The effectiveness of attentional strategies on pain in adults: a meta-analysis

1. Objective

To investigate the efficacy of directing the attention away from pain (distraction) or to direct attention towards pain (monitoring) upon the pain experience in adult participants.

2. Criteria for considering studies for this review

2.1. Type of studies

Only designs in which an effect size can be calculated based on an experimental manipulation of attention with at least 10 participants in each arm will be included. If several attentional strategy conditions are present in a study, only the arms which include more than 10 participants will be included.

2.2. Type of participants

Studies involve adults (age ≥18 years). Studies with children will not be coded because some reviews have already been published (DeMore & Cohen, 2005; Kleiber & Harper, 1999; Piira et al., 2002; Uman, Chambers, McGrath, & Kisely, 2006). Participants may experience chronic pain (pain duration longer as 3 months), acute pain (pain duration not exceeding 3 months), experimental pain (e.g. cold pressor test) or procedural pain (pain produced by a medical procedure). As result we will distinguish between following subgroups:

- *Adults with acute pain:* Participants are individuals who experience a clinical form of pain that lasts between 0 and 3 months. Most often these adults are participants who seek medical help. However, it is also possible that participants are recruited via advertisement and self identify as adults with pain.
- *Adults with procedural pain*: Individuals are participants who experience or will experience pain that is needed for clinical purposes (dental procedure, surgery, painful investigation).
- *Adults with experimental pain:* Participants experience or will experience pain that is induced by the experimenter for the purpose of the study (e.g. cold pressor task).
- *Adults with chronic pain*: Participants are individuals who experience a clinical form of pain that lasts longer than 3 months. Most often these adults are participants who seek medical help. However, it is also possible that participants are recruited via advertisement and self identify as adults with pain.

Notes:

- The above categories are not mutually exclusive. For example it is possible that participants are suffering from a chronic pain (e.g. CLBP) and perform a distraction task while putting their hand in cold water (experimental pain). However participants will be categorised in only one of these categories on the basis *of the primary focus of the study*.
- Adults have an age of 18 or older. When studies include individuals of younger age, the mean age of participants should be 18 or older. When studies combine adults and children, at least half of the participants have to be adults.
- When studies include individuals with both acute and chronic pain, the mean duration of pain will be used to categorize studies.

2.3. Type of intervention

Although the manipulation of attention is a common method of coping with pain, there is an ongoing debate about its definition and its efficacy. In this review, we will take as a starting point a broad definition of attention. More specifically, we conceptualize the attentional strategies as a form of selective attention. According to the American Psychological Association selective attention is the "focusing of awareness on a limited range of stimuli". Attentional strategies that are spread over more than one session and aim at learning participants to cope with a chronic illness or chronic pain will be excluded. These are often

part of a larger cognitive-behavioural program, as a result of which the specific effects of attentional strategies cannot be investigated.

Important to note is that we use a procedural approach of this definition (the authors have to identify their study as a manipulation of attention). Applying this definition upon our topic of interest, two broad attentional strategies are distinguished.

2.3.1. *Attentional distraction*

The first strategy involves focusing of awareness on stimuli that are not related to the pain experience (attentional distraction). Examples are focusing upon a visual stimulus, thoughts, or another part of the body instead of the pain experience.

