Promotion and Prevention Goal Focus; the Effects of Goal Pursuit on Experimentally Induced Pain

Viktor Nilsson & Alexander Sundkvist

Örebro Universitet

Supervisor: Martien G.S. Schrooten
Psychology C
Autumn semester 2013
Positivt och Negativt Vinklade Målinriktningars Effekt på Experimentellt Frambringad Smärta

Sammanfattning

Smärta har stor roll i dagens samhälle och viken av att utveckla ett effektivt behandlingsprogram bör uppmärksammas. Syftet med denna studie var att undersöka distraktionens effekt på personlig målinriktning. Om målinriktningen handlar om positivt eller negativt vinklad målinriktning. Smärta framkallades genom att deltagarna ombads utföra ett så kallat cold pressor task. Deltagarna blev indelade i tre grupper, kontrollgrupp, en grupp med positivt vinklad målinriktning och en grupp med negativt vinklad målinriktning. Resultatet indikerade på en icke signifikant skillnad mellan de tre grupperna gällande grader av smärta men deltagare som oroade sig över smärten visade på högre smärta än de som inte oroade sig i den positiva gruppen. Resultatet kan vara vägledande för framtida studier i syftet att utveckla smärthanterings program.

Nyckelord. Distraktion, positiv, negativ, målinriktning, smärta, cold pressor task.
Abstract

Physical pain is a burden to pain patients and society. Interest has risen to develop effective pain treatment. The aim of this study was to examine if the impact of distraction on pain perception depends on the motivational characteristics of the distraction task. We examined whether the impact of distraction depended on the distraction task had a promotion or a prevention goal focus. Pain was induced using a cold pressor task. Participants were divided into three groups: a control, a promotion and a prevention group. Results indicated no significant difference between the three groups in pain intensity but among high catastrophizers in the promotion group. This result provides guidelines for further studies in the purpose of conducting effective pain treatment.

Keywords. Distraction, promotion, prevention, goal focus, pain, cold pressor task
Promotion and Prevention Goal Focus; the Effect of Goal Pursuit on Experimentally Induced Pain

Imagine having a feeling of intense pain in your back or in your shoulders. Now imagine that while in pain you also have a difficult task ahead of you. Does the way you view the task have any effect on your thoughts and feelings about your pain? Would there be any difference in how that back or shoulder pain would be perceived if the task would result in something good, like getting promoted, or something bad, like being demoted or fired? More specifically, the differences between a promotion and prevention goal focus (for definitions, see page 7).

Even though pain is highly individual (Taylor, 2009), it is a problem that many people can relate to and it is an issue that could inhibit our working capability. In fact, 71% of the women and 58% of the men in Sweden have reported issues with pain (Persson, 2006). Pain is not only a problem many people have to deal with, it is also a problem for society in the sense that pain may render people unable to work. Problems with pain such as back and neck pain are the two biggest reasons for early retirement and sick leave in Sweden; see review (Statens beredning för medicinsk utvärdering, 2003). Chronic pain is a serious problem, both for the individual, but also because of the costs in medical bills for society from that chronic pain (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006).

Since problems with pain poses a significant burden to both the individual (Persson, 2006) and society (Statens beredning för medicinsk utvärdering, 2003; Breivik, et al., 2006) a big interest has been showed to develop successful cognitive pain treatment programs (Lynch, Craig & Peng, 2010; Cohen et., al 2006; Kristjánsdóttir & Kristjánsdóttir, 2011) although the possibilities and the need to improve already existing pain treatment programs can not be denied; see commentary (Schrooten & Vlaeyen, 2010). More research has to be done to
further understand the underlying mechanisms of pain perception and how we can influence it.

Trying to manipulate our attention away from pain is today a well-known cognitive strategy to deal with pain in clinical settings (Lynch, et al., 2010) and it is called dissociative strategy. A dissociative strategy is about focusing on a stimulus that is not painful while experiencing pain. This requires a large amount of concentration on, for example, a pleasurable experience. Using dissociative strategies has proven to be a successful way of coping with pain and it has been supported by numerous studies (Cohen et al., 2006; Kristjánsdóttir & Kristjánsdóttir, 2011). For example clinical research has showed that dissociative coping strategies are helpful for infants and their parents when trying to relieving pain from infants (Cohen et al., 2006) and using music in clinical environment as a distraction reliefs, pain for adolescents’ (Kristjánsdóttir & Kristjánsdóttir, 2011). A big advantage for cognitive behavioral treatment programs is that it can be used in an every day life setting as well as in clinical settings such as using music as distraction (Kristjánsdóttir & Kristjánsdóttir, 2011).

Furthermore, experimental studies have shown that distraction has a relieving impact on pain perception (Verhoeven et al., 2010). For example a study where participants in the test groups were supposed to move their attention away from pain to focus on tone detection and respond quickly when they were exposed to tones. This attention manipulation resulted in significantly less pain perception compared to the control group where they only received the pain stimuli by a cold pressor task (Verhoeven et al., 2010). Taking attention away from pain by having participants perform a non-pain related task at the same time as being exposed to pain has proven effective in pain relief; see review (Van Damme, Legrain, Vogt & Crombez, 2010). The interactions that occur in the brain between pain and the attention to another subject such as tone detection (Verhoeven et al., 2010) have been showed in a brain study...
(Wiech, et al., 2005) where participants were exposed to heat stimuli and at the same time performed a cognitive task where they had to detect colors. The brain activity was measured by a functional magnetic resonance imaging (fMRI) that indicated that pain stimuli and the color detection had a clear interaction in use of cognitive resources that indicated that the distraction of detecting the colors shared cognitive resources with the task of dealing with the heat stimuli, which was the pain task. This indicates a clear impact of distraction on pain perception (Wiech et al., 2005).

