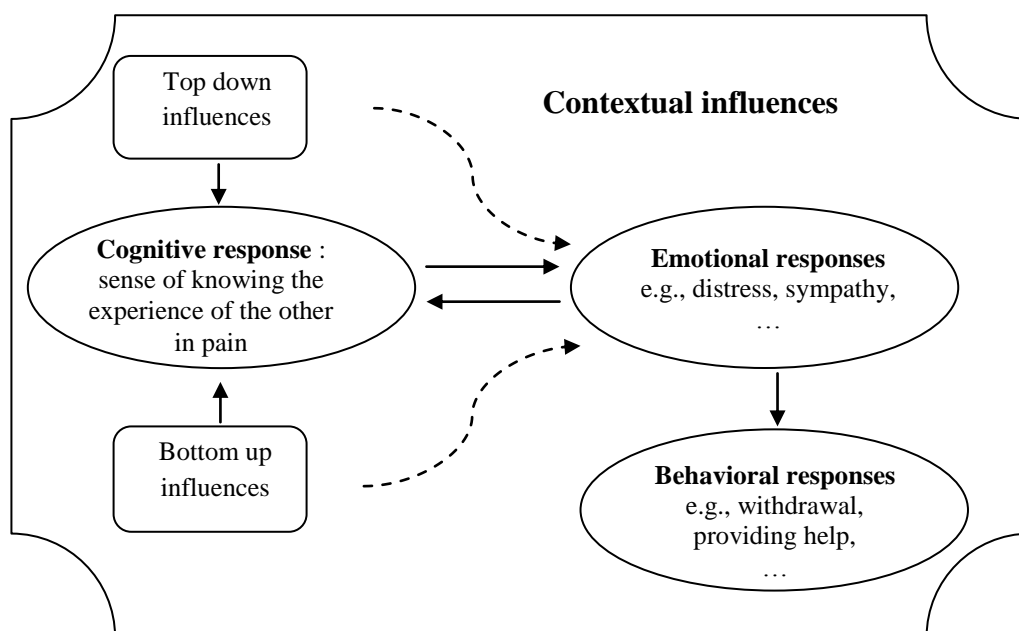


Figure 2: The empathy model in the context of pain (adapted from Goubert et al., 2005).

The empathy model in the context of pain, formulated by Goubert et al. (2005) provides a related heuristic framework to better understand observer estimates of another individual's pain (see Figure 2). The model states that the capacity of the observer to imagine him/herself in the thoughts, feelings and motives of the person with pain (i.e., the capacity to empathize) is fundamental to the estimation of the other's pain. The model identifies three observer empathic responses that are, although distinct, closely related to each other: (1) the observer cognitive responses that are defined as "a sense of knowing the experience of the other in pain" (e.g., the observers' pain estimates), (2) the emotional responses (e.g., the felt sympathy for the patient or the own distress while observing the patient), and (3) the behavioral responses (e.g., helping or avoidance behavior). In accordance with the pain communications model (Hadjistavropoulos et al., 2011), the empathy model in the context of pain (Goubert et al., 2005) acknowledges that observers' pain estimates are influenced by several variables. In particular, the model distinguishes bottom-up variables, top-down variables and contextual variables (see Figure 2). In what follows, a concise (but not exhaustive) review of

the literature about the variables that influence the observers' pain estimates is provided. In the review, particular attention is drawn to the role of the absence of medical evidence for the pain as an important contextual factor. Further, the focus will be on the role of the patients' valence (bottom-up) and the (implicit) priming of the observers with social deception (top-down) as important potential influences.

THE ESTIMATION OF PAIN BY OTHERS

Bottom-up influences

Bottom-up influences on the observers' pain estimates are the variables that are related to the individual with pain him/herself, for example, the patient's (verbal and nonverbal) expressive pain behavior. Research indicates that the patient's self-report is one important cue for both lay observers (e.g., Chibnall & Tait, 1995) and healthcare practitioners (e.g., Ferrel, Eberts, McCaffery, & Grant, 1991; Kappesser, Williams, & Prkachin, 2006) to estimate the patient's pain. In particular, there is a positive relationship between the patient's self-reported pain and the lay observers' pain estimates (Chibnall & Tait, 1995; Kappesser & Williams, 2008). Moreover, the patient's facial display, a core component of the patient's nonverbal expressive pain behavior, has been found to be very powerful in signaling pain to others (Williams, 2002). In general, the level of the patient's facial pain expression positively relates to both lay observers' (e.g., Vervoort et al., 2011) and professionals' (e.g., Hadjistavropoulos, Ross, & Von Baeyer, 1990) pain estimates. Equally, higher levels of the patient's full body pain behavior induce higher estimates of pain by lay observers (e.g., Sullivan, Martel, Tripp, Savard, & Crombez, 2006). Research into the influencing role of the patient's full body pain behavior on healthcare practitioners' pain estimates is, to our knowledge, nonexistent. Further, the patient's physical attractiveness, gender, age, race, and coping style play an influencing role. In particular, physically unattractive patients are believed by both lay observers (Hadjistavropoulos, McMurtry, & Craig, 1996; Hadjistavropoulos, LaChapelle, Hale, & MacLeod,

2000) and healthcare practitioners (Hadjistavropoulos et al., 1990) to experience more pain than physically unattractive patients. Further, lay observers attribute more pain to female than to male patients (e.g., Hadjistavropoulos et al., 1996; Martel, Thibault, & Sullican, 2011; Robinson & Wise, 2003; Sullivan et al., 2006), to older than to younger patients (Hadjistavropoulos et al., 2000) and to patients with an adaptive coping style than to patients with a maladaptive coping style (MacLeod, LaChapelle, & Hadjistavropoulos, 2001). Further, the pain of black patients is more likely to be underestimated by healthcare practitioners than the pain of nonblack patients (Staton et al., 2007). Finally, there is preliminary yet equivocal evidence for the role of the patient's likability on the observer pain estimates. In particular, Chibnall and Tait (1995) demonstrated that observers attribute less pain to disliked than to liked patients, while the findings of Tait and Chibnall (1997) suggest that healthcare practitioners (physicians) attribute less distress and disability to liked than to disliked patients. Worth noting, in the vignette study of Chibnall and Tait (1995), the patient's likability was manipulated by clearly mentioning the likability of the patients. In contrast, Tait and Chibnall (1997) manipulated the mood and behavior of the patient, rather than the likability. Although one may doubt whether both studies manipulated the patient's likability, it is likely that both studies manipulated the patient's valence, i.e., how negative/positive the patient is evaluated by the observer. Patient valence is one important potential factor influencing observer pain estimates. In particular, evaluating objects or individuals in terms of their valence (positive versus negative), even without clear explicit rational arguments, is inherent to human life. This phenomenon is described as automatic evaluations (see for example Bargh, Chaiken, Raymond, & Hymes, 1996) and is one of the basic tenets of many models of evaluation in social psychology (e.g., Osgood, as cited in Bradley & Lang, 1994; Tesser & Martin, 1996). Nevertheless, research into the role of the patient's valence on observers' pain estimates is, to our knowledge, sparse.

Contextual influences

Contextual variations may also influence observers' estimates of others' pain, e.g., the relationship between the patient with pain and the observer: lay observers attribute less pain to patients when the relationship between them is negative rather than positive (Tait & Chibnall, 1994). To date, the most influencing contextual variable is the presence or absence of medical evidence for the pain. Specifically, the absence of medical evidence relates to lower pain estimates in lay observers (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Tait & Chibnall, 1994), medical students (Chibnall, Tait, & Ross, 1997), nurse students (Halfens, Evers, & Abu-Saad, 1990), nurses (Taylor, Skelton, & Butcher, 1984), and internal medicine physicians (Tait & Chibnall, 1997). Despite the abundance of studies indicating that the absence of medical evidence relates to lower pain estimates by observers, one must be cautious in generalizing these results towards real life settings. In particular, the above studies all made use of short stories about *fictitious* patients, which limits the ecological validity of the results. Furthermore, the studies left out the influencing role of the patients' pain behaviors. The patients' expressive pain behaviors provide worthwhile feedback to the observers about the patients' pain experiences (Williams, 2002) and, hence, may facilitate or limit the effect of the absence of medical evidence on the observers' pain estimates. Pain in the absence of medical evidence is commonly observed (Hiller et al., 2006; Jacobi et al., 2004; Lahmann et al., 2010; Lieb et al., 2000; Rief et al., 2001) and relates to low psychological wellbeing (Beesdo et al., 2010). Moreover, patients with pain that is not medically understood are a vulnerable patient group. In particular, absence of medical evidence deviates from the biomedical model that is widely endorsed in Western societies (Eccleston & Crombez, 2007; Goubert et al., 2004). This biomedical model posits that pain is directly linked with tissue/bodily damage (Engel, 1977). Consequently, and in line with the findings of Chibnall and Tait (1995; 1999), Chibnall et al. (1997), Halfens et al. (1990), Tait and Chibnall (1994; 1997) and Taylor et al. (1984), observers might not take the pain of patients seriously when not explained by physiological damage. Besides the absence of medical evidence, there is another important

factor that does not fit within the widely endorsed biomedical model and therefore, is a potential factor that may impact on observer pain estimates, i.e., the presence of psychosocial influences on the patient's pain experience. Despite the findings that pain is clearly influenced by several psychosocial factors (Carragee, 2005; Gatchel et al., 2007; Linton, 2000; Pincus, Burton, Vogel, & Fiels, 2002), it remains unclear, however, whether their presence also affects observer pain estimates.

As suggested by Kappesser and Williams (2008), the studies into the role of the absence of medical evidence for the pain on observers' pain estimates can be reinterpreted using the social contract theory. In particular, the information that the pain does not fit within the biomedical perspective might activate observers' alertness towards social deception. This sensitivity to cues to social cheating is called the 'cheating detection mechanism' and serves as a protection against exploitation by others who challenge reciprocal altruism (Cosmides, 1989). This line of reasoning is further elaborated in the social contract theory in the context of pain (see e.g., Kappesser & Williams, 2008). In particular, the estimation of others' pain may be conceived of as part of a social exchange situation in which a person (patient) expresses pain towards an observer who has to decide whether he/she will bestow particular benefits, such as support or practical aid. If the cheating detection mechanism is activated, observers may doubt about the genuineness of the patients' pain symptoms and consequently, attribute lower pain to the patients (e.g., Kappesser et al., 2006). Furthermore, the observers will not expect a normal reciprocal action and therefore, might be reluctant in offering help to the patient.

Top-down influences

Observer pain estimates are likely to be influenced by top-down variables, i.e., variables that are related to the observer. One important top-down variable is the extent to which observers catastrophize about pain (i.e., to perceive pain as highly threatening). For example, Sullivan et al. (2006) demonstrated that lay observers with high levels of catastrophic thoughts attributed more pain to patients than

observers with a low level of catastrophic thinking. Other top-down variables impacting upon estimation of pain have been identified. In particular, research indicates that greater exposure of the observer towards others' pain relates to lower attributed pain by lay observers (Prkachin, Mass, & Mercer, 2004). Equally, clinical experience negatively relates to the student nurses' estimates of patients' pain (Halfens et al., 1990), and healthcare practitioners attribute less pain to patients than lay observers (Cheng et al., 2007; Pkrachin, Solomon, Hwang, & Mercer, 2001). Further, there is preliminary evidence for the role of observers' suspicion about the genuineness of the patients' pain. In particular, healthcare practitioners (Kappesser et al., 2006) and student nurses (Poole & Craig, 1992) attribute less pain to patients when there is suspicion about the genuineness of the patients' pain symptoms. In these studies, the participants' suspicion about the genuineness of the patients' pain symptoms was manipulated by telling the participants beforehand that the patients they would observe could fake their pain expressions. Although these studies made use of a rather explicit manipulation of the participants' suspicion, in real life, observers' suspicion about others' pain behavior may be induced in a more subtle or implicit way, e.g., by reading an article in the newspaper about social deception. Research into the role of these ubiquitous subtle cues towards social deception in the observers' pain estimates is lacking. Following Kappesser and Williams (2008), it might be that a rather implicit priming with social deception induces suspicion in observers about the veracity of the patients' pain symptoms and as a consequence, generates lower observers' pain estimates.

AIMS AND OUTLINE

This PhD project has three aims. The **first aim** is the examination of the role of the patients' valence (positive versus negative) in the observers' pain estimates. The **second aim** is the investigation of the role of information that the pain does or does not fit within a strict biomedical perspective in the observers' pain estimates. A **third aim** is the examination of the role of (implicit) priming of the observers with social deception in the observers' estimates of the patients' pain.

The three research questions will be investigated in both lay observers (i.e., individuals recruited from the community) and healthcare practitioners (physiotherapists, general practitioners and nurses). Insight into lay observers' estimates of others' pain is of crucial importance as it might foster our understanding of how pain is perceived by the community as a whole. Besides, insight into healthcare practitioners' estimates of patients' pain is worthwhile given the hypothesized pivotal role of these observers in the management of patient pain. In this PhD project, physiotherapists, general practitioners and nurses will be included. Physiotherapists and general practitioners have a pre-eminent role in the care of patients with pain (Blackburn, Cowan, Cary, & Nall, 2009; Foster, Hartvigsen, & Croft, 2012; Ludvigsson & Enthoven, 2012). In particular, general practitioners are responsible for the first-line care of patients with pain and physiotherapists are responsible for the first-line interventions for these pain patients. Further, with respect to hospitalized settings, where the management of pain is often a significant struggle (e.g., Ribeiro et al., 2012), nurses are of critical importance (Solomon, 2001).

In this project, the influence of the above-mentioned variables on the observers' pain estimates will be investigated and not their influence on the agreement between the patient and the observer. Although a perfect agreement in pain rating between observer and patient is often considered as the criterion (e.g., Chambers, Reid, Craig, McGrath, & Finley, 1998; Redinbaugh, Baum, DeMoss, Fello, & Arnold, 2002; Riemsma, Taal, & Rasker, 2000), the appropriateness of the agreement is equivocal, given that patient and observer may use different cues to make a pain estimation (Kappesser & Williams, 2010). Further, there is no consensus about which technique is best suited to assess 'agreement' (Kappesser & Williams, 2010) and the question arises whether a perfect agreement is at all desirable in clinical practice (Goubert et al., 2005; Hodges & Klein, 2001; Prkachin, Solomon, & Ross, 2007).

The first research aim is addressed in **chapter 1** (lay observers) and in **chapter 2** (physiotherapists). In particular, by means of an evaluative conditioning procedure in which neutral photographs of patients were paired with negative, neutral or positive personal traits, the patients' general valence (i.e., positive vs.

negative) was manipulated and the influence of the patients' valence on the observers' pain estimates, their perceptual sensitivity towards the patients' pain expressions (i.e., the ability to discriminate between several levels of pain expressed by the patients) and their response bias (i.e., the general tendency to attribute pain to a patient) was examined. The second research aim is addressed in chapter 3 (lay observers), chapter 4 (lay observers) and in chapter 5 (physiotherapists and general practitioners). In **chapter 3**, two studies are described that investigated whether the observers' pain estimates, but also their ratings of sympathy felt for the patient, their ratings of distress felt while observing the patient, and their inclination to help the patient, are influenced by the absence of medical evidence and the presence of psychosocial influences on the patient's pain experience. In **chapter 4**, one study is described that investigated the moderating role of the patient's pain behavior in the relationship between the absence of medical evidence for the pain/the presence of psychosocial influences on the patient's pain experience and the observer pain estimates, ratings of sympathy felt for the patient and inclination to help the patient with daily activities. In this study, two potential underlying mechanisms of the effect of medical evidence on the observers' responses, i.e., a negative evaluation (in terms of valence) of the patient by the observer and the observer's belief in deception were also investigated. **Chapter 5** describes an adaptation of the study described in chapter 4 in general practitioners and in physiotherapists. Finally, the third research aim is attended to in **chapter 6** (lay observers) and in **chapter 7** (nurses). These chapters each describe a study in which the participants were primed with a text about social deception or with a neutral text. The influence of this priming on the observers' pain estimates, their ratings of felt sympathy for the patient and their inclination to help the patient with daily activities (lay observers)/their belief in need for help (nurses) was investigated.

Unlike most previous studies that dealt with observers' pain estimates, in the studies described in this PhD project, a paradigm in which photographs and videos of *actual* patients was used instead of a paradigm with short stories about fictitious patients. Moreover, videos of patients displaying facial pain expressions as well as videos displaying the patients' full body pain behaviors were used.

Although the patient's facial pain expression is suggested to be more influential than the patient's full body pain behavior (Martel et al., 2011), observing the patient's full body pain behavior is more akin to real-life clinical settings. Furthermore, the paradigm allowed investigation of the moderating role of the patients' expressive pain behaviors in the relationship between the variables of interest (i.e., the patients' valence, the information about whether the patients' pain fits within a biomedical perspective and the priming of the participants with social deception) and the observer pain estimates.

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CHAPTER 1

WHEN YOU DISLIKE PATIENTS, PAIN IS TAKEN LESS SERIOUSLY¹

ABSTRACT

This study examined the influence of patients' likability on pain estimations made by observers. Patients' likability was manipulated by means of an evaluative conditioning procedure: pictures of patients were combined with positive, neutral, or negative personal traits. Next, videos of the patients were presented to 40 observers who rated the pain. Patients were expressing no, mild-, or high-intensity pain. Results indicated lower pain estimations as well as lower perceptual sensitivity towards pain (i.e., lower ability to discriminate between varying levels of pain expression) with regard to patients who were associated with negative personal traits. The effect on pain estimations was only found with regard to patients expressing high-intensity pain. There was no effect on response bias (i.e., the overall tendency to attribute pain). These findings suggest that we take the pain of patients we do not like less seriously than the pain of patients we like.

¹ Based on: De Ruddere, L., Goubert, L., Prkachin, K.M., Stevens, M.A.L., Van Ryckeghem, D.M.L., & Crombez, G. (2011). When you dislike patients, pain is taken less seriously. *Pain, 152*, 2342–2347.

INTRODUCTION

Pain is a prevalent health problem (Crombie, Croft, Linton, LeResche, & Von Korff, 1991), entailing severe personal and social impacts (Breivik, Collet, Ventafridda, Cohen, & Gallacher, 2006) as well as financial costs (Dagenais, Caro, & Haldeman, 2008). However, pain management often remains inadequate (Spacek, 2006). One important aspect of pain management is the estimation of pain by observers, as potential caregivers (Hadjistavropoulos & Craig, 2002). Others observing a person with pain can vary in the amount of pain they impute to a sufferer. It is reasonable to assume that such differences influence the responses to the sufferer, such as treatment choices or helping behavior in the everyday social environment. Hence, insight into how pain estimations originate is essential.

Some variables have been found to have a major impact upon pain estimation. Factors related to the sufferer are the expression of pain (Goubert, Vervoort, Cano, & Crombez, 2009; Williams, 2002) or the physical attractiveness of the pain sufferer (Hadjistavropoulos, LaChapelle, Hale, & MacLeod, 2000; Hadjistavropoulos, McMurtry, & Craig, 1996; Hadjistavropoulos, Ross, & von Baeyer, 1990). Factors related to the observer, are observers' catastrophizing thoughts about (the sufferer's) pain (Goubert et al., 2009; Sullivan, Martel, Tripp, Savard, & Crombez, 2006), or observers' past experience with pain of others (Prkachin & Rocha, 2010). Also contextual factors play a role, such as the presence of a medical cause for pain (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Tait & Chibnall, 1994; Tait & Chibnall, 1997). The present study focuses on one factor that is important in clinical practice, i.e. patient's likability. Next to perceived treatability and manageability, perceived likability (i.e., the degree to which the patient is liked by an individual) contributes to the perception of patients' characteristics (Rouse & Hamilton, 1991; Wills, 1978). Previous studies, using vignettes, have demonstrated that observers attribute more severe symptoms (i.e., more pain, distress and disability) to liked than to disliked patients (Chibnall & Tait, 1995; Tait & Chibnall, 1994). This study aims to extend existing research

by using videos of real patients in order to investigate whether the effects of likability of patients are dependent upon the level of pain expressed by patients.

Insight into the processes underlying pain estimations is important (Prkachin & Rocha, 2010; Prkachin, Solomon, & Ross, 2007). Pain estimation might reflect two processes: observers may be sensitive to a patient's pain (i.e., being able to discriminate between levels of pain), and/or have a general tendency to ascribe pain to a patient (i.e., response bias) without taking into account a patient's pain cues. Insight into these two processes is important as they might have implications for clinical practice.

In the present study, an evaluative conditioning procedure (EC) (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010) was used to manipulate the likability of patients, by associating pictures of patients with positive, neutral or negative personal traits. Videos of the patients were then presented to healthy volunteers (observers) who rated the patients' pain. We expect observers (1) to rate the pain of liked patients as more intense than the pain of disliked patients (primary outcome; pain ratings on VAS), (2) to be more sensitive to pain expressed by liked patients than to pain expressed by disliked patients (sensitivity), and (3) to have a higher tendency to ascribe pain to liked than to disliked patients (response bias). Furthermore, we explored whether the level of pain expressed by the patients moderated the effect of the patients' likability upon the observers' pain estimations.

METHOD

Participants

Participants were recruited by means of an advertisement in local newspapers. To be eligible, participants had to be 18 years or older, and had to speak the Dutch language fluently. Potential participants who reported a current psychiatric disorder were excluded. Forty healthy volunteers (17 men and 23 women) participated. Mean age was 35.20 years ($SD = 14.55$; range = 19 – 65 years). Participants were rewarded €15. All participants were Caucasian. The ethical

committee of the Faculty of Psychology and Educational Sciences of Ghent University approved the study.

Design

The experiment consisted of two phases. In the first phase, adjectives denoting positive, neutral or negative personal traits (unconditioned stimuli; UCS) were paired with pictures of six different patients (conditioned stimuli; CS), by means of an evaluative conditioning (EC) procedure. EC is a procedure in which a change in the valence of a stimulus (CS) is realized due to the pairing of that stimulus with another positive or negative stimulus (UCS) (De Houwer, 2007; De Houwer, Thomas, & Baeyens, 2001). In the second phase, video fragments of the same patients performing pain-inducing activities were shown to the participants, who were asked to rate the pain of the patients.

Apparatus and stimuli

The experiment was programmed and presented by the Inquisit Millisecond software package (Inquisit 1.33) on a 745 Dell Optiplex computer with a 75 Hz, 19-inch color CRT monitor. Pictures of faces of six patients (three men) with shoulder pain were used as conditioned stimuli (CS). These pictures were obtained by means of a screenshot from the UNBC-McMaster Shoulder Pain Archive (Prkachin & Solomon, 2008). Unconditioned stimuli consisted of nine Dutch adjectives (personal traits). These adjectives describe personal traits that are rated on the degree to which they have good or bad consequences for others dealing with the possessors of the traits. The ratings range from 100 (extremely negative) through 500 (neutral) to 900 (extremely positive) (see Peeters (1992) for the scaling method). Three words with a positive valence [faithful ($M = 820$, $SD = 83$), honest ($M = 815$, $SD = 99$), friendly ($M = 760$, $SD = 94$)], three with a negative valence [egoistic ($M = 180$, $SD = 62$), hypocritical ($M = 185$, $SD = 81$), arrogant ($M = 240$, $SD = 99$)] and three with a neutral valence [true to tradition (M

= 510, $SD = 102$), reserved ($M = 495$, $SD = 128$), conventional ($M = 480$, $SD = 128$)] were selected.

During the rating phase, a set of video fragments of these patients was shown to participants. These video fragments were selected from a set of videos displaying facial pain expressions of shoulder pain patients undergoing a physiotherapy assessment protocol (Prkachin & Solomon, 2008). For the present study, 8 videos of 6 different patients were selected, resulting in 48 video fragments. As it was not possible to obtain video fragments ranging from no to high intensity pain expression for each of the 6 patients, two different patients (one male and one female) were selected for each category (no, mild-, or high-intensity pain expression). Pain scores were on a composite index based on the intensity of four facial actions that have been associated with pain (Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003). The scores can range from 0-16. Scores of 0 were taken to define no pain. Scores of 3-6 defined mild pain and scores of 7 or higher defined high pain. Each fragment had a length of 2000 milliseconds (ms).

Questionnaires

A 100 mm visual analogue scale was used to rate pain of the patients. The endpoints of the scale were marked by 'no pain' on the left and by 'pain as bad as could be' on the right. The effectiveness of the evaluative conditioning manipulation was checked by means of three 21-point scales. The scales measured the extent to which the participant judged the patient to be negative or positive (-10 = very negative, 0 = neutral, 10 = very positive), disagreeable or agreeable (-10 = very disagreeable, 0 = neutral, 10 = very agreeable), and unsympathetic or sympathetic (-10 = very unsympathetic, 0 = neutral, 10 = very sympathetic). A mean score for likability of the patients was calculated by averaging the scores on the three questions.

Procedure

In the experiment room, the participant was seated at about 60 cm from the computer screen. To minimize demand effects, the following cover story was used: participants were informed that this study examined spontaneous psychophysiological responses (e.g., heartbeat, respiration, skin conductance) of people observing other persons with pain. Furthermore, each participant was told that numerous variables influence these psychophysiological reactions and that the present study focused on one specific factor: the verbal information about the observed person. Next, the course of the experiment was shortly explained, i.e., participants were told that (1) verbal information about six different persons would be given and (2) they would be asked to observe several video fragments of these persons and rate their pain. The first written informed consent was obtained. Electrodes and a respiration strain gauge for the psychophysiology measurement (there was no real record of the psychophysiology) were applied.

Consequently, by means of instructions presented on the computer screen, participants were informed that pictures of six different patients would be presented together with some information about those patients. Participants were asked to pay close attention to the information. When the participant pressed the ENTER button, stimuli (CS-US pairs) were randomly presented. For each participant, one male and one female patient were always associated with positive words, one male and one female patient with neutral words, and one male and one female patient with negative words. This pattern was counterbalanced between participants. The CS was presented for 2000 ms followed by the presentation of the US together with the CS, for 3000 ms. After each CS-US pair, there was an inter trial interval of 1000 ms (see Figure 1). Each CS-US pair appeared 9 times. In sum, 54 trials were presented to each participant.

Afterwards, the 48 video fragments were each three times randomly presented on the computer screen. Each participant received a different random sequence of video fragments. After a video fragment (2000 ms) was shown, a black screen appeared. At this moment, the participant reported by means of a vertical line on the VAS how much pain he/she thought the person was experiencing. The black

screen disappeared when the participant pressed the ENTER button, initiating the next video fragment.

Finally, the pictures of the six patients were presented again. For each picture, participants reported their current evaluation of the person. Presentation of pictures was randomized across participants. At the end of the study, the participant filled in a second informed consent, which revealed the true purpose of the study.

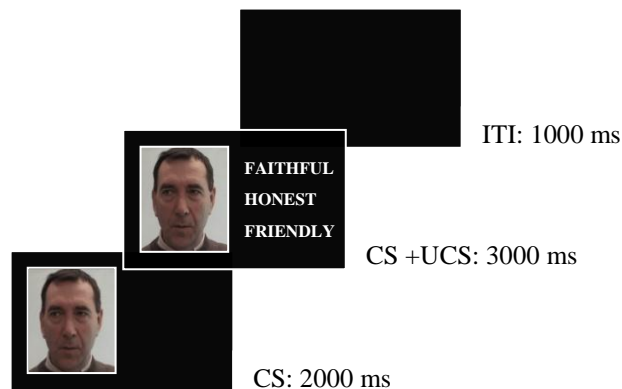


Figure 1. Presentation of one trial during the acquisition phase; CS = conditioned stimulus, UCS = unconditioned stimulus, ITI = inter trial interval.

Data reduction and statistical analysis

Sensitivity and response bias

By means of signal detection analyses, two measures were calculated. First, observers' sensitivity, i.e. the ability to discriminate between levels of patients' pain expression, was measured by calculating the nonparametric index $P(A)$ (McNicol, 1972). In particular, observers' ability to differentiate between no and mild intensity pain, between no and high intensity pain and between mild and high intensity pain was measured. $P(A)$ is the average of all the maximum and minimum areas under the Receiver Operating Characteristic defined by observers' performance [see (McNicol, 1972) for the method to calculate $P(A)$]. Values of $P(A)$ can range from 0 to 1.0, with .5 indicating chance performance or a lack of ability to discriminate between levels of patients' pain expressions. Second,

observers' response bias, i.e., the overall likelihood to attribute pain to the patients, was evaluated by calculating the nonparametric index B (McNicol, 1972). B is the point on the visual analogue scale at which the observer is equally likely to refer to a higher or a lower pain expression. The higher the B value, the higher the overall likelihood of attributing pain to a patient, irrespective of the level of patients' pain expressions.

Statistical analyses

Analyses were conducted for the following dependent variables: the scores on the manipulation check questionnaire, the pain ratings, the sensitivity scores ($P(A)$), and the response bias scores (B). In the manipulation check analysis, the valence of the traits (positive, neutral or negative) that were combined with the patients in the acquisition phase was the only factor (we will refer to this factor as 'valence of traits'). In the pain rating analysis, there were two factors: 'valence of traits' and the patient's 'pain expression' (no pain, mild intensity pain or high intensity pain). In the sensitivity score analysis, there were also two factors: 'valence of traits' and the two levels of pain expression between which the observer had to discriminate. This factor had three levels: discrimination between no and mild intensity pain, between no and high intensity pain or between mild and high intensity pain (we will refer to this factor as 'discrimination between levels of pain'). 'Valence of traits' was the only factor in the response bias analysis.

The factors in the pain rating study were manipulated partially within and partially between subjects. Within subjects, each level of 'valence of traits' was combined with only two of the three levels of 'pain expression'. Between subjects, every level of 'valence of traits' was combined with every level of 'pain expression'. Therefore, we analyzed the results using linear mixed effects models as implemented in the R package nlme (Pinheiro & Bates, 2000). This is a commonly used alternative to repeated measures analysis that can handle a wider variety of designs (Pinheiro & Bates, 2000). In short, linear mixed effects models account for the correlations in within-subjects data by estimating subject-specific deviations (or *random effects*) from each population-level factor (or *fixed factor*) of interest (see West, Welch, and Galecki (2007) for an elaboration).

Each analysis consisted of three steps. First, all relevant factors and interactions were entered in the model as fixed factors. In the second step, we assessed whether it was necessary to add a random effect for each of the fixed factors in the analysis. If a random effect increased the fit of the model, it was included in the final model. In the third step, we inspected the ANOVA table of the final model and tested specific hypotheses about possible main effects or interactions (see Verbruggen, Aron, Stevens, and Chambers (2010) for a similar approach). When testing specific hypotheses, standardized regression weights were reported as a measure of effect size.

RESULTS

Manipulation check

In this analysis, the random effect of 'valence of traits' was necessary. A significant main effect of 'valence of traits' was found ($F(2,78) = 15.98, p < .001$): patients associated with negative traits were rated as less likable than patients associated with neutral traits ($F(1,78) = 20.44, p < 0.001, \beta = -.76, 95\% \text{ CI } [-1.09, -0.43]$). Patients associated with neutral traits were rated as less likable than patients associated with positive traits ($F(1,78) = 10.22, p = .002, \beta = -.49, 95\% \text{ CI } [-0.80, -0.19]$).

Pain ratings

In this analysis, both the random effects of 'pain expression' and 'valence of traits' were necessary. A significant main effect of 'pain expression' was found ($F(2,5709) = 83.49, p < .001$). Observers attributed more intense pain to patients expressing more pain: pain ratings were higher in the mild pain expression condition than in the no pain expression condition ($F(1,5709) = 71.87, p < .001, \beta = 0.68, 95\% \text{ CI } [0.52, 0.84]$) and higher in the high pain expression condition than in the mild pain expression condition ($F(1,5709) = 94.71, p < .001, \beta = 0.58, 95\% \text{ CI } [0.47, 0.70]$). The main effect of 'valence of traits' was not significant

($F(2,5709) = 1.38, p = .250$). However, the interaction between ‘valence of traits’ and ‘pain expression’ was significant ($F(4,5709) = 13.00, p < .001$). In the high pain expression condition, the effect of ‘valence of traits’ was significant ($F(2,5709) = 10.63, p < .001$). Observers’ pain ratings for patients who were presented with negative traits were significantly lower than observers’ pain ratings for patients who were presented with neutral ($F(1,5709) = 10.23, p = .001, \beta = -.26, 95\% \text{ CI } [-0.42, -0.10]$) or positive traits ($F(1,5709) = 19.39, p < .001, \beta = -.32, 95\% \text{ CI } [-0.46, -0.18]$). Observers’ pain ratings of patients who were presented with positive and neutral traits did not differ significantly ($F(1,5709) = 0.54, p = .461$) (see Figure 2). Both in the no pain ($F(2,5709) = 1.52, p = .218$) and the mild pain condition ($F(2,5709) = 1.43, p = .240$) there was no effect of ‘valence of traits’.

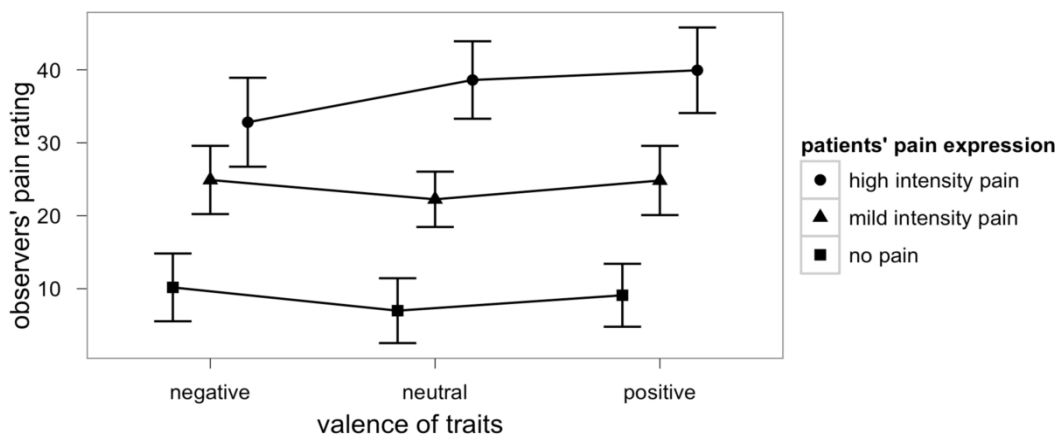


Figure 2. Observers’ pain ratings as a function of valence of traits associated with patients and patients’ pain expressions. In the high intensity pain expression condition, a significant difference was found in observers’ pain ratings when evaluating patients associated with negative traits versus neutral or positive traits. In the mild and no pain expression conditions, no differences were found. The intervals around condition means represent 95% confidence intervals.

Sensitivity and response bias

In the sensitivity analysis, only the random effect of 'discrimination between levels of pain' was necessary. The variable 'valence of traits' ($F(2,72) = 9.27, p < .001$) had a significant effect upon perceptual sensitivity, indicating lower sensitivity to pain of patients who were presented with negative traits than to pain of patients who were presented with neutral ($F(1,72) = 10.81, p = .002, \beta = -.55, 95\% \text{ CI } [-0.92, -0.23]$) or positive traits ($F(1,72) = 16.09, p < .001, \beta = -.63, 95\% \text{ CI } [-1.06, -0.36]$). Sensitivity to pain of patients who were presented with neutral traits did not differ from sensitivity to pain of patients who were presented with positive traits ($F(1,72) = 0.55, p = .458$). Furthermore, a main effect of 'discrimination between levels of pain' was found ($F(2,72) = 8.50, p < .001$), demonstrating better ability to discriminate no pain from high intensity pain than no pain from mild intensity pain ($F(1,72) = 9.99, p = .002, \beta = .49, \text{ CI } [0.18, 0.78]$) or mild intensity from high intensity pain ($F(1,72) = 15.88, p < .001, \beta = .80, \text{ CI } [0.41, 1.21]$). The ability to discriminate mild intensity from high intensity pain did not differ from the ability to discriminate no from mild intensity pain ($F(1,72) = 3.63, p = .061$). The interaction effect between 'valence of traits' and 'discrimination between levels of pain' was not significant ($F(4,72) = 0.25, p = .906$). In the response bias analysis, no effect of 'valence of the traits' upon response bias scores was found ($F(2,78) = 0.97, p = .383$).

DISCUSSION

The present study investigated the influence of patients' likability² upon observers' pain estimations, sensitivity towards pain and response bias. Patients' likability was manipulated by means of an evaluative conditioning procedure in which a change in the valence of a stimulus (the patient) was realized due to the pairing of that stimulus with another positive or negative stimulus (i.e., adjectives

² The use of the term likability is discussed in the general discussion of this dissertation.

describing personal traits) (De Houwer, 2007; De Houwer et al., 2001). In the present study, patients associated with negative traits were rated as less likable than patients associated with neutral traits and patients associated with neutral traits were rated as less likable than patients associated with positive traits. It was found that pain of disliked patients expressing high intensity pain was estimated as less intense than pain of liked patients expressing high intensity pain. Furthermore, observers were less sensitive towards pain of negatively evaluated patients than to pain of positively evaluated patients. No influence of patients' likability upon response bias was found.

The findings are in line with the findings of Chibnall and Tait (1995) and Tait and Chibnall (1994), indicating higher pain, disability and distress scores attributed to liked than to disliked patients. Moreover, the present study extends this research by using real instead of fictitious patients, enabling to examine the interaction between patients' likability and patients' facial pain expressions. Noteworthy, the effect of patients' likability was only found for patients expressing high intensity pain. This seems to be paradoxical, as we would expect contextual information to be the most influential with regard to ambiguous stimuli (mild intensity pain). However, the high levels of pain expression could have induced feelings of suspiciousness in the observers, as extreme levels of pain expression are characteristic of faked or exaggerated pain (Craig, Hyde, & Patrick, 1991). According to Kahneman (2003), we could expect that the observers – when feeling suspiciousness about the reality of the pain symptoms – made use of the contextual information (i.e., patients' likability) to facilitate the pain judgment. The expression of mild and no pain, to the contrary, might not have contributed to suspiciousness and might have served as reliable and sufficient cues to make the pain estimation.

Although we did not find a main effect of patients' likability upon pain estimations, we did find a main effect upon observers' sensitivity for the pain. These results extend – on a behavioral level – neurological findings in the context of sensitivity for pain. It has been shown, for example, that the neural network activated in an observer of someone in pain, is highly similar to the neural network activated in the person in pain himself (Botvinick et al., 2005). This

perception-action coupling – the activation of a representation of a behavior that is observed in someone else – is less pronounced when observers dislike the observed person in pain (Singer et al., 2006). Further, we did not find an effect of patients' likability upon observers' response bias, indicating that observers are not more inclined to attribute pain to positive than to negative patients – irrespective of patients' pain expression. This parallels the finding that there was no main effect of patients' likability upon pain estimations.

Identifying variables that influence pain estimation by others is relevant as pain estimation might influence crucial actions concerning pain management both in the professional context as well as in the everyday environment. Our results suggest that others take the pain of disliked patients who express high pain less seriously. This could imply less helping behavior by others as well as poorer health outcomes. However, research into consequences of reduced pain estimation is lacking. Further, research into factors that might be responsible for the likability of a pain patient is worthwhile as well. For example, there is evidence that observers have more negative attitudes towards patients when medical evidence for the pain is lacking (Chibnall & Tait, 1995) or when the duration of the pain is chronic (Eccleston & Crombez, 2007; Taylor, Skelton, & Butcher, 1984).

In addition, the question remains why observers estimate pain to a lower degree and are less sensitive to pain when they do not like the patient. Hadjistavropoulos and colleagues (Hadjistavropoulos et al., 2000; Hadjistavropoulos et al., 1996; Hadjistavropoulos et al., 1990), for example, found that observers perceived unattractive patients as experiencing more pain than attractive patients. At first sight this seems at odds with our findings. However, it is important to distinguish between physical unattractiveness and unattractiveness due to personal traits. Physically unattractive patients may be perceived by others as unhealthy due to their physical appearance. This reasoning may not apply to attractiveness based upon personal traits. Based on the social contract theory in the context of pain (Kappesser & Williams, 2008), observers of others in pain are alert to the possibility of social cheating. Persons with negative personal traits might activate the cheating detection mechanism. Accordingly, being sensitive towards the pain of 'negative' persons would not be expected to have any benefits

to the observer and the social exchange would not be warranted (Kappesser & Williams, 2008; Kappesser & Williams, 2010). In our study, only the attractiveness with regard to personal traits (patients' likability) was manipulated. As facial expressions were counterbalanced across the valences of the personal traits, physical attractiveness could not have influenced our results.

There are some limitations to this study. First, as in most vignette studies on this topic (Chibnall & Tait, 1995; Tait & Chibnall, 1994), observers were lay people. One should, therefore, be cautious in generalizing results towards professional caregivers. Tait and Chibnall (1997) suggest for example that professional caregivers might interpret negative traits of patients more diagnostically, i.e., for example, as a consequence of the pain they feel. Future studies should investigate the influence of patients' likability upon the estimation of patients' pain by professional caregivers. Second, observers only saw the facial expressions of patients. Future research would benefit from including information on full body movements instead of only facial expressions, as this can be considered more ecologically valid. Finally, we opted for a procedure that resulted in awareness of the contingencies between CS and UCS. This awareness could have induced demand effects. However, to reduce demand effects, we used a cover story that has previously been used in studies on evaluative conditioning (Baeyens, Hermans, & Eelen, 1993). At the end of the experiment, none of the participants was able to identify the true purpose of the study.

To conclude, this study provides evidence for the impact of patients' likability upon estimation of pain by others. Pain of disliked patients was found to be taken less seriously than pain of liked patients. Further research into the underlying mechanisms, as well as into the consequences of reduced pain estimation of disliked patients is needed. Also, replication of the data with professional caregivers and with other pain behavior is recommended.

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**THE INFLUENCE OF PATIENT LIKABILITY
ON PHYSIOTHERAPIST ESTIMATES OF
PATIENT PAIN¹**

ABSTRACT

This study examined the influence of patients' likability upon pain estimations made by physiotherapists. Patients' likability was manipulated by means of an evaluative conditioning procedure: pictures of patients were combined with positive, neutral or negative personal traits. Next, videos of the patients were presented to observers ($N = 40$) who rated the pain. Patients were expressing no, mild-, or high-intensity pain. Overall, results indicated no effect of patients' likability on physiotherapist pain estimates, their perceptual sensitivity towards pain (i.e., the ability to discriminate between varying levels of pain expression), nor on their response bias (i.e., the overall tendency to attribute pain to the patient). However, results indicated higher pain estimations for patients who were expressing mild intensity pain and who were associated with neutral personal traits than for those patients who were associated with negative personal traits. The findings suggest that, overall, physiotherapists' pain estimates are not biased by patients' personal traits.

¹ De Ruddere, L., Goubert, L., Stevens, M.A.L., Danneels, L., Prkachin, K.M., & Crombez, G. (in preparation). The influence of patient likability on physiotherapist estimates of patient pain.

INTRODUCTION

Jackson and colleagues named the management of pain a ‘fundamental medical anomaly’ (Jackson, 2005). This quote is consistent with considerable research indicating the difficulty of pain management for healthcare providers (Breivik, 2005; Mannion & Woolf, 2000; Matthias et al., 2010; Notcutt & Gibbs, 2012; Sinatra, 2010; Spacek, 2006; Wasan, Wootton, & Jamison, 2005). Healthcare practitioners have the difficult task of understanding the subjective experience of other people’s pain in order to make adequate pain judgments. These judgments are crucial because they relate to important clinical decisions that affect patient wellbeing (Hadjistavropoulos et al., 2011). Recognizing the private features of the patient’s experience inevitably creates uncertainty in the healthcare practitioner about the basis for pain complaints, symptoms, and appropriate treatment decisions (Tait, Chibnall, & Kalauokalani, 2009).

Several important factors influence observer estimates of others’ pain (Coll, Grégoire, Latimer, Eugène, & Jackson, 2011; Prkachin, Solomon, & Ross, 2007; Solomon, 2001) and may be related to observer uncertainty about the patients’ pain symptoms (Tait et al., 2009). One important factor that has been suggested by research with lay observers is the perceived likability or the valence of the patient (how positive or negative a patient is evaluated) by the observer (Chibnall & Tait, 1995; De Ruddere et al., 2011; De Ruddere, Goubert, Vervoort, Kappesser, & Crombez, 2013; Tait & Chibnall, 1994; 1997). For example, De Ruddere et al. (2011) recently demonstrated that lay observers take the pain of liked patients more seriously than the pain of disliked patients. In the context of patient care, Wills (1978) demonstrated that the patient’s likability is (beyond treatability and manageability) one important dimension on which the patient is perceived by the healthcare provider. Nevertheless, the role of patient likability in healthcare provider estimates of pain is largely unknown.

This study aimed at investigating whether patient likability influences the pain estimates of one important group of health care providers: physiotherapists (PTs) (Blackburn, Cowan, Cary, & Nall, 2009; Foster, Hartvigsen, & Croft, 2012; Ludvigsson & Enthoven, 2012; Pinnington, Miller, & Stanley, 2004). Among

health-care providers, physiotherapists play a pre-eminent role in the care of pain sufferers. Physical therapy is a first-line intervention for many high impact pain conditions. Moreover, unlike the intervention modalities employed by other categories of health-care providers, because of their active nature, interventions employed by physical therapists can occasionally be uncomfortable themselves. Consequently, pain estimation is an inherent element of physiotherapists' practices. An evaluative conditioning procedure (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010) was used to manipulate the likability of patients, by associating pictures of patients with positive, neutral or negative personal traits (see also De Ruddere et al., 2011). Videos of the patients were then presented to physiotherapists (observers) who rated the patients' pain. The study explored whether PTs a) rate the pain of liked patients as more intense than the pain of disliked patients (primary outcome; pain ratings on VAS), b) are more sensitive to pain expressed by liked patients than to pain expressed by disliked patients (sensitivity), and c) have a higher tendency to ascribe pain to liked than to disliked patients (response bias). Furthermore, the study explored whether the level of pain expressed by patients moderates the effect of the patients' likability upon observers' pain estimations. Ferrell, Eberts, McCaffery, and Grant (1991) demonstrated that the patient's pain behavior is an essential cue for healthcare providers in clinical decision-making.

METHOD

Participants

Participants were recruited by mail. In sum, 829 emails were sent to members of the Institute for Permanent Education in Physiotherapy of Ghent University, to the PTs of both the University Hospital of Ghent and the Jan Palfijn Hospital in Ghent and to the members of an independent association for PTs in Ghent. Fifty-three PTs responded affirmatively to the mail (response rate = 6%). Five prospective participants did not attend the appointment (two reported personal problems, two were sick and one had practical problems) and two were not PTs. In consequence,

46 PTs completed the experiment. Prospective participants were excluded if 1) they did not speak Dutch fluently ($N = 1$), 2) they were not active as PTs in clinical practice ($N = 1$) and 3) they knew the true purpose of the study at the end of the experiment ($N = 4$). The mean age of the remaining sample ($N = 40$) was 39.83 years ($SD = 10.61$; range = 24 – 63 years). Most of the PTs were married, in a relationship, or cohabiting (85%). Seventy percent of the PTs were female. This is in accordance with data provided by the annual statistics of the Federal public service in Belgium (distribution in Flanders: 40% men and 60% women; see <http://www.health.belgium.be>). The study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University and by the medical ethical committee of Ghent University Hospital.

Design

By means of an evaluative conditioning procedure (EC), positive, neutral or negative personal traits (unconditioned stimuli; UCS) were paired with pictures of six different patients (conditioned stimuli; CS) (see also De Ruddere et al., 2011). Evaluative conditioning is a procedure in which a change in the valence of a stimulus (CS) is realized due to the pairing of that stimulus with another positive or negative stimulus (UCS) (De Houwer, 2007; De Houwer, Thomas, & Baeyens, 2001). Subsequently, the participants rated the pain of the same patients. Those patients were performing pain-inducing activities and were presented by means of video sequences.

Apparatus and stimuli

The experiment was programmed and presented by the INQUISIT Millisecond software package (Inquisit 3.0.4.0, 2009) on a 745 Dell Optiplex computer with a 75 Hz, 19-inch color CRT monitor. The stimuli that were used were the same stimuli as described by De Ruddere et al. (2011). In particular, the conditioned stimuli (CS) were pictures of faces of six patients (three men) with shoulder pain that were collected from the UNBC-McMaster Shoulder Pain Archive (Prkachin

& Solomon, 2008). The unconditioned stimuli (UCS) were nine Dutch personal traits that were rated on the degree to which they have good or bad consequences for others dealing with the possessors of the traits. The ratings range from 100 (extremely negative) through 500 (neutral) to 900 (extremely positive) [see Peeters (1992) for the scaling method]. We selected three words with a positive valence [faithful ($M = 820$, $SD = 83$), honest ($M = 815$, $SD = 99$), friendly ($M = 760$, $SD = 94$)], three with a negative valence [egoistic ($M = 180$, $SD = 62$), hypocritical ($M = 185$, $SD = 81$), arrogant ($M = 240$, $SD = 99$)] and three with a neutral valence [true to tradition ($M = 510$, $SD = 102$), reserved ($M = 495$, $SD = 128$), conventional ($M = 480$, $SD = 128$)].

Eight video sequences of 6 different shoulder pain patients who displayed facial pain expression during a physiotherapy assessment protocol (Prkachin & Solomon, 2008) were selected (48 video sequences in total). Because we could not obtain video sequences ranging from no to high intensity pain expression for each of the 6 patients, two different patients (one male and one female) were selected for each category (no, mild-, or high-intensity pain expression). The scores for facial pain expression were calculated by means of a composite index based on the intensity of four facial actions that have been associated with pain (Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003). The scores can range from 0-16. Scores of 0 were taken to define no pain. Scores of 3-6 defined mild pain and scores of 7 or higher defined high pain. Each fragment had a length of 2000 milliseconds (ms).

Questionnaires

We used the same questionnaires as described in De Ruddere et al. (2011). Specifically, participants' ratings of pain were assessed by a 100 mm visual analogue scale (left endpoint = 'no pain'; right endpoint = 'pain as bad as could be'). Further, the effectiveness of the evaluative conditioning manipulation was checked by measuring how 1) positive or negative, 2) agreeable or disagreeable and 3) sympathetic or unsympathetic the patient was judged (three 21-point

scales). A mean score for likability of the patients was calculated by averaging the scores on the three questions.

Procedure

The procedure of the present study is the same procedure as described in De Rudder et al. (2011). In particular, first, a cover story was used to reduce demand effects: participants were informed that the study examined how healthcare providers spontaneously respond (e.g., heartbeat, respiration, skin conductance) to other persons with pain. Further, each participant was told that the present study focused on one specific factor that could influence the psychophysiological responses: the verbal information about the patient. Subsequently, the course of the experiment was shortly explained, written informed consents were obtained and we attached electrodes and a respiration strain gauge for the psychophysiology measurement (there was no real psychophysiological record). When the participant pressed the ENTER button, stimuli (CS-US pairs) were randomly presented with the CS presented for 2000 ms followed by the US together with the CS, for 3000 ms. Per participant, one male and one female patient were always presented with positive words, one male and one female patient with neutral words, and one male and one female patient with negative words. This pattern was counterbalanced between participants. Each CS-US pair appeared 9 times. In sum, 54 trials were presented to each participant.

Afterwards, each participant received a different random sequence of the 144 video sequences (every video sequence was shown three times). After each video sequence, a black screen appeared and participants rated the patient's pain. Finally, the pictures of the six patients were presented again (randomly) and participants reported on their current evaluation of the person.

Data reduction and statistical analysis

Sensitivity and response bias

Similar to De Ruddere et al. (2011), two measures of signal detection performance were calculated, i.e., the healthcare practitioners' sensitivity towards the patients' pain and the healthcare practitioners' response bias. Sensitivity is the ability to discriminate between levels of patients' pain expressions and was measured by calculating the nonparametric index $P(A)$ [see McNicol (1972) for the method to calculate $P(A)$]. Values of $P(A)$ can range from 0 to 1.0, with .5 indicating chance performance or a lack of ability to discriminate between levels of patients' pain expressions. Response bias is the overall likelihood to attribute pain to the patient and was measured by calculating the nonparametric index B (McNicol, 1972). The higher the B value, the higher the overall likelihood of attributing pain to a patient, irrespective of the level of the patient's pain expression.

Statistical analyses

The dependent variables in this study were 1) the scores on the manipulation check questionnaire, 2) the pain ratings, 3) the sensitivity scores ($P(A)$), and 4) the response bias scores (B). The independent variables in the study were 1) 'valence of traits' (the valence of the traits (positive, neutral or negative) that were combined with the patients in the acquisition phase; this independent variable is included in all four analyses), 2) 'pain expression' (no pain, mild intensity pain or high intensity pain expression of the patients; this variable is included in the analyses with the pain ratings), 3) 'discrimination between levels of pain' (the two levels of pain expression between which the observer had to discriminate for the sensitivity analyses; this factor had three levels: discrimination between no and mild intensity pain, between no and high intensity pain or between mild and high intensity pain).

In the pain rating analysis, within subjects, each level of 'valence of traits' was combined with only two of the three levels of 'pain expression'. Between subjects, every level of 'valence of traits' was combined with every level of 'pain expression'. Therefore, we analyzed the results using linear mixed effects models

as implemented in the R package nlme which is an alternative to repeated measures analysis that can handle a wider variety of designs (Pinheiro & Bates, 2000; see West, Welch, and Galecki (2007) for an elaboration of the linear mixed effects models). Each analysis required three steps. First, the fixed factors were entered in the model. Second, we examined whether adding a random effect for each of the fixed factors increased the fit of the model (if not, no random effect was included). Third, we investigated the ANOVA table of the final model and specific hypotheses about main effects and interactions were tested (standardized regression weights were reported as a measure of effect size) (see De Ruddere et al. (2011), and Verbruggen, Aron, Stevens, and Chambers (2010) for a similar approach).

RESULTS

Manipulation check

In this analysis, the random effect of ‘valence of traits’ was necessary. A significant main effect of ‘valence of traits’ was found ($F(2,76) = 16.88, p < .001$): patients associated with negative traits were rated as less likable than patients associated with neutral traits ($F(1,76) = 16.53, p < 0.001, \beta = -0.85$). Patients associated with neutral traits were rated as less likable than patients associated with positive traits ($F(1,76) = 6.44, p = .013, \beta = -0.32$).

Pain ratings

Both the random effects of ‘pain expression’ and ‘valence of traits’ were necessary in this analysis. A significant main effect of ‘pain expression’ was found ($F(2,5700) = 119.11, p < .001$). Observers attributed more intense pain to patients expressing more pain: pain ratings were higher in the mild pain expression condition than in the no pain expression condition ($F(1,5700) = 203.76, p < .001, \beta = 0.91$) and higher in the high pain expression condition than in the mild pain expression condition ($F(1,5700) = 92.92, p < .001, \beta = 0.48$). The

main effect of 'valence of traits' was not significant ($F(2,5700) = 0.28, p = .753$). However, the interaction between 'valence of traits' and 'pain expression' was significant ($F(4,5700) = 3.90, p = .004$). Both in the high pain expression ($F(2,5700) = 0.06, p = .945$) and in the no pain expression condition ($F(2,5700) = 0.07, p = .916$), the effect of 'valence of traits' was not significant. In the mild pain expression condition, the effect of 'valence of traits' was significant ($F(2,5700) = 3.24, p < .039$). Observers' pain ratings for patients who were presented with negative traits were significantly lower than observers' pain ratings for patients who were presented with neutral traits ($F(1,5700) = 6.27, p = .012, \beta = -.22$). Observers' pain ratings for patients who were presented with negative and positive traits did not differ significantly ($F(1,5700) = 0.86, p = .354$). Equally, pain ratings for patients who were presented with positive and neutral traits did not differ ($F(1,5700) = 2.97, p = .084$) (see Figure 1).

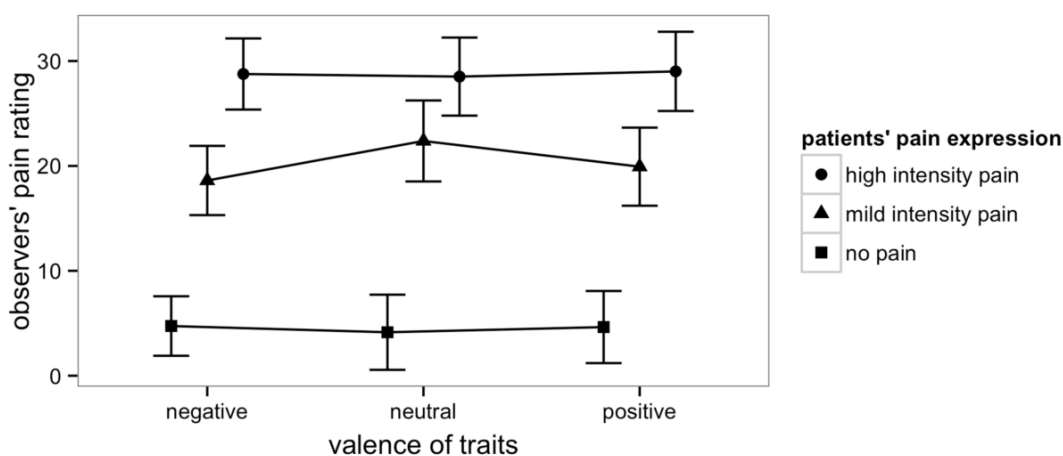


Figure 1. Observers' pain ratings as a function of valence of traits associated with patients and patients' pain expression. The intervals around condition means represent 95% confidence intervals.

Sensitivity and response bias

In both the sensitivity and the response bias analysis, only a random intercept was necessary. There was a main effect of 'discrimination between levels of pain' ($F(2,72) = 79.65, p < .001$), demonstrating better ability to discriminate no pain

from high intensity pain than no pain from mild intensity pain ($F(1,72) = 28.27, p < .001, \beta = 0.68$) or mild intensity from high intensity pain ($F(1,72) = 158.04, p < .001, \beta = 1.62$). Further, the results indicated better ability to discriminate no intensity from mild intensity pain than mild from high intensity pain ($F(1,72) = 52.62, p < .001, \beta = 0.93$). There was no effect of ‘valence of traits’ ($F(2,72) = 0.29, p = .751$) upon perceptual sensitivity towards the patients’ pain. The interaction effect between ‘valence of traits’ and ‘discrimination between levels of pain’ was not significant ($F(4,72) = 1.74, p = .150$). In the response bias analysis, no effect of ‘valence of the traits’ upon response bias scores was found ($F(2,78) = 0.84, p = .434$).

DISCUSSION

The present study aimed at examining the influence of patients’ likability² upon physiotherapist estimations of the patients’ pain, sensitivity towards pain and response bias. The design of the study with video sequences of real patients displaying varying levels of pain enabled examination of the moderating role of patients’ facial pain expressions on the relationship between patients’ likability and the physiotherapist pain estimates. Patients’ likability was manipulated by means of an evaluative conditioning procedure in which a change in the valence of a stimulus (the patient) was realized due to the pairing of that stimulus with another positive or negative stimulus (i.e., adjectives describing personal traits) (De Houwer, 2007; De Houwer et al., 2001). In the present study, patients associated with negative traits were rated as less likable than patients associated with neutral traits and patients associated with neutral traits were rated as less likable than patients associated with positive traits. Overall, there was no linear effect of the patient’s likability on physiotherapists’ ratings of the patients’ pain, their sensitivity towards the patients’ pain and their bias in attributing pain to the patients. However, there was a quadratic effect of the patient’s likability only for patients who displayed a mild level of pain. Specifically, physiotherapists

² The use of the term likability is discussed in the general discussion of this dissertation.

attributed more pain to patients who were expressing a mild level of pain and who were associated with neutral traits than to patients who were expressing a mild level of pain and who were associated with negative traits.

First, the finding that the likability of the patients in our study had, in general, no effect on the physiotherapists' pain estimates is inconsistent with the findings of Chibnall and Tait (1995) and Tait and Chibnall (1994) who found that lay observers attributed higher pain, disability and distress scores to liked than to disliked patients. Furthermore, the results are inconsistent with the findings of Tait and Chibnall (1997) who demonstrated that physicians attributed more distress and disability to disliked than to liked patients. Note that in the studies of Chibnall and Tait (1995) and Tait and Chibnall (1994; 1997), the patient's pain expression was not taken into account because fictitious patients and their pain were described in written vignettes. Our results suggest that the patient's pain expression is a highly influential factor, potentially diminishing the effects of contextual information, such as the patient's likability.

Second, in the study of De Ruddere et al. (2011), the patients' pain expressions moderated the effect of the patients' likability when the patient was expressing high intensity pain while in the present study, the moderating effect was found for patients expressing mild intensity pain. This finding may point to differences in lay observers and physiotherapists in the way patient pain is perceived. In particular, it seems that for physiotherapists, a mild level of pain expression was more ambiguous than a high level of pain expression while for lay observers, a high level of pain was the most ambiguous. One potential explanation is that high levels of pain expression may have induced feelings of suspiciousness in lay observers but not in physiotherapists. Specifically, it may be that lay observers perceive high pain expression as challenging cultural norms tending towards stoicism (Craig, Hill, & McMurtry, 1999; Williams, 2002), while the physiotherapists considered the high pain expression as a veridical sign of the patient's pain experience. Indeed, the patient's pain behavior has been indicated by healthcare providers as essential in clinical decision-making (Ferrel et al., 1991). Still, the question remains why the patients who were expressing a mild level of pain and who were associated with neutral traits, were attributed more

pain than the patients who were expressing a mild level of pain and who were associated with negative personal traits. The finding that there was no difference in pain ratings between liked and disliked patients is not limited to the patients expressing mild pain, but observed in every pain expression category. A potential explanation for these findings is that the negative and the positive traits of the patients were not associated by the physiotherapists with the genuineness of the pain expression contrary to the neutral traits. For example, it may be that the mild pain expression of the patient was attributed to the trait 'reserved' and therefore, was considered as underrepresenting the patient's pain experience. To the contrary, the no pain and the high pain expression might have induced a ceiling effect. Still, as suggested by Tait and Chibnall (1997), another explanation may be that the negative personal traits were considered by the physiotherapists as indicative of the patient's pain problem and therefore, did not lead to lower pain estimates than the positive personal traits. Another difference between the study with lay observers (De Ruddere et al., 2011) and the current study is the finding that physiotherapists overall attributed lower pain ($M = 17.86$) to the patients than the lay observers³ ($M = 23.29$). This is in accordance with Prkachin, Solomon, Hwang, and Mercer (2001) who demonstrated that the patient pain judgments of physical therapists were lower than those of lay observers. Cheng et al. (2007) and recently Decety, Yang, and Cheng (2010) provided evidence that this finding may involve different brain activities, which might, according to the authors, protect the healthcare providers against emotional over-involvement (e.g., burn out) and hence against negative treatment outcomes. However, to date, the relationship between others' pain estimates and treatment outcomes remains unclear.

Third, the results suggest that the physiotherapists have good levels of sensitivity towards the patient's pain. This is in consistent with the findings of Prkachin, Mass, and Mercer (2004) who demonstrated overall good levels of lay observer sensitivity to others' pain. Further, contrary to the findings of De Ruddere et al. (2011), no effect of the patients' likability on the physiotherapists'

³ The experimental design for the lay people in the study of De Ruddere et al. (2011) was exactly the same as the experimental design for the physiotherapists, i.e., the same video sequences of patients were used.

perceptual sensitivity towards the patients' pain was found. This finding indicates that the patient's likability does not influence the physiotherapist's ability to detect pain in patients. Equally, no effect of patients' likability on the physiotherapists' bias in attributing pain to the patients was found.

