Working memory and chronic pain, is there evidence for dysfunction? A systematic review & meta-analysis.

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Working memory refers to a limited-capacity, short-term, information retention system, essential to the skill of maintaining and manipulating behaviourally relevant information. People with chronic pain commonly report poor memory and concentration and research findings agree - several studies describe impaired cognitive function in people with chronic pain. The idea that pain could impact working memory function has long been suggested in the literature and there are several mechanisms that could explain this interaction: 1. Theory of limited resources 2. Theory of poor salience detection abilities 3. Disruption of cortical inhibitory mechanisms. This study aimed to systematically evaluate the vast body of literature concerning working memory deficit in people with chronic pain and undertake a meta-analysis of the nature and extent of this deficit.

OBJECTIVE
To summarise and critically appraise the literature that quantifies the difference in working memory function between people with chronic pain and healthy controls.

METHODS
Using a sensitive search strategy, the following databases were searched: Medline, Embase, PsychINFO, CINAHL, AMED and Scopus. Citations related to working memory and chronic pain were retrieved. Important review articles published in the area were hand searched for relevant citations.

Searches were limited to humans and studies were excluded if they met any of these criteria: more than 15% of participants were younger than 18 years old, used a group with any diagnosis of disease or trauma that would impair cognition, had no control group, or used a stimulus that required an emotionally-biased response. Two reviewers independently assessed studies for eligibility and also extracted relevant data.

RISK OF BIAS
Risk of bias was assessed using a modified version of the Cochrane risk of bias tool (eg, using items relevant to case control study designs). Two reviewers independently assessed the risk of bias. Disagreements were resolved through discussion or by the inclusion of a third reviewer.

RESULTS
We identified 1930 records. 19 satisfied the inclusion criteria. Working memory was evaluated using behavioural (16 studies) and physiological (4 studies) tasks. Nine different working memory constructs were tested using 20 different tasks.

DISCUSSION
• Chronic pain is associated with reduced performance on working memory tasks. That is, although there was high heterogeneity in some comparisons, the pooled results from the behavioural outcomes reflect a consistent, significant moderate effect.
• In contrast to the behavioural measures, the physiological measures present an inconclusive picture. That is, only two studies, which tested running memory, show a clear difference between patients and healthy controls. On the whole, physiological outcomes of latency and amplitude of EEG responses appear no different between patients and controls.
• There is a need to standardise definitions of sample conditions and the type of cognitive impairment (ie, verbal working memory) that is measured.
• Due to our finding that numerous tests are used to evaluate a working memory construct, it is key to develop a standard paradigm by which to evaluate each construct of working memory.

References: