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## Effects of responsibility and mood on painful task persistence

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### ABSTRACT

**Background and objectives:** Not just avoidance behaviour, but also painful task persistence might be a risk factor for development and maintenance of pain complaints. In seeking to understand these dysfunctional patterns of task performance, it has been suggested that mood influences the individuals' motivation to persist in a task depending on the interpretation of current mood within a certain motivational context. The aim of the present study was to test the effects of a social responsibility context and mood on persistence on a painful finger pressing task.

**Methods:** A 2 Mood (positive vs. negative)  $\times$  2 Responsibility (high vs. neutral) between-subjects factorial design was used in which 79 healthy participants (53 women; mean age = 22.99 years,  $SD = 4.77$ ) performed the finger pressing task.

**Results:** The results show that mood and sense of responsibility independently influence task persistence: participants in a negative as opposed to positive mood spent more time on the task; the same was true for participants who reported a stronger sense of responsibility. In addition, an increase in pain during the task was associated with longer task persistence. No effect of pain-related fear on task persistence was found.

**Conclusion:** This experimental study was the first to demonstrate an effect of sense of responsibility on persistence in a painful physical task.

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### 1. Introduction

Acute and chronic pain involve both psychological burden and financial costs for the individual and society (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Picavet & Schouten, 2003; Tunks, Crook, & Weir, 2008). Cognitive-behavioural models describing the development and maintenance of chronic pain, such as Fear-Avoidance models (Vlaeyen & Linton, 2000), have received a great deal of support (Leeuw et al., 2007, 2008; Linton et al., 2008). Still, pain-related fear and resulting activity avoidance may be less relevant in pain syndromes characterized by task persistence instead of avoidance (Hasenbring, Plaas, Fischbein, & Willburger, 2006; van Koulil et al., 2008; Vlaeyen & Morley, 2004). When performing physically strenuous and/or painful tasks, task persistence might be a risk factor in development and maintenance of pain, such as work-related musculoskeletal disorders (WMSDs) or

fibromyalgia (Barr & Barbe, 2002; Coq et al., 2009; Hasenbring, Hallner, & Rusu, 2009; van Koulil et al., 2008). The Mood-as-input (MAI) model (Martin, Ward, Achee, & Wyer, 1993) may extend fear-avoidance models in explaining both avoidance and persistence behaviour during painful tasks (Vlaeyen & Morley, 2004).

MAI's (Martin, Ward, et al., 1993) basic assumption is that people use their moods as input for behavioural decision making. The impact of mood on individuals' motivation to persist in a task depends on the interpretation of current mood within a certain motivational context, not on mood per se (Hirt, Levine, McDonald, Melton, & Martin, 1997; Hirt, Melton, McDonald, & Harackiewicz, 1996; Martin, Tesser, & McIntosh, 1993; Martin, Ward, et al., 1993). This way, both positive and negative moods can lead to persistence or avoidance, depending on the context. In a performance context, negative moods facilitate task persistence because it signals that performance goals (e.g. doing as much as one can) have not been reached yet, whereas positive moods inform the individual (s)he has performed adequately, leading to task disengagement. In a hedonic context (e.g. going on as long as one feels like it), the signal value of mood is reversed.

A recent review (Meeten & Davey, 2011) indicated that the majority of MAI-based research in the fields of pathological

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worrying, compulsive checking and depressive rumination confirmed the hypothesized mood  $\times$  context interaction effect. Research applying the MAI theory to painful situations so far only demonstrated main effects of mood and goals (Karsdorp, Nijst, Goossens, & Vlaeyen, 2010; Karsdorp, Ranson, Nijst, & Vlaeyen, 2012). However, these studies did not test the effect of responsibility on pain behaviour.

One way to establish a performance context is to draw on participants' sense of responsibility [conceptualized as the belief one has pivotal power to prevent others from negative outcomes (Rhéaume, Ladouceur, Freeston, & Letarte, 1995; Salkovskis et al., 2000; Wilson & Chambless, 1999)]. Startup and Davey (2003) found individuals reporting a high sense of responsibility inclined to adopt performance-related goals. MAI thus predicts that, in a responsibility context, negative mood is related to task persistence since it informs people they have not yet fully addressed their responsibility concerns, whereas positive moods inform them they have done enough to prevent others from negative outcomes, leading to task disengagement. Conversely, a low responsibility context without substantial consequences of one's task execution for others, would elicit greater persistence when a persons' mood is positive mood than negative, since a positive mood would inform people they are still enjoying their task execution. In line with MAI predictions, responsibility affected persistence on a catastrophizing task dependent on mood: a high level of responsibility resulted in increased task persistence only with high negative mood (Startup & Davey, 2003).