The findings have some clinical implications. First, the results indicate that physiotherapists pay close attention to the patient's pain behavior. This nonverbal pain behavior is widely acknowledged to play an essential role in the process of communicating pain to others (Craig, Versloot, Goubert, Vervoort, & Crombez, 2010; Ferrell et al., 1991; Hadjistavropoulos et al., 2011; Williams, 2002). Second, the results indicate that the physiotherapists are in general not prone to influence by one important patient characteristic, i.e., the patient's likability. According to Osgood and colleagues (Osgood, as cited in Bradley & Lang, 1994), valence is an important dimension on which individuals rate stimuli, also in the context of patient care (Wills, 1978). Although we found that the physiotherapists evaluated the patients differently in terms of valence (positive, neutral and negative), the results suggest that these evaluations did not impact their perceptions of the patient's pain experience.

The study has some limitations. First, our experimental study provides only an analogue of the clinical setting. Analogue studies limit the ecological validity of findings, but we note that in this study some verisimilitude to the real setting was accomplished - actual clinicians were rating the behaviors of real patients while they were manifesting pain. The experimental design allowed investigation of the influence of one important patient characteristic upon the healthcare practitioner responses to the patient's pain. Nevertheless, the design did not allow study of the important role of relational aspects in the patient – healthcare practitioner encounter (Vowles & Thompson, 2012). Indeed, Jeffrey and Foster (2012) recently demonstrated that the working partnership between physical therapists and their patients has been reported by the therapists as a major difficulty. Further, the healthcare practitioners did not have prior knowledge of the patients presented in the vignettes, including for example the history of the pain complaints. Second, our study did not take into account actual behavioural measures of help, nor measures of behavioural tendencies. Although we did not find general effects of

the patients' likability on the physiotherapists' pain estimates, we cannot assume that the patients' likability would not influence their actual helping behaviour. In line with this reasoning are the findings of Lehman and Salovey (1990), who found that psychotherapists were less inclined to help disliked patients, compared to liked patients despite their beliefs that those patients were in greater need of help. Third, the low response rate might have led to certain biases in our study. For example, only highly motivated physiotherapists might have participated in our study, making the sample not representative for the whole population of Flemish physiotherapists. Fourth, only facial expressions of patients suffering from shoulder pain were shown to observers. Future research on pain estimation would benefit from including information on full body movements instead of only facial expressions, as well as from including patients with other pain complaints, such as chronic low back pain. Fifth, as already indicated in De Ruddere et al. (2011), we opted for a procedure that resulted in awareness of the contingencies between CS and UCS. This awareness in the physiotherapists could have induced social desirability responses, i.e., physiotherapists could have explicitly tried not to influence their pain ratings by the patient's likability. However, we used a cover story that has previously been used in studies on evaluative conditioning (e.g., Baeyens, Hermans, & Eelen, 1993). At the end of the experiment, only four of the participants were able to identify the true purpose of the study and the data of these participants were excluded from the analyses. Finally, the results of the present study may not be generalized to other healthcare practitioners, such as general practitioners and nurses.

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**WE DISCOUNT THE PAIN OF OTHERS WHEN
PAIN HAS NO MEDICAL EXPLANATION¹**

ABSTRACT

The present studies investigated the impact of medical and psychosocial information upon observers' 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, participants' 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 reported that they felt 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.

¹ Based on: De Ruddere, L., Goubert, L., Vervoort, T., Prkachin, K.M., & Crombez, G. (2012). We discount the pain of others when pain has no medical explanation. *Journal of Pain*, 13, 1198-1205.

INTRODUCTION

Many individuals adhere to a strict biomedical orientation, considering a medical cause as the only explanation for illness (Goubert, Crombez, & De Bourdeaudhuij, 2004). In the context of pain, people are often convinced that pain is directly linked and proportional to physical pathology (Eccleston & Crombez, 2007; Goubert et al., 2004). However, pain for which there is no clear medical explanation is a common phenomenon (Hiller, Rief, & Brähler, 2006; Jacobi et al., 2004; Lahmann, Henningsen, & Noll-Hussong, 2010; Lieb, Pfister, Mastaler, & Wittchen, 2000; Rief, Hessel, & Braehler, 2001), representing a struggle, for the pain sufferer as well as for others dealing with the person in pain (Eccleston, Williams, & Rogers, 1997). When a clear biomedical cause is lacking, pain sufferers may feel disbelieved, misunderstood or unaccepted by others (Allegretti, Borkan, Reis, & Griffiths, 2010; Peters, Stanley, Rose, & Salmon, 1998; Werner & Malterud, 2003). Others (e.g., health care practitioners) may feel uncertain about the genuineness of the pain symptoms (MacNeela, Gibbons, McGuire, & Murphy, 2011) and/or may feel ineffective in caregiving (Matthias et al., 2010).

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 experience (Hadjistavropoulos et al., 2011) and observers often estimate the pain of others, and react to the pain of others both in terms of emotional and behavioral responses (Goubert, Craig, & Buysse, 2009; Goubert et al., 2005). 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) (Williams, 2002). 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 (Chibnall &

Tait, 1995; Chibnall & Tait, 1999; Halfens, Evers, & Abu-Saad, 1990; Tait & Chibnall, 1997; Taylor, Skelton, & Butcher, 1984).

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 (Malec, Glasgow, Ely, & Kling, 1977). Although psychosocial influences (e.g., a depressive mood, relational problems) are common in case of pain suffering (Gatchel, Peng, Peters, Fuchs, & Turk, 2007), 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 (Martin, Gordon, & Lounsbury, 1998; Martin & Lemos, 2002) and Swartzman and McDermid (Swartzman & McDermid, 1993) 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 effect 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 observer (Williams, 2002), 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 patients (Prkachin & Solomon, 2008), 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

METHOD

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 quarters 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 ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University approved the study.

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.

Stimuli

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 (Prkachin & Solomon, 2008). Facial pain expression scores consisted of a composite index based on the intensity of four facial actions that are highly indicative of pain (Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003). 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 package (version 2.0.6) 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.

Further, 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 the 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).

Measures

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-subjects variables. To control for multiple testing, we corrected our p-values using the Benjamini and Hochberg method (Benjamini & Hochberg, 1995). 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 Cohen (Cohen, 1988; .20 = small effect, .50 = medium effect and .80 = large effect), effect sizes were measured using the formula of Dunlap and colleagues (Borenstein, Hedges, Higgins, & Rothstein, 2009; Dunlap, Cortina, Vaslow, & Burke, 1996). All data were normally distributed except participants' distress ratings that were negatively skewed ($KS\ Z\text{-score} (39) = 1.58, p = .013$). These scores +1 were log-transformed. Log transformation resulted in normal distribution of this score ($KS\ Z\text{-score} (39) = 0.63, p = .858$).

RESULTS

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 ($F(1,38) = 6.68, p = .014$) 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 effects 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.

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 that demonstrated by means of vignettes describing fictitious patients and their pain that observers ascribe less pain in the absence of medical evidence (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Halfens et al., 1990; Tait & Chibnall, 1997; Taylor et al., 1984). 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

saliency 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

METHOD

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 ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University approved the study.

Design

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

Stimuli

The same videos and pictures as in study 1 were used. Further, 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).

Measures, procedure and statistical analyses

The measures, procedure and 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: $r = .94$; $p < .001$). All data were normally distributed.

RESULTS

Results demonstrated that participants reported lower pain ratings ($F(1,40) = 33.93$, $p < .001$), less sympathy ($F(1,40) = 6.85$, $p = .012$), less distress ($F(1,40) = 5.05$, $p = .030$) 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 ($F(1,40) = 6.91$, $p = .012$), 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 \times psychosocial influences interaction was found for sympathy ($F(1,40) = 5.63$, $p = .023$), indicating that when medical evidence is present, participants reported that they felt 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%).

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	Cohen's d_1
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	

*Note*₁. Pain = pain estimates, sympathy = sympathy for the patient, distress = distress while observing the patient, help = inclination to help the patient with daily activities.

*Note*₂: M_1 , SD_1 , Cohen's d_1 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	Cohen's d_2
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	

*Note*₁. Pain = pain estimates, sympathy = sympathy for the patient, distress = distress while observing the patient, help = inclination to help the patient with daily activities.

*Note*₂. M_2 , SD_2 , Cohen's d_2 are the means, standard deviations and effect sizes in study 2.

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, when 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 the 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 when medical evidence was absent. Participant ratings were not influenced by information on psychosocial variables affecting the patient's pain, except for the ratings on distress in study 2 where participants reported to feel less distress while observing a patient when there were psychosocial influences compared to when there were no psychosocial influences on the patient's pain experience.

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. However, 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 (Kahneman, 2003). 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 colleagues (Tait, Chibnall, & Kalauokalani, 2009) 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 colleagues (Solomon, Pkrachin, & Farewell, 1997) 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 (Beesdo et al., 2010). This could also explain why our results are not in line with the results of Martin and colleagues (Martin et al., 1998; Martin & Lemos, 2002) and Swartzman and McDermid (Swartzman & McDermid, 1993) 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 (Hiller et al., 2006; Jacobi et al., 2004; Lahmann et al., 2010; Lieb et al., 2000; Rief et al., 2001). 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 to 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, observers' 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 (Beesdo et al., 2010). 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 (Sullivan et al., 2006). Therefore, future research may benefit from including information on full body movements. Sixth, future research may benefit from measuring the participants' beliefs 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-subjects 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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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.*)

**DISCOUNTING PAIN IN THE ABSENCE OF
MEDICAL EVIDENCE IS EXPLAINED BY
NEGATIVE EVALUATION OF THE PATIENT¹**

ABSTRACT

This study investigated the effect on observer responses of the presence/absence of information about medical evidence for pain and psychosocial influences on the patient's pain experience. Additionally, the moderating role of the patients' pain expressions and the mediating role of the observers' beliefs in deception and evaluations of the patients was examined. Sixty-two participants were presented videos of 4 patients, each accompanied by a vignette describing presence or absence of both medical evidence for the pain and psychosocial influences on the patient's pain. Participants estimated patients' pain, and rated their own sympathy and inclination to help; they re-estimated patients' pain when the patient's self-report of pain was provided. Finally, participants evaluated each patient as positive or negative, and the likelihood the patient was feigning pain. Participants gave lower ratings on pain, sympathy and help when medical evidence was absent. Further, in the presence of psychosocial influences, participants took patients' self-reported pain less into account. Next, only for patients expressing high intensity pain, information about both medical evidence and psychosocial influences was taken into account. Finally, the observer's evaluation of the patient and his/her belief in deception fully, respectively partially, explained the effect of medical evidence. The results indicate that discounting pain in the absence of medical evidence may involve negative evaluation of the patient. Additionally, the patient's pain expression is a moderating variable, and psychosocial influences negatively impact on the degree to which patients' self-reports are taken into account. The results indicate that contextual information impacts on observer responses to pain.

¹ Based on: De Ruddere, L., Goubert, L., Stevens, M.A.L., Williams, A.C.deC., & Crombez, G. (in press). Discounting pain in the absence of medical evidence is explained by negative evaluation of the patient. *Pain*.

INTRODUCTION

Pain experiences are inherent to human life. Nevertheless, pain management often remains unsatisfactory (Breivik, 2005; Sinatra, 2010), especially when pain is chronic and/or when diagnosable pathology is absent (Breivik, 2005; Spacek, 2006). When a clear medical explanation for pain is lacking, people in pain may feel frustrated and may feel that they are disbelieved by others (Allegretti, Borkan, Reis, & Griffiths, 2010; Holloway, Sofaer-Bennett, & Walker, 2007; Peters, Stanley, Rose, & Salmon, 1998; Toye & Barker, 2010; Werner & Malterud, 2003). Furthermore, those who observe people in pain may feel unable to provide adequate care when clear medical evidence for the pain is lacking (Matthias et al., 2010).

Further insight into the social context in which an individual experiences pain for which there is no clear medical explanation is fundamental. Research demonstrated that observers attribute less pain to a patient (Chibnall & Tait, 1995; Chibnall & Tait, 1999; De Ruddere, Goubert, Vervoort, Prkachin, & Crombez, 2012; Tait & Chibnall, 1994; Tait & Chibnall, 1997; Taylor, Skelton, & Butcher, 1984), feel less sympathy for the patient and are less inclined to help the patient (De Ruddere et al., 2012) when clear medical evidence for the pain is lacking. Others' reactions towards the person with pain, such as pain estimations, feelings of sympathy and the inclination to help are important, as these responses may underlie pain management decisions and may affect the wellbeing of the individual with pain (Hadjistavropoulos et al., 2011).

At present, it is not known which mechanisms account for the effects of lacking medical evidence on observer responses. The absence of diagnosable pathology determining the patient's pain is considered as a risk factor for observers to impute to the person with pain the intention of feigning pain (Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999; Eccleston, Williams, & Rogers, 1997). Additionally, there is preliminary evidence for the role of negative evaluation of the patient in the process of estimating a patient's pain where there is no clear medical evidence (Taylor, Skelton, & Butcher, 1984). De Ruddere and colleagues (De Ruddere, Goubert, Prkachin, Stevens, Van Ryckeghem, &

Crombez, 2011; De Ruddere, Goubert, Vervoort, Kappesser, & Crombez, 2013) found that observer negative evaluations of patients appear to generate lower observer pain estimates.

Using a vignette paradigm with videos of low back pain patients performing four back straining activities, the present study had three objectives. First, we investigated the effects of absence versus presence of medical evidence and of psychosocial influences on observer responses (pain estimates, sympathy, and inclination to help). Although psychosocial factors and influences are common in pain suffering (Carragee, 2005; Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Linton, 2000; Pincus, Burton, Vogel, & Fiels, 2002), it remains unclear whether their presence also affects observer responses. We also investigated whether information about both factors influences the degree to which observers take the verbal pain report of the patient into account when estimating the patient's pain. Second, we examined patients' pain expressions as a moderating factor in the relationship between absence versus presence of medical evidence and psychosocial influences upon observer responses. We hypothesized that the effects of absence/presence of medical evidence and of psychosocial influences would be most pronounced when patients expressed high intensity pain. Following Tait and colleagues (Tait, Chibnall, & Kalauokalani, 2009), observers might be more likely to take into account contextual information when judging high intensity pain. Third, we examined potential mechanisms underlying the effect of medical evidence on the observer responses. In particular, we investigated the mediating role of the observer's belief in deception by the patient, as well as the mediating role of the observer's judgment of how positively or negatively the patient is evaluated.

METHOD

Participants

Participants were recruited by an advertisement in local newspapers. Sixty-two (30 men, 32 women) individuals volunteered. To be eligible, participants had to

be 18 years or older and speak Dutch fluently. Further, participants who reported that they knew one of the patients shown on the videos were excluded. The mean age of the sample was 33.74 years ($SD = 13.08$; range = 19 – 64 years). About half of the participants were married, in a relationship or cohabiting (58.1%), and about half of the participants had education beyond the age of 18 (53.2%). Most were employed (67.8%) and a quarter of the participants (25.8%) were university or college students. The unemployment rate was 6.4%. About one third of the participants ($N = 18$) reported having had no pain in the prior six months. The reported mean pain intensity during the past six months of the remaining 44 participants (“In the past six months, on the average, how intense was your pain rated on a 0 to 10 scale where 0 is “no pain” and 10 is “pain as bad as could be”?) was 4.00 ($SD = 2.01$; range = 1-8). All participants were Caucasian. The ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University approved the study.

Design

The experiment consisted of four phases (see Figure 1). In the first, *pain estimation phase*, participants were shown pictures of four different patients each accompanied by 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. Subsequently, participants estimated the patient’s pain, and rated their own sympathy and inclination to help the patient with daily activities. Second, during the *pain estimation after feedback phase*, videos of the patients were presented again with the pain ratings of the patients themselves. Participants again estimated the patients’ pain. Third, during the *patient evaluation rating phase*, pictures of the patients were shown and participants rated to what extent they judged the patients to be positive or negative. Fourth, during the *deception rating phase*, pictures of the patients were shown again and participants rated to what extent they thought the patient was feigning his or her pain.

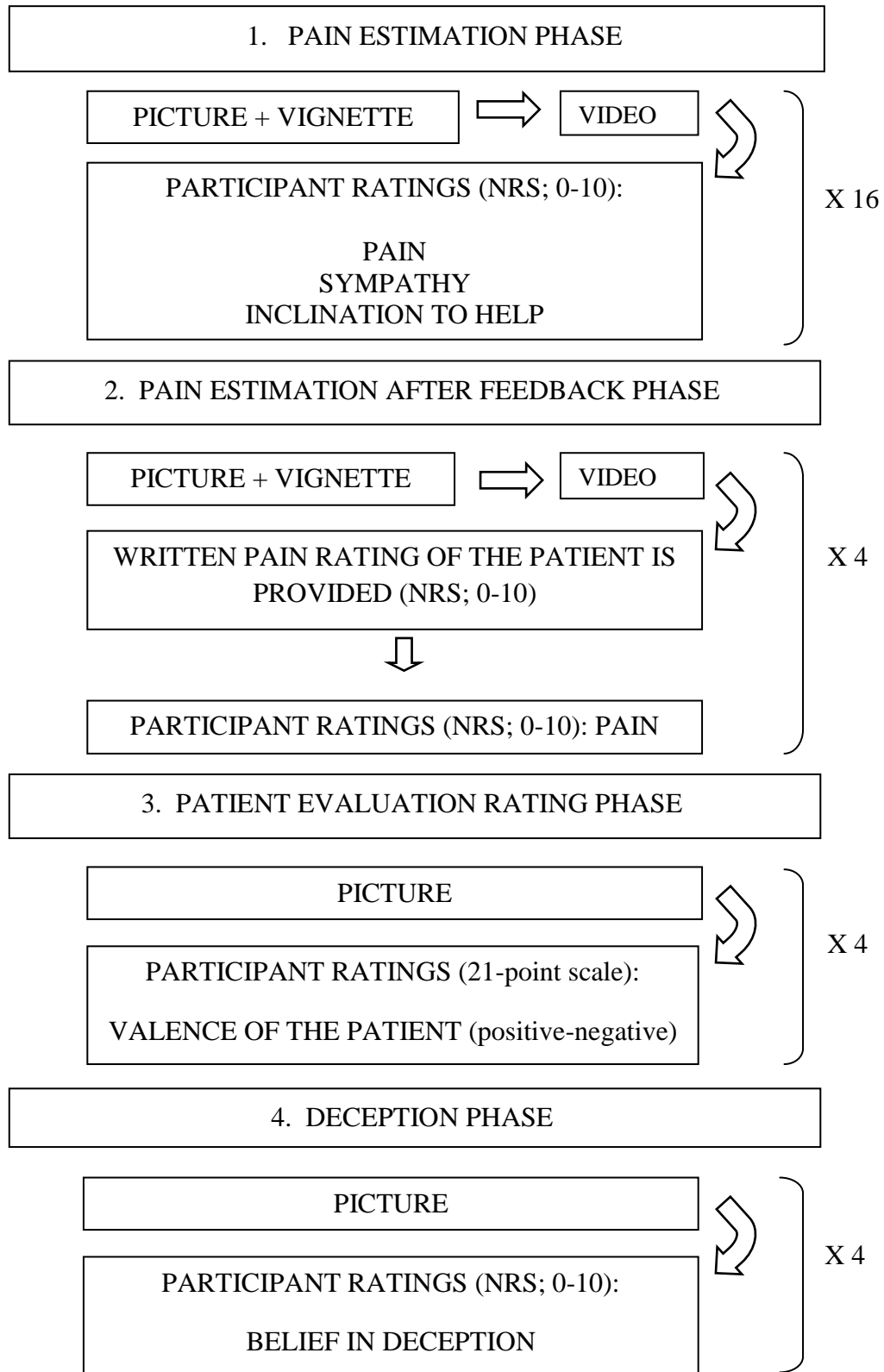


Figure 1. Flow diagram of the study.

Stimuli

The videos and pictures were selected from the Ghent Pain Videos of Daily Activities (G-PAVIDA), consisting of videos displaying 34 chronic back pain patients (19 women, 15 men; $M_{\text{age}} = 52$ years (range: 23-74; $SD_{\text{age}} = 12$ years) who performed four back straining movements. All patients reported chronic low back pain and were in (outpatient) treatment for pain at the University Hospital in Ghent. The patients were asked to execute four movements: 1) lying down on a bed and standing up, 2) sitting down on a chair and standing up, 3) taking a box from the ground, putting it on a table and then lifting it and replacing it on the ground, and 4) picking up marbles from the ground. Each movement was videotaped and every patient started the movement in upright position with the face directed to the camera. The videos display patients' full body pain behaviors, i.e., facial pain expression and active pain behavior (e.g., guarding, holding or rubbing). Further, patients provided verbal pain ratings on a numerical scale (0: no pain at all – 10: pain as bad as could be) after the performance of each movement.

For the present study, video sequences of four patients were selected. These patients were selected based on specific criteria. In particular, to ensure generalizability across gender, we selected two female patients and two male patients. To investigate effects of pain expression, two patients displaying a low level of pain and two patients displaying a high level of pain were selected based upon face validity (the videos were also coded to confirm the distinction between low and high levels of pain expression, see below). Furthermore, we also ensured that patients' age across the genders and across the two levels of pain expression were similar (see Table 1). After the experiment was conducted, the videos were coded in order to have additional evidence for the distinction between low and high intensity pain expression. In particular, pain expressions of all 34 patients were coded by a reliable rater by means of an adjusted coding system², based upon the pain behavior-coding manual of Sullivan and colleagues (the Pain Can

² This coding scheme is particularly suitable for the levels of pain expressed by the patients in this study; it is not as comprehensive as the pain behavior coding manual of Sullivan et al. (2007), as the set up did not allow to make a fine grained coding of the facial pain expressions of the patients.

Paradigm; unpublished manual). To calculate inter-rater reliability, a second independent rater coded 20% of the pain expressions. Each movement was coded for the presence of one or more of the key facial pain expressions (Craig, Prkachin, & Grunau, 2001; Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003) [(absent (0), slightly present (1), distinctly present (2)]. Next, the presence (1) or absence (0) of active pain behavior (e.g., guarding, holding or rubbing) was coded per second. Inter-rater reliability was calculated according to the formula given by Ekman and Friesen (1978) that assesses the proportion of agreement on actions recorded by two coders relative to the total number of actions coded as occurring by each coder. Videos were presented by the INQUISIT Millisecond software package (version 3.0.4.0) on a 745 Dell Optiplex computer with a 75 HZ, 19-inch colour CRT monitor. The overall mean length of the video fragments presented in the study was 16s ($SD = 7.36$).

Further, vignettes described (1) the presence or absence of medical evidence for the pain and (2) the presence or absence of psychosocial influences upon the pain experience. Medical evidence in the vignettes was referred to as “a compressed nerve” or “inflammation of the ligaments”. These operationalisations of medical evidence were discussed with a general practitioner in order to ensure that they are representative of attributions for low back pain. Vignettes describing the presence of psychosocial influences included “job stress and feelings of anxiety” or “relational problems and depressed mood”. Feelings of anxiety, depression and emotional distress have been found to impact patients’ pain experiences (Gatchel et al., 2007). These biomedical explanations and psychosocial influences were counterbalanced across patients and across vignettes. Information about ‘medical evidence’ and ‘psychosocial influences’ provided within the vignettes was embedded within broader information about the patient’s name, age, job and number of children. This information was also counterbalanced across vignettes as well as across patients (see appendix A for examples of vignettes).

Measures

A numerical rating scale (0-10) was used by observers to estimate the patient's pain, their own inclination to help the patient with daily activities, and their sympathy for the patient. Zero indicated 'no pain at all', 'totally unwilling', and 'no sympathy at all' respectively; 10 indicated 'pain as bad as could be', 'totally willing', and 'a lot of sympathy' respectively. Further, the extent to which the patient was judged to be positive or negative was assessed by a 21-point scale ('Please indicate your current evaluation of each person on the scale' -10 = very negative, 0 = neutral, 10 = very positive). Finally, the extent to which the participant thought the patient was feigning her or his pain was measured by an 11-point numerical rating scale (0 indicated 'not at all', 10 indicated 'a lot').

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) written information about four people and their pain complaints would be given, followed by (2) presentation of video fragments of these people on the computer screen. Written informed consent was obtained. When the participant pressed ENTER on the PC keyboard, a (neutral) picture of a patient was shown combined with one vignette. 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. Within each participant, the four patients were presented with each of the vignettes 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. Each patient was shown four times (i.e., each movement was shown once). In sum, 16 videos were shown in random order to the participants. After the presentation of each

video, a blank screen appeared and participants were requested to estimate the patient's pain, and to rate their sympathy for the patient and their inclination to help the patient.

Next, participants were presented one video of each patient (four videos in total). For each participant, all four patients were performing the same movement in this phase. The movement that all four patients were performing was counterbalanced across participants. Participants were provided with self-reported pain intensity ratings of the patients and were once again asked to estimate patients' pain. Afterwards, one (neutral) picture of each patient was shown to the participant who rated the extent to which she/he judged the patient to be negative or positive. Finally, one (neutral) picture of each patient was shown to the participant who rated the extent to which she/he thought the patient was feigning pain. At the end of the experiment, the participant was requested to fill out a second informed consent after revealing the true purpose of the study.

Statistical analyses

Outcome variables were participants' estimates of pain ('pain'), sympathy ('sympathy') and inclination to help ('help') as well as the absolute difference between the pain rating of the patient and the pain estimation of the observer after the patient's own pain rating was provided during the 'pain estimation after feedback phase' ('discrepancy'). As each patient was presented four times and the ratings (pain, sympathy, help) for each presentation were highly correlated (pain: $r = .84$, sympathy: $r = .90$, inclination to help: $r = .91$; $p < .001$), a mean score for each outcome variable was calculated per patient. Next, the presence/absence of medical evidence ('medical evidence') and psychosocial influences ('psychosocial influences') as well as the level of pain expressed by the patient (high or low 'pain expression') were included in the analyses as independent variables. Further, the observer's evaluation of the patient ('evaluation') as well as the observer's belief in deception ('deception') were the potential mediating variables in the relationship between presence/absence of medical evidence and the observer responses (pain, sympathy and help).

The factors in the present study were manipulated partially within and partially between subjects. Within subjects, each level of ‘medical evidence’ and ‘psychosocial factors’ was combined with only one of the two levels of ‘pain expression’. Between subjects, each level of ‘medical evidence’ and ‘psychosocial factors’ was combined with each level of ‘pain expression’. Because this type of factorial design cannot be handled by classical repeated measures analyses, the results were analyzed using linear mixed effects models as implemented in the R package nlme (Pinheiro & Bates, 2000). Linear mixed effects models account for the correlations in within-subjects data by estimating subject-specific deviations (or *random effects*) from each population-level factor (or *fixed factor*) of interest (see (West, Welch, and Galecki (2007) for an elaboration).

Each analysis consisted of three steps. First, all relevant factors and interactions were entered in the model as fixed factors. In the second step, we assessed whether it was necessary to add a random effect for each of the fixed factors in the analysis: if a random effect significantly increased the fit of the model, it was included in the final model. In the third step, we inspected the ANOVA table of the final model and tested specific hypotheses about possible main effects or interactions (see De Ruddere et al. (2011); Verbruggen, Aron, Stevens, and Chambers (2010) for a similar approach). When testing specific hypotheses, standardized regression weights were reported as a measure of effect size.

Mediation analyses followed the procedure outlined by Judd and colleagues (Judd, Kenny, & McClelland, 2001). First, we investigated (by means of a paired sample t-test) whether the scores on the potential mediating variables were lower (evaluation) and higher (deception) when medical evidence was absent compared to when medical evidence was present. Second, we computed difference scores for the potential mediating variables (for evaluation: the difference between 1) evaluation when medical evidence is present and 2) evaluation when medical evidence is absent; for deception: the difference between 1) deception when medical evidence is absent and 2) deception when medical evidence is present). Next, we examined (by means of regression analyses) whether these difference

scores were related to the differences (between presence and absence of medical evidence) in the outcome variables, pain, help, sympathy and discrepancy.

RESULTS

Results concerning the coding of the videos

Acceptable inter-rater reliability was achieved for facial pain expression (.66) and active pain behavior (.89). The scores on facial pain expression could range from 0-2 and the scores on active pain behavior were calculated by summing the seconds in which the patient was showing active pain behavior. The scores on facial pain expression and active pain behavior are presented in Table 1. Furthermore, we provided information on quartiles to indicate how the selected patients related to the larger patient sample ($N = 34$) regarding pain expression scores (see Table 1)³.

Impact of presence/absence of medical evidence and of psychosocial influences on the observer responses pain, help and sympathy

For the analyses of the outcomes pain, help, and sympathy, random effects of medical evidence, psychosocial influences, and pain expression were included. The results indicated a significant main effect of pain expression on pain estimates ($F(1,923) = 206.59, p < .001, \beta = 0.92$), on help ($F(1,923) = 87.44, p < .001, \beta = 0.63$), and on sympathy ($F(1,923) = 33.45, p < .001, \beta = 0.45$): participants reported higher pain ratings, more sympathy and more inclination to help when the patient expressed high intensity pain. Further, the results revealed a significant main effect of medical evidence on pain ($F(1,923) = 25.40, p < .001, \beta = 0.30$), help ($F(1,923) = 23.14, p < .001, \beta = 0.31$), and sympathy ($F(1,923) = 22.56, p <$

³ For more information on the Ghent Pain Videos of Daily Activities (G-PAVIDA) (also regarding the use of the videos for research purposes) please contact Lies De Ruddere (Lies.DeRuddere@UGent.be) or Liesbet Goubert (Liesbet.Goubert@UGent.be).

.001, $\beta = 0.32$), such that participants reported lower pain ratings, less sympathy, and less inclination to help when medical evidence for pain was absent. No significant effect of psychosocial influences on pain ($F(1,923) = 0.81, p = .376, \beta = -0.05$), help ($F(1,923) = 0.75, p = .387, \beta = -0.04$), or sympathy ($F(1,923) = 0.01, p = .940, \beta = 0.00$) was found. Further, the medical evidence x psychosocial influences interaction was not significant for pain ($F(1,923) = 0.11, p = .741$), sympathy ($F(1,923) = 2.83, p = .093$), or help ($F(1,923) = 1.65, p = .199$).

Impact of presence/absence of medical evidence and of psychosocial influences on the degree to which the observer takes the patient's self report of pain into account

For the analyses of discrepancy between the patient's pain rating and the participant's pain estimate after being informed about the patient's rating, only a random intercept was necessary. There was a main effect of pain expression ($F(1,176) = 29.78, p < .001, \beta = -0.53$), indicating larger discrepancies when pain expression was low. There was a marginally significant effect of medical evidence ($F(1,176) = 3.34, p = .069, \beta = -0.18$), indicating a trend towards larger discrepancies when medical evidence was absent. There was an effect of psychosocial influences ($F(1,176) = 9.35, p = 0.003, \beta = 0.30$), indicating larger (absolute) discrepancy between the pain ratings of the patients and the estimates by observers when psychosocial influences were present. None of the two-way interactions was significant, neither was the three-way interaction. The means and standard errors of participants' scores on discrepancy for each cell are provided in Table 2.

The moderating role of the patient's pain expression in the relationship between medical evidence and psychosocial influences, and observer responses pain, help and sympathy

Pain expression did not moderate the effect of medical evidence on pain ($F(1,923) = 1.23, p = .268$), sympathy ($F(1,923) = 0.88, p = .349$), or help ($F(1,923) = 2.54,$

$p = .111$). Further, there was no pain expression x psychosocial influences interaction on pain ($F(1,923) = 0.03, p = .858$), sympathy ($F(1,923) = 0.42, p = .516$) or help ($F(1,923) = 1.32, p = .252$). However, the three-way interaction effect between pain expression, medical evidence and psychosocial influences was significant for pain ($F(1,923) = 3.95, p = .047$) and for help ($F(1,923) = 4.38, p = .036$) but not for sympathy ($F(1,923) = 2.44, p = .118$). This three-way interaction effect for pain and help indicated that the influence of medical evidence and psychosocial influences was dependent upon the level of pain expressed by the patient. The interaction did not invalidate the main effects of pain expression or medical influence: within each cell the main effects of pain expression and medical influence were present and in the same direction.