2.3.2. *Sensory monitoring.*

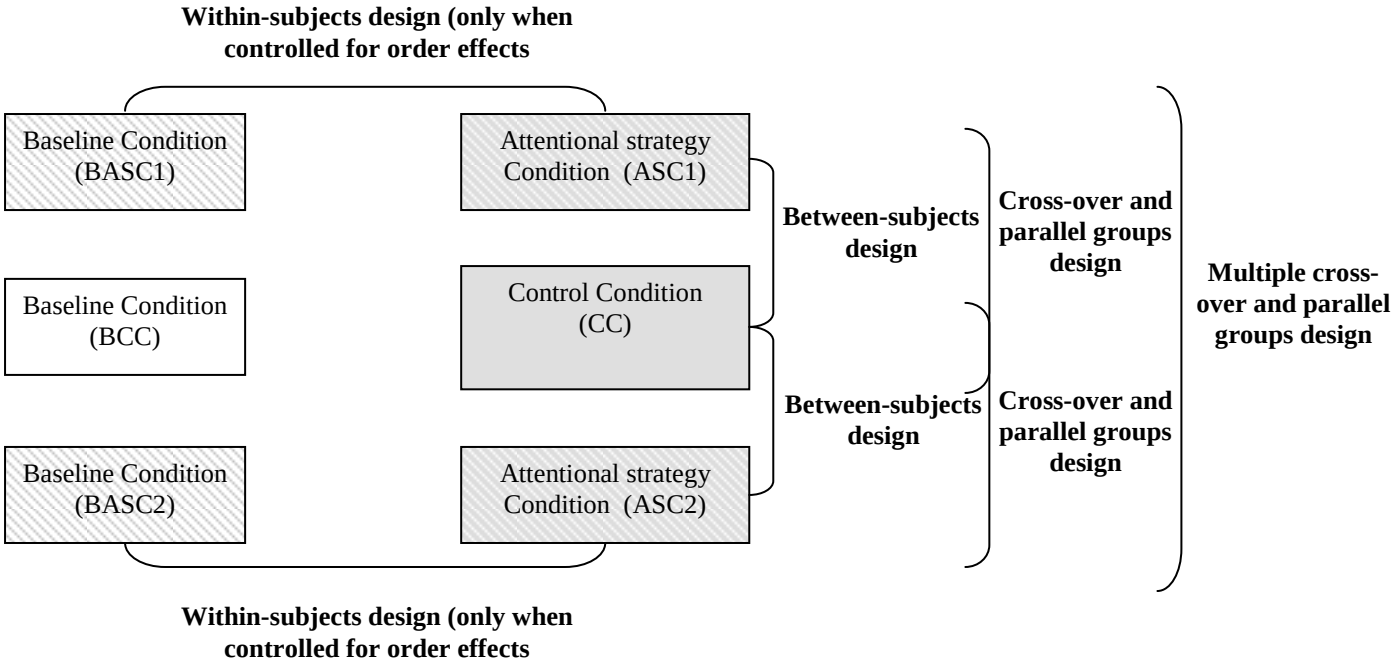
The second strategy involves focusing on the sensory characteristics of the pain stimulus at the expense of its affective and emotional aspects. Leventhal's dual processing theory provides a theoretical framework that might account for the pain decreasing effects of sensory monitoring. According to this model individuals can either use a sensation- or emotional orientated processing. These two systems are parallel and at some extent mutually exclusive. According to this model sensory monitoring could be beneficial by preventing the distress schemata from activation, because attention is assumed to be directed to a neutral schema and away of emotional schemata.

We have no intention to restrict the possible cognitive or neurological processes that may be responsible for the effects of distraction or sensory monitoring. There is almost no research on this issue. Possible candidates are expectancy effects (see Devilly & Borkovec, 2000), or the executive functions of inhibition or switching (see Miyake et al., 2000).
The boundaries of attentional strategies with other coping techniques (e.g. hypnosis, imagery guide,…) are often vague and overlapping as you can see in following definitions.
For example in 2003, APA's Hypnosis Division proffered the following definition: Hypnosis typically involves an introduction to the procedure during which the subject is told that suggestions for imaginative experiences will be presented. When using hypnosis, one person…is guided by another…to respond to suggestions for changes in subjective experience, alterations in perception, sensation, emotion, thought, or behaviour. If the subject responds to hypnotic suggestions, it is generally inferred that hypnosis has been induced. (Green, Barabasz, Barrett, & Montgomery, 2005).
Lang (1979) defines guided imagery as follows: Guided imagery uses verbal suggestions to create a flow of thoughts that focus the individual's attention on imagined visual, auditory, tactile, or olfactory sensations. The process of refocusing the individual's attention on these imagined sensations results in specific psychological and physiological responses, such as relaxation.

