Meta-analytic Comparison of Depressed Versus Chronic Pain Patients on Processing Speed, Memory, and Learning.

Yasir Rehman MD, MSc, William Parkinson PhD, Michél Rathbone MD, Navraj Randhawa MD, Jessie Grewal MSc, Suneel Upadhye MD, MSc, Catherine Krasnik MD, PhD, Dinesh Kumbhare MD, MSc. Ontario, Canada.

Background & Purpose:

Chronic pain (CP)[1,2] and depression (DEP)[3,4] are both associated with poorer performances on various neuropsychological tests. Tests studied in both clinical conditions provide an opportunity to compare effect magnitudes across these conditions. Similarities could reflect the frequent co-occurrence of these diagnoses. Differences could reflect different neuropathologies and different coping challenges between these conditions. Given these considerations, we compare cognitive test effect sizes between chronic pain and major depression.

Methods:

Systematic reviews and meta-analyses were performed using the Cochrane, PRISMA guidelines, to estimated effect sizes (Cohen's *d*). The analysis included published studies that involved: 1. neuropsychological tests/subtests that were common to separate studies of chronic pain and depression, 2. a control group, and 3. tests studied at least 3 times in each clinical condition, by different researchers, or in different clinical subgroups. All chronic pain diagnoses qualified and pain subgroups were combined. Only major depression qualified.

Results:

15 **c**hronic pain studies[5-19] and 17 depression studies[21-37] met criteria. 8 cognitive subtests had been studied at least 3 times. CP and DEP both showed small to moderate effect sizes for the following performances compared to their control groups (Table 1):

- slower decoding of symbol-number pairs,
- slower visual scanning to connect numbered dots (Trail Making A),
- slower visual scanning when alternating between numbered versus lettered dots (Trail Making B),
- held smaller strings of digits in working memory (Digit Span Backward),
- learned a word list more slowly (Rey Auditory Verbal Learning (RAVLT) – Immediate Recall).

Only DEP, and not CP patients, had *poorer performances on a test of concept learning and reasoning* (Wisconsin Card Sort Categories Achieved and Perseveration Errors) (Tables 2 & 3).

Conclusions:

1. Chronic pain and major depression were both associated with small to moderate Effect Sizes for poorer cognitive impairment on tests sensitive to processing speed, working memory, and learning.
2. Major depression was associated with moderate Effect Sizes for poorer performance on a test of executive reasoning.

Table 1. Results Of Meta-analyses

Neurocognitive Test	Total Controls (N)		Total Clinical (N)		Random Effects Overall Standardized Mean Difference (95% CI)		Random p <		Random I^2 (%)	
	CP	DEP	CP	DEP	CP	DEP	CP	DEP	CP	DEP
Digit Span Forward	87	229	93	295	-.33 (-.77,.08)	-.25 (-.43,-.07)	n.s.	0.01	46	0
Digit Span Backward	119	210	127	274	-.35 (-.61, -.10)	-.42 (-.69,-.15)	0.01	0.01	0	48
Digit Symbol Coding	1361	230	376	375	-.36 (-.5,-.22)	-.45 (-.79,-.10)	0.00001	0.01	8	72
Trail Making - A	272	405	285	594	-.32 (-.49,-.15)	-.49 (-.36,-.62)	0.001	0.00001	0	66
Trail Making - B	432	274	448	487	-.38 (-.52,-.25)	-.57 (-.30,-.84)	0.00001	0.0001	0	64
RAVLT- Immediate Recall	168	314	186	382	-.52 (-.74,-.31)	-.79 (-1.02,-.55)	0.00001	0.00001	0	51
Wisconsin Card Sort - Categories	78	112	81	222	-.24 (-.77,.28)	-.60 (-.03,-1.16)	n.s.	0.05	63	79
Wisconsin Card Sort - Perseveration	78	164	81	269	-.15 (-.16, 0.47)	-.57 (-.28,-.85)	n.s.	0.0001	0	43

Table 2. Effect Sizes For The Wisconsin Card Sort: Categories Achieved

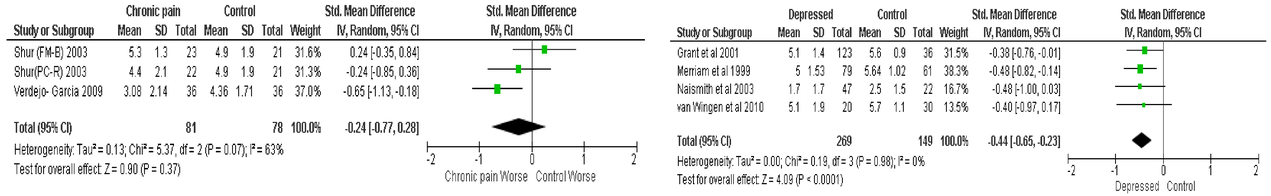
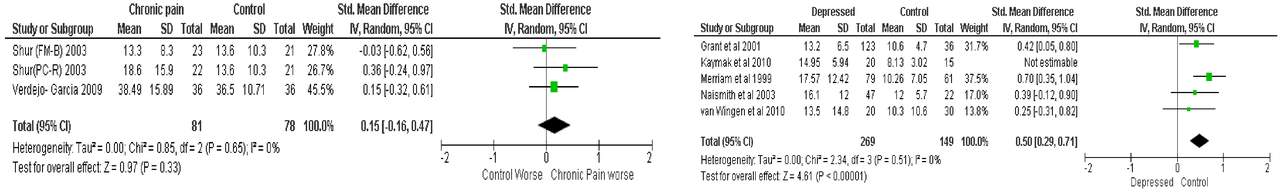


Table 3. Effect Sizes For The Wisconsin Card Sort: Perseveration



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