For estimates of pain, the medical evidence x psychosocial influences interaction was not significant for patients expressing low intensity pain ($F(1,923) = 2.11, p = .145$); but it was marginally significant for patients expressing high intensity pain ($F(1,923) = 3.36, p = .067$): when there were no psychosocial influences in the condition in which the patients were expressing high intensity pain, the effect of medical evidence was more pronounced ($F(1,923) = 22.78, p < 0.001, \beta = 0.48$) than when the psychosocial influences were present ($F(1,923) = 4.36, p = 0.037, \beta = 0.22$).

Further, the analyses revealed that for help, the medical evidence x psychosocial influences interaction was not significant for patients expressing low intensity pain ($F(1,923) = 1.28, p = .260$); but it was significant for patients expressing high intensity pain ($F(1,923) = 6.03, p = 0.014$): when there were no psychosocial influences, the effect of medical evidence was more pronounced ($F(1,923) = 30.26, p < 0.001, \beta = 0.55$) than when the psychosocial influences were present ($F(1,923) = 3.72, p = 0.054, \beta = 0.21$) (see Figure 2). The means and standard errors of the participants' scores on pain, sympathy and help for each cell are provided in Table 2.

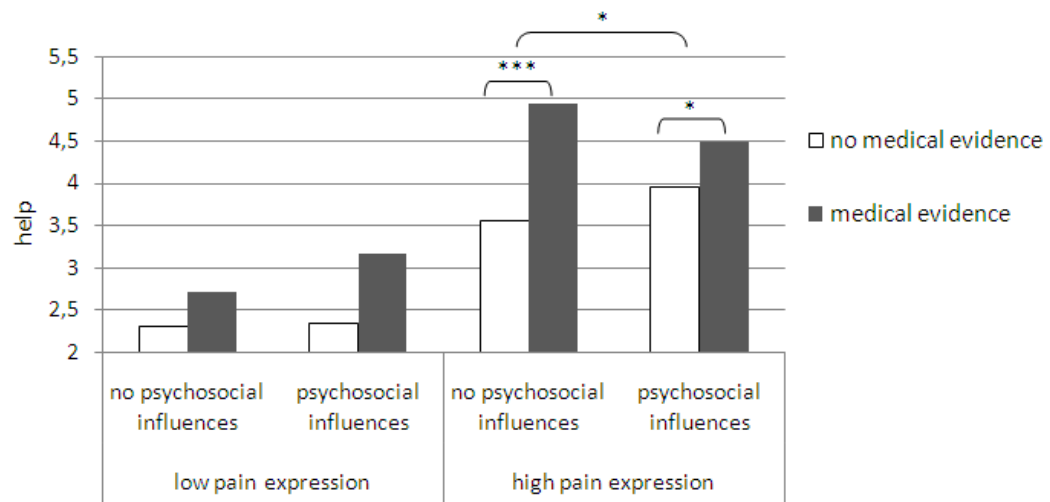


Figure 2. The three-way interaction effect between the patient's pain expression, medical evidence and psychosocial influences upon the participant's inclination to help the patient with daily activities.

Table 1

The age of each patient and for each patient: 1) the scores on facial pain expression averaged across the four video sequences, 2) the active pain behavior, averaged across the four video sequences, 3) the mean duration of the video sequences and 4) patients' self reported pain ratings for each video sequence

patient	age	facial pain expression	active pain behavior	duration	pain 1	pain 2	pain 3	pain 4
FL	65	0.5 (2)	8.25 (3)	11.55s (2)	7	4	6	7
ML	55	0.5 (2)	7 (2)	13.55s (2)	7	7	6	7
FH	46	1 (4)	11.25 (3)	20.25s (4)	8	8	8.5	8.5
MH	63	1 (4)	16.75 (4)	18.71s (3)	7	5.5	7	7

Note 1. In the column 'patient', the first initials refer to the gender of the patients (F = female, M = male) and the second initials refer to the level of pain expression that is displayed by the patient (L = low pain expression; H = high pain expression).

Note 2. Pain 1, pain 2, pain 3 and pain 4 refer to patients' self-reported pain ratings for each video sequence.

Note 3. The quartile with regard to the scores of the 34 patients of the G-PAVIDA each patient fitted in is provided between brackets.

Note 4. The scores on active pain behavior of patient FL and patient FH fitted within the same quartile (based on the larger sample; $N = 34$). However, the mean score on active pain behavior for the two patients in the 'low pain expression' group ($M_{low} = 7.63$) fitted within the 2nd quartile while the mean score on active pain behavior for the two patients in the 'high pain expression' group ($M_{high} = 14$) fitted within the 4th quartile.

Table 2

Means (and standard errors) of the participants' scores on pain, sympathy, help and discrepancy for each cell

pain expression	medical evidence	psychosocial influences	pain	sympathy	help	discrepancy
low	absent	absent	2.70 (0.21)	3.85 (0.29)	2.31 (0.28)	2.36 (0.32)
high	absent	absent	4.54 (0.22)	4.62 (0.28)	3.55 (0.28)	2.14 (0.32)
low	present	absent	3.05 (0.22)	4.40 (0.27)	2.71 (0.32)	2.63 (0.32)
high	present	absent	5.73 (0.23)	5.81 (0.25)	4.95 (0.31)	1.41 (0.32)
low	absent	present	2.31 (0.22)	3.84 (0.29)	2.35 (0.28)	3.48 (0.31)
high	absent	present	4.77 (0.24)	4.92 (0.31)	3.96 (0.31)	2.40 (0.32)
low	present	present	3.17 (0.23)	4.57 (0.29)	3.16 (0.31)	3.27 (0.32)
high	present	present	5.32 (0.26)	5.39 (0.30)	4.49 (0.33)	1.69 (0.31)

Mediating role of the participant's evaluation of the patient in the relationship between medical evidence and observer responses pain, help and sympathy

Analyses revealed a significant difference between patient evaluation when medical evidence was present and patient evaluation when medical evidence was absent ($t(61) = 5.18, p < .001$), indicating more positive evaluation scores when medical evidence was present compared to when medical evidence was absent ($M_{\text{medicalevidence}} = 3.37; M_{\text{nomedicalevidence}} = 0.97$). Further, regression analyses revealed that the difference scores for evaluation (the difference between evaluation when medical evidence is present and evaluation when medical evidence is absent) were related to the difference scores for pain ($t(61) = 4.11, p < .001; \beta = 0.49$), help ($t(61) = 6.32, p < .001; \beta = 0.66$), and sympathy ($t(61) = 8.40, p < .001; \beta = 0.75$). These results indicate that the effect of medical evidence upon pain, help and sympathy was mediated by the participant's evaluation of the patient. Furthermore, the residual effects of the presence/absence of medical evidence were not longer significant for pain ($\beta_{\text{intercept}} = .33, p = .126$), help ($\beta_{\text{intercept}} = .26, p = .114$) and sympathy ($\beta_{\text{intercept}} = .18, p = .184$) when controlling for the mediating role of patient evaluation, indicating full mediation by the participant's evaluation of the patient.

Mediating role of the participant's belief in deception in the relationship between medical evidence and observer responses pain, help and sympathy

Analyses revealed a significant difference between the participant's belief in deception when there was no medical evidence for the pain compared to when there was medical evidence for the pain ($t(61) = 4.61, p < .001$), indicating higher deception scores when medical evidence was absent ($M_{\text{medicalevidence}} = 2.75; M_{\text{nomedicalevidence}} = 4.32$). Further, regression analyses revealed that the difference scores for deception (the difference between deception when medical evidence is absent and deception when medical evidence is present) were related to the difference scores for pain ($t(61) = 2.27, p = .027, \beta = .29$), help ($t(61) = 3.78, p < .001, \beta = .44$), and sympathy ($t(61) = 4.64, p < .001, \beta = .51$). Although decreased,

the residual effects of the presence/absence of medical evidence remained significant for pain ($\beta_{intercept} = 0.58, p = .013$), help ($\beta_{intercept} = 0.50, p = .008$) and sympathy ($\beta_{intercept} = 0.44, p = .010$) when controlled for the mediating role of deception, indicating only a partial mediation by the participant's belief in deception⁴.

DISCUSSION

This study investigated the effects of information about medical evidence for pain and of psychosocial factors on observer responses and on the degree to which observers take the self-reported pain intensity of the patient into account. Further, we investigated whether the effects of medical evidence and psychosocial influences is moderated by the patient's level of pain expression. Next, the study examined whether the effect of the absence of medical evidence upon observer responses is explained by 1) the observer's negative evaluation of the patient and 2) the observer's belief in deception. Results indicated that participants ascribed lower pain, felt less sympathy for and were less inclined to help the person with pain when medical evidence for the pain was absent. Further, when estimating the patient's pain, participants who were told that the patient's pain experience was influenced by psychosocial factors took the patient's self report into account less. Next, results revealed that information about both medical evidence for pain and psychosocial influences upon the pain experience was taken into account in relation to the inclination to help the patient expressing high intensity pain. Further, the results indicated that the observer's negative evaluation of the patient fully mediated, and his/her belief in deception partially mediated the relationship between the absence of medical evidence and the participant responses.

⁴ The scores on evaluation were not significantly related to the scores on deception ($r = -.23, p = .075$). Further, the scores on evaluation were not significantly related to the scores on pain ($r = .24, p = .063$) and help ($r = .22, p = .089$), but were positively related to the scores on sympathy ($r = .47, p < .001$). Equally, the scores on deception were not related to the scores on pain ($r = -.19, p = .143$) and help ($r = -.07, p = .588$), but were negatively related to the scores on sympathy ($r = -.28, p < .001$).

The design of this study allowed investigation of the influence of medical evidence on participant responses when *actual* patients showing full body pain behaviors were observed. The results are in line with the findings of several vignette studies that presented written descriptions of fictitious patients to the participants (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Tait & Chibnall, 1994; Tait & Chibnall, 1997; Taylor et al., 1984). Only recently, De Ruddere et al. (2012) investigated the influence of medical evidence by means of videos displaying the facial pain expressions of actual patients. In accordance with De Ruddere et al. (2012), the current findings did not reveal an effect of psychosocial influences on observer responses. However, in the current study, information about psychosocial influences on the patient's pain influenced the degree to which the pain report of the patient was taken into account. One potential explanation may be that participants considered the patient's self-reported pain as under psychosocial influence: participants might have assumed that when psychosocial influences were present, patients were in some way biased in their pain ratings.

Further, our study was designed to examine the moderating role of one influential factor: the level of pain expressed by the patient (Goubert, Craig, & Buysse, 2009; Williams, 2002). Although the underlying mechanisms remain unclear, Tait et al. (2009) demonstrated that contextual information has more impact on pain estimates when observers judge high intensity pain. For example, Tait et al. (2009) describe the study of Chibnall and Tait (1995), which showed that the effect of the contextual factor (presence/absence of medical evidence) on observer pain estimates was more pronounced for patients reporting high intensity pain. With regard to our findings, absence of medical evidence had a smaller impact upon the observer's inclination to help the patient when psychosocial factors influenced the patient's pain and when the patient was expressing high intensity pain. Although the results do not allow a full interpretation, they suggest that observers take contextual cues more into account when estimating high intensity pain. One potential explanation for this finding may be that pain expression was sufficiently high, given cultural norms tending towards stoicism, that observers' suspicions were aroused and they searched for contextual information to help interpretation (Craig et al., 1999; Williams, 2002).

Our study was also designed to identify putative underlying mechanisms accounting for the effect of medical evidence. Considerable research indicates that observer responses towards others in pain are influenced by the observer's evaluation of the patient (Chibnall & Tait, 1995; De Ruddere et al., 2011; De Ruddere et al., 2013; Tait & Chibnall, 1994; Tait & Chibnall, 1997). For example, De Ruddere et al. (2013) showed that observers attribute less pain to patients when they evaluate these patients more negatively. The present study reveals that the absence of medical evidence negatively affects the evaluation of patients. Further, the results provided evidence that this effect explained the observer's tendency to discount pain for which there is no clear medical evidence. This finding extends the preliminary findings of Taylor et al. (1984), who found that nurses evaluated patients more negatively when there was no medical evidence for their pain. In many clinical settings, chronic pain patients are considered as 'difficult' patients (Wasan, Wootton, & Jamison, 2005), that is, they are negatively evaluated. The findings may reflect a general dislike of the patient by participants, due to the inability of the participants to identify with people with pain for which there is no clear medical explanation. In particular, it may be that the participants evaluated the patients more negatively due to a lack of knowledge about pain in the absence of clear medical evidence. For example, models of acute pain might dominate thinking about pain, including chronic pain. Although many individuals suffer from pain in the absence of disease or damage (Hiller, Rief, & Brähler, 2006; Jacobi et al., 2004; Lahmann, Henningsen, & Noll-Hussong, 2010; Lieb, Pfister, Mastaler, & Wittchen, 2000; Rief, Hessel, & Braehler, 2001), many individuals still believe that pain should always be proportional to disease or tissue damage (Eccleston & Crombez, 2007; Goubert, Crombez, & De Bourdeaudhuij, 2004).

In addition to the observer's evaluation of the patient, the study indicated a second potential underlying mechanism: the observer's belief that the patient feigned her or his pain. Following Craig and colleagues (Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999), absence of diagnosable pathology associated with the patient's pain is a risk factor for observers to impute to the patient an intention of feigning pain. Our findings indicate that this mechanism partially

underlies the relationship between absence of clear medical evidence for the pain and the observer's lower pain estimates, less sympathy and less inclination to help. Nevertheless, given the partial mediation, the findings suggest that a belief in malingering or deception is not the only mechanism explaining the detrimental effects of the absence of medical evidence upon observer responses. Instead, the results indicate the observer's evaluation of the patient as the key mechanism.

The findings of the present study may have some clinical implications. First, the results suggest that observers negatively evaluate people for whom no medical evidence for their pain is available. The results further indicate that this effect may be the reason why observers attribute less pain, feel less sympathy and are less inclined to help with daily activities. All this may impact the wellbeing of people with pain. Lower pain estimates, less sympathy and less inclination to help may negatively affect the observer's behavior towards the individual with pain (e.g., help giving). Second, suspecting deception when a medical explanation for the pain is lacking may lead to stigmatizing individuals with pain for which there is no clear medical explanation. For example, stigmatization may occur to the extent of believing the individuals to be malingering. This, in turn, has important repercussions for the wellbeing and identity of the people with pain (Holloway, Sofaer-Bennet, & Walker, 2007). Third, the results suggest that the patient's self-reported pain is taken less into consideration by the observer when information is provided that the pain is influenced by psychosocial factors, such as marital dissatisfaction or job stress. The patient's self-report is, with nonverbal pain behavior, an important cue for others to estimate patient pain (Kappesser, Williams, & Prkachin, 2006), and informs appropriate decisions on pain treatment. Fourth, the results suggest that observers take information about psychosocial influences into account predominantly for high intensity pain. This finding may suggest that the observation of patients expressing high intensity pain made observers more sensitive to the information about *both* medical evidence and psychosocial influences.

Some limitations, each of which points to directions for future research, deserve attention. First, the vignette methodology may lack ecological validity; observer reports of their reactions to a vignette and picture/video may not predict

their behavior in real life. Ways of bridging this gap are challenging for the researcher, but crucial for understanding clinical situations. Second, additional actual behavioral measures of help might strengthen the ecological validity of the results, as self-report is prone to social desirability effects. Third, the results from our participant observers may differ significantly from the beliefs and behavior of professional healthcare providers in relation to pain, medical and psychosocial influence on pain, and evaluation of patients. Fourth, although video sequences of actual patients with chronic low back pain were used in the study, one may question whether the four patients are representative of the full population of patients with pain. Fifth, the psychosocial influences described in our vignettes may have been weak compared with the psychosocial issues (e.g., clinical mood or anxiety disorders) that are often prominent in pain patients (Beesdo, Jacobi, Hoyer, Low, Höfler, & Wittchen, 2010). Therefore, future research may benefit from examining the influence of the comorbidity of pain with clinical mental disorders on observer responses. Sixth, future research may benefit from examining whether the patient's pain expression impacts on the mediating role of the participant's evaluation of the patient and/or his or her belief in deception.

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APPENDIX A

“Kris is 45 years and the parent of four children. Kris works as a self-employed surveyor. Kris indicates that he/she has had back pain for a while. Based upon the medical examination, there appeared to be no injury in the back. 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 back pain for a while. Based upon the medical examination, there appeared to be a compressed nerve in the back. 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 back pain for a while. Based upon the medical examination, there appeared to be no injury in the back. 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 back pain for a while. Based upon the medical examination, there appeared to be an inflammation of the ligaments in the back. 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*)

**HEALTH CARE PROFESSIONAL REACTIONS TO
PATIENT PAIN: IMPACT OF KNOWLEDGE
ABOUT MEDICAL EVIDENCE AND
PSYCHOSOCIAL INFLUENCES¹**

ABSTRACT

This study examined the impact of evidence concerning the presence of: a) a clear biomedical basis for pain, and b) psychosocial influences, on practitioner appraisals of patient pain experiences. Further, the potential moderating role of patient pain behaviour was examined. In an online study, 52 general practitioners (GPs) and 45 physiotherapists (PTs) viewed video sequences of 4 patients manifesting pain, with accompanying vignettes describing presence or absence of medical evidence and psychosocial influences. Participants estimated pain severity, interference of pain with daily activities, felt sympathy, likely effectiveness of pain medication, self-efficacy in helping the patients, their likability and suspicions of deception. Primary findings indicated higher perceived pain and daily interference, more sympathy, stronger expectations of medication impact, and more self-efficacy when medical evidence was present. The same results were found when psychosocial influences were absent, but only when the patient displayed higher levels of pain behavior. Further, absence of medical evidence was related to less positive evaluations of the patients in GPs and to higher beliefs in deception in both professions. The presence of psychosocial influences was related to less positive evaluations and higher beliefs in deception in both professions. In sum, a range of contextual factors bias healthcare practitioner responses to patient pain. Implications for caregiving behavior are discussed.

¹ De Ruddere, L., Goubert, L., Stevens, M.A.L., Deveugele, M., & Crombez, G. (submitted).

Health care professional reactions to patient pain: impact of knowledge about medical evidence and psychosocial influences.

INTRODUCTION

Pain management poses a considerable challenge for both healthcare practitioners and people in pain (Breivik, 2005; Mannion & Woolf, 2000; Matthias et al., 2010; Sinatra, 2010; Spacek, 2006; Wasan, Wootton, & Jamison, 2005). Basic to delivery of care is the necessary but difficult task of understanding the subjective experience of pain, a covert experience to which observers do not have direct and complete access (Hadjistavropoulos et al., 2011). Recognizing the private features of the experience inevitably creates uncertainty in the healthcare practitioner about the basis for pain complaints and symptoms and appropriate treatment decisions (Coll, Grégoire, Latimer, Eugène, & Jackson, 2011; Prkachin, Solomon, & Ross, 2007; Solomon, 2001; Tait, Chibnall, & Kalauokalani, 2009).

Elstein (1999) describes important mental scripts or heuristics used by healthcare practitioners to facilitate the decision process in patient care. Although pain is now widely acknowledged to be a biopsychosocial phenomenon (Gatchel, Peng, Peters, Fuchs, & Turk, 2007), the biomedical model which presumes that pain is caused by physiological pathology remains the most influential heuristic in patient care (Kent, Keating, & Taylor, 2009). This model leaves little room for multiple causal factors, in particular, psychosocial factors, to play determinative, prognostic, moderating or mediating roles in pain experience and disability (Engel, 1977; Melzack & Wall, 1965). Accordingly, although healthcare practitioners' uncertainty is inherent and ubiquitous in patient care (Gerrity, DeVellis, & Earp, 1990; Gordon, Joos, & Byrne, 2000), we may expect it to be heightened when medical evidence for pain is lacking and/or when healthcare practitioners have knowledge about psychosocial stressors that impact on the patients' pain experiences (MacNeela, Gibbons, McGuire, & Murphy, 2011; Tait et al., 2009). Hence, adhering to a strict biomedical heuristic may lead to biases. For example, Tait and Chibnall (1997) and Taylor, Skelton, and Butcher (1984) have shown that healthcare providers attributed lower pain to patients when clear medical evidence for the pain was absent compared to when medical evidence was present. Further, Taylor et al. (1984) suggested that healthcare providers may be less willing to perform pain relief actions for patients with pain who feel

depressed than for patients with pain who do not feel depressed. A thorough understanding of these biases is essential since pain complaints for which there is no clear medical explanation are highly prevalent (Hiller, Rief, & Brähler, 2006; Jacobi et al., 2004; Lahmann, Henningsen, & Noll-Hussong, 2010; Lieb, Pfister, Mastaler, & Wittchen, 2000; Rief, Hessel, & Braehler, 2001). Further, psychosocial influences on the pain experience have widely been acknowledged in the literature (Carragee, 2005; Gatchel et al., 2007; Linton, 2000; Osborne, Jensen, Ehde, Hanley, & Kraft, 2007; Pincus, Burton, Vogel, & Fiels, 2002).

Using an online experimental design, the present study had four objectives. First, we investigated the effects of both absence or presence of medical evidence and psychosocial influences on healthcare practitioner (physiotherapists and general practitioners) appraisals (i.e., estimates of pain, interference, sympathy, adequacy of pain medication and self-efficacy) by means of vignettes with video sequences of actual patients displaying full body pain behavior. Second, we examined variations in patient pain behavior as a potential moderating factor in the relation between absence versus presence of medical evidence and psychosocial influences on the one hand and the healthcare practitioner responses on the other. Previous research into the influence of contextual information on observer responses has largely relied on short written stories about fictitious patients (e.g., Tait & Chibnall, 1997; Taylor et al., 1984). Our approach using videotaped behaviors of actual patients in pain is more akin to clinician assessment in natural settings. Indeed, patient pain behavior provides a range of cues of great importance to healthcare practitioners and other observers (Craig, Prkachin, & Grunau, 2001; Ferrel, Eberts, McCaffery, & Grant, 1991; Williams, 2002), which may limit or facilitate the effects of medical explanation and psychosocial influences. Third, we investigated whether the absence of medical evidence and the presence of psychosocial influences relate to the healthcare practitioner's belief in deception and his or her evaluation of the patient (in terms of likability). Research suggests that healthcare practitioners may dislike patients when clear medical evidence for the pain is lacking (Wasan, Wootton, & Jamison, 2005; Taylor et al., 1984). Further, healthcare providers may have more doubts about the genuineness of the pain symptoms (MacNeela et al., 2011; Matthias et

al., 2010; Nilsen, Werner, Maeland, Eriksen, & Magnussen, 2011) when pain has no clear medical explanation.

METHOD

Participants

Participants were recruited by mail (physiotherapists; PTs) or telephone (general practitioners; GPs). Four hundred emails were sent to members of the Institute for Permanent Education in Physiotherapy of Ghent University. Seventy-four PTs responded positively to the mail (response rate = 19%). They were sent an email with the link to the online experiment. Five PTs filled in only the first part of the experiment (i.e., the sociodemographics questionnaire), 5 PTs reported technical problems, 2 PTs had a Macintosh computer that could not run the program Inquisit by which the experiment was presented, and 14 PTs did not complete the experiment despite reminders. In consequence, 48 PTs completed the experiment. Further, 142 Flemish GPs were randomly (computerized randomization) selected from the online public list of Belgian GPs. These GPs were contacted by telephone, with 87 GPs responding positively (response rate = 61%). Seven GPs filled in only the first part of the experiment (i.e., the sociodemographics questionnaire), 3 GPs reported technical problems, 5 GPs had a Macintosh computer that could not run the program Inquisit, 19 GPs never filled in the experiment despite reminders, and one mail with the link to the experiment was not sent successfully. A total of 52 GPs completed the experiment.

To be eligible, participants had to speak Dutch fluently and they had to be active as a GP or PT. The data of two participants were excluded, as one participant worked as a speech therapist and one participant was an academic not engaged in clinical practice. The mean age of the remaining sample ($N = 98$) was 45.29 years ($SD = 12.06$; range = 25 – 73 years). Almost all participants were married, in a relationship or cohabiting (99%). Twenty-five percent of the GPs and 63% of the PTs were female. This is in accordance with data provided by the annual statistics of the Federal public service in Belgium (distribution in Flanders

for GPs: 68% men and 32% women; for PTs: 40% men and 60% women; see FOD, Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu, 2012). The study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University and by the medical ethical committee of the Ghent University Hospital.

Design

The online experiment consisted of two main parts: (1) the sociodemographics survey and (2) the experiment proper. During the experiment proper part, participants were shown pictures of 4 different patients, each presented with a written vignette (detailed below). 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 sequence of the patient performing a pain-inducing activity was shown. Subsequently, participants estimated the patient's pain, the degree of the patient's pain interference with daily activities, their own sympathy for the patient, the likely effectiveness of pain medication and the expectations of self-efficacy in treating the patient. Subsequently, pictures of the patients again were shown and participants reported their evaluation of the patient (in terms of likability) and their beliefs in deception.

Stimuli

The video sequences and pictures were selected from the Ghent Pain Videos of Daily Activities (G-PAVIDA), consisting of video sequences displaying 34 chronic back pain patients (19 women, 15 men; $M_{age} = 52$ years (range: 23-74; $SD_{age} = 12$ years) who perform four back straining movements. All patients were suffering from chronic low back pain and were receiving (outpatient) treatment for the pain at the University Hospital in Ghent. The patients were asked to execute four movements: 1) lying down on a bed and standing up, 2) sitting down on a chair and standing up, 3) taking a box from the ground, putting it on a table

and replacing it on the ground, and 4) picking up marbles from the ground. Each movement was videotaped and every patient started the movement in upright position with the face directed to the camera. The video sequences display the patients' full body pain behaviors, i.e., facial pain expression and active head, torso or limb pain behavior (e.g., guarding, holding or rubbing).

For the present study, video sequences displaying the first movement were selected for four different patients (four video sequences in total). These patients were selected based on specific criteria. In particular, to ensure generalizability across gender, we selected two female patients and two male patients. To investigate effects of pain expression, two patients displaying a low level of pain and two patients displaying a high level of pain were selected based upon face validity (the videos were also coded to confirm the distinction between low and high levels of pain expression, see below). Furthermore, we also ensured that the patients' age across the genders and across the two levels of pain expression were similar (see Table 1). The videos were coded in order to have additional evidence for the distinction between low and high intensity pain expression. In particular, pain expressions of all 34 patients were coded by a reliable rater by means of an adjusted coding system², based upon the pain behavior-coding manual of Sullivan and colleagues (the Pain Can Paradigm; unpublished manual). To calculate inter-rater reliability, 20% of the pain expressions were coded by a second independent rater. Each movement was coded for the presence of one or more of the key facial pain expressions (Craig, Prkachin, & Grunau, 2001; Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003) [(absent (0), slightly present (1), distinctly present (2)]. Next, the presence (1) or absence (0) of active pain behavior (e.g., guarding, holding or rubbing) was coded per second. Inter-rater reliability was calculated according to the formula given by Ekman and Friesen (1978) that assesses the proportion of agreement on actions recorded by two coders relative to the total number of actions coded as occurring by each coder. Acceptable inter-rater reliability was achieved for facial pain expression (.66) and

² This coding scheme is particularly suitable for the levels of pain expressed by the patients in this study; it is not as comprehensive as the pain behavior coding manual of Sullivan et al. (2007), as the set up did not allow to make a fine grained coding of the facial pain expressions of the patients.

active pain behavior (.89). The scores on facial pain expression could range from 0-2 and the scores on active pain behavior were calculated by summing the seconds in which the patient was showing active pain behavior. Furthermore, the duration of each movement was also considered as indicative of pain behavior. The scores on facial pain expression, active pain behavior and duration of the movement are presented in Table 1. Furthermore, we provided information on percentiles to indicate how the selected patients related to the larger patient sample ($N = 34$) regarding pain expression scores (see Table 1)³. Video sequences were presented by the 3.0.6.0 web version of the INQUISIT Millisecond software package.

Table 1

The age of each patient and for each patient: the scores on 1) facial pain expression, 2) active pain behavior, 3) the duration of the video

patient	age	facial pain expression	active pain behavior	duration
FL	65	1 (50)	19s (70)	21s (50)
ML	55	1 (50)	16s (60)	18s (50)
FH	46	1 (50)	26s (80)	30s (80)
MH	63	1 (50)	28s (90)	30s (80)

Note 1. In the column ‘patient’, the first initial refers to the gender of the patients (F = female, M = male) and the second initial to the level of pain expression that is displayed by the patient (based on face validity; L = lower pain expression; H = higher pain expression).

Note 2. The percentile with regard to the scores of the 34 patients of the G-PAVIDA each patient fitted in is provided between brackets.

³ For more information on the Ghent Pain Videos of Daily Activities (G-PAVIDA) (also regarding the use of the videos for research purposes) please contact Lies De Ruddere (Lies.DeRuddere@UGent.be) or Liesbet Goubert (Liesbet.Goubert@UGent.be).

Vignettes

Vignettes described (1) the presence or absence of medical evidence for the pain and (2) the presence or absence of psychosocial influences upon the pain experience. Medical evidence in the vignettes was referred to as “a compressed nerve” or “a primary arthritis”. Vignettes describing the presence of psychosocial influences included “job stress and feelings of anxiety” or “relational problems and depressed mood”. These medical explanations and psychosocial influences were counterbalanced across patients and across vignettes. In order to make the pictures and video sequences 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 the 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 would not be confounded by this information (see appendix A for examples of vignettes).

Measures

Participants were asked about their sex, age (in years), nationality, marital status, employment (part time or full time), profession (PT or GP), work experience (in years), and work practice (e.g., group versus solo practice). Further, a visual analogue scale (0-100 mm) was used to estimate the patient’s pain, the degree of interference of the patient’s pain with daily activities, the practitioner’s sympathy for the patient, the probable effectiveness of pain medication and their perceived self-efficacy in treating the patient.

Next, the extent to which the patient was judged to be 1) positive or negative, 2) agreeable or disagreeable and 3) sympathetic or unsympathetic was assessed by a visual analogue scale from -100 to 100 (‘Please indicate your current evaluation of each person on each scale’). A mean score for participant evaluation of the

patient was calculated by averaging the scores on the three questions. Finally, the extent to which the participant thought the patient was feigning her or his pain was measured by a visual analogue scale (0 indicated 'not at all', 100 indicated 'a lot').

Procedure

Participants who were willing to participate in the experiment were sent an email with the link to the online experiment. Prior to the sociodemographics survey, participants were informed that the study examined healthcare practitioners' impressions of patients with pain. After completing the sociodemographics questionnaire, they were introduced to the experiment.

The participants were informed that (1) written information about four persons and their pain complaints would be given, followed by (2) presentation of video sequences of these persons. Subsequently, a (neutral) picture of a first patient combined with one vignette was shown. When the participant pressed the space bar, the video sequence of the same patient performing the pain-inducing activity was presented. This procedure was repeated with the video sequences of the three other patients. Vignettes were counterbalanced across participants for the four patients. Within each participant, the four patients were presented with a different vignette describing 1) presence of both clear medical evidence and psychosocial influences, 2) absence of clear medical evidence and presence of psychosocial influences, 3) presence of clear medical evidence and absence of psychosocial influences or 4) absence of both clear medical evidence and psychosocial influences. Each patient was shown once. In sum, four video sequences were shown in a different order to the participants. After the presentation of each video sequence, a screen with the five rating scales appeared and participants were requested to estimate the patient's pain, the degree of interference of the patient's pain with daily activities, their sympathy for the patient, the likely effectiveness of pain medication and their self-efficacy in treating the patient. Next, the (neutral) picture of each patient was shown to the participant who rated the extent to which she/he judged the patient to be negative or positive, agreeable or disagreeable,

sympathetic or unsympathetic. Subsequently, the (neutral) picture of each patient was shown again to the participant who rated the extent to which she/he thought the patient was feigning his or her pain.