Our cognitive functions have been shown to influence the perception of pain (Eccleston & Crombez, 1999), however, our cognitive abilities have limitations (Sweller, 1988; Ashcraft & Radvansky, 2010). Limited cognitive function can be explained by the limitations of the working memory. The working memory can be explained as a mental system that processes the perceived information to the brain and codes these stimuli and translates it into context. For example, the working memory is used to keep your concentration at a certain task, like when you are studying (Passer et al., 2009). When one is performing more than one task there might be interference between the tasks in the working memory, both tasks are trying to use the same resources from the limited cognitive capacity (Ashcraft & Radvansky, 2010). To use this information in the subject of pain; when exposed to pain, the process of dealing with the pain will take part as a task in the working memory. If a person at the same time is exposed to another non-pain task the two might compete over the cognitive resources in the working memory. According to the working load theory (Sweller, 1988); this competition between the resources can lead to that less attention is distributed to each of the tasks. The working load theory suggests that during problem solving combined with another cognitive task such as dealing with pain, the available cognitive resources have to be divided between the two tasks, which will result in a less efficient performance of both the problem solving, and less attention to pain and therefore less pain experienced (Sweller, 1988). Using distraction to
manipulate attention away from pain might differ on the intensity and threat of the pain stimuli (Eccleston & Crombez, 1999), which increases the demand of a more effective pain treatment program. Specifically, the effect of distraction might differ due to subjective differences depending on your thoughts and beliefs towards pain (Sullivan, 1995). Negative thoughts and beliefs towards pain is called catastrophic thinking or pain catastrophizing and is an important variable to take into account regarding studies of pain (Sullivan, 1995).

One way to further refine pain treatment programs including distraction could be to take into account the motivational characteristics of the distraction task. (Van Damme, Legrain, Vogt & Crombez, 2010). Recent experimental evidence suggests that the motivational value of the distraction task determines how much pain you perceive, but only in those who report high levels of pain catastrophizing (Verhoeven et al., 2010). More specifically, participants who reported high levels of catastrophizing perceived significantly less pain if rewards were given for good performance on a distraction task when being exposed to pain compared to when no rewards were given for the performance on the distraction task (Verhoeven et al., 2010).

It has been suggested that tasks with high motivational value have a priority in receiving resources from our working memory (Goschke & Dreisbach, 2008). With this in mind, using motivational goal as a way of pain treatment and the possible impact of differences in motivational state and outcome focus on distraction effects have been largely ignored. Take for instance the difference between promotion goals versus prevention goals (Higgins, 1997).

There are different definitions of the terms promotion and prevention. The more common definitions of promotion are related to advancement in ones career (Longman Advanced American Dictionary, 2007). A common definition of prevention is to stop something from happening (Longman Advanced American Dictionary, 2007). However, in the field of goal pursuits, promotion goals involve a focus on the possibility of gaining
something positive (Higgins, 1997) and prevention goals on the other hand, involve a prevention focus of the risk of losing something (Higgins, 1997). More or less, to reach something good or avoiding something bad.

The effects of using promotion or prevention goals have for example been used in the context of working environment (Goldsmith & Dhar, 2013), more specifically; when incentives are used in workplaces and educational academics as a motivational tool, positive incentives such as receiving money for performing good on a task works as a less effective motivational tool compared to the risk of losing incentives among students, such as money (Goldsmith & Dhar, 2013). As an example, the risk of losing a day off in the weekend has a higher motivational impact compared to winning an extra day off. Research regarding the effect of promotion compared to prevention towards pain has not been conducted which leaves important questions that needs to be answered for the purpose of developing more effective pain treatment programs.

The aim of the present experiment was to study if the effect of distraction on pain perception depends on the participant's current affective motivational state and personal goal orientation, and more specifically, on the outcome focus of the non-pain goal: promotion focus or prevention focus. This study can be viewed as a follow up study on a previous experiment on the role of motivation in distracting attention away from pain (Verhoeven et al., 2010). During this lab study; pain was experimentally induced using a so-called cold pressor task in healthy otherwise pain-free participants. This study was conducted by Viktor Nilsson and Alexander Sundkvist for the purpose of the present C paper.

Based on previous research, which suggest that goal pursuits might have an effect on pain perception (Verhoeven et al., 2010). Negatively framed incentives works more efficient as motivation compared to positively framed incentives (Goldsmith & Dhar, 2013) and that high catastrophizers perceive more pain (Sullivan, 1995) we hypothesize that: (1) Participants
in promotion and prevention goal groups will rate less pain intensity compared to participants in the control group. (2) Furthermore, a prevention goal focus will work as better distraction compared to a promotion goal focus which will result in a lower pain rating for participants with prevention goal focus compared to participants with a promotion goal focus. (3) Although, we hypothesize that the effect of the distraction will work less on high catastrophizing participants, as they will report higher pain intensity.

Method

Participants

79 university and college level students in Sweden (69.6 % females 30.4 % males, mean age = 23.56, SD = 2.46) participated. Power analysis regarding the number of participants has not been done in this field therefore the numbers of participants used in this study was inspired by similar published experimental studies in the subject of pain research (Verhoeven et al., 2010; Vlaeyen et al., 2009). Exclusion criteria were self-reported chronic or acute pain, hand problems such as scars and cuts, heart problems, epilepsy, Raynaud’s disease and ADHD. Inclusion criteria were age between 18 and 30 years and good comprehension of the Swedish language.

All participants volunteered to participate based on informed consent and in exchange for lottery tickets (see Procedure). Participants could win one out of three gift certificates, each worth 250 SEK. This experiment was conducted as part of a C essay project and in accordance with the recommendations of the International Association of the Study of Pain and the Helsinki rules. Ethical committees have approved similar studies in similar population with comparable experimental design, procedure and experimental manipulations. (e.g., Verhoeven et al., 2010; Vlaeyen et al., 2009; Van Damme, Crombez, Van Nieuwenborgh-De Wever & Goubert, 2008).
PROMOTION AND PREVENTION GOAL FOCUS

Materials

Pain Manipulation. Pain was manipulated by asking participant to perform a Cold Pressor Task (Hines, 1937). During this task the participants would hold their non-dominant hand in a water container with 19 liters of water with a set temperature of 12 °C for one minute. A circulation water pump and a cooling aggregate were used to keep the water temperature constant at 12°C. The participants had to immerse their hand so that the water reached their wrist. They were instructed to not form a fist with their hand and to not touch the bottom or the edges of the container. The participants were also instructed to hold their hand still and not to move their fingers. The water temperature of 12 °C and the duration, one minute, were chosen to produce an average degree of pain. The same water temperature and time limit has been used successfully to produce an average degree of pain in a previous study (Verhoeven et al., 2010). The Cold Pressor Task has been widely used due to its benefits on producing pain without the risk of causing any harm or tissue damage to the participant (Sullivan, 1995).