Studies will only be included if they report data that allow the computation of an effect size for at least one of the following outcome measures of distraction or sensory monitoring: a within group comparison in which a control condition is compared with an experimental condition (distraction or monitoring) at a different time or a between group comparison where one group of participants is allocated to a distraction/monitoring condition and another group of participants to a control group [not-distraction and not-monitoring condition- (usually a standard procedure)].
For each study an effect size (Cohen's d) will be calculated directly from means (or medians) and SDs with Cohen's (1977) formula for d. A negative Cohen's d will indicate that the attentional strategy reduces the pain experience, a positive Cohen's d will indicate that the attentional strategy increases the pain experience.
Only studies that experimentally manipulate attention will be included. Clinical studies that report the effects of a spontaneous use of distraction or monitoring to manage pain will be excluded. These studies are correlational and cross-sectional. Pain itself, however, does not have to be induced experimentally. Studies in which patients with chronic or acute clinical pain are examined will also be included in the meta-analyses.

Experimental studies may include:

- Cross-over design/within subject comparisons (only if controlled for experimental confound of order effects)
  - The effects of distraction are compared within subjects
  - The effects of sensory monitoring are compared within subjects
- Parallel design/between subject comparisons (only if participants are assigned at random to groups)
  - The effects of distraction are compared between subjects
  - The effects of sensory monitoring are compared between subjects
- Cross-over and parallel groups design (a combination of repeated measures and between subject design) (only if participants are assigned at random to groups or if controlled for experimental confound of order effects)
  - The effects of distraction are compared within subjects and between different groups
  - The effects of sensory monitoring are compared within subjects and between different groups



Note: The between-subjects design is also possible with several attentional strategy conditions, which are compared with the same control condition. In the overall effect size, we will average over all dependent effect sizes.

3. Type of outcome measure

Pain is the primary outcome. As a secondary outcome, we consider distress. No physiological or neurobiological measures will be taken into account.

The most widely accepted definition of pain is one proposed by the International Association for the Study of Pain (IASP) in which pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage". It is generally acknowledged that this is a highly personal and subjective experience that can be addressed only indirectly. Distress will be broadly defined as any type of negative affect associated with the procedure (e.g. anxiety, stress, fear, frustration). In previous studies different variables were taken into account to measure the efficacy of the used strategy (monitoring/ distraction). These variables are pain intensity, pain affect, pain tolerance, pain threshold and distress. Further on, each of these variables was measured by a number of different instruments (Eccleston, 1994). Previous studies show that it is important

to make a categorisation of the used outcome measures (Roelofs et al., 2004) and used measurement method (James & Hardardottir, 2002). During the meta-analysis we will therefore do subanalyses for each type of outcome measure. These measures may be:

- Visual analogue scales (VAS)
- Numerical rating scales (NRS)
- Graphic rating scales (GRS)
- McGill Pain Questionnaire (MPQ)
- Pain tolerance measure
- Pain threshold measure
- Other primary measure: ...
- Secondary measure: …

Several research questions will be addressed:

1. Does attentional distraction have pain reducing effects in adults with pain?

This will be done by looking at the average effect sizes of the comparison of participants in the distraction condition with participants in the control condition (standard condition).

2. *Does sensory monitoring have pain reducing effects in adults with pain?*

This will be done by looking at the average effect sizes of the comparison of participants in the sensory monitoring condition with participants in the control condition (standard condition).

3. *Is the efficacy of distraction/monitoring related to the intensity of current pain (Crombez et al., 1997), pain related fear (Crombez et al, 1998), disposition to experience negative effect, novelty of the pain stimulus (Crombez et al., 1993), and multiple somatic complaints or other previous mentioned moderators?*

Often these hypotheses are not directly tested, and can not be investigated by the available results reported in the studies. We will investigate these hypotheses by a meta-analysis of the correlation coefficients between the efficacy of the distraction/monitoring strategy and theoretically relevant constructs such as current pain intensity, pain-related fear, disposition to experience negative affect, novelty of the pain stimulus, and multiple somatic complaints. However, the necessary information for such analysis is often not reported in the articles. This analysis will be dependent upon the availability of the original data-sets of the authors.