Statistical analyses

Outcome variables were participants' estimates of the patient's pain ('pain'), the interference of the patient's pain with daily activities ('interference'), their own sympathy for the patient ('sympathy'), the likely effectiveness of pain medication ('medication'), their self-efficacy in treating the patient ('self-efficacy'), the evaluation of the patient ('evaluation') and their beliefs in deception ('deception'). The presence/absence of medical evidence ('medical evidence') and psychosocial influences ('psychosocial influences') as well as the level of pain behavior displayed by the patient (high level or low level of 'pain behavior'), and the profession of the participant (PT or GP) were the independent variables.

The factors in the present study were manipulated partially within and partially between subjects. Within subjects, each level of 'medical evidence' and 'psychosocial factors' was combined with only one of the two levels of 'pain behavior'. Between subjects, each level of 'medical evidence' and 'psychosocial factors' was combined with each level of 'pain behavior'. Because this type of factorial design cannot be analyzed using classical repeated measures analyses, the results were analyzed using linear mixed effects models as implemented in the R package nlme (Pinheiro & Bates, 2000). Linear mixed effects models account for the correlations in within-subjects data by estimating subject-specific deviations (or random effects) from each population-level factor (or fixed factor) of interest (see West, Welch, and Galecki (2007) for an elaboration). Each analysis required three steps. First, all relevant factors and interactions were entered in the model as fixed factors. In the second step, we assessed whether it was necessary to add a random effect for each of the fixed factors in the analysis: if a random effect significantly increased the fit of the model, it was included in the final model. In the third step, we inspected the ANOVA table of the final model and tested specific hypotheses about possible main effects or interactions

(see De Ruddere, Goubert, Prkachin, Van Ryckeghem, and Crombez (2011) and Verbruggen, Aron, Stevens, and Chambers (2010) for a similar approach). When testing specific hypotheses, standardized regression weights were reported as a measure of effect size. In a second set of analyses, the influence of medical evidence and psychosocial influences on deception and evaluation was investigated. In particular, for each dependent variable, a 2 (medical evidence: present versus absent) x 2 (psychosocial influences: present versus absent) repeated measures ANOVA was performed.

RESULTS

The scores on the sociodemographics questionnaire of the 46 PTs and the 52 GPs are provided in Table 2.

Table 2

Characteristics of the physiotherapists (PTs) and the general practitioners (GPs)

	Means and SD/%	Means and SD/%
	PTs	GPs
sex	37% male	75% male
age	39.02 (10.77)	50.83 (10.37)
fulltime employment	85%	96%
years as physiotherapist/GP	15.93 (10.68)	25.06 (10.24)
work practice		
▪ solo practice	35%	60%
▪ group practice	39%	40%
▪ hospital	20%	/
▪ nursing home	4%	/
▪ rehabilitation centre	2%	/

Impact of medical evidence and psychosocial influences on the healthcare practitioners' responses and the moderating role of the patient's pain behavior

The results indicated a significant main effect of pain behavior on all ratings. In particular, when the patient displayed a high level of pain behavior (compared to a low level of pain behavior), participants reported higher pain estimates ($F(1,278) = 319.01, p < .001, \beta = 1.17$), higher interference estimates ($F(1,278) = 128.49, p < .001, \beta = 0.89$), more sympathy ($F(1,278) = 5.87, p = .016, \beta = 0.23$), higher ratings on the likely effectiveness of medication ($F(1,278) = 86.15, p < .001, \beta = 0.23$) and higher ratings on the self-efficacy in treating the patient ($F(1,278) = 10.46, p = .001, \beta = 0.24$).

Further, the results revealed a significant main effect of medical evidence on all ratings. When medical evidence for pain was absent (compared to when medical evidence for the pain was present), participants reported lower pain estimates ($F(1,278) = 38.02, p < .001, \beta = -0.40$), lower interference estimates ($F(1,278) = 12.91, p < .001, \beta = -0.33$), less sympathy ($F(1,278) = 36.70, p < .001, \beta = -0.41$), lower ratings on the likely effectiveness of medication ($F(1,278) = 82.77, p < .001, \beta = -0.66$) and less self-efficacy ($F(1,278) = 30.63, p < .001, \beta = -0.41$).

Next, a significant main effect of psychosocial influences was found for pain, sympathy, medication and self-efficacy, but not for interference ($F(1,278) = 1.87, p = 0.173$). When psychosocial influences were present (compared to when psychosocial influences were absent), results indicated lower scores on pain ($F(1,278) = 13.98, p < .001, \beta = -0.26$), sympathy ($F(1,278) = 24.17, p < .001, \beta = -0.33$), likely effectiveness of medication ($F(1,278) = 25.87, p < .001, \beta = -0.37$) and self-efficacy ($F(1,278) = 14.85, p < .001, \beta = -0.28$).

For all outcomes, a significant psychosocial influences x pain behavior interaction was found (pain: $F(1,278) = 7.18, p = .008$; interference: $F(1,278) = 12.63, p < .001$; sympathy: $F(1,278) = 7.02, p = .009$; pain medication $F(1,278) = 19.75, p < .001$; self-efficacy $F(1,278) = 6.57, p = .01$). These results indicate that, when patients were displaying a high level of pain behavior, the presence of

psychosocial influences was related to lower pain ratings ($\chi^2(1) = 20.71, p < .001, \beta = -0.45$), lower interference estimates ($\chi^2(1) = 13.00, p < .001, \beta = -0.41$), less sympathy ($\chi^2(1) = 28.94, p < .001, \beta = -0.51$), lower ratings on the likely effectiveness of medication ($\chi^2(1) = 45.39, p < .001, \beta = -0.72$) and to less self-efficacy ($\chi^2(1) = 20.25, p < .001, \beta = -0.49$) than when psychosocial influences were absent. There was no effect of psychosocial influences when patients were displaying a low level of pain. Further, there was a psychosocial influences x profession interaction for medication ($F(1,278) = 7.09, p = .008$), showing that psychosocial influences impacted upon estimations of the likely effectiveness of medication, but only for GPs ($\chi^2(1) = 32.09, p < .001$) and not for PTs ($\chi^2(1) = 2.58, p = .096$). Specifically, the GPs rated medication as less effective for the patient when psychosocial influences were present compared to when psychosocial influences were absent ($\beta = 0.56$). None of the other two-way interaction effects and none of the three-way interactions were significant.

Finally, there was one four-way interaction effect between profession, pain behavior, medical evidence and psychosocial influences for self-efficacy ($F(1,278) = 5.80, p < .017$). These results indicate that there was a two-way interaction effect between medical evidence and psychosocial influences but only for PTs when patients were displaying a low level of pain ($\chi^2(1) = 5.01, p = .025$). In particular, when medical evidence was absent, lower ratings on self-efficacy in helping the patients were given when psychosocial influences were present compared to when psychosocial influences were absent ($\beta = -0.56$). When there was medical evidence, no effect of psychosocial influences was found ($\chi^2(1) = 0.58, p = .446$).

Table 3

Means (and standard deviations) of physiotherapists' (PTs) and general practitioners' (GPs) 1) evaluations of the patients and 2) beliefs in deception per condition (medical evidence present or absent and psychosocial influences present or absent), together with the F-values of the univariate ANOVA's

	$M_{\text{medical evidence}}$	$M_{\text{no medical evidence}}$	F	$M_{\text{psychosocial influences}}$	$M_{\text{no psychosocial influences}}$	F
PTs						
evaluation	8.71 (20.54)	4.30 (23.70)	1.37	1.86 (21.38)	11.16 (19.75)	10.56**
deception	30.24 (19.56)	43.79 (19.87)	13.10**	43.53 (17.29)	30.50 (18.80)	19.77***
GPs						
evaluation	9.79 (20.05)	-1.33 (17.80)	9.52**	-0.13 (19.00)	8.59 (18.88)	5.88*
deception	31.59 (18.78)	42.30 (20.01)	9.44**	43.36 (20.25)	30.53 (17.31)	15.68***

* $p < .05$, ** $p < .01$, *** $p < .001$

Impact of medical evidence and psychosocial influences on the participants' evaluations of the patients and their beliefs in deception

The means for the variables evaluation and deception and the F -values for the repeated measures ANOVA's are provided in Table 3 for both conditions, i.e., presence versus absence of medical evidence and presence versus absence of psychosocial influences. For GPs only, an absence of medical evidence was related to less positive evaluations of the patients. For both professions, absence of medical evidence was related to higher scores on deception. Further, the presence of psychosocial influences was related to less positive evaluations of the patients and to higher scores on deception in comparison with the absence of psychosocial influences, regardless of the profession.⁴

DISCUSSION

This study investigated the effect on physiotherapist and general practitioner responses of the presence/absence of clear medical evidence for the patient's pain and psychosocial influences on the patient's pain experience. Healthcare practitioners' responses were estimates of 1) the patient's pain, 2) the interference of the patient's pain with daily activities, 3) the sympathy felt for the patient, 4) the believed adequacy of pain medication and 5) the degree to which the healthcare practitioner believed they would be effective in treating the patient. Further, the study investigated the influence of medical evidence and psychosocial influences on the healthcare practitioner's evaluation of the patient and on the healthcare practitioner's belief in deception.

Results revealed lower ratings on all measures when clear medical evidence for the pain was absent compared to when clear medical evidence for the pain was

⁴ The participant's evaluation of the patient was positively related to ratings on pain ($F(1,94) = 6.58, p < .05, \beta = 0.26$), sympathy ($F(1,94) = 45.481, p < .001, \beta = 0.58$), and self-efficacy ($F(1,94) = 10.83, p = .001, \beta = 0.35$). The participant's belief in deception was negatively related to ratings on sympathy ($F(1,94) = 8.22, p < .01, \beta = -0.28$) and interference ($F(1,94) = 10.60, p < .01, \beta = -0.32$).

present. Further, results indicated lower ratings on all measures when psychosocial stress factors influenced the patient's pain experience, but only when the patient was displaying a high level of pain behaviour. Next, absence of medical evidence was related to less positive evaluations of the patients in GPs and to higher beliefs in deception in both professions. The presence of psychosocial influences was related to less positive evaluations and higher beliefs in deception in both professions.

The design of our study allowed investigation of potential biases that may occur in healthcare practitioners' responses towards the pain of patients. Although general practitioners and physiotherapists play a crucial role in pain management, we are unaware of any study that investigated the role of contextual information on these healthcare practitioners' responses to patient pain. Note that the design of our study enabled investigation of healthcare practitioners' responses to the pain of actual patients displaying full body pain behaviors. To our knowledge, this is the first study to accomplish this.

A first bias indicated by our results relate to the lower ratings on pain, interference, sympathy, adequateness of pain medication and self-efficacy in treating the patient when clear medical evidence for the pain is absent. These results are in line with findings of several vignette studies indicating that the absence of medical evidence relates to lower pain estimates in lay observers (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Tait & Chibnall, 1994), medical students (Chibnall, Tait, & Ross, 1997), internal medicine physicians (Tait & Chibnall, 1997) and nurses (Taylor et al., 1984). Further, the results are consistent with recent findings (De Ruddere, Goubert, Vervoort, Prkachin, & Crombez, 2012; De Ruddere, Goubert, Stevens, Williams, & Crombez, in press) indicating that lay observers attribute lower pain, feel less sympathy for the patient, and are less inclined to help the patient when a medical explanation for the pain is lacking. Further, the results support the findings of Taylor et al. (1984) that show that nurses are less willing to undertake pain relief actions when medical evidence for pain is absent. Next, the results are consistent with the qualitative research findings of Matthias et al. (2010), indicating that primary care providers feel

ineffective and frustrated when treating chronic pain patients, many of whom do not present with medical pathology.

The important and robust effect of knowledge about medical evidence was further highlighted by the finding that it was not influenced by one of the most important cues for healthcare practitioners when providing patient care, i.e., the level of pain that is displayed by the patient (Ferrell et al., 1991). Furthermore, in our study, absence of medical evidence was positively related to beliefs in deception by both PTs and GPs. Although Craig and colleagues (Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999) suggest that absence of diagnosable pathology serves as a risk factor for observers to impute to the patient an intent to feign the pain, our study is, to our knowledge, the first to investigate this association in healthcare practitioners. The findings may reflect emphasis on the biomedical model as taught in schools of medicine and physical therapy, and a mode of thinking supported by industry and continuing education activities. The biomedical model as a dominant heuristic probably makes observers prone to skepticism when confronted with patient complaints that do not fit within this perspective. Accordingly, beliefs in deception (voluntary misrepresentation) may be ‘mental shortcuts’ or ‘premature closures’ to ease the decision process or to actually ‘close’ the difficult patient encounter (Borrel-Carrio & Epstein, 2004). Further, the absence of clear medical evidence for the pain was also related to less positive evaluations of the patients by GPs. This finding is consistent with the findings of vignette studies showing that patients are disliked more by nurses (Taylor et al., 1984) when clear medical evidence for the pain is absent. Contrary to the findings with general practitioners, physiotherapists’ evaluations of patients seemed not to be influenced by the presence or absence of medical evidence for the pain. This finding suggests that the likability of the patients, as perceived by the physiotherapists, is not prone to biases induced by the absence of medical evidence.

A second bias was evident in the finding that the presence of psychosocial factors lowered the practitioner ratings on pain, interference, sympathy, likely effectiveness of medication and self-efficacy in treating the patient. The finding that the impact on estimated adequacy of pain medication was only found in GPs

and not in PTs was not surprising, as the issue of pain medication is more relevant to GPs than to PTs. More importantly, the bias induced by psychosocial influences was only found when the patient was displaying a high level of pain behavior. Our results are in accordance with Tait et al. (2009) who argue that observers' uncertainty is heightened when they are confronted with patients in severe pain conditions. For example, Solomon, Prkachin, and Farewell (1997) found that observers underestimated pain more when patients were displaying a high level of pain behavior. According to Kahneman (2003), feeling uncertain in decision-making may enhance observer proneness to contextual information. This may explain why information about psychosocial influences was only important when the patient was displaying a high level of pain behavior. Further, similar to the findings regarding the effect of medical evidence, knowledge about the influencing role of psychosocial stress factors was related to greater imputation of deception by both professions. Moreover, the presence of psychosocial factors was related to a less positive evaluation of the patient by the healthcare practitioners, irrespective of their profession. In line with the findings regarding the effect of medical evidence, these effects may be attributed to general use of a strict biomedical model as a heuristic in making decisions about a patient's pain.

The findings may have clinical implications. Our findings demonstrated biases in clinical judgments originating from absence of medical findings or evidence of psychosocial factors. These biases need to be taken seriously. Attributing lower pain and disability to patients may impact treatment decisions and may lead to inadequate pain management. Nilsen et al. (2011) found that patients with symptoms for which there was no clear biomedical basis were at risk of not receiving certificates attesting to their being ill. Moreover, healthcare practitioners may be perceived by patients as invalidating their pain complaints, leading to perceived injustice and exacerbating the disability (Scott & Sullivan, 2012). Epstein et al. (2006) found healthcare practitioners' actions to be more likely invalidating when patients presented symptoms for which there was no clear biomedical explanation. Further, less sympathy for the patient may adversely impact the healthcare practitioner - patient relationship, and in turn, may diminish clinical outcome (Vowles & Thompson, 2012). Next, the belief that pain

medication would be less effective may influence the actual prescription of medication by general practitioners. Hence, those patients with pain for which there is no clear medical evidence and/or for which psychosocial influences are of importance, may obtain insufficient pain relief. Importantly, clinical guidelines support the prescription of medication, whether the cause of the pain is known or not or whether psychosocial influences are present or absent (Chou et al., 2007; Airaksinen et al., 2006; van Tulder et al., 2006).

Finally, feeling ineffective in treating the patient, may negatively impact the patient encounter as well as the patient care. Although research is scarce concerning the actual relationship between observer behavior and patient outcomes, there is no question that patients with pain for which there is no clear medical evidence feel frustrated and disbelieved by others (Allegretti, Borkan, Reis, & Griffiths, 2010; Holloway, Sofaer-Bennett, & Walker, 2007; Peters, Stanley, Rose, & Salmon, 1998; Toye & Barker, 2010; Werner & Malterud, 2003).

Some limitations, each of which point to directions for further research, need attention. First, our study provided only an analogue of the clinical setting in order to use the power of an experimental investigation. Analogue studies limit the ecological validity of findings, but we note that in this study some verisimilitude to the real setting was accomplished; actual clinicians were rating the behaviors of real patients while they were manifesting pain. The experimental design allowed investigation of the influence of contextual information and the influence of one important patient characteristic upon the healthcare practitioner responses to the patient's pain. Nevertheless, the design did not allow study of the important role of relational aspects in the patient – healthcare practitioner interaction, which are potential determinants of outcomes (Vowles & Thompson, 2012). Further, the healthcare practitioners did not have prior knowledge of the patients presented in the vignettes, including both the history of the pain complaints and the psychosocial influences. Ecological validity requires demonstrations that the healthcare practitioner reactions observed here predict their behavior in real life. Future research would contribute by the investigation of the influence of medical evidence and psychosocial influences in real life interactions between healthcare

practitioners and patients with pain. Second, we used the words ‘not at all’ and ‘a lot’ to measure the degree to which the observers believed the patients were feigning pain. This might have biased the observer responses given that ‘a lot’ might be interpreted as less than ‘totally’, which might have been a better anchor of the scale. Third, more thorough research is needed into how healthcare practitioner responses may relate to patient outcomes, such as treatment outcome and psychosocial wellbeing.

To conclude, the results of our study indicate that patient pain in the absence of clear medical evidence and in the presence of psychosocial influences might be taken less seriously by healthcare practitioners. Future research would benefit from focusing upon real-life interactions between healthcare practitioners and patients with pain that is not fully understood medically. Further, research into the consequences of healthcare practitioner responses on patient pain is needed.

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APPENDIX A

“Kris is 45 years and the parent of four children. Kris works as a self-employed surveyor. Kris is a patient of you and is visiting you for the third time for back pain complaints. Based upon history and clinical examination, no clear pathology can be withheld. At this moment, no further major diagnostic examination is

indicated. Psychosocial factors do not seem to influence the pain complaints.”
(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 is a patient of you and is visiting you for the third time for back pain complaints. Based upon the medical and radiological examination, there is a compressed nerve in the back. Psychosocial factors do not seem to influence the pain complaints.” *(biomedical evidence present; psychosocial influences absent)*

“Kim is 45 years and the parent of one child. Kim works as a public employee. Kim is a patient of you and is visiting you for the third time for back pain complaints. Based upon history and clinical examination, no clear pathology can be withheld. At this moment, no further major diagnostic examination is indicated. Psychosocial factors seem to influence the pain complaints, 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 is a patient of you and is visiting you for the third time for back pain complaints. Based upon the medical and radiological examination, there is a clear primary arthritis in the back. Psychosocial factors seem to influence the pain complaints, in particular relational problems and a depressive mood.”
(biomedical evidence present; psychosocial influences present)

CHAPTER 6

**THE IMPACT OF BEING PRIMED WITH
SOCIAL DECEPTION UPON OBSERVER
RESPONSES TO OTHERS' PAIN¹**

ABSTRACT

This study examined whether priming with social deception affects responses (pain estimates, self-reported sympathy, inclination to help) towards others' pain. We further explored whether the priming effect is mediated by the valence of the patients (positive/negative), as reported by the participants. First, participants ($N = 55$) took part in an 'independent' delayed memory study in which they read either a neutral text about the use of the health care system (neutral condition) or a text about its misuse (social deception condition). Second, participants watched videos of pain patients performing pain-inducing activities. Participants rated the patients' pain, the sympathy felt for the patients and the inclination to help the patients. Third, the participants re-estimated patients' pain when patients' self-reports of pain were provided. Fourth, pictures of the patients were shown and participants reported the valence of the patients (positive/negative). Results revealed no direct effect of priming with social deception. However, priming with social deception was related to less positive ratings of the valence of the patients and less positive ratings of the valence of the patients were related to lower ratings on pain and sympathy, and to larger discrepancies between the ratings of the patients and the observers. The results indicate that observers attribute less pain, feel less sympathy and take patients' self-reported pain intensity less into account when the patients are evaluated less positively, which is likely to occur when a cognitive scheme of social deception is primed.

¹ Based on: De Ruddere, L., Goubert, L., Vervoort, T., Kappesser, J., & Crombez, G. (2013). The impact of being primed with social deception upon observer responses to others' pain. *Pain*, 154, 221-226.

INTRODUCTION

Pain is not only a private and subjective experience, it also has social or interpersonal features (Hadjistavropoulos et al., 2011). Understanding pain as an interpersonal experience requires consideration of its expressive nature and its effect upon others. Facing another in pain may elicit a variety of cognitive, emotional and behavioural responses in the observer (Goubert, Craig, & Buysse, 2009; Goubert et al., 2005; Goubert, Vervoort, & Craig, 2013; Hadjistavropoulos et al., 2011; Tait, Chibnall, & Kalauokalani, 2009) which may, in turn, affect the pain experience and wellbeing of the person in pain (Coll, Crégoire, Latimer, Eugène, & Jackson, 2011; Goubert et al., 2005; Hadjistavropoulos et al., 2011).

Several factors come into play when an individual faces another person in pain. One factor is the belief in the genuineness of the pain displayed by the other. It is reasonable to assume that individuals are more inclined to help sufferers when they believe the pain to be real. However, when individuals suspect (social) cheating, helping may not be guaranteed. According to Cosmides (1989), individuals are particularly sensitive to cues to social cheating. Such sensitivity protects individuals from being exploited by others who challenge normal reciprocal altruism, or the social contract (Kappesser & Williams, 2008; Williams, 2002) by taking a benefit without earning it. Estimating another person's pain may also be conceptualized as part of a social exchange situation. When a person expresses pain, the observer who has benefits to bestow (support or practical aid) has to decide whether to do so. Probably, the greater the observer's suspiciousness about the genuineness of the pain, the more cautious she or he will become in estimating the pain.

In line with this idea, observers attribute less pain to patients (Poole & Craig, 1992) and underestimate pain to a larger degree (Kappesser, Williams, & Pkrachin, 2006) when they are explicitly told that some of the patients may fake pain. In everyday life and clinical practice, cues to cheating may be subtle and implicit rather than explicit. For example, reading an article in the newspaper about the misuse of the health care system may unobtrusively bias the reaction of

an individual when she or he encounters someone experiencing pain. To date, there is no research on the effects of implicit priming with social cheating in pain.

The primary aim of the study was to investigate whether the effect of implicit priming with social deception lowers the observers' estimates of pain experienced by a patient, the sympathy for the patient and the inclination to help. A secondary aim was to investigate whether priming with social deception influenced the degree to which the self-report of the patient is taken into account. According to Kappesser et al. (2006), the verbal report of the patient is an important cue for observers when estimating pain.

Finally, we focused upon one potential mediator of the priming effect upon the observer responses. In line with previous research that suggests that the valence of the patient (more specifically, how positive or negative a patient is evaluated by the observer) plays an important role in pain estimations by observers (Chibnall & Tait, 1995; De Rudder, Goubert, Prkachin, Stevens, Van Ryckeghem, & Crombez, 2011; Tait & Chibnall, 1994; Tait & Chibnall, 1997), we investigated whether the valence of the patients mediates the effect of priming with social deception on the observer responses (pain, sympathy, inclination to help, and consideration of patients' pain reports).

METHOD

Participants

Participants were recruited from October 2010 until January 2011 by means of an advertisement in local newspapers ($N = 41$) or they were approached and asked to volunteer in two local supermarkets ($N = 16$, volunteer rate = 36%). In total, 57 individuals (16 men, 41 women) volunteered to participate in the study. To be eligible, participants had to be 18 years or older and had to speak Dutch fluently. Potential participants who reported that they knew one of the patients shown on the videos were excluded ($N = 1$). Further, participants were also excluded when they knew the true purpose of the study at the end of the experiment ($N = 1$). The final sample ($N = 55$) consisted of 28 participants in the social deception condition

(10 men; $M_{\text{age}} = 34.04$ years; $SD = 11.92$; range = 19-66) and 27 participants in the neutral condition (5 men; $M_{\text{age}} = 33.10$ years; $SD = 13.65$; range = 18-70). We aimed at collecting at least 20 observations per cell/condition (Simmons, Nelson, & Simonsohn, 2011). About half of the participants were married, in a relationship or cohabiting (54.5%) and about half of the participants had a higher education (beyond the age of 18 years) (47.3%). Most of the participants were employed (58.2%) and a quarter of the participants (23.6%) were university or college students. The unemployment rate was 12.7% and 5.5% of the participants were retired. All participants were Caucasian. The ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University approved the study.

Stimuli

Two different texts about the health care system were used. The text used in the neutral condition was a text describing the Belgian health care system and how people make use of it. The text used in the social deception condition focused on the misuse of the health care system by describing how some people take advantage of it and what consequences this has for the whole population including the participant (see Appendix A for the English version of the texts).

Further, videos and pictures of four different chronic back pain patients (two men, aged 55 and 54 years and two women, aged 44 and 53 years) selected from a larger set of pain videos were used for this study. This set of pain videos display the performance of four potentially painful movements by back pain patients who were in (outpatient) treatment for the pain at the University Hospital in Ghent. The patients were asked to execute four movements: 1) lying down on a bed and standing up, 2) sitting down on a chair and standing up, 3) taking a box from the ground, putting it on a table and replacing it on the ground, and 4) picking up marbles from the ground. Every patient started the movement in upright position with the face directed to the camera. The four patients we selected had been suffering from low back pain for at least 5 years. The self-reported mean pain intensity during the past 6 months was 7 (two patients), 6 (one patient) or 8 (1

patient) on a scale from 0 (no pain) to 10 (pain as bad as could be). The four movements were videotaped for all 4 patients, resulting in 16 different videos that displayed patients' full body pain behaviors. Patients provided verbal pain ratings on a numerical scale (0: no pain at all – 10: pain as bad as could be) after the performance of each movement. Unfortunately, the verbal pain ratings were unavailable for two movements of one patient. This patient prematurely halted the movement on these occasions, and no pain reports were obtained for those situations. For the present study, videos of two patients (one male and one female patient) displaying a high level of pain behavior and two patients (one male and one female patient) displaying a low level of pain behavior were selected based upon face validity. Before the actual experiment, we validated our categorization of patients as displaying either a high level or a low level of pain behavior in an independent sample of 24 lay people (8 men and 16 women; $M_{\text{age}} = 31.30$, $SD_{\text{age}} = 11.81$, range = 17-58 years). These lay persons were recruited from the immediate environment of the researchers. They watched each video fragment and rated each time the pain that they believed to be experienced by the patients using a numerical rating scale (0 = no pain at all; 10 = pain as bad as could be). The lay persons were requested to judge the pain based upon the behavior displayed on the video. No information was provided regarding the actual self-reports of pain of the patients. Analyses indicated that the judges rated the pain of two patients (one male, ZA, and one female, PV) as low ($M_{\text{male}} = 2.08$, $SD_{\text{male}} = 1.48$; $M_{\text{female}} = 2.93$, $SD_{\text{female}} = 1.73$) and the pain of two patients (one male, SP, and one female, ZN) as high ($M_{\text{male}} = 6.29$, $SD_{\text{male}} = 1.88$; $M_{\text{female}} = 6.89$, $SD_{\text{female}} = 2.29$). Based upon these results, we categorized patient ZA and patient PV as displaying a low level of pain behavior, and patient SP and patient ZN as displaying a high level of pain behavior. The mean length of the 16 video fragments used in this study was 18.56 seconds ($SD = 10.50$). We also provided some sociodemographic information about the patients using a vignette methodology. This information was not part of the experimental manipulation, but was introduced to make the pictures and videos of the patients more vivid or realistic. Vignettes included for each patient the (fictitious) first name (Sam, Jo, Kim, Dominik), age (49, 48, 46, 45), current job (surveyor, teacher, public employee, bank employee) and number

of children (4, 2, 1, 3). This background information was counterbalanced across the four different patients. The experiment was programmed and presented by the Inquisit Millisecond software package (version 3.0.6.0) on a 745 Dell Optiplex computer with a 75 Hz, 19-inch color CRT monitor.

Measures

A numerical rating scale (0-10) was used to assess observers' estimated pain of the patient, inclination to help the patient with daily activities and sympathy for the patient (0 indicated 'no pain at all', 'totally unwilling', and 'no sympathy at all' respectively; 10 indicated 'pain as bad as could be', 'totally willing', and 'a lot of sympathy' respectively). Participants were requested to evaluate the patients in terms of valence using a 21-point scale (-10 = very negative, 0 = neutral, 10 = very positive). Rating scales ranging from negative to positive have been applied by several researchers to measure participants' valence towards events or stimuli (Kanske & Kotz, 2012; Schryer & Ross, 2012).

Procedure

In the experiment room, two experimenters welcomed the participant. Experimenter 1 was involved in the 'independent' delayed memory task. The other experimenter invited the participant to participate in a second, independent study. Experimenter 1 informed the participant that he/she would be asked to read a text very carefully and that questions would be asked (1) immediately after reading the text and (2) after the participation in experiment 2. Written informed consent was obtained. Participants randomly received the neutral text about the health care system (i.e., neutral condition) *or* the text about the misuse of the health care system (i.e., social deception condition). Randomization was done by means of a computerized random number generator. After reading the text, the participant reported during one minute what he/she remembered about the text. Then, experimenter 1 left the room, the participant read the text a second time and experimenter 2 (who was blind with regard to the condition the participant was

assigned to) started the ‘actual’ experiment. In particular, the participant was told that the study examined people’s impression formation of others in pain and that questions about this impression formation would be asked at the end of the experiment. Participants were told that verbal information about four different persons would be given, and that video fragments of these persons would be presented on the computer screen.

Pain rating phase

When the participant pressed ENTER on the PC keyboard, a first neutral picture of a patient combined with one of the four vignettes was shown. When the participant pressed ENTER again, the video fragment of the same patient performing a painful movement was presented. This procedure was repeated with the video fragments of the three other patients. To have reliable measures, each patient in combination with the same vignette was shown four times as there were four different videos per patient. In sum, 16 different videos were randomly presented. After the presentation of each video, a black screen appeared and participants were requested to provide written ratings of the patients’ pain, their sympathy felt for the patient and their inclination to help the patient.

Pain rating after feedback phase

Participants were presented one video of each patient. In sum, four different videos were presented. Per participant, all four patients were performing the same movement in this phase and this was counterbalanced between participants. Participants were provided with the self-reported pain intensity ratings of the patients (NRS; 0-10) and were, once again, asked to estimate the patients’ pain. Because one patient did not report her/his pain after the performance of two movements, participants were provided with the self-reported pain rating of another movement of the same patient. However, these data were considered as missing values in the data analyses. The self-reported pain, averaged across the four different movements were 7/10 (man displaying a low level of pain behavior) and 4.25/10 (woman displaying a low level of pain behavior), 3/10 (man

displaying a high level of pain behavior) and 8,75/10 (woman displaying a high level of pain behavior).

Valence rating phase

A picture of each patient was shown to the participant who rated the overall valence of the patient, i.e., the participant rated how positively/negatively she or he evaluated the patient. At the end of the experiment, the participant was requested to fill out a second informed consent after revealing the true purpose of the study. Total duration of study participation (i.e., memory task and rating task) was on average 40 minutes per participant.

Statistical analyses

The outcome variables were participants' ratings of 1) patients' experienced pain ('pain'), sympathy for the patients ('sympathy'), and inclination to help the patients with daily activities ('help'), 2) the absolute difference in pain ratings between patients and participants when the self-reported pain ratings of the patients were provided (see 'pain rating after feedback phase') (= 'discrepancy'), and 3) participants' ratings of the valence of the patients (positive/negative; 'patient valence'). Pain, sympathy and help (see 'pain rating phase') were the mean scores per patient of the ratings on the 16 trials presented to the participants. Discrepancy (see 'pain rating after feedback phase') was the mean score of the absolute difference scores between the pain ratings of the patients and those of the participants on the 4 trials presented to the participants. Patient valence (see 'valence rating phase') was the mean score per patient of the ratings on the 4 trials presented to the participants. To investigate the influence of condition upon pain, sympathy and help, a multivariate ANOVA was performed with condition as a between-subjects variable and pain, sympathy and help as dependent variables. To investigate the influence of condition upon discrepancy and upon patient valence, two univariate ANOVA's were performed with condition as fixed factor and discrepancy and patient valence as dependent variables respectively. Effect sizes

were measured by means of Cohen's d (Cohen, 1988) (.20 = small effect, .50 = medium effect and .80 = large effect).