Before performing the Cold Pressor Task, the participants’ hand temperature was standardized. This was done by asking the participants to hold their non-dominant hand in a 14 liter Nordiska Plast container with water on a set temperature of 21°C for two minutes. Before each participant entered the room, a plastic lid was removed from the container. The lid kept the water temperature stable. If necessary, cold or warm water was added before the participants entered the lab until 21°C was reached. The temperature for 21°C to standardize the participants hand was used in a similar study for the same purpose (Verhoeven et al., 2010).

Classification task. The following computerized forced-choice classification task was used as distraction task in the present study. A series of the symbols “/” and “\” appeared at the center of a computer monitor, with one symbol after the other, in random order. The participants' task was to classify each symbol as fast as possible, but without making
mistakes, by pressing one of two keys on the keyboard marked with either “/” or “\”. A Swedish version of a QWERTY keyboard was used. The right-arrow key was marked with a “/” symbol and the left-arrow key was marked with the “\” symbol. Classification responses were given with the dominant hand. Right-handed participants were instructed to press the “/” key with their right index finger and the “\” key with their right long finger whilst a left-handed person were told to press the “/” key with their left long finger and the “\” with their left index finger. Depending on if the participant was left or right handed, the computer monitor was moved from the left side of the cold pressor task to the right side before the participant entered the lab.

**Pain ratings.** Participants rated (1) how unpleasant the Cold Pressor Task was on an Swedish translated 11-point Likert scale ranging from 0 (labeled “Not at all unpleasant”) to 10 (labeled “Extremely unpleasant”) and (2) how painful the Cold Pressor task was on an 11-point Likert scale ranging from 0 (labeled “Not at all painful”) to 10 (labeled “Worst pain imaginable”). (See appendix 1).

**Pain Catastrophizing Scale.** The Swedish version of the Pain Catastrophizing Scale was used to measure catastrophic thinking about pain (Sullivan, 1995). The Pain Catastrophizing Scale consists of 13 statements regarding thoughts and feeling about pain. For example “When I’m in pain I keep thinking of other painful events”. Participants had to indicate for each statement to what extent they thought, felt or worried about pain on a 5-point Likert scale ranging from 0 (labeled “not at all”), 1 (labeled “to a slight degree”), 2 (labeled “to a moderate degree”), 3, (labeled “to a great degree”) and 4 (labeled“all the time”). (See appendix 2) The Pain Catastrophizing Scale showed an inter-item reliability with a Chronbachs alpha =.85 in this study.

**Mood measurement.** The non-verbal Self-Assessment Manikin, also referred to as SAM, (Bradley & Lang 1994) was used to measure mood changes during the lab session. The
participants were asked to rate how they were feeling in the start of the lab-session, after perceiving pain and performing the classification task and at the end of the lab session by circling a number on a scale ranging between 1-9 using five manikins as visual aid. The SAM scale includes three subscales; pleasure, dominance and arousal. (See appendix 3) The SAM scale showed an inter-item reliability with a Chronbachs alpha =.82, in this study and the three subscales showed an inter-item reliability with a Chronbachs alpha, (1) Pleasure =.85, (2) Dominance =.91 and (3) Arousal = .80.

Measurement of motivation and goal orientation. Participants rated their motivation and goal orientation on an 11-point scale. The scale included 7 indication on their goal orientation and were ask to rate (1) to what extent did they focus on ending up with a good result on the classification task from 0 (labeled “not at all”) to 10 (labeled “very focused”). (2) How motivated they were to respond quickly on the classification task ranging from 0 (labeled “not at all” to 10 (labeled “very focused”). (3) To what extend the focused on reaching an end score of maximum numbers of tickets ranging from 0 (labeled “not at all motivated”) to 10 (labeled very motivated). (4) To what extent they focused on not getting a bad result on the computer task from 0 (labeled “not at all” to 10 (labeled “very focused). (5) To what extent they focused on not getting an end score of minimum number of lottery tickets from 0 (labeled “not at all”) to 10 “very focused”. (6) To what extend the worried about receiving less lottery tickets then other participants in the same group from 0 (labeled “not at all worried”) to 10 (labeled “very worried”). (7) To what extent they were motivated to end up with more lottery tickets compared to the other participants in the same group from 0 (labeled “not at all motivated” to 10 (labeled “very motivated”). See appendix 4

Procedure
Participants were recruited by a convenience sample mainly at the University of Örebro. They were told that the purpose of the experiment was to study the effect of aversion on the
cognitive ability and that they would perform a cold pressor task. The real purpose was masked due to possible placebo effects (Sunil, Naidu, Rani & Kumar Rao, 2012). When interested in participating they received further information about ethical standards, the study and they were asked to sign an informed consent when entering the lab. They could book their lab-session on an online calendar. The lab session lasted for approximately 20 minutes.

Before the participants entered the laboratory they had been asked to complete an online battery of Swedish questionnaires, consisting of the Pain Catastrophizing Scale and questions regarding exclusion criteria. Each participant was given an individual identification number that they used to get access to the online questionnaires. They could only get access to the questionnaires with that identification number. The questionnaires were conducted using an online service called “LimeService” and offers you secure access. Participants were randomly assigned to one of three experimental groups (control group, promotion goal group, and prevention goal group) after being stratified for gender and pain catastrophizing (total score on the Pain Catastrophizing Scale).

The laboratory had two rooms, one test room where the cold pressor task, the computer and the hand standardizer water container was located. The other room was the control room where the experiment leader stayed except for when instructions were given to the participant.

Participants were tested individually. When entering the laboratory, the participant was asked to leave their jacket, bag and cell phone (switched off) in the control room after which they were showed to the testing area. After signing the consent form and filling out a questionnaire regarding demographic and reading the exclusion/inclusion information (see appendix 5) and the first SAM (time point 1), the participants received the information about the lottery, the steps in the experiment and that they at any time could abort their participation. At this point the participants was asked to take of rings, watches and bracelets etc. and asked to standardize their non-dominant hand in the container of room temperature.
water. The procedure after standardizing their hands differed throughout the three groups. See figure 1 for group procedures.

(1) The participants in the promotion group received five lottery tickets and were informed that the number of lottery tickets that they would actually end up with depended on their performance on the classification task: (1) for each accurate and fast response they would get one point; (2) for each inaccurate and slow response they would lose one point; (3) the points would get translated into lottery tickets; (4) They were guaranteed a minimum of five lottery tickets but they could win up to four more lottery tickets, giving them nine lottery tickets. (5) The more tickets they ended up with, the bigger was the chance to win a 250-SEK gift certificate in the lottery.