So far, the role of sense of responsibility in performance on painful tasks has been neglected in pain research. There are indications that social responsibility influences the development of work related upper extremity pain (WRUEP) (Feuerstein & Nicholas, 2006; van den Heuvel, van der Beek, Blatter, & Bongers, 2007). Therefore, the present study aimed to test the combined effects of mood and responsibility on persistence in pain-free individuals performing a painful finger pressing task, while controlling for pain-related fear. It was hypothesized that participants with an inflated sense of responsibility would show greater task persistence when in negative as opposed to positive moods, irrespective of pain-related fear. In the neutral responsibility condition, effects of mood on task persistence were expected to be less pronounced.

## 2. Method

### 2.1. Design

A 2 Mood (negative vs. positive)  $\times$  2 Responsibility (high vs. neutral) factorial design was used. Both mood and responsibility were between-subject factors. Pain-related fear was included as a covariate. Persistence on a painful finger pressing task served as dependent variable.

### 2.2. Participants

A total of 88 participants took part in the experiment. Mastery of the Dutch language and absence of pain complaints served as inclusion criteria. Participants were recruited through web-based and paper advertisements in and around the Maastricht University environment. They received partial course credit or a € 7.50 financial compensation for their participation. Informed consent was obtained from all participants. Approval for the current study was granted by the Ethical Committee of the Maastricht University Faculty of Psychology.

Participants were randomly assigned to one of four experimental conditions, with an equal number in each condition

( $n = 22$ ). Data from six participants were deemed invalid (one participant reported an acute pain experience shortly before the experimental session, three participants already participated in similar research, another two demonstrated insight in current experimental set-up and goals during debriefing) and were excluded from analyses. In addition, data from another three participants were misplaced by the experimenter and lost. Thus, 79 participants (53 women, *mean age* = 22.99 years, *SD* = 4.77) were retained for statistical analyses (negative/high:  $n = 16$ ; negative/neutral:  $n = 22$ ; positive/high:  $n = 19$ ; positive/neutral:  $n = 22$ ).

### 2.3. Mood induction

All participants watched a neutral video fragment first and subsequently one of two emotional film fragments in order to induce a positive vs. negative mood. A Flemish weather forecast [4:29; Dutch spoken] with a documentary element on a lunar eclipse was chosen for its emotionally neutral valence, in order to neutralize participants' initial mood states and to draw their attention away from the emotional content of the subsequent film fragment. A joyful, colourful scene from the movie 'Le fabuleux destin d'Amélie Poulain' [4:12; French spoken, Dutch subtitles] was used as positive mood induction, whereas a grey, gloomy scene from the movie 'Il y a longtemps que je t'aime' [5:05; French spoken, Dutch subtitles] was used to induce a negative mood. Variation in length of the fragments was due to covering meaningful sequences of the movies. All three fragments were successfully used to induce opposite moods in a previous study (Karsdorp, Ranson, Schrooten, & Vlaeyen, 2012).

### 2.4. Responsibility induction

In order to induce a heightened sense of responsibility, participants in previous studies have generally been told their task results would be used to help a certain target group or individual (Arntz, Voncken, & Goosen, 2007; Bouchard, Rhéaume, & Ladouceur, 1999; Ladouceur, Rhéaume, & Aublet, 1997; Ladouceur, Rhéaume, Freeston, & Aublet, 1995; Mancini, D'Olimpio, & Cieri, 2004; Startup & Davey, 2003). Despite subtle differences, the core feature present in each manipulation was that participants had a pivotal influence to provoke or prevent certain consequences. In the current study, sense of responsibility was manipulated by written instructions referring to the use of participants' data for important, urgent publication purposes. It was made clear to participants they had a pivotal influence on the quality of collected data and as a consequence could prevent the experimenter and his/her research group from professional damage. The current manipulation incorporates elements from the responsibility manipulation by Mancini et al. (2004), using a (publication) deadline cover story; and from the manipulation used by Arntz et al. (2007), with its reference to previous studies where results were disappointing because of errors in the data. No explicit reference to responsibility was made to prevent demand effects on the responsibility manipulation check, nor was it stated that participants should perform 'as seriously as possible' (Bouchard et al., 1999) or 'as best as they could' (Mancini et al., 2004), so that participants would base their task persistence only on the responsibility context (in conjunction with current mood) and not on explicit performance demands. The responsibility manipulation was added to neutral task instructions (Appendix).

A neutral instead of low responsibility condition was chosen as control condition, in contrast with previous manipulations, where in the low responsibility condition it was either stated that participants' task execution was only a practice round (Arntz et al., 2007; Ladouceur et al., 1995, 1997), that task results would not be

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