The influence of patient valence upon pain, sympathy, help and discrepancy was investigated by means of four regression analyses with patient valence as the independent variable and pain, sympathy, help and discrepancy as the dependent variables. To test the mediating role of patient valence, we used a bootstrapping method following the procedure described by Preacher and Hayes (Hayes, 2009; Preacher & Hayes, 2004). The bootstrapping method is a nonparametric resampling procedure that has been shown to be more appropriate than a normal-theory test (i.e., Sobel's test) for studies with smaller sample sizes (MacKinnon, Lockwood, Hoffman, West, & Sheets; 2002; Preacher & Hayes, 2004; Shrout & Bolger, 2002). Figure 1 represents the effects and their corresponding weights that must be distinguished in order to perform the mediation analysis (for reasons of clarity, only the outcome 'pain' is mentioned in the figure, however, the figure is applicable for the other three outcomes, sympathy, help and discrepancy as well). The direct effect of condition on pain has the weight c' , whereas the indirect effect, through the proposed mediator 'patient valence' has the weight ab . The effect of condition on patient valence is represented by weight a , whereas weight b is the effect of patient valence on pain, partialling out the effect of condition (Roelofs, Huibers, Peeters, Arntz, & van Os, 2008). The total effect (c) of condition upon pain consists of both the direct (c') and the indirect (ab) effect. In the bootstrap analyses, the indirect effect (ab) is found to be significant if the bootstrap confidence interval excludes zero. Overall, mediation is assumed if 1) the total effect c is significant in addition to the indirect effect ab and 2) the total effect c reduces significantly when controlling for the indirect effect ab . However, if the total effect c is not significant, but the indirect effect ab is significant, the effect is considered an indirect effect and not a mediation (Mathieu & Taylor, 2006).

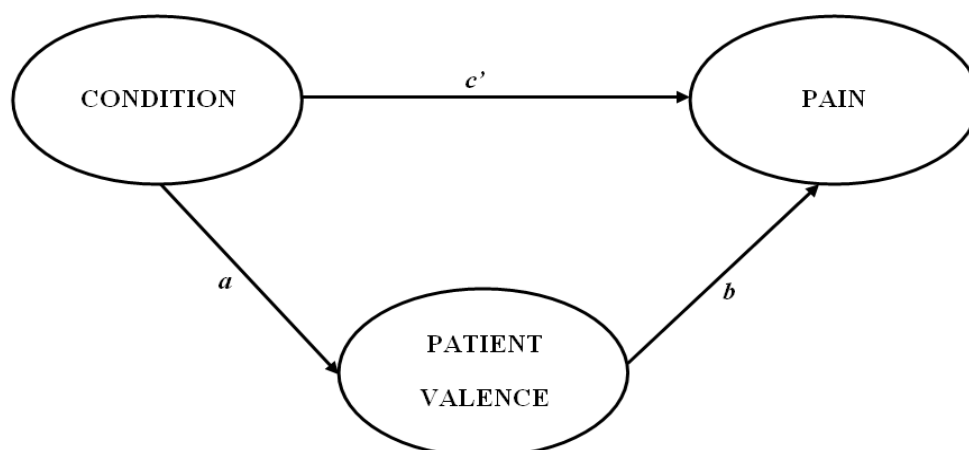


Figure 1. The effects and their corresponding weights in the mediation model.

Note₁. The total effect (c) consists of both the direct effect (c') and the indirect effect (ab).

Note₂. The figure is applicable for the outcomes sympathy, help and discrepancy in pain ratings as well.

RESULTS

Means and standard deviations of the ratings on pain, sympathy and inclination to help as well as of the discrepancy (pain ratings of the patients minus the pain ratings of the participants) and the patient valence per condition are presented in Table 1. All data were normally distributed ($KS\ Z\text{-score}(55) = 0.83, p = .490$), no outliers (defined as scores that deviate more than 3 SD's from the mean) were identified. Data of one participant were excluded from the analyses with regard to inclination to help, as data on inclination to help were missing for one participant.

Multivariate ANOVA revealed no effect of condition² upon pain, sympathy and inclination to help ($F(3,50) = 0.082, p = .970$). Univariate ANOVA revealed

² All participants in the social deception condition remembered that the text was about social deception. When participants were asked about the content of the text, all participants from the social deception condition mentioned words that are related to social cheating (e.g., misuse and fraud). None of the participants in the neutral condition mentioned words that are related to social deception.

no effect of condition upon the pain discrepancy measure ($F(1,53) = 0.65, p = .532$). However, an effect of condition upon patient valence was found ($F(1,53) = 4.99, p = .30; d = 0.60; 95\% \text{ CI } [.06, 1.14]$), indicating that valence of the patients was rated less positively in the social deception condition than in the neutral condition ($M_{\text{social deception}} = 21.03; M_{\text{neutral}} = 33.58$).

Table 1

Means (and standard deviations) for pain, help, sympathy, discrepancy and (patient) valence per condition

	pain	help	sympathy	discrepancy	valence*
control condition	4.48 (1.18)	4.24 (1.61)	5.10 (1.48)	1.53 (1.17)	33.58 (21.92)
social deception condition	4.38 (1.34)	4.04 (1.57)	4.98 (1.60)	1.74 (1.30)	21.03 (19.74)

* $p < .05$

Regression analyses revealed that less positive ratings of valence were related to lower pain ratings ($t(53) = 2.87, p < .006; \beta = .37$) and less sympathy ($t(53) = 2.66, p = .010; \beta = .34$); however, no effect of valence upon inclination to help ($t(52) = 1.45, p = .154$) was found. Next, the results revealed an effect of patient valence upon the pain discrepancy measure ($t(53) = -2.35, p = .022; \beta = -.31$), indicating a larger discrepancy between patient and participant with less positive ratings of the valence of the patients³.

Bootstrap analyses (with 5000 resamples) for patient valence as a mediator in the relation between condition and pain did not reveal a total effect of condition upon pain ($c = -0.09, SE = 0.34, p = .786$), nor a direct effect of condition upon pain ($c' = 0.19, SE = 0.33, p = .570$). However, a direct effect of condition upon patient valence ($a = -12.56, SE = 5.62, p = .030$) was found, indicating less positive ratings of valence in the social deception condition compared to the neutral condition. Also a direct effect of patient valence upon pain ratings ($b =$

³ The results remained similar after controlling for the level of pain behavior displayed by the patients (a low level of pain behavior versus a high level of pain behavior).

0.02, $SE = 0.01$, $p = .006$) was found, showing less attributed pain with less positive ratings of the valence of the patients. Further, the indirect effect of condition on pain through patient valence ($ab = -0.28$, $SE = 0.17$) was significant as the bootstrapped confidence interval (90% CI [-0.75, -0.04]) excluded zero. The same pattern of results was reflected with regard to sympathy and discrepancy: there was no total effect, nor a direct effect of condition upon sympathy ($c = -0.12$, $SE = 0.42$, $p = .771$; $c' = 0.20$, $SE = 0.41$, $p = .629$) or discrepancy ($c = 0.21$, $SE = 0.33$; $p = .532$; $c' = -0.01$, $SE = 0.34$, $p = .975$); however, there was a direct effect of patient valence upon sympathy ($b = 0.03$, $SE = 0.01$, $p = .010$) and discrepancy ($b = -0.02$, $SE = 0.01$, $p = .030$), indicating lower ratings on felt sympathy, as well as larger discrepancy between patient and participant with less positive ratings of the valence of the patients. Finally, the indirect effect of condition, through patient valence, was significant for both sympathy ($ab = -0.32$, $SE = .18$; 90% CI [-0.84, -0.06]) and discrepancy ($ab = 0.22$, $SE = 0.15$; 90% CI [0.02, 0.60]). Further, the bootstrap analyses did not reveal a total effect, nor a direct effect of condition upon help ($c = -0.19$, $SE = 0.43$, $p = .655$; $c' = -0.01$, $SE = 0.45$, $p = .983$) and no direct effect of valence upon help ($b = 0.02$, $SE = 0.01$, $p = .180$) was found. The indirect effect of condition, through patient valence, upon inclination to help was not significant ($ab = -0.18$, $SE = 0.17$; 90% CI [-0.66, 0.03]). These results indicate that priming with social deception negatively influences the pain estimates as well as felt sympathy and discrepancy indirectly via the valence of the patient.

DISCUSSION

The present study investigated the influence of priming participants with social deception upon participants' ratings of the patients' pain, sympathy and inclination to help the patients. Furthermore, we investigated the influence of priming participants with social deception upon the degree to which participants took the self-reported pain ratings of the patients into account. Finally, this study investigated whether the effect of priming with social deception could be explained by the valence of the patient as reported by the participants. Half of the

participants were primed with a text about the misuse of our health care system (i.e., social deception condition) and half of the participants were primed with a neutral text about the use of our health care system (i.e., neutral condition). Findings indicated that priming with social deception had no overall effect upon the ratings of pain, sympathy and inclination to help, nor upon the discrepancy in pain ratings between patient and participant. However, priming with social deception was associated with less positive ratings of the valence of the patients, which in turn contributed to lower ratings of pain, to lower ratings of sympathy and to a larger discrepancy between patients' pain ratings and those of the participants.

Contrary to previous findings of Kappesser and Williams (2008) and Poole and Craig (1992) who found a direct effect of priming on lower pain estimations, our findings indicate that this effect occurs indirectly, i.e., via observers' evaluation of the valence of the patient. It is not surprising that observers' evaluation of the valence of the patient is an important predictor. First, valence is, next to arousal and dominance one important dimension on which stimuli are rated by individuals (see Osgood and colleagues, as cited in Bradley & Lang, 1994). Second, considerable research has shown that the valence of the patient plays a significant role into pain estimation. For example, Chibnall and Tait (1995) and Tait and Chibnall (1994) found that less likable patients are attributed lower pain scores, lower distress and lower disability scores. Also, De Ruddere et al. (2011) found that observers attribute lower pain scores to patients expressing high pain when they dislike rather than like them. Moreover, our results indicate that observers' evaluation of the patients' valence not only influences observers' cognitive responses (i.e., pain estimation), but also observers' emotional responses (i.e., sympathy felt for the sufferer), as well as the willingness to take the self-reported pain of the patient into consideration.

There are several possible explanations for why patients were evaluated less positively when observers were primed with social deception. A first explanation may relate to the 'cheating detection mechanism' (Cosmides, 1989; Kappesser & Williams, 2008; Williams, 2002). Participants who have read the text about social deception might have been alerted to social deception of the patients, making

them more prone to evaluate the patients less positively. It is reasonable to assume that observers' belief in cheating behavior of others co-occurs with viewing the others less positively. A second, related mechanism stems from social psychology. Reading the text about misuse may have prompted participants to perceive the patients as part of their 'social out-group'. Following Turner, Brown, and Tajfel (1979) individuals favor others with whom they can identify (the 'social in-group') and reject others with whom they cannot identify (the 'social out-group'). Evaluating the valence of the patients as less positive may be part of considering these patients as being part of the 'social out-group'. Finally, a third potential mechanism is assimilation to the context in which the participants evaluated the valence of the patients. According to Tesser and Martin (1996), contextual elements have the most important influence upon evaluations, especially when people are instructed to make an evaluation of a stimulus or target. Individuals tend then to assimilate their evaluation to the valence of the context in which the target is presented, when, at least, this context is relevant and accessible for the individual (Tesser & Martin, 1996). In our study, evaluating the patient less positively may be explained by the assimilation to the negative context in which the target was presented (i.e., social deception).

Although the effect of priming upon the valence of the patients is clear, one puzzling question remains. Why did we not observe a direct effect of the priming upon participant's ratings of pain and sympathy? Previous research has indicated that when the cheating detection mechanism is activated, people attribute less pain to patients (Kappesser et al., 2006; Kappesser & Williams, 2008; Poole & Criag, 1992). Further, research revealed that observers feel less empathy and less altruistic motivation for members of their social out-group (Gutsell & Inzlicht, 2010). As yet, we have no full explanation. One reason may be that the priming had only a small effect on observers' evaluation of the valence of the patient, leaving insufficient power to detect other changes. Another explanation may be that also other variables, which we did not take into account, had an impact upon the effect of priming on the ratings. As our priming manipulation occurred on a more implicit level than previous studies in the context of pain (Kappesser et al., 2006; Kappesser & Williams, 2008; Poole & Criag, 1992), we may assume that

there was more room for other factors to influence the pain estimations. Indeed, according to Tait et al. (2009), observers who feel *uncertain* about their pain judgments, are more prone to contextual information. For example, participants in the social deception condition might have felt compassion towards patients who are the victims of the misuse of the healthcare system by others. Concurrent feelings of compassion might have suppressed the punishing behavior (i.e., attributing lower pain, feeling less sympathy and taking the self-reported pain less into account) towards the ‘cheating’ patients in our study. Accordingly, Condon and DeSteno (2011) indicate that when compassion is induced in participants, the likelihood that those participants will punish a ‘cheater’ is reduced.

Our findings may have some clinical implications. First, the results of the present study are in support of previous research demonstrating the crucial role of observers’ evaluation in terms of valence of the patient in observer responses towards (the person in) pain (Chibnall & Tait, 1995; De Ruddere et al. (2011); Tait & Chibnall, 1994; Tait & Chibnall, 1997). Taking the pain of less positively evaluated patients less seriously may have detrimental consequences for the patient as lower pain estimates may lead to inadequate pain management, and less sympathy to less actual helping behavior. Second, taking the patient’s pain report less into consideration may make pain sufferers feel disbelieved and misunderstood. All this may impact treatment outcome.

This study has some limitations and indicates some important suggestions for future research. First, we used an experimental procedure to prime participants with social deception. It may well be that in everyday situations, individuals are primed with social cheating in other ways (e.g., hearing that someone got a sick note, but does not seem to be sick at all; hearing colleagues reporting incidences of social deception). It is not known which situations prime for social deception. Further research may identify these triggers in natural situations. Second, although the current study indicated one particular factor affecting observers’ evaluations of the valence of the patient, i.e., an (implicit) priming of the observers with social deception, research about other factors that may prime observers with social deception and induce less positive evaluations is needed. For example, it would be interesting to examine whether the absence of medical evidence for the pain may

function as a prime towards social cheating and whether the relationship between the absence of medical evidence for the pain and lower ratings of pain (Chibnall & Tait, 1994; Chibnall & Tait, 1995; Tait & Chibnall, 1994; Tait & Chibnall, 1995) is mediated by observers' evaluation of the valence of the patient. Another example that may function as a cue for social cheating has been suggested by MacLeod, LaChapelle, and Hadjistavropoulos (2001), who found that observers judge adaptive copers who claim compensation as less deserving of compensation than patients with maladaptive coping styles. Third, behavioural measures (e.g., approach-avoidance behaviour measures) may complement our self-report measures and strengthen the validity of our results. Self-reports may be prone to social desirability. Fourth, participants were recruited from the community and our results may not generalize to professional caregivers. Future research may examine the effect of implicit priming in professional caregivers. Although Kappesser et al. (2006) found an effect of the explicit activation of the cheating detection mechanism in professional caregivers, we do not know whether such effect will be found with regard to a more implicit manipulation. Fifth, videos of four actual patients with chronic low back pain were used for this study. An incongruence was found between the self reports and the displayed pain behavior of two of these patients. Future research may focus upon different patients/patient groups in order to investigate the generalizability of the results.

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APPENDIX A

Use of healthcare

Belgium has developed a comprehensive health care. Research shows that many people use this health care. For example, many people visit a physician because they are ill or because they need a prescription for medication to treat their complaints/symptoms. People can also visit the physician in order to get a sick note so that they can justify their absence from work due to illness.

In Belgium, we pay social security taxes in order to keep the health care working. This is money that we – through our taxes – give to the government so that adequate care to ill people is warranted (for example by ensuring that sick people receive sickness benefits). People make use of it, for example, by receiving the compensation when being ill. Hence, the system of social security implies that we work together to ensure that people who are ill can receive appropriate care.

To conclude, we can say that it is important to get a good insight into the use of the health care system so that we can further improve the health care.

Misuse of health care

Belgium has developed a comprehensive health care. Research shows that many people misuse this health care. For example, many people visit a physician not because they are ill but because they want a prescription for medication they don't need or because they want a sick note when they are not ill.

Furthermore, in Belgium, we have to pay social security taxes. This is money that we – through our taxes – give to the government so that adequate care to ill people is warranted (for example by ensuring that sick people receive sickness benefits). Some people make misuse of it, for example, by receiving the compensation when faking or exaggerating illness. This implies that we unfairly pay for the health care of people who are actually not ill or at least not to the extent they pretend to be. Moreover, this also implies that there is less money left for those people who are ill and who could use the money.

To conclude, we can say that it is highly important to detect such misuse on time, so that care for other people who are really ill is not at risk.

**THE IMPACT OF BEING PRIMED WITH SOCIAL
DECEPTION UPON NURSE RESPONSES TO
PATIENT PAIN¹**

ABSTRACT

This study investigated whether priming with social deception affects nurse responses (pain estimates, self-reported sympathy and estimates of the patients' need for help) towards patient pain. Further, we explored whether the valence of the patients (positive/negative), as reported by the nurses, is a potential mechanism underlying the effect of priming. First, participants ($N = 60$) took part in an 'independent' delayed memory study in which they read either a neutral text about the use of the health care system (neutral condition) or a text about its misuse (social deception condition). Second, participants watched videos of pain patients performing pain-inducing activities. Participants rated the patients' pain, the sympathy felt for the patients and the patients' need for help. Third, the participants re-estimated patients' pain when patients' self-reports of pain were provided. Fourth, pictures of the patients were shown and participants reported the valence of the patients (positive/negative). Results revealed no direct effect of priming with social deception on nurses' ratings of pain, sympathy and need for help. There was also no impact of priming on the degree to which the nurses took into account the patient's self-report of pain, nor on the valence of the patient as reported by the nurses.

¹ De Ruddere, L., Goubert, L., Vervoort, T., Williams, A.C.deC., & Crombez, G. (in preparation). The impact of being primed with social deception upon nurse responses to patient pain.

INTRODUCTION

Pain is the most common health complaint in clinical settings (Crombie, Croft, Linton, LeResche, & Von Korff, 1998). For example, Achterberg et al. (2010) report a daily prevalence of pain that varies between 32% and 50% in three European long-term care facilities. Moreover, research has demonstrated that the treatment of pain is often unsatisfactory (Spacek, 2006). Recently, Ribeiro et al. (2012) demonstrated that 28% of the hospitalized patients with acute pain experienced no pain relief with analgesics, including strong opioids.

According to the pain communications model of Hadjistavropoulos et al. (2011), a shift is needed from a focus upon the patient's internal experience towards the pain experience as an interpersonal process. In particular, when the patient experiences pain, the pain is expressed to the observer, often the healthcare practitioner, who will respond to the patient's pain. Based upon the empathy model of Goubert and colleagues in the context of pain (Goubert, Craig, & Buysse, 2009; Goubert et al., 2005; Goubert, Vervoort, & Craig, 2013), those responses entail three distinct but related responses: (1) the cognitive responses (e.g., pain estimates), (2) emotional responses (e.g., felt sympathy for the patient), and (3) behavioral responses (e.g., helping behavior). Applied to the context of patient care, healthcare practitioners' responses towards patient pain are very crucial with respect to pain management. In clinical contexts, such as hospitalized settings, nurses play a key role in the management of the patients' pain. In particular, nurse estimates of the patients' pain may relate to clinical decision making, for example, the amount and frequency of analgesics administered to a particular patient.

The important role of the nurse in pain management is reflected in abundant research focusing on factors that influence the nurse estimates of patient pain (see Solomon (2001) for a review). However, one salient and important factor that remains unexplored is the priming of the nurse with social deception (Hadjistavropoulos, 2012). Priming refers to the exposure of individuals to particular stimuli that are presumed to influence the individual's subsequent actions. In the context of patient care, healthcare practitioners are frequently

primed with information about the possibility of the patient's cheating behavior. For example, considerable research focuses on the healthcare practitioner's ability to distinguish between the patient's genuine pain and the patient's faked or exaggerated pain (e.g., Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999; Hill & Craig, 2002; 2004). In general, abundant research has focused on strategies to avoid and combat fraud in the healthcare system (Rashidian, Joudaki, & Vian, 2012). Importantly, all these messages may induce alertness in healthcare providers to suspect malingering in their pain patients. This alertness is described as the 'cheating detection mechanism' in the social contract theory (Cosmides, 1989; Kappesser & Williams, 2008; Williams, 2002). In particular, this theory assumes that individuals are sensitive to cues for social cheating in order to protect themselves from being exploited. Applied to the context of pain management, nurses' estimations of patients' pain may be conceptualized as social exchange. It is reasonable to assume that the nurse's suspiciousness about the genuineness of the patients' pain may lead to lower pain estimates, less sympathy felt for the patients and a lower tendency to help the patients. In line with this reasoning, Kappesser, Williams, and Prkachin (2006) found that nurses and doctors underestimated patient pain more when explicitly primed to expect cheating of the pain patients (the participants were told that some of the patients might fake their pain expressions) compared to when not primed with the patients' cheating behaviors. In the study of Kappesser et al. (2006), nurses were primed in a rather *explicit* way. Specifically, the nurses were told that some of the patients they would observe were faking pain to obtain opioid drugs. However, we argue that cues to social deception may be subtle and implicit, rather than explicit. For example, reading an article in the newspaper about the misuse of the healthcare system might bias the reaction of an individual towards another one with pain. Although there is preliminary evidence for the role of implicit priming of lay observers with social deception on their reactions towards pain patients (De Ruddere, Goubert, Vervoort, Kappesser, & Crombez, 2013), the role of implicit priming of nurses in the process of pain estimation remains unexplored.

The first aim of the present study was the examination of the role of *implicit* priming with social deception on the nurse responses towards patient pain. In

particular, we investigated the influence on three responses: 1) the nurses' estimates of the patients' pain, 2) the self-reports of felt sympathy for the patients and 3) the nurses' estimates of the patients' need for help. The second aim of the study was to investigate whether the priming influenced the degree to which the nurses took into account the patients' pain estimates when making pain judgments. Third, in accordance with De Ruddere et al. (2013), we investigated the influence of priming on the nurses' estimates of the patient valence. Research suggests that the nurse evaluation of the patient is a potential factor influencing the actual amount of analgesia prescribed (Salmon & Manyande, 1996). Additionally, we investigated whether the potential effect of priming on the nurse ratings of pain, sympathy and need for help would be mediated by the nurses' estimates of the patient's valence. In particular, we expected that priming with social deception would relate to lower estimates of pain, sympathy and the patient's need for help by the nurses and that this relationship would be explained by a negative evaluation of the patient by the nurse.

METHOD

Participants

All nurses ($N = 106$) from the General Hospital 'Koningin Fabiola' of Blankenberge were invited by the head of their department (who was blind with regard to the purpose of the study) to participate in the study. To be eligible, participants had to speak Dutch fluently and they had to be active as a nurse. We aimed at recruiting 60 participants. After the first two weeks of recruitment, 74 nurses agreed to participate (response rate = 70%). We decided to exclude the nurses ($N = 11$) from the surgery department because of familiarity with the experimenter. Further, one participant did not participate because of illness and two participants were not able to participate because of maternity leave. A total of 60 nurses completed the experiment. The mean age of the remaining sample ($N = 60$) was 37.43 years ($SD = 10.51$; range = 21 – 54 years). Most participants were married, in a relationship or cohabiting (83%). Eighty-five percent of the

participants were female. This is in accordance with data provided by the annual statistics of the Federal public service in Belgium (distribution in Flanders for nurses: 14% men and 86% women; see FOD, Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu, 2012). The study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University and by the medical ethical committee of the Ghent University Hospital.

Stimuli

We selected four video sequences and pictures of four different chronic low back pain patients who performed four pain-inducing movements (see Table 1 for an overview of each patient's sex, age, and per video sequence, the patient's facial pain expression, active pain behaviour, self-reported pain rating, as well as the duration of each sequence). These videos were selected from the G-PAVIDA (the Ghent Pain Videos of Daily Activities); detailed description of the videos can be found in De Ruddere, Goubert, Stevens, Williams, and Crombez (in press). Videos were presented by the INQUISIT Millisecond software package, version 3.0.4.0, on a 745 Dell Optiplex computer with a 75 HZ, 19-inch colour CRT monitor. The overall mean length of the video fragments presented in the study was 16s ($SD = 7.36$). Videos were also presented with vignettes that provided some sociodemographic information about the patients. This information was not part of the experimental manipulation, but was used to make the pictures and videos of the patients more vivid or realistic. Furthermore, the information was counterbalanced across the four patients. Vignettes described for each patient the (fictitious) first name (Sam, Jo, Kim, Dominik), age (49, 48, 46, 45), current job (surveyor, teacher, public employee, bank employee) and number of children (4, 2, 1, 3).

Further, in the present study, we used the same texts about the Belgian health care system as described in De Ruddere et al. (2013). In particular, we used one text that described the health care system and how people make use of it (neutral condition) and one text that described how some people take advantage of it (misuse of the health care system) and what consequences this has for the whole

population including the participant (see Appendix A for the English version of the texts).

Measures

Participants reported on their sex, age (in years), nationality, marital status, employment (part time or full time), work experience (in years), and department (e.g., emergency department, geriatrics). Further, nurses' estimates of the patient's pain, sympathy felt for the patient and the patient's need for help were measured by a numerical rating scale (0-10). Next, the nurses were requested to evaluate the patients in terms of valence using a 21-point scale (-10 = very negative, 0 = neutral, 10 = very positive). Rating scales ranging from negative to positive have been applied by several researchers to measure participants' valence towards events or stimuli (e.g., Kanske & Kotz, 2012; Schryer & Ross, 2012).

Procedure

The procedure of this study was the same as described in the study of De Ruddere et al. (2013). First, the participant was asked by the experimenter to participate in a small study of a colleague who investigated memory processes². The participant was informed that he/she would be asked to read a text very carefully and that questions would be asked (1) immediately after reading the text and (2) after the participation in the 'actual' experiment of the experimenter. Written informed consent was obtained. By means of a computerized random number generator, participants received the neutral text about the health care system (i.e., neutral condition) *or* the text about the misuse of the health care system (i.e., social deception condition). Afterwards, the participant reported during one minute what he/she remembered about the text, read the text a second time and consequently, started with the 'actual' experiment: participants were told that the study examined the impression formation of others with pain by healthcare practitioners

² For this study, in contrast with the study of De Ruddere et al. (2013), there were not two different experimenters.

and that questions about this impression formation would be asked at the end of the experiment. Next, a first neutral picture of a patient combined with one of the four vignettes was shown and one video sequence of the same patient performing a painful movement was presented (this procedure was repeated with the other 15 video sequences). After the presentation of each video, a black screen appeared and participants were requested to provide written ratings of the patient's pain, their sympathy felt for the patient and belief that the patient needed help. Consequently, participants were presented one video of each patient together with the self-reported pain intensity ratings of the patients (NRS; 0-10) and were, once again, asked to estimate the patients' pain. Finally, a picture of each patient was shown to the participant who rated the overall valence of the patient, i.e., the participant rated how positively/negatively she/he evaluated the patient.

Statistical analyses

The outcome variables were participants' ratings of 1) patients' experienced pain ('pain'), sympathy for the patients ('sympathy'), and patients' need for help ('help'), 2) the absolute difference in pain ratings between patients and participants when the self-reported pain ratings of the patients were provided ('discrepancy'), and 3) participants' ratings of the valence of the patients (positive/negative; 'patient valence'). To investigate the influence of condition upon pain, sympathy and help, a multivariate ANOVA was performed with condition as a between-subjects variable and pain, sympathy and help as dependent variables. To investigate the influence of condition (i.e., social cheating vs. neutral condition) upon discrepancy and upon patient valence, two univariate ANOVA's were performed with condition as fixed factor and discrepancy and patient valence as dependent variables respectively. Further, the influence of patient valence upon pain, sympathy, need for help and discrepancy was investigated by means of four regression analyses with patient valence as the independent variable and pain, sympathy, help and discrepancy as the dependent variables. Finally, to test the mediating role of patient valence, we selected the bootstrapping method following the procedure described by Preacher and Hayes

(Hayes, 2009; Preacher & Hayes, 2004). The bootstrapping method is a nonparametric resampling procedure that has been shown to be more appropriate than a normal-theory test (i.e., Sobel's test) for studies with smaller sample sizes (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Preacher & Hayes, 2004; Shrout & Bolger, 2002). See De Ruddere et al. (2013) for a similar approach.

RESULTS

Descriptives

Table 2 presents an overview of the sociodemographic data per condition. In order to investigate whether the two conditions differed significantly on the participant's age and the participant's years of working experience, we performed two independent t-tests (see Table 2). These analyses revealed a significant difference in age and years of working experience between the two conditions. Further, there were four missing values for the scores on nationality (3 missing values for the neutral condition and 1 missing value for the deception condition). Means and standard deviations of the ratings on pain, sympathy and need for help as well as of discrepancy (pain rating of the patient minus the pain rating of the participant; absolute difference scores) and the patient valence per condition are presented in Table 3. No outliers (defined as scores that deviate more than 3 SD's from the mean) were identified, except for one participant with regard to valence evaluation. Therefore, the data for this participant were excluded from the analyses with evaluation as the dependent variable. All data were normally distributed.

Table 1

The age of each patient and for each patient: 1) the scores on facial pain expression averaged across the four video sequences, 2) the active pain behavior, averaged across the four video sequences, 3) the mean duration of the video sequences and 4) patients' self reported pain ratings for each video sequence.

patient	age	facial pain expression	active pain behavior	duration	pain 1	pain 2	pain 3	pain 4
FL	65	0.5 (2)	8.25 (3)	11.55s (2)	7	4	6	7
ML	55	0.5 (2)	7 (2)	13.55s (2)	7	7	6	7
FH	46	1 (4)	11.25 (3)	20.25s (4)	8	8	8.5	8.5
MH	63	1 (4)	16.75 (4)	18.71s (3)	7	5.5	7	7

Note 1. In the column 'patient', the first initials refer to the gender of the patients (F = female, M = male) and the second initials refer to the level of pain expression that is displayed by the patient (based on face validity; L = low pain expression; H = high pain expression).

Note 2. Pain 1, pain 2, pain 3 and pain 4 refer to patients' self-reported pain ratings for each video sequence.

Note 3. The quartile with regard to the scores of the 34 patients of the G-PAVIDA each patient fitted in is provided between brackets.

Note 4. The scores on active pain behavior of patient FL and patient FH fitted within the same quartile (based on the larger sample; $N = 34$). However, the mean score on active pain behavior for the two patients in the 'low pain expression' group ($M_{low} = 7.63$) fitted within the 2nd quartile while the mean score on active pain behavior for the two patients in the 'high pain expression' group ($M_{high} = 14$) fitted within the 4th quartile.

Table 2

Characteristics of the nurses per condition

	Control condition	Social deception condition
Sex (male)	14%	16%
Age (in years)*	33.07 (10.26)	41.52 (9.13)
Nationality (Belgian)	86%	97%
Marital status (single)	21%	13%
Head nurse	7%	7%
Fulltime employment	76%	45%
Working experience as nurse*	10.49 (9.87)	19.44(9.13)
Department		
• emergency	21%	13%
• orthopaedic consultations	0%	10%
• day hospital	7%	10%
• intensive care	14%	16%
• surgery	10%	10%
• internal medicine	14%	23%
• geriatrics	21%	13%
• revalidation	14%	7%

*The conditions differed significantly ($p < .001$).