3.1. Intensity of the current pain

- *Characteristics of the experiment*

  In these analyses only studies that used a self-report measure of the current pain intensity by a VAS-scale, graphic rating scale, numerical rating scale (or the McGill Pain Questionnaire) will be included. To obtain a uniform measure of pain intensity we will calculate the following score:

$$Z = \frac{X - \mu}{\sigma}.$$

  where μ stands for the lowest possible value of the scale. For all numerical rating scales, we will code mean, possible minimum, possible maximum, standard deviation, and labels of the anchor points of the scale.

- *Experimental manipulation*

  In these analyses only studies that investigated the effect of intensity of the current pain on the efficacy of distraction/monitoring will be included. e.g. by manipulating the intensity of the applied pain.

3.2. Pain related fear

- *Individual differences*

In these analyses only studies that used a self-report measure of pain related fear will be included, e.g. PCS, TSK, FABQ, ….
To obtain a uniform measure of pain-related fear we will calculate the following score:

$$Z = \frac{X - \mu}{\sigma}.$$

where μ stands for the lowest possible value of the scale. For all scales, we will code mean, possible minimum, possible maximum, standard deviation, and labels of the anchor points of the scale.

- *Experimental manipulation*
  In these analyses only studies in which the threat value of the pain stimulus is manipulated will be taken in account. By manipulating the threat value of the pain, there also should be a change in pain related fear.

3.3. Disposition to experience negative affect

- *Individual differences*
  In these analyses only studies that used a self-report measure of trait anxiety will be included, e.g. STAI-T, ASI,….
  To obtain an uniform measure of negative affect we will calculate the following score:

$$Z = \frac{X - \mu}{\sigma}.$$

where μ stands for the lowest possible value of the scale. For all scales, we will code mean, possible minimum, possible maximum, standard deviation, and labels of the anchor points of the scale.

3.4. Novelty of the pain stimulus

- *Characteristics of the experiment*
  In these analyses only studies that give an indication of novelty of the pain stimulus (check if the specific pain stimulus is experienced for the first time) will be included. Subsequently, there will be made a categorisation between stimuli experienced for the first time and stimuli experienced before the distraction procedure.

3.5. Multiple somatic complaints

- *Individual differences*
  In these analyses only studies that used a self-report measure of somatic complaints will be included, e.g. SCL-90-R,….
  To obtain a uniform measure of somatic complaints we will calculate the following score:

$$Z = \frac{X - \mu}{\sigma}.$$

where μ stands for the lowest possible value of the scale. For all scales, we will code mean, possible minimum, possible maximum, standard deviation, and labels of the anchor points of the scale.

3. 6. Measure of present state of anxiety/distress (state anxiety, negative affect,…):

- *individual differences*
  In these analyses only studies that used an ad hoc self-report measure of the present state of distress will be included, e.g. STAI-S.

To obtain a uniform measure of negative affect we will calculate the following score:

$$Z = \frac{X - \mu}{\sigma}.$$

where μ stands for the lowest possible value of the scale. For all scales, we will code mean, possible minimum, possible maximum, standard deviation, and labels of the anchor points of the scale.

- *Experimental manipulation*
  In these analyses only studies that investigated the effect of the present state of anxiety/distress on the efficacy of distraction/monitoring will be included.