The classification task was performed simultaneously as the cold pressor task. Since the participants had received the information that the purpose of this study was to study the effect of aversion on the cognitive ability they did not now that classification task was meant to be a distraction away from pain. The position of the hand when performing the cold pressor task was controlled from the control room through a video feed displayed on a monitor that the participants had been debriefed about. After performing the two tasks the participants received the following rating scales: (1) SAM scale (time point 2) regarding their mood during the previous task (2) the two pain rating scales (3) the scales measuring motivation and goal orientation during the classification task; and (4) SAM scale (time point 3) regarding their mood in the end of the session.

(2) The procedure for the participants in the prevention group was the same as in the promotion group except for the information about the lottery tickets. The participants in the prevention group received five lottery tickets and were informed that the number of lottery tickets that they would actually end up with would depend on their performance on the classification task: (1) for each inaccurate and slow response they would lose one point; (2)
for each accurate and fast response they would win one point; (3) the points would get translated into lottery tickets; (4) They were guaranteed a maximum of five lottery tickets but they could lose up to four lottery tickets, with a risk of ending up with one lottery ticket. (5) The less tickets they ended up with, the lower was the chance to win a 250-SEK gift certificate in the lottery.

(3) The participants in the control group received five lottery tickets without further information. Then they were informed that they would first perform the cold pressor task followed by the classification task. Then, the participants received information about the cold pressor task and how to immerse their hand. Participants were instructed to look at the center of the computer monitor, where a series of / and \ would appear (one after the other) while performing the cold pressor task. Participants received no instruction to respond to the symbols, this was only so all the participants would see the same information. After performing the cold pressor task the participants received a questionnaire including the SAM scale (time point 2) regarding their mood during the cold pressor task and the two pain rating scales. After this session the participants received the information about the lottery tickets combined with instructions of the classification task. (1) The participants in the control group received five lottery tickets and were informed that the number of lottery tickets that they would actually end up with would depend on their performance on the classification task: (1) for each accurate and fast response they would get one point; (2) for each inaccurate and slow response they would lose one point; (3) the points would get translated into lottery tickets; (4) They could both win and lose tickets from the five they started with. The more tickets they ended up with, the bigger was the chance to win a 250-SEK gift certificate during the lottery.

After the classification task the participants received a questionnaire including the SAM scale time point 4 regarding their mood during the classification task, the measurement
of motivation and goal orientation and the self-assessment manikin time point 3 regarding their mood at the end of the session.

During this experiment, the participants had a chance to win one out of three gift certificates worth 250 SEK each in a lottery. There were three lotteries, one for each group so the chance of winning a gift certificate was not depending on which group they were placed in. The participants were led to believe that the number of tickets they received was based on their performance, but each participant had in fact been randomly assigned to the number of tickets they would receive before they even entered the lab. The reason why they received different numbers of lottery tickets was to keep credibility if the participants talked with each other after the lab session.

<table>
<thead>
<tr>
<th>Promotion Group</th>
<th>Prevention Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAM timepoint 1 + demographic</td>
<td>SAM timepoint 1 + demographic</td>
<td>SAM timepoint 1 + demographic</td>
</tr>
<tr>
<td>Hand Standardize</td>
<td>Hand Standardize</td>
<td>Hand Standardize</td>
</tr>
<tr>
<td>Cold Pressor Task + Classification Task</td>
<td>Cold Pressor Task + Classification Task</td>
<td>Cold Pressor Task</td>
</tr>
<tr>
<td>SAM timepoint 2 + pain rating</td>
<td>SAM timepoint 2 + pain rating</td>
<td>SAM timepoint 2 + pain rating</td>
</tr>
<tr>
<td>Motivation and goal orientation</td>
<td>Motivation and goal orientation</td>
<td>Classification Task</td>
</tr>
<tr>
<td>SAM timepoint 3</td>
<td>SAM timepoint 3</td>
<td>SAM timepoint 3</td>
</tr>
</tbody>
</table>

Figure 1. The procedure for all three groups

To keep a high credibility, all participants had the possibility to control that their lottery tickets were in fact in the lottery by giving them access to video of the lottery. A debriefing about the purpose and more information about the study was given by email and was sent separately to all participants, this way all participants stayed anonymous.
Results

Sample characteristics

Four participants were excluded from the statistical analyses. Three participants were excluded because of meeting the exclusion criteria, two from the prevention group and one from the control group. One other participant from the control group was excluded due to an extreme score on the pain catastrophizing scale (score = 44), 3.59 SDs above sample mean (= 17.52). This left a final sample of n = 75 (69.3 % females, 30.7 % males, mean age = 23.41, SD = 2.35). As can be seen in Table 1, the groups did not significantly differ in age or catastrophizing.

Manipulation check

To evaluate the manipulation of motivational value, and more specifically promotion vs. prevention outcome focus and to control if the manipulation was succeeded, the ratings of motivation and goal pursuit were subjected to separate ANOVAs with group (3: control, promotion, prevention) as between-subjects factor. As you can see in table 1, an ANOVA with focus on doing well on the classification task as dependent variable showed a significant difference between the three groups, $F_{(2,72)} = 3.14, p < .05$. More specifically, a Bonferroni analysis indicates that participants in the promotion group were significantly more motivated to perform better on the classification task compared to participants in the control group. On the other hand, there was no statistical significance between the control group and the prevention group, nor was there a statistical significance between the promotion and prevention group. The result of the manipulation check indicated no significant difference in goal direction between the three groups.
<table>
<thead>
<tr>
<th>Table 1</th>
<th>Group sizes, mean age and mean total scores (standard deviation in parentheses) on measured variables between the three test groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>(n=25)</td>
</tr>
<tr>
<td>Men:women</td>
<td>8:17</td>
</tr>
<tr>
<td>Age</td>
<td>23.32 (2.23)</td>
</tr>
<tr>
<td>Pain</td>
<td>16.24 (7.10)</td>
</tr>
<tr>
<td>Catastrophizing</td>
<td>4.52 (2.52)</td>
</tr>
<tr>
<td>Pain perception</td>
<td>5.48 (2.45)</td>
</tr>
<tr>
<td>Unpleasantness</td>
<td>8.76 (1.42)</td>
</tr>
<tr>
<td>Focus on performing well on the classification task</td>
<td>9 (1.53)</td>
</tr>
<tr>
<td>Focus on not performing bad on the classification task</td>
<td>5.64 (3.83)</td>
</tr>
<tr>
<td>Focus on receiving max tickets</td>
<td>4.12 (3.83)</td>
</tr>
<tr>
<td>Focus on not reaching minimum ...</td>
<td>9 (1.53)</td>
</tr>
<tr>
<td>Motivation fast responses</td>
<td>4.36 (3.71)</td>
</tr>
<tr>
<td>Motivated getting more tickets than others</td>
<td>2.48 (3.71)</td>
</tr>
</tbody>
</table>

*Note. $^*$ $p$<.05.