Analyses

Multivariate ANOVA revealed no effect of condition upon pain, sympathy, and need for help ($F(3,56) = 0.20, p = .896$).³ Further, univariate ANOVA revealed an

³ These results remained similar after controlling for the level of pain behavior (a low level of pain behavior vs. a high level of pain behavior). Further, before we controlled for the nurses' age and years of working experience by means of multivariate ANCOVA, we tested for the assumption of homogeneity of regression slopes by investigating whether the effect of age/years of working experience on pain, sympathy and help interacted with condition (see Field, 2005). This assumption was not violated for the analyses with pain and need for help, however, the assumption was violated for the analyses with help ($F(1,56) = 10.18, p = .002$). Therefore, multivariate ANCOVA analyses were only performed for pain and need for help. The results of these analyses indicated no effect of condition on pain and need for help when controlled for age ($F(2,56) = 0.80, p = .454$) and working experience ($F(2,56) = 0.32, p = .727$).

effect of condition upon the pain discrepancy measure ($F(1,58) = 4.15, p = .046$). However, this effect disappeared when we controlled for the participant's age ($F(1,57) = 2.11, p = .152$), or the participant's years of working experience ($F(1,57) = 2.01, p = .162$). Further, no effect of condition upon patient valence was found ($F(1,57) = 0.80, p = .374$)⁴. Similarly, regression analyses revealed that valence was not related to pain ($t(57) = 1.02, p = .311$), sympathy ($t(57) = 0.38, p = .706$), help ($t(57) = 1.18, p = .242$), or discrepancy ($t(57) = -0.27, p = .792$). Finally, because condition had no effect on the nurse ratings of pain, sympathy, need for help, and evaluation scores, no mediation analyses were performed.

Table 3

Means (and standard deviations) for pain, help, sympathy, discrepancy and (patient) evaluation per condition

	pain	help	sympathy	discrepancy	evaluation
Control condition	2.93 (1.02)	1.54 (1.25)	4.14 (1.58)	2.89 (0.87)	1.79 (23.79)
Social deception condition	3.04 (0.81)	1.52 (1.06)	4.41 (2.03)	2.37 (1.10)	7.08 (21.47)

DSCUSSION

This study examined the influence of priming nurses with social deception upon their estimates of patients' pain, their reported sympathy for the patients, their estimates of the patients' need for help and the degree to which the nurses took the pain report of the patients into account. Additionally, we investigated the influence of the priming on the nurses' (positive/negative) evaluations of the patients. The priming procedure consisted of a reading of a text about the use of the healthcare system (neutral condition) or the misuse of the healthcare system (social deception condition). The results indicated no effect of the priming manipulation upon nurses' ratings of pain, sympathy and need for help, and no

⁴ These results remained similar after controlling for the level of pain behavior and for the nurses' age and years of working experience.

effect on the degree to which they took the patient's pain report into account. Furthermore, no influence of the priming on the nurses' evaluation of the patients was found.

Examination of the role of being primed with social deception on nurse responses towards patient pain is crucial given the high prevalence of cues that might prime healthcare providers with social deception. For example, research into observers' ability to discriminate genuine from faked pain (e.g., Hill & Craig, 2002) and the focus of our insurance system on the importance of the healthcare practitioner's role in detecting social deception in patients (Hadjistavropoulos, 2012) may prime healthcare practitioners with social deception. Being primed with social deception might lead to negative responses of the healthcare practitioner towards the patient's pain, and therefore, might adversely impact on pain treatment. Worth noting, despite the omnipresent cues that may alert the healthcare practitioners towards social cheating of patients, research has demonstrated that social deception, e.g., with respect to iatrogenic drug addiction, is seldom observed in pain patients (Drayer, Henderson, & Reidenberg, 1999).

Our results, however, indicate that priming with social deception does not influence nurses' responses towards the patient pain. This is in contrast with the study of Poole and Craig (1992) who found that nurse students estimated patient pain to be less severe when they had been primed in advance with social deception. In the study of Poole and Craig (1992), the nurse students were told that they would observe both genuine and faked faces of pain patients. Furthermore, our results are also not in line with the findings of Kappesser et al. (2006), indicating that nurses underestimated the patients' pain more when they were told that some patients they would observe fake pain to obtain opioid drugs. In line with the reasoning of De Ruddere et al. (2013), the current findings may be due to the rather implicit priming of the nurses with social deception. In particular, contrary to the priming method used in Poole and Craig (1992) and in Kappesser et al. (2006), our priming texts did not refer to the patients whom the nurses observed during the experiment, making the priming less explicit. Consequently, in our study, there might have been more room for other factors to play an important role on the nurse responses, e.g., the pain behavior that is

displayed by the patient, which might have led to a ceiling effect⁵. Indeed, according to Ferrell, Eberts, McCaffery, & Grant (1991), the patient's pain behavior is one crucial cue that nurses take into account with regard to their clinical decision making. Another explanation for why we did not find an effect of the priming on the nurse responses may rely in the relevance of the content of the texts for the nurses. For example, the text provided the example of individuals who feign their symptoms in a doctor visit in order to obtain a prescription for medication or because they want a sick note. This information does not directly relate to the clinical context of hospitalized care, in which the nurses were employed. This might also explain why in the study of De Ruddere et al. (2013) with lay observers (for whom the texts might have been more relevant), an effect of the priming on the evaluation was found while in the present study, no influence was observed. Consequently, arguing that, based on the results of our study, priming nurses with social deception does not influence their responses to patient pain is precarious. In line with this reasoning are the findings of Taylor et al. (1984) who demonstrated that nurses attribute lower pain to patients in the absence of clear medical evidence for the pain, a condition that is often suggested to be a prime for nurses toward social deception of patients (Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999; Hadjistavropoulos, 2012).

There are several limitations in our study. First, the nurses in the study were asked to observe unknown patients presented by means of video sequences. Although this experimental manipulation allows controlling for potential confounding variables, it reduces ecological validity. In particular, the nurses are not familiar with the medical history of the patient and are not involved in a real clinical encounter with the patients. A second limitation relates to the text stimuli used in our study to prime the nurses. Future research would benefit from

⁵ A significant main effect of patients' pain behaviors on the nurse ratings of patient pain, felt sympathy and estimate of the patients need for help was found ($F(3,57) = 150.27, p < .001$), indicating higher pain estimates, more felt sympathy and higher estimates of the patient need for help when the patient was displaying a high compared to a low level of pain behavior. There was no interaction between the level of the patients' pain behaviors and the condition on the nurse ratings of patient pain, felt sympathy and estimates of the patient need for help ($F(3,56) = .270, p = .847$).

including more relevant cues to prime nurses with social deception, e.g., cues about iatrogenic drug addiction of hospitalized patients (Drayer et al., 1999) or cues from insurance companies that stress the important role of healthcare practitioners in being vigilant about the possibility of social cheating (Hadjistavropoulos, 2012). Third, in contrast with the study of De Ruddere et al. (2013), there was only one experimenter. This means that the ‘memory experiment’ as well as the actual experiment was led by the same experimenter, who was, as a consequence, not blind with regard to the condition the nurse was assigned to. This may have biased the results.

To conclude, the priming with social deception in our study did not influence the nurses’ ratings of the patients’ pain, their sympathy felt for the patients and their estimates of the patients’ need for help, nor their evaluation of the patients in terms of general valence (positive-negative). Future research should further investigate to what degree different forms of priming with social deception may influence nurses’, and in general, healthcare practitioners’ responses towards patient pain.

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APPENDIX A

Use of healthcare

Belgium has developed a comprehensive health care. Research shows that many people use this health care. For example, many people visit a physician because they are ill or because they need a prescription for medication to treat their complaints/symptoms. People can also visit the physician in order to get a sick note so that they can justify their absence from work due to illness.

In Belgium, we pay social security taxes in order to keep the health care working. This is money that we – through our taxes – give to the government so that adequate care to ill people is warranted (for example by ensuring that sick people receive sickness benefits). People make use of it, for example, by receiving the compensation when being ill. Hence, the system of social security implies that we work together to ensure that people who are ill can receive appropriate care.

To conclude, we can say that it is important to get a good insight into the use of the health care system so that we can further improve the health care.

Misuse of health care

Belgium has developed a comprehensive health care. Research shows that many people misuse this health care. For example, many people visit a physician not because they are ill but because they want a prescription for medication they don't need or because they want a sick note when they are not ill.

Furthermore, in Belgium, we have to pay social security taxes. This is money that we – through our taxes – give to the government so that adequate care to ill people is warranted (for example by ensuring that sick people receive sickness benefits). Some people make misuse of it, for example, by receiving the compensation when faking or exaggerating illness. This implies that we unfairly pay for the health care of people who are actually not ill or at least not to the extent they pretend to be. Moreover, this also implies that there is less money left for those people who are ill and who could use the money.

To conclude, we can say that it is highly important to detect such misuse on time, so that care for other people who are really ill is not at risk

GENERAL DISCUSSION

PREFACE

Pain is an inherently interpersonal experience: it is both expressed by the pain sufferer and perceived by the observer (Hadjistavropoulos et al., 2011). According to the communications model, an individual with pain expresses his/her pain by means of pain behaviors (e.g., facial pain expression and full body pain behaviors). Observers, in turn, decode these expressive pain behaviors and make inferences about the patients' pain experiences, among which inferences about the patients' pain intensity. These observer pain estimates are, in turn, likely to influence the patients' pain experiences, e.g., through important decisions with regard to the management of the patients' pain. Several variables may impact on the observers' pain estimates. Based on the empathy model in the context of pain of Goubert et al. (2005), observers' pain estimates or 'sense of knowing the experience of the other's pain' is influenced by features of the person in pain (i.e., bottom-up variables), features of the observer (i.e., top-down variables) and contextual influences. In this PhD project, the role of particular bottom-up, top-down and contextual variables was investigated. The three research questions will be investigated in both lay observers and healthcare practitioners, given the important role of both groups in the management of pain. A **first aim** was to investigate whether the valence of the patients (positive versus negative; bottom-up variable) influences the observers' pain estimates. Evaluating objects or individuals in terms of their valence (positive versus negative) is inherent to human life. In line with this reasoning are the findings suggesting that the patient's likability is one important dimension on which the patient is perceived by healthcare practitioners (Wills, 1978). However, research into the role of patient valence in observers' pain estimates is scarce. A **second aim** of the project was to investigate whether observers' estimates are influenced by information about whether the patient's pain does or does not fit within a strict biomedical perspective. Based on the social contract theory (Cosmides, 1989; Kappesser, Williams, & Prkachin, 2006; Kappesser & Williams, 2008), observers may

attribute less pain to patients when the pain does not fit within a strict biomedical perspective. In general, the social contract theory defines social exchange situations as situations in which individuals ask for benefits from other individuals. However, one important prerequisite is that the individuals who claim help meet particular requirements, i.e., that they are in need for help (Cosmides, 1989). In the context of pain, Kappesser and Williams (2008) have argued that a situation in which an observer estimates the pain of another individual with pain can be considered a social exchange situation. In particular, the individual with pain asks for help from another individual (the observer). However, when the individual is not in real pain, the social exchange would not be warranted and the observers might be 'exploited'. Therefore, based on the social contract theory, individuals are alert to cues to social cheating (e.g., pain that does not fit within a strict biomedical perspective); this cheating detection mechanism is believed to protect us from being exploited by others (Kappesser et al., 2006). Finally, a **third aim** was to investigate whether the (implicit) priming of the observers with social deception influences the observers' estimates of the patients' pain. Based on the social contract theory, it was hypothesized that priming with social deception would relate to lower pain estimates of observers. The three research questions were systematically investigated in both lay observers (i.e., individuals recruited from the community) and healthcare practitioners (i.e., physiotherapists, general practitioners, and nurses).

Chapter 1 examined the influence of the patients' valence (positive/negative) on pain estimations made by lay observers. Patients' valence was manipulated by means of an evaluative conditioning procedure: pictures of patients were combined with positive, neutral, or negative personal traits. Afterwards, observers were presented video sequences that displayed the patients' facial pain expressions (patients were expressing no, mild-, or high-intensity pain) and the observers rated the patients' pain. **Chapter 2** involves a replication of this study in physiotherapists. Physiotherapists play a key role in the management of patients with pain; they are often responsible for the first line intervention for these patients. **Chapter 3** considers the impact of the presence/absence of 1) medical evidence for the patients' pain and 2) psychosocial influences on the patients' pain

experiences, on lay observers' ratings of the patients' pain, their emotional responses (sympathy and distress) and behavioral inclination to help the patients with daily activities. In particular, the observers viewed videos of four patients (expressing an equal level of pain), paired with vignettes describing absence or presence of a) medical evidence for the pain and b) psychosocial influences on the patients' pain experiences. Chapter 3 describes two studies, each using a similar methodology except for the manipulation of the presence/absence of psychosocial influences. Specifically, the influence of psychosocial factors was made more explicit in study 1 than in study 2. **Chapter 4** presents findings on the impact of the presence/absence of information about medical evidence for pain and psychosocial influences on the patients' pain experiences upon observer responses (ratings of the patients' pain, felt sympathy and inclination to help the patients with daily activities). Further, this chapter also reports on the influence of both variables (i.e., presence/absence of medical evidence/psychosocial influences) upon the degree to which the observers took the patients' self-reports of pain into account and the moderating role of the patients' pain expressions in the relationship between the presence/absence of medical evidence and psychosocial influences on the observers' responses. The mediating role of the observers' beliefs in deception and general evaluations of the patients (in terms of valence) was also addressed. A replication of this study in a sample of healthcare practitioners (general practitioners and physiotherapists) is described in **chapter 5**. Besides physiotherapists, general practitioners have an important role in the management of patients with pain given their responsibility for the first-line care of these patients. **Chapter 6** describes the investigation of the role of priming with social deception into lay observers' responses (pain estimates, self-reported sympathy, inclination to help) towards others' pain. Chapter 6 also describes the examination of the role of priming with social deception in the degree to which observers take the patients' self-reports of pain into account. This chapter also addressed the potential mediating role of the valence of the patients (positive/negative), as reported by the participants. A replication of this study in a sample of nurses is described in **chapter 7**. Nurses are of critical importance in hospitalized settings, where the management of pain is often a major challenge.

DEVELOPMENT OF EXPERIMENTAL PARADIGMS

In all studies, a paradigm with photographs and videos of *actual* patients was used. This is a particular strength of the project. In most previous studies into observers' pain estimates, short stories about fictitious patients were used to investigate the role of the patients' valence (e.g., Chibnall & Tait, 1995) or the absence of medical evidence for the pain (e.g., Chibnall, Tait, & Ross, 1997). The inclusion of videos displaying the expressive pain behaviors of actual patients might improve ecological validity and makes the experimental paradigms used in this PhD project more akin to clinical settings. Furthermore, the use of the videos allowed the investigation of the moderating role of the patients' expressive pain behaviors in the relationship between the variables of interest and the observers' pain estimates. In chapter 1, chapter 2 and in chapter 3, videos selected from the UNBC-McMaster Shoulder Pain Archive (Prkachin & Solomon, 2008), which is a set of videos displaying facial pain expressions of shoulder pain patients undergoing a physiotherapy assessment protocol, were used. In chapters 4-7, videos selected from the Ghent Pain Videos of Daily Activities (G-PAVIDA), a set of videos that was developed in the context of the current PhD project, were selected. The G-PAVIDA contains videos of 34 patients (19 women, 15 men; $M_{\text{age}} = 52$ years (range: 23-74; $SD_{\text{age}} = 12$ years) with chronic low back pain who performed four potentially pain-inducing movements. Requested movements to perform were 1) lying down on a bed and standing up, 2) sitting down on a chair and standing up, 3) taking a box from the ground, putting it on a table and replacing it on the ground, 4) picking up marbles from the ground. Choice of these movements is based upon literature indicating the painfulness of these movements, in consultation with Prof. Dr. Lieven Danneels who works as a physiotherapist at Ghent University Hospital and based upon the pilot study with patients performing different movements. This set of videos was developed because the PhD project primarily aimed at examining the estimation of pain based on the full body pain behaviors of patients. It was argued that the observation of the patients' full body pain behaviors was more allied to real-life encounters between patients with pain and observers. Furthermore, patients

displaying pain behaviors while performing *daily activities* (e.g., taking a seat, lifting a box,...) were preferred. Such videotapes are likely to be ecologically valid: the movements are relevant for all pain patients and occur in a lot of (interpersonal) contexts where a pain estimation (by a health care professional or a lay observer) is made. For the development of the video set, patients were also preferred to actors. In particular, research indicates that observers are well capable of identifying simulated expressions of pain (Larochette et al., 2006). The use of real patients also allows the inclusion of the patients' self-reports of pain in the studies. In particular, after each movement, the patients were asked to report on the pain that they experienced during the performance of the movement (visual analogue scale; 0-10).

The patients' expressive pain behaviors were coded by means of an adjusted coding system, based upon the pain behavior-coding manual of Sullivan and colleagues (the Pain Can Paradigm; unpublished manual). The set up of the videos did not allow making a fine grained coding of the facial pain expressions of the patients. Therefore, the coding scheme is particularly suitable for the levels of pain expressed by the patients in the studies presented in this PhD project; it is not as comprehensive as the pain behavior-coding manual of Sullivan and colleagues. In particular, each movement has been coded for the presence of one or more of the key facial pain expressions (Craig, Prkachin, & Grunau, 2001; Prkachin, 1992; Rocha, Prkachin, Beaumont, Hardy, & Zumbo, 2003) [(absent (0), slightly present (1) distinctly present (2)]. Further, the presence or absence of active pain behavior (e.g., guarding, holding or rubbing) was coded per second. Inter-rater reliability was calculated according to the formula given by Ekman and Friesen (1978) that assesses the proportion of agreement on actions recorded by two coders relative to the total number of actions coded as occurring by each coder. With regard to the G-PAVIDA, acceptable inter-rater reliability was achieved for facial pain expression (.66) and good inter-rater reliability was achieved for active pain behavior (.89). The scores on facial pain expression could range from 0-2 and the scores on active pain behavior were calculated by summing the seconds in which the patient was showing active pain behavior. For the 34 patients, the mean score on facial pain expression was 0.66 ($SD = .56$; range = 0-2), and the mean score on

active pain behavior was 8.97 ($SD = 5.76$; range = 0-47). Further, the mean duration of the videos was 14.41s ($SD = 5.10$; range = 2-47). The mean reported pain intensity of the patients (after the performance of each movement) was 5.02 ($SD = 1.95$; range = 1.25-8.75).

MAIN FINDINGS

The influence of patients' valence on observers' pain estimates (chapters 1-2)

The patients' valence is one important and potential bottom-up variable that influences observers' pain estimates. Specifically, it was hypothesized that, regarding lay observers, a negative valence of patients would relate to lower observer pain estimates than a positive valence of patients. However, regarding healthcare practitioners, no particular hypotheses were formulated given the equivocal evidence of Tait and Chibnall (1997) suggesting that negative personal traits of patients might be interpreted by healthcare practitioners as resulting from the patients' pain.

The patients' valence influenced the observers' pain estimates (chapter 1 and chapter 2). This effect, however, differed according to the level of pain expressed by the patients and according to the group of observers (lay observers or physiotherapists). Specifically, lay observers attributed less pain to patients who were presented with negative personal traits than to patients who were presented with positive or neutral personal traits. Moderation analyses indicated that the patients' valence only influenced the lay observers' pain estimates with regard to patients expressing a *high* level of pain. In contrast, the patients' valence influenced the physiotherapists' pain estimates only with regard to patients expressing a *mild* level of pain. Specifically, physiotherapists attributed less pain to patients who were presented with negative personal traits than to patients who were presented with neutral personal traits but only for patients expressing *mild* levels of pain. The studies described in chapter 1 and in chapter 2 also allowed investigation of observers' sensitivity (i.e., the ability to discriminate between several levels of the patients' pain expressions) and response bias (i.e., the general

tendency to attribute pain to patients). Besides insight into the observers' pain estimates, insight into the observers' sensitivity and response bias might be of valuable importance. In particular, different levels of a patient's facial pain expression might communicate to the observer different levels of the patient's pain experience. Consequently, being able to discriminate between the different levels of pain behavior might relate to a better understanding of the patient's pain experience by the observer. Further, the observers' response bias gives information about the general tendency of observers to attribute pain to patients, irrespective of the level of the patient's pain behavior (and therefore, differs from the observers' pain estimates). Regarding sensitivity, findings indicated that lay observers were perceptually less sensitive for the pain expressed by patients who were presented with negative personal traits than for the pain expressed by patients who were presented with neutral or with positive personal traits. In contrast, the patients' valence did not influence the physiotherapists' sensitivity towards the patients' pain. The valence of the patients did not influence the lay observers' and physiotherapists' response bias.

The influence of information that the pain does not fit with a biomedical model on observers' pain estimates (chapters 3-5)

One potential contextual variable impacting on the patient's pain experience is the information about whether the patient's pain does or does not fit within a strict biomedical perspective. A strict biomedical model that posits a direct relationship between pain and tissue damage is widely endorsed by both lay observers and healthcare practitioners. Based on the social contract theory, it was hypothesized that information about the absence of clear medical evidence for the pain as well as information about the presence of psychosocial influences on the patient's pain experience, would relate to lower pain estimates.

In the absence of medical evidence for the patients' pain, lay observers attributed less pain to the patients. Additionally, the impact of information that the pain does or not does fit within a biomedical perspective on the observers' emotional responses (sympathy, distress) and behavioral inclination to help the

patients was investigated. In the absence of medical evidence for the pain, observers reported to feel less sympathy and less distress and reported lower inclination to help the patients with daily activities (chapter 3). Interestingly, however, no effect of psychosocial influences on the observers' pain estimates, ratings of sympathy, and inclination to help was found, except with regard to the degree to which the patients' self-reports of pain were taken into account by the observers (chapter 4). In particular, findings indicated that observers took the patients' self-reports less into account in the presence of psychosocial influences. In the healthcare practitioners (physiotherapists and general practitioners; chapter 5), higher perceived pain and daily interference, more sympathy, stronger expectations of medication impact, and more self-efficacy when medical evidence was present compared to when medical evidence was absent was found. Further, the results indicated higher ratings on perceived pain and daily interference, more sympathy, stronger expectations of medication impact, and more self-efficacy when psychosocial influences on the patients' pain experiences were absent, but only when the patients displayed a high level of pain behavior. It was also hypothesized that the absence of medical evidence for the pain would relate to higher beliefs in deception by the observers and to less positive evaluations (in terms of valence) of the patients by the observers. In particular, one might expect that the absence of medical evidence for pain serves as a cue for observers towards social deception. Furthermore, there is preliminary evidence indicating that the absence of medical evidence also relates to less positive evaluations of patients (Taylor, Skelton, & Butcher, 1984). The findings of this PhD project indicated that the lay observers' evaluations of the patients (in terms of valence) and their beliefs in deception explained the effect of medical evidence on their responses (estimates of pain, sympathy and inclination to help the patient). In healthcare practitioners, absence of medical evidence was related to less positive evaluations of the patients in general practitioners and to higher beliefs in deception in both professions. Further, given the effect of psychosocial influences on the healthcare practitioners' responses, the relationship between the presence of psychosocial influences and the observers' beliefs in deception and less positive evaluations of the patients was investigated. It was hypothesized that

the presence of psychosocial influences would serve as a cue for healthcare practitioners towards social deception. In healthcare practitioners, the presence of psychosocial influences was indeed related to less positive evaluations and higher beliefs in deception in both professions.

The influence of priming observers with social deception on observers' pain estimates (chapters 6-7)

Being primed with social deception is a potential top-down variable that may impact on observers' pain estimates. Based on the social contract theory, it was hypothesized that, when observers are primed with social deception, they would attribute lower pain to patients. Priming of lay observers with social deception (chapter 6) did not directly influence the observers' ratings of pain, sympathy and inclination to help, nor the degree to which they took the patients' self-reports of pain into account. Instead, an indirect effect of the priming upon observer responses was observed. Specifically, priming was related to less positive ratings of the valence of the patients (positive/negative) and less positive ratings of the patients were related to lower ratings on pain, sympathy, and to a larger discrepancy between the observers' ratings and those of the patients when the patients' self-reports were provided. In contrast, there was no effect of priming with social deception on nurse responses (chapter 7) towards the patients' pain (i.e., ratings on the patients' pain, their own sympathy and belief that the patients needed help), nor on their evaluations of the patients in terms of valence (positive/negative).

THEORETICAL IMPLICATIONS

Do others take patient pain less seriously when they dislike the patient?

The findings described in chapter 1 suggest that lay observers take a patient's pain less seriously when they dislike this patient. This is consistent with the findings of Chibnall and Tait (1995) indicating that lay observers attributed more pain, disability and distress scores to liked than to disliked patients. Worth noting, in the study presented in this PhD dissertation, the methodology differed from the methodology used by Chibnall and Tait (1995). In particular, instead of a vignette methodology that manipulated the likability of patients (Chibnall & Tait, 1995), an evaluative conditioning procedure with photographs of actual patients to manipulate the patients' valence (positive/neutral/negative) was used. Consequently, one may doubt whether the patients' likability was manipulated or rather, the general affective valence of the patients. Although a negative valence of a patient might be related to a dislike of the patient by the observer, this may not necessarily be the case. The same line of reasoning holds for the findings of chapter 4 and chapter 6. Although the primary aims of the studies described in these chapters were not to investigate the influencing role of the patients' valence on the observers' pain estimates (i.e., there was no experimental manipulation of the patients' valence), they nevertheless provide supporting evidence for the potential role of the patients' valence in observers' pain estimates. In particular, chapter 4 points to the important *underlying* role of the observers' evaluation of the patients (in terms of valence) in the relationship between the absence of medical evidence and the observers' estimates of the patients' pain, their reported sympathy for the patients and inclination to help the patients. Further, chapter 6 indicates that less positive evaluations of patients by lay observers were related to lower pain estimates, less reported sympathy for the patients and a less degree to which the patients' self-reports of pain were taken into account. These results might be interpreted in the light of the social contract theory. In particular, it is reasonable to assume that the negative personal traits associated with the patients activated the social detection mechanism in observers, and consequently, led to

lower pain estimates. The findings regarding the healthcare practitioners are less consistent. In particular, although less positive evaluations of the patients by healthcare practitioners were related to lower pain estimates, less reported sympathy for the patients and less self-efficacy with regard to helping the patients (chapter 5), in chapter 2, it was demonstrated that patients with a negative valence were not attributed less pain than patients with a positive valence. Furthermore, in chapter 7, it was demonstrated that the evaluations of the patients (in terms of valence) by the nurses did not impact on the nurse pain estimates.

Do others take patient pain less seriously when the pain is not consistent with a biomedical model?

The findings of this PhD project are in line with the findings of several vignette studies that presented written descriptions of fictitious patients to lay observers (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Tait & Chibnall, 1994), medical students (Chibnall et al., 1997), nurse students (Halfens, Evers, & Abu-Saad, 1990), nurses (Taylor et al., 1984), and internal medicine physicians (Tait & Chibnall, 1997), indicating less attributed pain to patients by observers when the pain is not medically explained. Further, the results are in line with the findings of Taylor et al. (1984) demonstrating that nurses are less willing to undertake pain relief actions when there is no medical evidence for the pain. Moreover, the results provide experimental evidence for the qualitative findings that primary care providers feel ineffective and frustrated when treating chronic pain patients, many of whom do not present with medical pathology (e.g., Matthias et al., 2010; Wasan, Wootton, & Jamison, 2005).

This PhD project stresses the robust effect of knowledge about medical evidence by indicating that this effect was not influenced by the level of pain that was displayed by the patients, a crucial cue for observers when estimating others' pain (Craig et al., 2001; Ferrell, Eberts, McCaffery, & Grant, 1991; Williams, 2002). Equally, although research indicates that, relative to the patients' full body pain behaviors, the patients' facial pain expressions would be the most influential (Martel, Thibault, & Sullivan, 2011), our findings indicate an effect of medical

evidence, regardless of pain behavior. In particular, there was an effect of medical evidence when the observers were provided with the patients' facial pain expressions (chapter 3) and when the observers were provided with the patients' full body pain behaviors (chapter 4 and chapter 5).

The robust effect of medical evidence on observers' responses towards others' pain raises the question about its potential underlying mechanisms. Findings of studies conducted in the context of the current PhD project provide evidence for two underlying mechanisms, i.e., the observers' beliefs in deception and their evaluations of the patients (in terms of valence; positive/negative). This is in line with the findings of Taylor et al. (1984) who found that nurses attributed more negative personality and behavioral traits towards patients when medical evidence for the patients' pain was absent. Further, the absence of medical evidence has been suggested to serve as a risk factor for observers to impute to the patient an intent to feign the pain (Craig & Badali, 2004; Craig, Hill, & McMurtry, 1999). To our knowledge, this PhD project was the first to experimentally investigate this relationship. As already suggested by Kappesser and Williams (2008), the absence of medical evidence for the pain might function as a cue towards social deception. Nevertheless, although the absence of medical evidence was related to higher beliefs in deception by observers, these beliefs did not fully mediate the effect of medical evidence on observers' responses. Instead, a full mediation by the observers' evaluation of the patient was found. Notwithstanding the difficulty to measure the observers' alertness towards social cheating (Kappesser et al., 2006), our findings might suggest that other mechanisms may play a role as well, for example, a general dislike of the patient due to the unfamiliarity with his/her pain condition, without being explicit about the patients' cheating behavior.

Although the biopsychosocial perspective on pain is currently acknowledged in scientific literature, the findings suggest that the biomedical model is still widely endorsed. This is in line with previous findings indicating that lay individuals (Eccleston & Crombez, 2007; Goubert, Crombez, & De Bourdeaudhuij, 2004), but also professionals adhere to a strict biomedical model (Kent, Keating, & Taylor, 2009). This model posits that pain is directly linked with tissue/bodily damage. Accordingly, skepticism may occur in individuals when confronted with

patients whose pain complaints are not understood in terms of clear physiological damage. Beliefs in deception (voluntary misrepresentation) may therefore be ‘mental shortcuts’ or ‘premature closures’ to ease the decision process with regard to pain judgment or to actually ‘close’ the difficult patient encounter in clinical settings (Borrel-Carrio & Epstein, 2004). Furthermore, the routine use in practice of pain behavior that is subject to voluntary control (verbal self-report, use of medication, withdrawal from activity) encourages consideration of pain expression as not necessarily arising from the experience of pain (Craig, Versloot, Goubert, Vervoort, & Crombez, 2010; McCrystal, Craig, Versloot, Fashler, & Jones, 2011), but as having sources in social considerations other than pain, e.g., onerous work or family responsibilities. In line with this reasoning was the hypothesis that the presence of psychosocial influences on the patients’ pain experiences would relate to lower pain estimates by the observers. The influence of psychosocial influences is not acknowledged by a strict biomedical model and therefore, knowledge about psychosocial influences on the patients’ pain experiences may relate to the observers’ consideration of the pain as ‘not real’ (Malec, Glasgow, Ely, & Kling, 1977). However, in contrast with the effect of medical evidence, the effect of psychosocial influences on the observers’ responses was not robust. The presence of psychosocial influences was related to lower ratings of pain, interference, sympathy, adequacy of medication and self-efficacy in healthcare practitioners. One potential explanation for this finding might be that lay observers, in general, give less weight to information about psychosocial influences than healthcare practitioners when estimating others’ pain. In clinical practice, there is no question that patients with pain frequently present with several psychosocial issues (e.g., Beesdo et al., 2010).

Does priming with social deception change observers’ estimates of others’ pain?

The findings of the PhD project are in contrast with the findings of Kappesser et al. (2006) and Poole and Craig (1992) who demonstrated that priming observers with social deception related to lower pain estimates. As discussed in chapter 5

and in chapter 6, a potential explanation might relate to the rather implicit priming of the observers with social deception. In particular, in contrast to the priming method used in Poole and Craig (1992) and in Kappesser et al. (2006), the priming texts did not refer to the patients who were observed during the experiment, making the priming less explicit. Consequently, observers might have strongly relied on the patients' pain behaviors as an influential cue (Ferrell et al., 1991; Craig et al., 2001; Williams, 2002). Lay observers and nurses differed in the degree to which the priming influenced their evaluations of the patients. The finding that the priming only influenced the evaluation of the patient in lay observers might be due to the content of the texts that were used to prime the observers with social deception. In particular, the text provided the example of individuals who feign their symptoms in a doctor visit in order to obtain a prescription for medication or because they want a sick note. This information does not directly relate to the clinical context of hospitalized care in which nurses work.