4. Search methods for identification of studies

Published studies will be identified using electronic databases. Only papers and PhD dissertations that are published in English will be selected. Reference and citation lists of papers will be searched. Finally, a list of publications will be sent to lead authors to ask for any other published papers. Electronic databases are:

- MEDLINE (1966-present)
- PsychINFO (1887-present)
- Web of Science (1980- present)

MEDLINE will be searched using the terms

OR distraction AND pain
OR attention* focus*
OR attention* directing
OR sensory focus*
OR attention* diver*

PsychINFO will be searched using the terms

OR distraction AND pain
OR attention* focus*
OR attention* directing
OR sensory focus*
OR monitoring
OR attention* diver*

Web of science will be searched using the terms as keywords, title and abstract

OR distraction AND pain
OR attention* focus*
OR attention* directing
OR sensory focus*
OR attention* diver*

Furthermore, the list of articles will be completed with articles that were used in previous literature studies concerning attentional strategies applied during pain:

- Cioffi (1991)
- Fernandez & Turk (1989)
- Eccleston (1995)
- McCaul & Malott (1984)
- Tan (1982)
- Weisenberg (1977)
- Wissmeijer & Vingerhoets (2005)

5. Methods of the review

5.1. Selection of the studies

Two reviewers (DVR & LDR) will independently screen titles and abstracts from literature searches for inclusion in the review. Reviewers will not be blind for authors, institutions, journals and results. In addition to the previous selection criteria, articles will only be selected when the original authors classify the article as an article concerning attentional distraction or attentional monitoring. Specific articles will only be included in the meta-analysis if the idea concerning attentional distraction or monitoring was mentioned in the introduction section. Consensus will be used to resolve disagreement regarding inclusion of the studies. If disagreement persists, a third reviewer will be consulted if necessary (GC).

5.2. Data extraction

Data-extraction will be conducted by one reviewer (SVD), after 2 authors (DVR & SVD) conducted a pilot sample of 50 articles independently. This will be performed by using a data extraction form specifically designed for this meta-analysis. If necessary, a third reviewer will be brought in to resolve disagreements in the pilot sample. Also study characteristics will be coded. Amongst these are sample, paradigm, and methodological characteristics. The coding categories were developed in an iterative process. An initial coding sheet was developed and distributed amongst the authors, who gave feedback on content after piloting a random selection of 10 articles divided twice over two authors (SVDa & DVR; GC & SVD). This process was repeated until a consensus amongst the authors was reached. Next, lead authors of publications in the area of distraction/ monitoring strategies in pain research will be invited to comment on the coding sheet, and to suggest other important coding categories. The coding sheet will then be finalized by the authors.

6. Included variables

Source characteristics

- Bibliographic reference
- Study ID (STID xxx.xx)
  If a report presents two *independent studies* then add a decimal to the study ID number. For example, STID: 100.1, and STID: 100.2
- Group ID (GROUP xx)
  If a study presents two *independent groups* then raise the number with one unit. Note: Groups will only be coded with different group ID when the overall effect size can not be calculated.
- Publication year
- Country of publication (1st author)
- Language of publication
- Email address of corresponding author
- Dependant data ID (ASID xx)
  - Studies often report several outcome measures of an attentional strategy using the same sample
  - Studies often compare several groups with a different type of attentional strategy with the same control group.
  - Studies sometimes report data based on different experimental designs

  In all cases the calculated effect-sizes are not independent. The measure of dependant data index will be increased by 1 for each added dependant measure. For example ASID:001, ASID:002, ASID:003

Experimental design

- Cross-over design (within subject comparisons or repeated measures design)
  - The effects of distraction are compared within subjects
  - The effects of sensory monitoring are compared within subjects;
- Parallel design/between subject comparisons
  - The effects of distraction are compared between subjects

- The effects of sensory monitoring are compared between subjects

- Cross-over and parallel groups design (a combination of repeated measures and between subject design)
  - The effects of distraction are compared within subjects and between groups.
  - The effects of sensory monitoring are compared within subjects and between groups.