**Mood check**

To evaluate the participants mood and to investigate if there was a difference in pleasure between the different time-points a repeated measure ANOVA with the SAM pleasure scale as dependent variable, time point (4:time point 1, time point 2, time point 3, time point 4) as within subjects factor and group as between subject variable indicated that there was no significant group difference in mood through the four time points, $F_{(4,144)} = 1.30$, $p > .05$ and
there was no interaction effect, $F_{(2, 72)} = 1.1, p > .05$. Although, there was an overall main effect of time point with a significant quadratic difference through the four time points, $F_{(2, 144)} = 23.34, p < .01$. More specifically, a Bonferroni analysis indicates that the participants reported significant less pleasure at time point 2 compared to any other time points and there was no significant difference in pleasure between the other three time points. See figure 2 for differences of pleasure for all four time-points.

![Figure 2](image_url)

*Figure 2.* Over all time point differences regarding pleasure, time point 1 = beginning of the session, time point 2 = after performing cold pressor task, time point 3 = end of the session, time point 4 = after classification task for control group.

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

There was not any significant group difference in mood through the four time points when SAM dominance scale was used as a dependent variable, time point (4:time point 1, time point 2, time point 3, time point 4) as within subjects factor and group as between subject variable, $F_{(4, 144)} = .40, p > .05$, there was no interaction effect, $F_{(2, 72)} = .19, p > .05$, but as pleasure an overall main effect of time points with a significant quadratic difference through the four time points, $F_{(2, 144)} = 11.99, p < .01$. More specifically, a Bonferroni analysis indicates that the participants reported significant less dominance at time point 2 compared to any other time points and there was no significant difference in dominance.
between the other three time points. See figure 3 for differences of dominance for all four time-points.

![Figure 3](image)

**Figure 3.** Over all time point differences regarding, time point 1 = beginning of the session, time point 2 = after performing cold pressor task, time point 3 = end of the session, time point 4 = after classification task for control group.

*Note.* *p* =< .05, **p** =< .01, ***p** =< .001

Finally, a repeated measure ANOVA with the SAM arousal scale as dependent variable, time point (4: time point 1, time point 2, time point 3, time point 4) as within subjects factor and group as between subject variable indicates that there was no significant group difference in mood through the four time points (group x time point), $F_{(4, 144)} = .60, p > .05$. There was no interaction effect, $F_{(2, 72)} = 1.2, p > .05$. Although, there was an overall main effect of time point with a significant quadratic difference through the four time points, $F_{(2, 144)} 20.26, p < .01$. More specifically, a Bonferroni analysis indicates that the participants reported significant less arousal at time point 2 compared to time point 1 and 3. Time point 4 showed a significant difference from time point 3 but interestingly not towards time point 1 and 2 and there was no significant difference between time point 3 and 1 in arousal. See figure 4 for differences of arousal for all four time-points.
In summation, participants reported to feel less pleasant, less dominant and more aroused at time point 2 where they just had performed the cold pressor task compared to when entering the lab and after the session. Interestingly, there was no significant difference in arousal for the participants in the control group after performing the classification task compared to after performing the cold pressor task.

**Pain ratings**

To investigate if the groups differed in unpleasantness an ANOVA with unpleasantness as dependent variable and group (3: control group, promotion group, prevention group) as between-subjects factor variable revealed no significant difference between groups in unpleasantness ratings, $F_{(2, 72)} = .81, p > .05$.

To investigate if the groups differed in perceived pain an ANOVA with perceived pain as a dependent variable and group (3: control group, promotion group, prevention group) as between subject factor variable revealed no significant difference between groups in rating perceived pain, $F_{(2, 72)} = .43, p > .05$, for means, see table 1. The result of pain reports
indicates that the hypothesis that participants in the promotion and prevention group would perceive less pain than the control group was disproven. This is also the case for the second hypothesis that participants in the prevention group would rate less pain compared to participants in the promotion group since no significant difference in pain perception between those two groups could be found.

The third hypothesis was that the effect of the distraction will work less on high catastrophizing participants, as they will report higher pain intensity and in order to see whether group differences in pain and unpleasantness ratings depend on pain catastrophizing (cf. Verhoeven et al., 2010) total score on the Pain Catastrophizing Scale was included as centred covariate in the latter two ANOVAs. Unpleasantness was subjected to an ANCOVA with group as between subjects factor and centred Pain Catastrophizing score as continues independent variable. There was a significant main effect of pain catastrophizing, $F(2, 69) = 4.1, p < .05$, indicating that there was an association between unpleasantness and pain catastrophizing. To further evaluate the association between pain unpleasantness and pain catastrophizing a Pearson correlation were computed per group. In the promotion group there was a significant positive correlation between unpleasantness and pain catastrophizing, $r(23) = .47, p < .01$. Although, there was no significant correlation between unpleasantness and pain catastrophizing in the control group, $r(23) = -.01, p > .05$, or in the prevention group, $r(23) = -.25, p > .05$. Pain perception was subjected to an ANCOVA with group as between subjects factor and centred Pain Catastrophizing score as continues independent variable. There was no significant main effect of pain catastrophizing, $F(2, 69) = 1.40, p > .05$.

In summary; this result indicates that there is an interaction between unpleasantness and pain catastrophizing but only in the promotion group where high catastrophizers reported higher unpleasantness.
For explorative reasons a Pearson correlations between mood and pain reports were conducted for the whole sample. As can be seen in table 2 there were significant correlations between all three SAM subscales and pain/unpleasantness at time point 2 (just after performing the cold pressor task), this differed from time point 1 (in the beginning of the session) and time point 3 (in the end of the session). This indicates a significant relationship between mood and pain rating.