Is there a difference between lay observers and healthcare practitioners in their estimates of the patients' pain?

The similar methodology used in chapter 1 and in chapter 2 allowed to investigate whether the pain estimates of the lay observers differed from the pain estimates of the professionals. Results indicated that lay observers attributed more pain to patients (chapter 1) than physiotherapists (chapter 2). This finding lends support to previous findings indicating that clinical experience negatively relates to observers' pain estimates (Cheng et al., 2007; Halfens et al., 1990; Prkachin, Solomon, Hwang, & Mercer, 2001). For example, Prkachin et al. (2001) demonstrated that the patient pain judgments of physical therapists were lower than those of lay observers. Cheng et al. (2007) and recently Decety, Yang, and Cheng (2010) suggested that the lower pain estimates of healthcare practitioners might be understood as a way of protecting themselves against emotional over-involvement (e.g., burn out). However, according to Prkachin et al. (2001), other explanations may be of importance as well. For example, lower pain estimates of

healthcare practitioners may reflect the way they think about patients' pain experiences. As discussed by Prkachin et al. (2001), the patients' pain intensity may be of lower interest relative to the nature and source of the patients' pain. Finally, Prkachin et al. (2001) argue that, because of their experience, healthcare practitioners might use extreme levels of pain expression as the standard against which patients' pain expressions are compared. Interestingly, however, in spite of lower pain estimates among physiotherapists, both groups did not differ in their ability to discriminate between several levels of the patients' pain expressions. Good levels of sensitivity are consistent with Prkachin, Mass, and Mercer (2004) who found overall good levels of observers' sensitivity towards others' pain. The experimental paradigms in chapters 3 and 4 and in chapters 5 and 6 differed with regard to the patients or the video sequences that were presented to the observers. Consequently, these paradigms did not allow reflection upon differences in pain estimates between the lay observers and the healthcare practitioners.

The role of the patients' pain behaviors

Although not the main aim of the research, this PhD project highlights the importance of expressive pain behaviors of patients and their influences on the observers' pain estimates. First, the results provide evidence for the role of the patients' verbal expressive pain behaviors in observers' pain estimates. In particular, although not explicitly mentioned in the chapters, the pain estimates of the observers, once they were provided with the patients' self-reports, were positively related to these verbal pain behaviors (studies described in chapters 4, 6 and 7). This is in line with previous research indicating a positive relationship between the observers' pain estimates and the patients' self-reports of pain (e.g., Chibnall & Tait, 1995; Kappesser & Williams, 2008). Second, the results provided evidence for the important role of the patients' facial pain expressions in the observers' pain estimates. In particular, in chapter 1 and in chapter 2, it was demonstrated that the facial pain expressions of the patients had a large impact on the observers' pain estimates. Third, this was also the case for full body pain behaviors. Specifically, in the studies described in chapters 4-7, the impact of

patients' varying levels of full body pain behavior was examined. Again, higher levels of full body pain behavior were related to higher pain estimates by the observers. These findings are in line with considerable research indicating that patients' pain expressions were positively related to the observers' pain estimates (e.g., Vervoort et al., 2011; Hadjistavropoulos, Ross, & Von Baeyer, 1990; Sullivan, Martel, Tripp, Savard, & Crombez, 2006). Worth noting, to our knowledge, the current PhD project provides the first series of studies that investigated healthcare practitioners' estimates of pain using video sequences displaying full body pain behaviors of patients. Despite experimental research indicating that patients' facial pain expression may be more influential than full body pain behaviors (Martel et al., 2011), observing the patients' full body pain behaviors might be more akin to real-life clinical settings.

Besides the main effect of the patients' expressive pain behaviors on the observers' responses, considerable evidence was provided for the moderating role of these nonverbal pain behaviors in the relationship between the explanatory variables of interest (in particular, the patients' valence and information about psychosocial influences) and the observers' responses (chapter 1, chapter 2, and chapter 5). The expressive pain behaviors are very powerful in signaling pain to others (e.g., Sullivan et al., 2006) and therefore, may facilitate or limit the effect of other variables on the observers' pain estimates. Results indicated that the patients' nonverbal pain behaviors indeed moderated the effects of particular variables on the observers' pain estimates. Specifically, chapter 1 and in chapter 2 indicate that the patients' facial pain expressions moderated the influence of the patients' valence on the observers' pain estimates. However, the results about the moderating role of the patients' pain expressions were not consistent across both groups of observers (i.e., lay observers and physiotherapists). According to Kahneman (2003), individuals make use of contextual information (e.g., the patients' valence) when feeling uncertain about their judgment, e.g., their estimates of patients' pain. Accordingly, it might have been that the high pain expression condition was the most ambiguous for the lay observers, while the mild pain expression condition was the most ambiguous for the physiotherapists. High levels of pain behavior might have induced feelings of suspiciousness in the

lay observers given the cultural norms tending towards stoicism (Craig et al., 1999; Williams, 2002), while physiotherapists might have considered the high pain expressions as a veridical cue for the experience of high intensity pain. Nevertheless, this line of reasoning offers a post hoc explanation and further research is needed to further disentangle the different meanings of the patients' pain behaviors for lay observers and healthcare practitioners. Further, the findings described in chapter 5 provide additional evidence for the moderating role of the patients' pain behaviors. In particular, information about psychosocial influences on the patients' pain experiences was only taken into account when the healthcare practitioners observed patients displaying a high level of pain behavior. These results provide support for the idea that was put forward by Tait, Chibnall, and Kalauokalani (2009) that observers' uncertainty about the patients' pain experiences would be heightened in severe pain conditions. To our knowledge, this PhD project is the first to stress the potential moderating role of the patients' expressive pain behaviors in the relationship between particular explanatory variables and observers' responses.

CLINICAL IMPLICATIONS

The results of this PhD project have some important clinical implications. The results suggest that the patients' valence is one potential factor that influences the observers' pain estimates. In particular, the results suggest that lay observers take the pain of patients who are evaluated unfavorably less seriously. A potential implication of this finding is that patients with a negative valence receive less support from the wider community, which may, as a consequence, lead to lower psychological wellbeing of the patients with pain. With respect to the clinical context, however, the results do not suggest that the pain of patients who are evaluated negatively is estimated differently than the pain of patients who are evaluated positively by physiotherapists. This finding indicates that physiotherapists' pain estimates are not biased by the valence of the patient.

Further, the results are consistent in suggesting that the patients' pain might be taken less seriously by both lay observers and healthcare practitioners when not

supported by medical evidence. Although it is unclear how reduced empathic responses translate into actual behavior, it may be that these responses are related to less helping behavior in the everyday social environment, and to less effective pain management in the clinical context, which may, in turn affect the sufferers' pain and psychological wellbeing. Even more, our results indicate that the patients with pain that is not medically understood might be prone to stigmatizing responses of others. Stigmatizing responses are devaluing and discrediting responses of observers towards individuals who possess a particular characteristic that deviates from societal norms (Crocker, Major, & Steele, 1998). In pain terms, the deviating characteristic is the absence of medical evidence for the pain. In line with our reasoning is the abundant research suggesting that individuals suffering from chronic pain, many of whom do not present with medical pathology, feel stigmatized by others (Allegretti, Borkan, Reis, & Griffiths, 2010; Dewar, White, Posade, & Dillon, 2003; Glenton, 2003; Holloway, Sofaer-Bennett, & Walker, 2007; Peters, Stanley, Rose, & Salmon, 1998; Toye & Barker, 2010; Werner & Malterud, 2003). Equally, the results suggest that the absence of psychosocial influences may make patients prone to stigmatizing responses from others. Worth noting, the psychosocial influences described in this PhD project might have been weak compared with the psychosocial issues (e.g., clinical mood or anxiety disorders) that are often prominent in pain patients (Beesdo et al., 2010). Therefore, it might be that stigmatizing responses are even more pronounced in real-life encounters, given the ubiquity of stigma related to mental health disorders (Fitzpatrick, 2012).

With respect to the clinical context, healthcare practitioners must ask themselves how they can improve the clinical encounter with the pain patient in order to reduce negative feelings in both the patients and themselves. Our results suggest that avoiding the two indicated potential biases (induced by the absence of medical evidence for the patients' pain and/or the presence of psychosocial influences on the patients' pain experiences) are of importance. One way to accomplish this would be to provide healthcare practitioners with education about the unnecessarily relationship between tissue damage and pain and/or about the important role of psychosocial influences in the patient's pain experience. In line

with this reasoning is the suggestion that the educational programs for healthcare practitioners would benefit from including a more biopsychosocial approach towards the management of pain (e.g., Ali & Thomson, 2009). Furthermore, healthcare practitioners might not be aware of their biases when estimating patients' pain (Hirsh, Jensen, & Robinson, 2010). Consequently, increasing the healthcare practitioners' awareness of the biases induced by the absence of clinical evidence and the presence of psychosocial influences may be of importance. Most importantly, as acknowledged by Wasan et al. (2005, p. 184), a clinician need not be a mental health expert to provide effective care. Instead, accepting that pain may occur in the absence of clear medical evidence and/or in the presence of several psychosocial influences may be of valuable importance, both for the healthcare practitioner and the patient with pain. As suggested by Dowrick et al. (2008), and recently by Poitras, Durand, Côté, and Tousignant (2012), a more profound focus upon the integration of the perspectives of practitioners from different disciplines (e.g., psychology, physiotherapy and medicine) is required. For example, Main, Sowden, Hill, Watson, and Hay (2012) recently developed "StarT Back", a comprehensive evidence-based approach for the management of chronic low back pain by physiotherapists.

LIMITATIONS

Several limitations of this PhD project need to be addressed. First, the experimental paradigms provide only analogues of real life or clinical settings, which limits the ecological validity of the findings. Still, some verisimilitude to real settings was accomplished by implementing videos of real patients while they were manifesting pain. However, the experimental paradigms did not allow study of the important role of relational aspects in the patient – observer encounter. Further, in the studies, the observers did not have prior knowledge of the patients presented in the vignettes, for example, information about the history of the pain complaints or elaborated information about the psychosocial influences on the patients' pain experiences. Second, the studies did not take into account actual behavioural measures of help, such as actual measures of help with daily activities

(lay observers) or actual administration of pain medication (health care practitioners); self-reports may be prone to social desirability. Third, the observer responses towards the patients' pain in our studies may differ from real-life interactions. For example, observers' real-life reactions to someone in pain might be more governed by emotions. Fourth, the results of the studies may not necessarily generalize to friends and relatives. Equally, the results of the studies presented in this PhD may not generalize to other healthcare practitioners. In line with this reasoning are the recent findings of Tait, Chibnall, Miller, and Werner (2011) suggesting that healthcare practitioners' pain estimates might be influenced by the practitioners' specialty.

FUTURE CHALLENGES

Enhancing the ecological validity

Research would benefit from the investigation of lay observers' pain estimates in real-life settings. For example, with respect to the experimental paradigms, instead of using vignettes, photographs or videos of actual patients, future research should also include real life observations of actual patients. Equally, future research may benefit from the investigation of the healthcare practitioners' pain estimates in clinical settings. For example, healthcare practitioners could be asked to report on their pain estimates and other responses (e.g., the prescription or administration of medication), after a consultation with a particular patient. Equally, patients could be asked to report on, for example, their pain experiences, distress, and satisfaction with the clinical encounter. Furthermore, future research should benefit from videotaping real life encounters between patients and observers. By doing so, important behavioral and relational features could be measured, for example, the patients' pain behaviors and the communication between patients and observers. This would be interesting especially with regard to romantic partners, friends or relatives (see also Cano, Leong, Williams, May, and Lutz (2012))

The moderating role of the relationship between the patient and the observer

Thorough research into the moderating role of the relationship between the patient and observers would be of importance. In general and also in this PhD project, research into the factors that influence observers' pain estimates mainly focused on lay observers or healthcare practitioners (Tait et al., 2009), but not on relatives or friends of patients with pain. As suggested by Kappesser and Williams (2008), relatives of patients with pain may differ from lay observers and professionals in their responses towards others with pain. In their study, Kappesser and Williams (2008) found that the absence of medical evidence hardly influenced the relatives' pain estimates. This suggests that the influence of particular variables, e.g., the absence of medical evidence, may differ according to the relationship between the observer and patient. Equally, future research should investigate whether the impact of particular variables on healthcare practitioners' pain estimates differ according to the specialty of the professional. Tait et al. (2011), for example, demonstrated that neurosurgeons, in comparison with internists, attribute less pain to patients.

Understanding the moderating role of the patients' pain behaviors

More theoretical insight as well as experimental research into the moderating role of the patients' expressive pain behaviors is needed. Our results suggest that a high level of pain expression makes observers prone to particular biases, especially with regard to the knowledge about psychosocial influences on the patients' pain experiences. It was suggested that observers take into account more contextual information when judging high intensity pain because higher levels of pain behavior might make observers more uncertain about their pain judgments. However, future research is needed to test this hypothesis.

Consequences of lower observer pain estimates

Research about the consequences of observers' pain estimates, and in general, observers' responses towards others' pain is scarce. Although the findings indicate that lower pain estimates are related to less empathic responses in both lay observers and healthcare practitioners, further research is needed to investigate whether lower pain estimates actually relate to lower patient wellbeing. Furthermore, observers' pain estimates may not only influence the patient him/herself, but also the observer. In particular, in healthcare practitioners, the attribution of less pain to patients has been suggested to originate from a self-protective function (Cheng et al., 2007; Decety et al., 2010). It might be that healthcare practitioners 'discount' the patients' pain to protect themselves from getting emotionally overwhelmed (Prakchin, Solomon, & Ross, 2007). The studies demonstrated that healthcare practitioners felt less effective in treating the patients when there were no medical explanations for the patients' pain. Lower self-efficacy might co-occur with distress and this could explain why the general practitioners attributed less pain to patients. However, further research is needed to address this issue.

Research into the role of social exclusion on patient wellbeing

As previously indicated, the results of this PhD project suggest that patients with pain that is not understood medically are prone to stigmatizing responses from others. In line with this reasoning are the recent findings of Kool et al. (2010) indicating that individuals with fibromyalgia (i.e., an illness that is characterized by widespread pain that is not understood medically) experience more discounting and a lack of understanding from significant others (e.g., relatives, healthcare professionals, and colleagues) than individuals with rheumatoid arthritis (i.e., a rheumatic disease characterized by widespread pain that is well understood). However, the findings of Kool et al. (2010) as well as the findings described in this dissertation are based on self-reports from patients and observers respectively. Future research should benefit from a thorough investigation into the role of

stigma in patients with pain for which there is no medical explanation. One of the core aspects of stigmatizing behavior is the social exclusion of patients from social, economic and cultural networks in the society they live in (Major & Eccleston, 2005). According to a social pain account of rejection (Mac Donald & Leary, 2005), social exclusion is a powerful social process that typically relates to 'social pain' -- 'a distressing experience arising from the perception of actual or potential psychological distance from close others or a social group' (Eisenberger & Lieberman, 2004). Experimental research has shown that social exclusion is related to lower psychological wellbeing, characterized by lower self-esteem, more depressive symptoms, and higher negative affect among those excluded (Major & Eccleston, 2005). However, in current literature, knowledge about the relationship between absence of medical evidence and the existence as well as impact of social exclusion upon the pain patient's wellbeing is lacking. This is an important gap, given that the social context of patients with pain is currently acknowledged to play a major role in their pain and wellbeing.

With respect to the experimental paradigms to investigate observers' social exclusion, an adaptation of the study presented in chapter 4 could be used. In particular, after being presented with the videos of the different patients, the observers' social exclusion could be measured by means of social distance scales, which are considered a good proxy of social exclusion behavior (Link, Yang, Phelan, & Collins, 2004). Further, the observers' actual social exclusion could be investigated as well, for example, by asking them to indicate the patient with whom they would like to collaborate with in a subsequent independent study. Next, to investigate the role of social exclusion on patient wellbeing, the ball tossing game 'Cyberball' could be used. Cyberball is a widely used and reliable experimental procedure for simulating the participant's experience of social exclusion or social inclusion (Williams & Blair, 2000). The patient's wellbeing may be operationalized by the patient's pain, self-esteem, mood, depressive symptoms and stress responses.

Moreover, based on the Perceived Unfairness Model of Jackson and colleagues (Jackson, Kubzansky, & Wright, 2006), the patient's *perceived unfairness* is a potential factor underlying the relationship between social exclusion and patient

wellbeing. In particular, the model posits that a patient's perceived unfairness may be an essential mechanism by which external inequities, such as social exclusion, may influence patient wellbeing. Judgments of perceived unfairness might be made when one's own position is considered inferior to that of a similar other in a specific situation (MacParland, Eccleston, Osborn, & Hezseltine, 2010). For example, perceived unfairness may occur when an individual with pain is not selected by a house owner to rent his/her house, whereas another individual without pain is allowed to rent the house. In general, it is likely that being excluded from a social group will lead to perceived unfairness in the excluded. According to Jackson and colleagues (Jackson et al., 2006), perceived unfairness, in turn, may lead to both stress responses and a decline in the physical health of the individual who perceives unfairness. To test the mediating role of patients' perceived unfairness in the relationship between social exclusion and patient wellbeing, a measure of the patient's perceived unfairness could be included in the study described above.

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NEDERLANDSTALIGE SAMENVATTING

ALGEMENE INLEIDING

Pijn is de voornaamste gezondheidsklacht waarvoor mensen medische hulp zoeken (Crombie, Croft, Linton, LeResche, & Von Korff, 1991). Zowel acute als chronische pijn (i.e., wanneer de pijn langer aanhoudt dan 3 maanden) gaat niet enkel samen met de pijnsymptomen op zich, maar ook met substantiële belemmeringen in het dagelijkse persoonlijke, sociale en functionele leven (Breivik, Collet, Ventafridda, Cohen, & Gallacher, 2006). Zo gaat pijn vaak gepaard met angst en depressieve symptomen (Beesdo et al., 2010), maar ook met beperkingen in het beroepsmatig functioneren (Dagenais, Caro, & Haldemen, 2008). Bijgevolg zorgt pijn ook op maatschappelijk niveau voor een grote kost, bij voorbeeld, door absentieïsme op het werk (Dagenais et al., 2008).

Uit het voorgaande blijkt dat pijn niet louter een ‘medisch’ probleem is. We spreken van een gezondheidsprobleem gezien de voortdurende wisselwerking tussen de medische aandoening, de pijnsymptomen en de ervaren beperkingen of hinder. Desondanks werd pijn lang beschouwd als een louter sensorische ervaring. Het oude Cartesiaans model beschouwde de perceptie van pijn als een rechtstreekse representatie van de sensorische input (de schade). Vandaar het onderscheid dat werd gemaakt tussen de ‘echte’ pijn (‘organische’ pijn) en de zogenaamde ‘ingebeelde’ pijn (‘psychogene’ pijn). Vanuit wetenschappelijk oogpunt werd nooit voldoende evidentie geleverd ter ondersteuning van een biomedisch perspectief. Onderzoek toonde aan dat een biomedisch model de ervaring van pijn bij mensen niet volledig kon verklaren. Bovendien wees onderzoek meer en meer op het belang van psychologische factoren binnen het proces van de pijnervaring. Geleidelijk aan kwam het inzicht dat een biomedisch perspectief onvoldoende was ter verklaring van de pijnervaring: de relatie tussen de weefselschade en de pijnervaring is verre van absoluut; de relatie tussen de pijnervaring en beperkingen of hinder in het dagelijkse leven evenmin. Desalniettemin moeten we vaststellen dat een strikt biomedisch denkkader, waarbij er een één op één relatie verondersteld wordt tussen de weefselschade en

het ervaren van pijn en hinder, nog altijd heel invloedrijk is, zowel bij leken (Eccleston & Crombez, 2007; Goubert, Crombez, & De Bourdeaudhuij, 2004) als bij professionele hulpverleners (Kent, Keating, & Taylor, 2009).

Pijn is evenwel geen individuele ervaring: pijn wordt door het individu met pijn geuit door middel van (non) verbaal pijngedrag, dit gedrag wordt waargenomen door anderen die, op hun beurt, een inschatting van de pijn maken (Hadjistavropoulos et al., 2011). Deze inschattingen van andermans pijn zijn van groot belang omdat we kunnen veronderstellen dat ze aan de basis liggen van heel wat cruciale beslissingen met betrekking tot de behandeling van pijn, bij voorbeeld, de keuze van behandeling, het voorschrijven van medicatie, het plaatsen van een patiënt op de wachtlijst, enzovoort.

Het empathie model in de context van pijn (Goubert et al., 2005) biedt ons een heuristisch kader om de inschattingen van pijn door derden beter te begrijpen. Het model gaat uit van drie belangrijke invloeden op de inschattingen die mensen maken van andermans pijn. Ten eerste beschrijft het model de bottom-up factoren, dit zijn de factoren gerelateerd aan de persoon met pijn, bij voorbeeld zijn of haar pijngedrag. Ten tweede wijst het model op de contextuele factoren, bij voorbeeld de relatie tussen de persoon met pijn en de observator. Ten slotte beschrijft het model de top-down factoren, dit zijn de factoren gerelateerd aan de observator, bij voorbeeld zijn of haar ervaring met andermans pijn. Dit doctoraatsonderzoek richtte zich op de invloed van drie specifieke factoren op de inschattingen die anderen (leken en professionele hulpverleners) maken van andermans pijn.

DOELSTELLINGEN

Dit doctoraatsonderzoek had drie hoofddoelstellingen. Ten eerste richtte het onderzoek zich op de rol van één belangrijke bottom-up variabele, namelijk de algemene valentie van de patiënt (positief versus negatief). Het evalueren van objecten en personen in termen van hun valentie (positief versus negatief) is inherent aan het menselijk bestaan. Nochtans is onderzoek naar de invloed van deze potentiële factor op de inschattingen die mensen maken van andermans pijn schaars. Ten tweede beoogde het onderzoek na te gaan of de pijninschattingen van

derden beïnvloed worden door informatie aangaande het al dan niet passen van de pijn binnen een strikt biomedisch denkkader. Meer specifiek werd hierbij nagegaan welke de invloed was van de aan- of afwezigheid van (1) medische evidentie voor pijn van de patiënt en (2) psychosociale invloeden op de pijnervaring van de patiënt. Vertrekkende vanuit de ‘social contract’ theorie (Cosmides, 1989; Kappesser, Williams, & Prkachin, 2006; Kappesser & Williams, 2008) werd er verwacht dat, wanneer de pijn van de patiënt niet past binnen een strikt biomedisch denkkader, anderen de pijnintensiteit van deze patiënt lager zouden inschatten dan wanneer de pijn wel past binnen een strikt biomedisch denkkader. Het achterliggende idee hierbij was dat het niet passen van de pijn binnen een strikt biomedisch denkkader gerelateerd zou zijn aan een vermoeden van sociaal bedrog. De ‘social contract’ theorie gaat ervan uit dat mensen bereid zijn andere mensen te helpen, maar enkel onder de voorwaarde dat die andere mensen ook effectief hulpbehoevend zijn. In de context van pijn betekent dit dat men bereid is anderen met pijn te helpen, maar enkel als deze anderen ook effectief pijn hebben. Tenslotte had de derde doelstelling betrekking op het effect van het impliciet primen van personen met sociaal bedrog op hun inschattingen van andermans pijn. Primeren is het blootstellen van een individu aan bepaalde informatie waarvan wordt verwacht dat deze een impact heeft op zijn/haar daaropvolgende handelingen. Opnieuw vertrekkende vanuit de social contract theorie, verwachtten we dat indien mensen geprimeerd worden met sociaal bedrog, ze de pijn van anderen lager zullen inschatten dan wanneer ze niet worden geprimeerd met sociaal bedrog.

RESULTATEN

Heeft de valentie van de patiënt een invloed op de pijninschattingen die anderen maken?

Hoofdstuk 1 en hoofdstuk 2 beschrijven de studies met betrekking tot de eerste onderzoeksvraag; i.e., de rol van de algemene valentie van de patiënt (positief versus negatief). In de studies werden neutrale foto’s van patiënten gekoppeld aan

negatieve, neutrale of positieve persoonskarakteristieken. Nadien werden videofragmenten van deze patiënten getoond aan de deelnemers. Op deze videofragmenten was de faciale pijnexpressie van elke patiënt te zien. Bij elk videofragment werden de deelnemers gevraagd om aan te duiden hoeveel pijn ze dachten dat de patiënt had ervaren. In het algemeen werd gevonden dat de valentie van de patiënt de pijninschattingen van de observator beïnvloedde. Echter, dit effect was afhankelijk van het niveau van faciale pijnexpressie van de patiënt (geen pijnexpressie, milde pijnexpressie of hoge pijnexpressie), en van het beroep van de observator; de effecten bij leken verschilden van de effecten bij hulpverleners (kinesitherapeuten). De resultaten toonden aan dat leken de pijn van ‘negatieve’ patiënten lager gingen inschatten dan de pijn van ‘neutrale’ en ‘positieve’ patiënten, maar enkel bij een hoge pijnexpressie van de patiënten. De kinesitherapeuten schreven de ‘negatieve’ patiënten minder pijn toe dan de ‘neutrale’ patiënten, maar enkel bij een milde pijnexpressie van de patiënten.

Schrijft men de patiënt minder pijn toe wanneer de pijn niet past binnen een biomedisch denkkader?

Hoofdstuk 3, hoofdstuk 4 en hoofdstuk 5 beschrijven de studies die betrekking hadden op de tweede onderzoeksvraag, i.e., de rol van informatie aangaande het al dan niet passen van de pijn binnen een strikt biomedisch denkkader. In deze studies werd de informatie omtrent de pijn (het al dan niet passen binnen een biomedisch denkkader) aan de hand van vignetten gemanipuleerd. Elk vignet beschreef de aanwezigheid of afwezigheid van (1) medische evidentie voor de pijn van de patiënt en (2) psychosociale invloeden op de pijnervaring van de patiënt. Elk vignet ging gepaard met een foto van een patiënt en werd gevolgd door een videofragment waarin de patiënt een bepaalde, mogelijks pijn inducerende, beweging uitvoerde. In deze videofragmenten werd niet enkel de faciale pijnexpressie in beeld gebracht; het hele lichaam (en daarbij horende pijngedragingen) werd getoond. Algemeen duiden de resultaten op een negatieve invloed van de afwezigheid van medische evidentie op de pijninschattingen, maar ook op de emotionele (gerapporteerde sympathie voor de patiënt) en de

gedragmatige reacties (de gerapporteerde bereidheid om de patiënt te helpen bij dagelijkse activiteiten) van leken. Gelijkaardige resultaten werden gevonden voor professionele hulpverleners. Meer specifiek toonden de resultaten aan dat, wanneer er geen medische evidentie voor de pijn was, zowel huisartsen en kinesitherapeuten minder pijn toeschreven aan deze patiënten en minder sympathie ervoeren voor deze patiënten. Verder dachten de professionele hulpverleners ook dat, in deze situatie, pijnmedicatie minder effectief zou zijn en dat de pijn van de patiënt minder interfereerde met de dagelijkse activiteiten van de patiënt. Tenslotte gaven de hulpverleners ook aan zich minder effectief te voelen in het helpen van de patiënten wanneer er geen medische evidentie voor de pijn was. De aanwezigheid van psychosociale factoren had geen invloed op de pijninschattingen van de leken, maar wel op de pijninschattingen van de professionele hulpverleners. Meer specifiek, wanneer psychosociale factoren de pijn van de patiënt beïnvloedden, werden dezelfde resultaten gevonden als wanneer er geen medische evidentie was voor de pijn, maar enkel wanneer de patiënt een hoge mate van pijnexpressie vertoonde.

Schrijft men de patiënt minder pijn toe wanneer men geprimed is met sociaal bedrog?

Hoofdstuk 6 en hoofdstuk 7 hebben betrekking op de studies die zich richtten op de laatste onderzoeksvraag, i.e., de rol van priming met sociaal bedrog. In de studies werd aan de helft van de deelnemers gevraagd om een tekst over sociaal bedrog te lezen, terwijl aan de andere helft werd gevraagd om een neutrale tekst te lezen. Daarna werden alle deelnemers gevraagd om pijninschattingen te maken van patiënten die werden gepresenteerd aan de hand van videofragmenten. Algemeen vonden we geen rechtstreeks effect van de priming op de inschattingen die leken en professionele hulpverleners (verpleegkundigen) maakten van de pijn van de patiënten. Bij leken werd er echter wel een onrechtstreeks verband gevonden: indien werd geprimed met sociaal bedrog, gingen leken de patiënten minder positief beoordelen en deze beoordelingen waren op hun beurt gerelateerd aan lagere pijninschattingen.

ALGEMEEN BESLUIT

Dit doctoraatsonderzoek wees op de invloed van verscheidene factoren op de inschattingen die mensen maken van andermans pijn. De belangrijkste en meest robuuste factor die uit dit onderzoek naar voren kwam was de afwezigheid van medische evidentie voor de pijn. Algemeen wezen de resultaten erop dat pijn minder ernstig genomen wordt door zowel leken als professionele hulpverleners wanneer deze niet verklaard kan worden door onderliggende weefselschade. Deze resultaten zijn consistent met heel wat voorgaand onderzoek dat wees op de negatieve invloed van de afwezigheid van medische evidentie voor de pijn op de pijninschattingen die anderen maken (Chibnall & Tait, 1995; Chibnall & Tait, 1999; Chibnall et al., 1997; Halfens, Evers, & Abu-Saad, 1990; Tait & Chibnall, 1997; Taylor, Skelton, & Butcher, 1984). Heel wat mensen lijden aan pijn waarvoor geen medische verklaring wordt gevonden (Hiller et al., 2006; Jacobi et al., 2004; Lahmann et al., 2010; Lieb et al., 2000; Rief et al., 2001). De resultaten van dit doctoraatsonderzoek doen vermoeden dat deze patiënten een bijzonder kwetsbare patiëntengroep vormen. Gezien de studies beschreven in dit proefschrift gebaseerd zijn op zelfrapportages, is verder onderzoek nodig naar het eigenlijke gedrag van personen ten aanzien van patiënten met pijn die medisch niet verklaard kan worden. Een belangrijke piste voor toekomstig onderzoek betreft de rol van stigma in het ervaren van pijn. De resultaten beschreven in dit proefschrift doen vermoeden dat patiënten met medisch onverklaarde pijn kwetsbaar zijn voor stigmatiserende reacties van anderen, zoals bij voorbeeld sociale uitsluiting. Naast de invloed van de afwezigheid van medische evidentie voor de pijn, bespreekt dit proefschrift ook de invloed van de algemene valentie van de patiënt en het geprimed zijn van de observator met sociaal bedrog. In de algemene discussie van dit proefschrift wordt ook dieper ingegaan op deze variabelen.

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NAWOORD

Een proefschrift vertoont heel wat gelijkenissen met het ervaren van pijn. Ten eerste komen beide frequent voor. Zo blijkt dat er in Vlaanderen in 2009 maar liefst 1228 doctoraten zijn behaald. Ten tweede hebben beide een grote impact op het persoonlijk leven van het individu, maar ook op de maatschappij. Ten derde genereren beide heel wat vragen waarop we - tot op de dag van vandaag - nog geen antwoord weten. Ten slotte is een proefschrift, net zoals het ervaren van pijn, het resultaat van een dynamisch samenspel tussen biologische, psychologische en sociale factoren. Het is juist deze gelijkenis die er voor zorgde dat dit proefschrift voor mij tegelijk ook zoveel *verschilde* van 'pijn'. Het doctoraat was voor mij een leuke ervaring en een boeiende uitdaging die mijn denken op heel wat vlakken heeft verruimd. Juist daarom wil ik mijn oprechte dank betuigen aan iedereen die hiertoe zijn of haar steentje heeft bijgedragen. Hoewel ik hieronder een opsomming geef, wil ik benadrukken dat deze 'lijst' niet volledig is; er zijn ongetwijfeld nog veel meer mensen die mij, hetzij bewust, hetzij onbewust, hebben geïnspireerd bij het uitvoeren van dit onderzoek. Ook deze mensen wil ik van harte bedanken.

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