Sample characteristics

- Sample size control group
- Sample size attentional strategy group
- Mean age; note: if the overall mean age is not reported and mean age of groups is reported, the overall mean should be calculated ((M1*N1) +(M2*N2)) /(N1+N2)
- Proportion of females; note: if the overall proportion of females is not reported and proportion of females of both groups is reported, the overall mean should be calculated ((M1*N1) +(M2*N2)) /(N1+N2)
- Type of participants
  - Pain free participants
  - Chronic pain patients
  - Acute pain patients
  - Procedural pain patients

Quality of the report: external validity (Based on consort-criteria)

- Description of eligibility criteria for participants (in terms of age, sex, diagnosis….)
  - Not adequate
  - Adequate
  - Not applicable

  A study should provide detailed information regarding the eligibility criteria in terms of age range, sex, diagnosis or exclusion criteria. These variables are of particular importance for patients, but are less of an issue when participants are students who volunteer for credit points. When participants are students this is coded as not applicable.

- Description of demographics of participants
  - Not adequate
  - Adequate

  A study should provide information regarding the age, sex and socio-economic status. Often study participants are biased towards the higher educated. Inclusion of this information provides valuable information for external validity (if one of these criteria is missing, this will be coded as not adequate). When participants are students this is coded as applicable when age, sex, field of study are mentionned.

- Description of pain experience
  - Adequate
  - Not adequate

  A study should provide a description of the pain-characteristics of the participants, in terms of pain severity and pain duration. One should also be able to infer the level of pain-related disability (e.g. interference score, sick leave, chirurgical intervention, medication use,…). Studies in which participants are assumed to be healthy, should check if participants are actually pain-free.

- Description of recruitment procedure (number of participants addressed, refused to participate, stopped during study)
  - Adequate
  - Not adequate

  A study should provide information about the recruitment procedure. When participants are students the description should include whether they volunteered for credit points or money. When participants are patients, the description should include the recruitment

procedure (advertisement, consecutive participants). When applicable, the study should describe how many participants refused participation and why.

- Description of the setting and/or location of the study
  - Adequate
  - Not adequate

  The study should provide information about the setting where participants were recruited (general population, revalidation centre, pain clinic, multidisciplinary pain centre), type of students (undergraduates of university)

- Description of data cleaning, and its criteria (outliers, missing values, invalid data)
  1: Adequate
  0: Not adequate

  It is important that the study reports that data were inspected for outliers, errors and technical failures. The study should report which rules were applied. Also, the study should report the percentage of missing values in the final data set. It is not necessary that the study investigates the pattern of the missing values (missing completely at random, missing at random or missing not at random).

Quality of the report: internal validity

- Participants should be assigned at random to the monitoring/distraction condition or control condition
  - Randomization was used in the study, and method was reported
  - Randomization was used in the study, but method was not reported
  - People were not assigned at random to the conditions
  - Unclear
  - Not applicable

  A study should report how the participants were assigned to one of the conditions (e.g. at random, voluntary,…). More in detail a study should also report how this procedure took place. When the study used a cross-over design, this will be coded as not applicable.

- Studies should control for order effects.
  - Study controlled for order effects, and method was reported (e.g. contra balanced, random allocation of order)
  - Study controlled for order effects, but method was not reported
  - Study did not control for order effects
  - Unclear
  - Not applicable

  Studies should report how they have controlled for effects of sequence. More in detail a study should also report how they have controlled for effects of sequence. When the study used a parallel groups design, this will be coded as not applicable.

- Participants should engage in the distraction/monitoring in the experimental condition
  - Adequate, data reported
  - Adequate, no data reported
  - Not adequate

  One may not assume that participants who are asked to use monitoring or distraction tasks during the experience of pain, will actually use this kind of strategies. Therefore it is important to check what strategies are used during the procedure within the experimental group. Data of this check should also be reported.

- Participants should not engage in the distraction/monitoring in the control condition
  - Adequate, data reported
  - Adequate, no data reported

- Not adequate

One may not assume that participants from the control condition do not spontaneously use monitoring or distraction during the experience of pain. Therefore it is important to check whether this is indeed the case (If a check is done → adequate).

- Report of objectives/cover story to participants
  - Adequate
  - Not adequate

A study should report which instructions were given to participants about the aim of the experiment (e.g. in this experiment we will look at the effects of a pain stimulus on a reaction time task- cover story instructions).

- Selective outcome reporting

Criteria for a judgement of 'Adequate' (Any of the following)

- The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way;
- The study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon).

