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ORIGINAL RESEARCH

Mindfulness-based cognitive therapy for depression after traumatic brain injury: responders' characteristics

Hillary Maxwell[1,2], Sacha Dubois[1,3], Dwight Mazmanian[1], Lana Ozen[2], Carrie Gibbons[2] and Michel Bédard[1,2]

[1]Faculty of Health and Behavioural Sciences, Lakehead University, Thunder Bay, Ontario, Canada, [2]Centre for Applied Health Research, St Joseph's Care Group, Thunder Bay, Ontario, Canada and [3]Human Sciences, NOSM University, Thunder Bay, Ontario, Canada
Corresponding author: Hillary Maxwell; Email: hillary.maxwell@tbh.net

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Abstract

Traumatic brain injury (TBI) can alter day-to-day life. While changes in cognition and physical function are most often cited, emotional disturbances, notably depression, are also common. For individuals who experience depression symptoms, mindfulness-based cognitive therapy (MBCT) may afford the opportunity to address these symptoms by teaching skills to mitigate negative thought patterns and foster acceptance. Yet, as with any treatment for depression, MBCT may not be the best fit for everyone. According to the literature, characteristics such as age, gender, and baseline mindfulness or pain levels have the potential to affect treatment response. While these factors have yet to be explored within a TBI sample, we must additionally consider whether possible cognitive impairment due to TBI plays a role in treatment response. Drawing from an earlier multi-site randomized controlled trial to explore the efficacy of MBCT for depression in a TBI sample, the current study examined the associations between a number of baseline factors (demographic, emotional, physical, and cognitive) and decreased depression scores post-intervention. Partial correlations adjusted for gender. Findings indicated that only higher levels of pain at baseline were associated with lesser effectiveness of the intervention. MBCT offers a good treatment option for most individuals experiencing depression following TBI.

Key learning aims

(1) To explore factors associated with treatment response to MBCT for depression after TBI.
(2) To understand how cognitive impairment resulting from TBI need not preclude treatment response.
(3) To reflect on the role of pain in treatment response.

Keywords: depression; mindfulness; MBCT; traumatic brain injury

Introduction

Traumatic brain injury (TBI) presents a significant public health concern. Each year, approximately 40,000 Canadians visit the emergency room, 20,000 are hospitalized, and 3800 die following a TBI (Public Health Agency of Canada, 2020). Depending on the severity and location of the injury, residual outcomes vary, but may include functional, cognitive, behavioural, and emotional disturbances (Kinnunen *et al.*, 2011; Ryan and Warden, 2003). Such long-term

challenges may partially explain why individuals who have experienced a TBI appear more vulnerable to depression (Koponen *et al.*, 2002; Perry *et al.*, 2016); as many as 60% develop depression symptoms post-injury (Kim e*t al.*, 2007).

Mindfulness-based cognitive therapy (MBCT) holds promise for individuals with TBI who live with depression. This assertion is supported by accumulating evidence, including trials conducted by our own research group (Bédard *et al.*, 2005, 2012, 2014). The core skill taught in MBCT is the ability 'to recognize and disengage from mind states characterized by self-perpetuating patterns of ruminative, negative thought' (Segal *et al.*, 2002; p. 74). In this way, participants are encouraged to 'reclaim' their lives as they accept limitations stemming from their injuries (Kangas and McDonald, 2011).

As with any treatment approach for depression, MBCT may not be a good fit for everyone – not all individuals will respond to treatment the same way. Understanding the factors that are associated with a good treatment response facilitates treatment plans tailored to the individual and increases the likelihood of favourable outcomes. In considering this, several baseline characteristics have been associated with a successful response to MBCT for depression. Examples include lower severity of depression symptoms, shorter time since symptom onset, and higher mindfulness levels (Kuyken *et al.*, 2016). There is also reason to believe that characteristics like younger age (Tunvirachaisakul *et al.*, 2018) and less severe pain (Bair *et al.*, 2003) could play a role, given their associations with success in other types of behavioural therapy for depression. Furthermore, while both men and women appear to benefit from behavioural therapy for depression, the mechanisms behind treatment success may vary by gender (Cuijpers *et al.*, 2014; Thase *et al.*, 1994). This stands to reason, given our understanding of how the disorder develops and manifests differently for men and women (Nolen-Hoeksema, 2001; Salk *et al.*, 2017).

However, with TBI, we must also consider additional layers of responders' characteristics. For example, MBCT requirements include the cognitive ability to recognize and disengage from negative thought patterns and build emotional regulation techniques (Lubbers *et al.*, 2022; Wang *et al.*, 2022). Such skills call upon processes of executive function and cognitive control, which are commonly affected in individuals who have experienced a TBI (Krpan *et al.*, 2007; Swick *et al.*, 2012). To our knowledge, these, or any type of MBCT responders' characteristics have yet to be explored in a population with TBI.

The current study serves to examine the characteristics of responders to an MBCT intervention within a sample with TBI. This study draws from the results of an earlier multi-site, parallel group randomized controlled trial (RCT) using a clinical sample of adults with a TBI who were experiencing depression symptoms. We explored the associations between several baseline characteristics (demographic, emotional, physical, and cognitive) and improvements in depression scores.