Table 2. Pearson Correlations between mood and pain intensity

<table>
<thead>
<tr>
<th></th>
<th>Sam pl tp1</th>
<th>Sam dom tp1</th>
<th>Sam arous tp1</th>
<th>Sam pl tp2</th>
<th>Sam dom tp2</th>
<th>Sam arous tp2</th>
<th>Sam pl tp3</th>
<th>Sam dom tp3</th>
<th>Sam arous tp3</th>
<th>Unpleasant</th>
<th>Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam pl tp1</td>
<td></td>
<td>-13</td>
<td>-.15</td>
<td>.50</td>
<td>-.73</td>
<td>-.06</td>
<td>.73</td>
<td>-.20</td>
<td>-.21</td>
<td>.18</td>
<td>.12</td>
</tr>
<tr>
<td>Sam dom tp1</td>
<td>-</td>
<td>.10</td>
<td>-.07</td>
<td>.58</td>
<td>-.09</td>
<td>-.18</td>
<td>.76</td>
<td>.08</td>
<td>-.09</td>
<td>-.16</td>
<td></td>
</tr>
<tr>
<td>Sam arous tp1</td>
<td>-</td>
<td>-.02</td>
<td>.03</td>
<td>.37</td>
<td>-.20</td>
<td>.13</td>
<td>.58</td>
<td>-.15</td>
<td>-.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sam pl tp2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sam dom tp2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sam arous tp2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Sam = Self assessment manikin scale, pl = pleasure, dom = dominance, arous = arousal and tp = time point. * p=<.05, ** p =<.01, *** p=<.001
Discussion

The purpose of this study was to examine if the effect of distraction on pain perception depends on the participants current affective motivational state and personal goal orientations. It was hypothesized that (1) it would be a significant difference in pain perception between the two goal groups compared to the control group after perceiving the cold pressor pain, more specifically, (2) the group with prevention goal focus would perceive less pain compared to the group with promotion goal focus and (3) that distraction would work less among high catastrophizing participants. Our main findings can be readily summarized as follows: there was no overall difference between the control group, distraction group with a promotion goal focus and distraction group with a prevention goal focus in pain ratings. However, taking pain catastrophizing into account, the groups differed in the association between pain catastrophizing and unpleasantness. More specifically, the distraction for the participants in the promotion group did not have an affect for high catastrophizers where there was a positive correlation between unpleasantness and catastrophizing ratings. No such correlation was found in the distraction group with a prevention goal focus.

Moreover, the results from this study showed a significant mood change between the different time points, more specifically, a less pleasure, less dominance and higher arousal was reported after perceiving pain compared to before and after the lab session. Correlations between negative mood and pain were also found.

The results of this study do not support our main hypothesis, since no overall group difference in pain intensity could be found. This result does not support previous theories and studies where distraction has showed to have a big impact on the perception of pain (Van Damme, Legrain, Vogt & Crombez 2010; Verhoeven et al., 2001; Wiech, et al., 2005). However, It has been stated that the effect of distraction on pain can differ regarding intensity and threat of the pain stimuli (Ecclestone & Crombez, 1999) and also pain catastrophizing
(Sullivan, 1995). Indeed this study provides additional evidence on the role of pain catastrophizing in the effect of distraction on pain perception and supports our hypothesis that pain catastrophizing participants would rate higher on the pain rating, although only in the promotion goal group. This study can be viewed as a follow-up study on a previous study that was conducted with a similar purpose but during which no distinction was made between different goal orientations (Verhoeven et al., 2010). The result from that study showed that participants receiving distraction away from pain and a goal pursuit and also reported high catastrophizing perceived significant less pain compared to high catastrophizers in the control group in addition to a non significant difference between the distraction group with no goal pursuit and the control group. In a similar vein, this present study indicates that participants with high catastrophizing reports more pain than low catastrophizers in the promotion goal group, which may indicate a lower effective distraction of the promotion goal. Therefore, this study provides a further contribution to the field of pain management. To know for sure that the effect of goal pursuit on distraction differed between the promotion group and the prevention group, an analysis between high catastrophizers and pain perception between the three groups should have been conducted. Although making sub groups of catastrophizing score in the test groups in this study was not preferable due to sample sizes (n=25), which would mean that there would have been approximately 12 participants in each group and that result would not have been trustworthy. This suggests bigger samples for further studies on the subject.

According to studies regarding the effect of prevention goal versus promotion goals as a motivational tool it has been suggested that a preventive goal focus will work more effective as motivation compared to a promotion goal focus (Goldsmith & Dhar, 2013). With that in mind it is not surprising that promotion goal seems to be less effective as a motivational distraction, but only for high catastrophizers. The reason why it is harder for a high
catastrophizing person to get distracted away from pain might be explained by a high catastrophizers constant worrying of the pain (Eccleston, Crombez, Aldrich & Stannard, 2001). It has also been proven harder to manipulate these negative feelings of pain away from the pain and being able to focus on something else (Eccleston et al., 2001).

Surprisingly, there was no overall significant difference between the groups on pain rating. An explanation of that might be due to how the distraction was manipulated. The distraction was manipulated in two ways, (1) using a classification task and (2) using incentives to control the goal pursuit. In this experiment, lottery tickets were used as manipulation of the goal pursuit. The more lottery tickets the participants received the greater the chance of winning a gift certificate worth 250 kronor became. Previous studies with the purpose of manipulating goal pursuits have used money as an incentive to manipulate the goal orientation (Goldsmith & Dhar, 2008; Schrooten, et al., 2012; Verhoeven, et al., 2010). It is possible that using money as a guaranteed incentive works better as motivation compared to gaining a greater chance of winning a gift certificate. Due to limited resources in this study, every participant receiving money was not a possibility. For a replication or further studies in the subject it would be recommended to use a more powerful end goal than a “greater chance of winning”.

The measurement of mood provided us with interesting findings. After performing the cold pressor task and thereby being exposed to pain, participants rated less pleasure, less dominance and a higher level of arousal compared what they felt in the beginning of the session and at the end of the session. This result is in accordance with previous studies on the subject (Meagher, Arnau & Rhudy, 2001). What is interesting though, is that no mood differences between the three groups were found. That indicates that the goal focus does not seem to have an effect on the mood when pain is perceived. Furthermore, it could be assumed that prevention from losing something could bring out more negative moods (Higgins, 1997).
This was not the case in this study. This could possible be explained by that preventive goals works better as motivational tools (Goldsmith & Dhar, 2013) compared to promotion goal and therefore there was no significant mood difference.