Criteria for the judgement of 'Not Adequate' (Any one of the following)

- Not all of the study's pre-specified primary outcomes have been reported
- One or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g. subscales) that were not pre-specified
- One or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided, such as an unexpected adverse effect)
- One or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis
- The study report fails to include results for a key outcome that would be expected to have been reported for such a study

Criteria for the judgement of 'Unclear'

- Insufficient information to permit judgement of 'Yes' or 'No'. It is likely that the majority of studies will fall into this category.

- Incomplete outcome data

Criteria for a judgement of 'Adequate' (Any one of the following)

- No missing outcome data
- Reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias)
- Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups
- For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate
- For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size
- Missing data have been imputed using appropriate methods.

Criteria for the judgement of 'Not adequate'(Any one of the following)

- Reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups

- For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk enough to induce clinically relevant bias in intervention effect estimate
- For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size
- 'As-treated' analysis done with substantial departure of the intervention

Criteria for the judgement of 'Unclear' (Any one of the following)
- Insufficient reporting of attrition/exclusions to permit judgement of 'Yes' or 'No' (e.g. number randomized not stated, no reasons for missing data provided);
- The study did not address this outcome.

- Blinding of participants, personnel and outcome assessors

Criteria for a judgement of 'Adequate' (Any one of the following)
- No blinding, but the review authors judge that the outcome and the outcome measurement is not likely to be influenced by lack of blinding
- Blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken.
- Either participants or some key study personnel were not blinded, but outcome assessment was blinded and the non-blinding of others unlikely to introduce bias.

Criteria for the judgement of 'Not adequate' (Any one of the following)
- No blinding or incomplete blinding, and the outcome or outcome measurement is likely to be influenced by lack of blinding.
- Blinding of key study participants and personnel attempted, but likely that the blinding could have been broken.
- Either participants or some key study personnel were not blinded, and the non-blinding of others likely to introduce bias.

Criteria for the judgement of 'Unclear' (Any one of the following)
- Insufficient information to permit judgement of 'Yes' or 'No';
- The study did not address this outcome.

Study characteristics

- General self-report measure - not related to the pain procedure- of the disposition to experience negative affect (trait anxiety, negative affectivity or neuroticism):
  - Present
  - Not present

  Report any measure used. The most appropriate will later be used for the meta-analysis of correlations. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear

- General self-report measure- not related to the pain procedure- of currently experienced negative affect (state anxiety, stress, distress):
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured

- Before Experiment
- Unclear

Note: when this is measured after the experiment, this will be coded as a secondary outcome measure

- General self-report measure - not related to the pain procedure- of depression:
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear.

- General self-report measure- not related to the pain procedure- of current pain intensity:
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear

  Note: this could also be an outcome when it concerns clinical patients

- General self-report measure - not related to the pain procedure- of pain-related fear:
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear

- General self-report measure - not related to the pain procedure- of hypervigilance:
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear

- General self-report measure - not related to the pain procedure- of multiple somatic complaints:
  - Present
  - Not present

  Report any measure used. Report also minimum, maximum, mean, standard deviation and labels of the anchor points.
  When measured
  - Before Experiment
  - After experiment
  - Unclear

- Type of target pain
  - Chronic pain
    - 0 Back pain & other musculoskeletal pains
    - 0 Headache and migraine
    - 0 Whole body pain
    - 0 Neuropathic pain
    - 0 Miscellaneous
    - 0 Mixed
    - 0 Other
  - Experimental Pain
    - 0 Cold pressor task; describe
    - 0 Ischemic pain (Tourniquet); describe
    - 0 Heat (thermodes, bulb, laser); describe
    - 0 Muscle pain (formaline injection,...); describe
    - 0 Pressure pain; describe
    - 0 Visceral pain (balloon dilation ...); describe
    - 0 Electrocutane pain; describe
    - 0 Chemical pain (capsaiscine,...)
    - 0 Other; describe
  - Procedural Pain; describe
  - Acute Pain (that isn't induced experimentally); describe

  The above categories are not mutually exclusive. For example it is possible that participants are suffering from a chronic pain (e.g. CLBP) and perform a distraction task while putting their hand in cold water (experimental pain). However to facilitate further research participants will be categorised in one of these categories on the basis of the primary focus of the research.