This result did show an effect of unpleasantness when catastrophizing was taken into account for in the promotion group. This raised an interesting topic for further research, and it is regarding the generalizability of unpleasantness. Take for instance unpleasant sound, could you distract your self away from unpleasant sound using distraction and goal pursuits? The possibility of distracting your self away from sound have similarities to distracting your self away from pain, see review (Bajo & King, 2010). Although the result from our study cannot be generalized to other unpleasant stimuli since pain catastrophizing was taken into account. It seems unlikely that catastrophic thinking towards pain should have an affect of a non-painful but unpleasant stimulus such as sound.

All three test groups perceived different information and performed the experiment out of different premises but surprisingly, no significant difference in motivation and goal pursuits was found between the promotion and the prevention group. That indicates that the manipulation of the promotion and the prevention group did not come across as it was supposed to. Therefore there’s no guarantee that the outcome focus between the participants in the promotion and the prevention group differed, this may once again be explained by weak incentives which didn’t motivated the participants strong enough to produce a difference. The limitation of the manipulation provides a weakness in this study.

This study did have some further limitations. In this study an experimental design was used to manipulate and expose pain to participants. Participants with issues regarding acute or chronic pain could not participate in this experiment and using an experimental design for this purpose has its limitations. When controlling for most variables and using a set lab environment it gets more difficult to generalize the result and conclusions out on the real
world such as persons with chronic pain (Abbot & McKinney, 2013). Therefore, a replication of this study would be suggested in a clinical setting to test its value on chronic pain patients.

The room temperature water that was used to standardize the participants' hand temperature before the cold pressor task was not controlled by a mechanical water pump that would keep the temperature at a set level. Even though the temperature was controlled before each participant entered the lab it cannot be guaranteed that every participant had the exact same temperature in the water during the standardizing time. Ideally, a mechanical water pumped like the one used in the cold pressor task should have been used for this purpose, but that was not possible due to limited resources but is suggested for future studies in the topic of pain research. Another aspect that needs considering is that the participants filled in the pain catastrophizing questionnaire at slightly different time points before entering the lab. The participants were asked to fill in the pain catastrophizing scale as soon as possible after receiving it, but this could not be controlled for. Depending on how fresh the information was in the participants' memory, it may have influenced their thought and feelings about the experiment when they entered the lab. If they had filled out the form soon before entering the lab, the information and questions about “how they feel when in pain” might be more on their mind than participants who filled out the questionnaire a week or more before entering the lab. This has to do with something called recency effect. Recency effect is a part of a serial position effect-theory that indicates just that recently acquired information is easier to remember and form associations to than information received a longer time period before an event. (Gupta, Lipinski, Abbs & Lin, 2005).

This study was conducted on healthy and pain free students for the purpose of controlling the intensity and the duration of the pain. This provides complications when generalizing the result to chronic pain patience but the study provides information and
guidelines for the purpose of pain research in a clinical setting with chronic or acute pain patience.

This study also had a number of strengths. Specifically, the design of this experiment was build on strong previous research but in the interest of an unexplored issue. All scales and questionnaires in this study showed on a strong inter–item reliability with a minimum of chronbachs alpha on .80 and maximum .91. Even though using an experimental design has it limitations it also have great strengths when used in pain studies (Sunil et al., 2012). If this experiment would have be conducted in a clinical setting there might be possible placebo effects or other variables that would have influenced the result (Sunil et al., 2012), for example; if a participant with issues of chronic pain participated in a clinical pain treatment program, the motivation of getting a more effective treatment could influence on the promotion and prevention goal focus. Since distraction on pain differ in its effectiveness regarding the intensity on pain (Ecclestone & Crombez, 1999) it might differ on how effective goal pursuits will work as an distraction towards pain between the participants in a clinical pain treatment program. In this experiment the duration, intensity and localization could be controlled so the stimuli would not vary between the participants. Since the participants were stratified into the three groups depending on their reported pain catastrophizing and their gender, the effect of these variables were controlled throughout the study and should not have affected the result

A large number of the citizens in Sweden have reported issues with pain, which affect both working capabilities and is a big cost for the society (Persson 2006; Statens beredning för medicinsk utvärdering, 2003; Breivik et al., 2006). The possibilities and the importance of developing effective clinical pain treatment program cannot be underestimated, see commentary (Schrooten & Vlaeyen, 2010). Although further research needs to be conducted regarding goal pursuits as a distraction to pain relief. The result that high catastrophizers
seems to have a clear correlation towards pain when they had a promotion end goal to focus on compared to the non correlation for high catastrophizers in the prevention group provides directions that can be used in developing pain treatment programs.

Now imagine again having that feeling of intense pain in your back or in your shoulder and you have a difficult task ahead of you. Pain perception might depend on your level of catastrophizing as well as your outcome focus. Specifically, high catastrophizers with a promotion goal focus has a relationship towards higher levels of unpleasantness, whereas high catastrophizers with a prevention goal focus has not.
References


Vlaeyen, J, W.S., Hanssen, M., Goubert, L., Vervoort, T., Peters, M.,

*Behaviour research and therapy*, 47, 774-782. doi: 10.1016/j.brat.2009.05.008


Appendix 1

Please mark the answer that best represents your experience from the cold pressor task.

1. How unpleasant did you find the cold pressor task? In other words, describe the maximum feeling of unpleasantness you experienced while you had your hand in the cold water.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all unpleasant</td>
<td>Extremly unpleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How painful did you find the cold pressor task? In other words, describe the maximum pain you experienced while you had your hand in the cold water.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all painful</td>
<td>Extremely painful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Swedish Version**

Var god markera det svar som passar in bäst från dina erfarenheter från ”cold pressor task”.

1. Hur obehaglig tyckte du det så kallade ”cold pressor task” var? Det vill säga, den maximala känslan av obehag du upplevde när du hade handen i kallt vatten.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inte alls obehagligt</td>
<td>Extremt obehagligt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inte alls smärtsamt</td>
<td>Värsta tänkbara smärtan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2

English version

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feelings that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

0 – not at all   1 – to a slight degree   2 – to a moderate degree   3 – to a great degree   4 – all the time

When I’m in pain …

☐ I worry all the time about whether the pain will end.
☐ I feel I can’t go on.
☐ It’s terrible and I think it’s never going to get any better.
☐ It’s awful and I feel that it overwhelms me.
☐ I feel I can’t stand it anymore.
☐ I become afraid that the pain will get worse.
☐ I keep thinking of other painful events.
☐ I anxiously want the pain to go away.
☐ I can’t seem to keep it out of my mind.
☐ I keep thinking about how much it hurts.
☐ I keep thinking about how badly I want the pain to stop.
☐ There’s nothing I can do to reduce the intensity of the pain.
☐ I wonder whether something serious may happen.

…Total

Updated 11/11
Swedish version

PCS

Vi är intresserade av de tankar och känslor du har när du upplever smärta, ont eller besvär. Använd skalan nedan för att skatta i vilken utsträckning dessa tankar och känslor gäller för dig.

<table>
<thead>
<tr>
<th>När jag har ont...</th>
<th>Inte alls</th>
<th>I liten</th>
<th>I måttlig</th>
<th>I stor utsträckning</th>
<th>Hela tiden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oroar jag mig jämt för att smärtan inte skall gå över.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Känner jag att jag inte orkar fortsätta.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Är det förfärligt och jag tror att det aldrig kommer att bli bättre</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Är det fruktansvärt och jag känner att det överväldigar mig.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Känner jag att jag inte står ut med det längre.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Blir jag rädd att smärtan ska förvärras.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tänker jag på andra smärtsamma erfarenheter.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Väntar jag otåligen på att smärtun ska försvinna.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Kan jag inte sluta tänka på det.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tänker jag hela tiden på hur ont det gör.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tänker jag hela tiden på hur mycket jag vill att smärtan ska gå över.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Finns det ingenting som jag kan göra för att lindra smärtan.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Undrar jag om något allvarligt har hänt mig.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix 3
English version
Below there are a number of figures who all express a certain feeling. Mark the number, using the figures as a reference to represent your feeling right now.

**Right now I feel:**

1 2 3 4 5 6 7 8 9

**Right now I feel:**

1 2 3 4 5 6 7 8 9

**Right now I feel:**

1 2 3 4 5 6 7 8 9
Swedish version

Nedan finns ett antal figurer som alla uttrycker en viss känsla. Ringa in den siffra utifrån figurerna som bäst stämmer överens med din känsla just nu.

**Just nu känner jag mig:**

![Image 1 of 4]

**Just nu känner jag mig:**

![Image 2 of 4]

**Just nu känner jag mig:**

![Image 3 of 4]
Appendix 4
Please mark the number that best represents your experience from the computer task.

1. To what extent did you focus on ending up with a good result on the computer task?
   
   0= Not at all  
   10 = Very focused
   
   0  1  2  3  4  5  6  7  8  9  10

2. How motivated were you to get quick and fast responses on the computer task?
   
   0= Not at all motivated  
   10 = Very motivated
   
   0  1  2  3  4  5  6  7  8  9  10

3. To what extent did you focus on reaching an end score of maximum numbers of lottery tickets?
   
   0= Not at all  
   10 = Very focused
   
   0  1  2  3  4  5  6  7  8  9  10

4. To what extent did you focus on not getting a bad result on the computer task?
   
   0= Not at all  
   10 = Very focused
   
   0  1  2  3  4  5  6  7  8  9  10

5. To what extent did you focus on not getting an end score of the minimum number of lottery tickets?
   
   0= Not at all  
   10 = Very focused
   
   0  1  2  3  4  5  6  7  8  9  10

6. To what extend were you worried that your end score meant fewer lottery tickets compared to other participants in the same group, which means a smaller chance of winning the lottery?
   
   0= Not at all worried  
   10 = Very worried
   
   0  1  2  3  4  5  6  7  8  9  10

7. To what extent were you motivated to end up with a score that means more lottery tickets compared to other participants in the same group, which means a greater chance of winning in the lottery?
   
   0= Not at all motivated  
   10 = Very motivated
   
   0  1  2  3  4  5  6  7  8  9  10
Var god markera det svar som passar bäst in på dig från dina erfarenheter gällande datauppgiften.

1. Till vilken grad fokuserade du på att få ett bra resultat på datauppgiften?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

2. Hur motiverad var du över att svara snabbt och korrekt på datauppgiften?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

3. Till vilken grad fokuserade du på att nå ett slutresultat på maximalt antal lotteribiljetter?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

4. Till vilken grad fokuserade du på att inte få ett dåligt resultat på datauppgiften?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

5. Till vilken grad fokuserade du på att inte nå ett slutresultat på minimalt antal lotteribiljetter?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

6. Till vilken grad var du orolig att ditt slutresultat innebar färre lotteribiljetter än andra deltagare i samma grupp, vilket innebär en mindre chans att vinna i lotteriet?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

7. Till vilken grad var du motiverad att ditt slutresultat innebar fler lotteribiljetter än andra deltagare i samma grupp, vilket innebär en större chans att vinna i lotteriet?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
Appendix 5.
Date of birth: (YYMMDD) ________

Please mark the alternative that best represents you.

Gender: Female ☐ Male ☐ Other ☐

Which is your dominant hand? With other words, mark if you are right or left handed

Left ☐ Right ☐ Both ☐

Answer yes or no on these following statements.

• I have been drinking alcohol today. If yes, indicate on how long time ago that was.

_______________________________

• I have been drinking coffee today. If yes, indicate on how long time ago that was.

_______________________________

• I have been taking painkillers today, i.e. Alvedon, Ipren or Panodil etc. If yes, indicate on how long time ago that was.

_______________________________

• At the moment, I have issues with an acute pain, i.e. headache, sore throat etc.

_______________________________

• At the moment, I have issues with my hands, i.e. open wounds, blisters, etc.

_______________________________
Swedish version

Födelsedatum: (ÅÅMMDD) _________

Kryssa i det alternativ som passar bäst in på dig.

Kön: Kvinna ☐ Man ☐ Annat ☐

Vilken är din dominanta hand? Det vill säga om du är höger- eller vänsterhänt

Vänster ☐ Höger ☐ Båda ☐

Svara ja eller nej på dessa påståenden.

• Jag har druckit alkohol idag. Om ja, ange för hur länge sedan det var.
  _____________________________________________

• Jag har druckit kaffe idag. Om ja, ange för hur länge sedan det var.
  _____________________________________________

• Jag har tagit smärtstillande tabletter idag, t.ex. Alvedon, Ipren eller Panodil etc. Om ja, ange för hur länge sedan det var.
  _____________________________________________

• Jag har för tillfälle en akut smärta. T.ex. huvudvärk, halsont etc.
  _____________________________________________

• Jag har för tillfälle problem med mina händer, såsom öppna sår, blåsor etc.
  _____________________________________________