- Duration of the pain stimulus (in seconds).
  If the duration of the pain stimuli varies during the experiment, report the average pain duration (e.g several electrocutaneous stimuli of different duration). If the average duration of the pain stimulus differs between the control group and the attentional strategy group (e.g. tolerance paradigm), the average duration will be computed.

- Type of primary outcome measure
  - Pain intensity
  - Pain tolerance
  - Pain threshold
  - Pain affect/ unpleasantness
  - Not available

- Type of secondary outcome measure
  - Distress (e.g. anxiety, stress, fear)
  - Not available

- Type of measurement instrument (more than 1 is possible)
  - Visual analogue scale (VAS)
  - Numerical Rating scale (NRS)
  - Graphic rating scale (GRS)
  - McGill Pain Questionnaire (MPQ)
  - Pain threshold measure
  - Pain tolerance measure
  - Other…

  Report also mean and standard deviation of the coded measure. If a threshold or a tolerance paradigm is used report duration, and if possible, report also intensity measure at moment of reaching threshold or tolerance level.

- Presence of paradoxical instructions (e.g. instruct to report pain during attentional manipulation condition)
  - Yes (explicit)
  - No (explicit)
  - Unclear

  Asking to report the amount of pain or distress while performing a distraction task is an inherent contradiction. When participants are asked to give an indication of the account of pain (for which participants need to focus on pain), one may not expect that participants perform the distraction task correctly (for which participants need to direct their attention away from the pain). If pain is asked to be reported during repeated pain induction (e.g. electrocutaneous stimuli), pain reports should not be asked in more than 50% of the pain trials.

- Presence of an induction of a positive efficacy expectancy in the experimental condition (expectation that it will work)
  - Yes (explicit)
  - No (explicit)
  - Unclear

  It is important to take in account that the expectancy of participants can be a major interfering variable in research about distraction/monitoring (e.g. participants who know that they have been assigned to a treatment of which a preferable outcome is expected, may have a favourable outcome). Therefore it should be mentioned if people were aware of the aim of the experiment (distraction/ monitoring) or if a cover story was told. In both cases it should be mentioned what exactly was told to the participants.

- Type of control condition
  - Expectancy control /placebo control
  - No instruction control (e.g. do as you usually do)
  - Attention Instruction Control

- Type of intervention
  - Attentional Distraction
  - Sensory monitoring

- Presence of others
  - Alone
  - With experiment leader
  - With unknown person (not experiment leader)
  - With known person
  - Unclear

- Type of distraction used

  Describe

- Choice of type of stimulus used during the strategy (e.g.: Participants can choose their own music)
  - No
  - Yes

- Type of distraction used
  - External
  - Internal

- Valence of distraction task
  - Positive

- Neutral
- Negative
- Unclear

- Type of Perceptual input (describe each time)
  - Visual
  - Auditory
  - Tactile
  - Olfactory
  - Taste
  - Other:....

  Note: more than one is possible (eg. Video: visual & auditory)

- Type of response required
  - No overt response
  - Discrete simple response
  - Discrete choice response (discrimination between 2, 3 or 4 events)
  - Continue response (e.g. video games)

- Describe instructions of sensory monitoring

- Study experimentally manipulated:
  - Perceptual load of task
  - Cognitive load of the task
  - Efficacy expectancy
  - Novelty of the pain stimulus
  - Sensory predictability of the pain stimulus
  - Threat value of the pain stimulus
  - Intensity of the pain stimulus
  - Valence of distractor
  - Arousal of distractor
  - Motivational relevance of distractor
  - Other:…
  - None

  This question is important to identify studies for sub-analysis on moderators which are identified in previous research.