Method

Original research study

The analyses in the current study are based on results from a multi-site RCT previously conducted by the research team (Bédard *et al.*, 2014). Inclusion criteria for this study consisted of a score of 16 or greater on the Beck Depression Inventory (BDI-II; Beck *et al.*, 1996), a history of TBI, ability to speak and read English, aged 18 or older, and completion of all standard treatments for their injury. Conditions that might interfere with the intervention (e.g. substance abuse, suicidal ideation) and concurrent major mental illness (e.g. schizophrenia, psychosis) constituted criteria for exclusion. Participants were initially recruited through community channels that included out-patient neurology and rehabilitation programs, brain injury associations, and health care practitioners.

Following informed consent, participants provided details on demographics (gender, age, relationship and employment status, education level); weekly alcohol intake; pain frequency (over

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previous 2 weeks); and years since injury. In addition to self-reporting their depression symptoms (BDI-II; Beck *et al.*, 1996), participants completed Likert-type measures of their mental and physical health-related quality of life (the RAND version of the Short-Form Health Survey, RAND-36; Hays *et al.*, 1993); mindfulness levels (Toronto Mindfulness Scale, TMS; Lau *et al.*, 2006); and life satisfaction (Satisfaction with Life Scale, SWLS; Diener *et al.*, 1985). Higher scores on these latter measures are considered better. A measure of psychological problems symptomology (the Global Severity Index of the Symptom Checklist-90-Revised, SCL-90; Derogatis, 1994) provided insight into levels of overall psychological distress. A number of measures were used to assess facets of cognition. Specifically, the free recall portions of the California Verbal Learning Test 3 (CVLT; Delis *et al.*, 2000) as a measure of verbal learning and memory; the Controlled Oral Word Association Test (COWAT; Benton *et al.*, 2017) as a measure of verbal fluency; Trail-Making Tests A&B (TMT; Reitan, 1958) as measures of visual attention and task switching; and the Digit Span and Similarities subtests of Wechsler Adult Intelligence Scale IV (WAIS; Wechsler, 1997) as measures of working memory and verbal comprehension, respectively. Except for the TMT (where scores indicate time to completion), higher scores on cognitive tests indicate better cognitive performance.

A total of 105 participants were randomized to intervention ($n = 57$) and control ($n = 48$) arms balanced by BDI scores, age, and sex. The MBCT intervention consisted of ten weekly 1.5-hour group sessions, with a curriculum grounded in works from Segal *et al.* (2013) and Kabat-Zinn (2009). Adaptations for TBI included shorter meditation sessions, more frequent review, and simplified language. The control arm participants were instructed to continue with their normal routines and were offered the opportunity to cross over and receive the intervention following their control periods.

Seventy-six participants (38 from each arm) completed post-intervention measures and were included in the parallel analysis. Results indicated that compared with the control arm, intervention participants experienced greater decreases in BDI-II scores (6.63 *versus* 2.13, $p = 0.029$; $d = 0.56$). Follow-up on intervention participants and the control arm participants who initially crossed over to receive the intervention indicated that reductions in BDI-II scores were maintained at 3-month follow-up. See Bédard *et al.* (2014) for further details.

Current research study

For the current study, 60 participants were included. These numbers represent the 38 participants who completed the intervention arm of the original study, along with 22 of the 38 control arm participants who completed the wait period and then elected to cross over and complete the intervention. Analyses to examine baseline predictors of improvement in depression scores post-intervention were completed over two stages. First, baseline characteristics of males and females were compared utilizing *t*-tests and chi-square tests of independence. Second, zero-order and partial correlations were conducted to examine the relationships between baseline characteristics and change in BDI-II scores; partial correlations permitted adjustments for gender. Specifically, Pearson correlation, phi, and point-biserial correlation coefficients were calculated for continuous variables, dichotomous variables, and combinations of the two, respectively. Bootstrapped confidence intervals (95%) were computed using 1000 iterations; this included random number generation (Matsumoto and Nishimura, 1998) with seeding to facilitate replication. Analyses were performed using SPSS v28.

For all correlations, BDI-II scores were considered (1) as a continuous variable (BDI raw change; pre score – post score, positive scores indicate improvement), and (2) as a dichotomous variable (BDI clinically significant change, 0 = not improved, 1 = improved; defined as a pre–post difference that met a three-criterion standard: reliable change, a minimum 5-point reduction in BDI scores, and a reduction of BDI severity category) (Ozen *et al.*, 2016). As needed, skewed variables were transformed for the correlation analyses. First, this included the $\log_{10}$ of years since

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Table 1. Baseline characteristics by gender with independent samples *t*-tests/chi-squared tests

Baseline characteristic	Male $n = 35$	Female $n = 25$	t/χ^2	p
Age (years)	45.99 (12.26)	50.89 (10.84)	−1.60	.058
Partner (yes/no)	57.1%	56.0%	0.01	.571
Employed (yes/no)	62.9%	52.0%	0.71	.282
Education*	3.00 (2.00)	3.00 (1.76)	1.10	.139
Alcohol intake**	1.77 (1.17)	1.52 (0.77)	0.91	.185
Pain***	47.54 (28.08)	60.08 (27.08)	**−1.73**	**.044**
Years since injury	5.07 (4.52)	3.58 (2.39)	1.50	.069
BDI-II Total	25.49 (11.36)	25.24 (9.19)	0.09	.465
RAND Physical	40.30 (9.52)	39.36 (11.00)	0.35	.363
RAND Mental	39.08 (12.97)	37.29 (11.37)	0.55	.291
TMS Curiosity	13.88 (5.90)	14.70 (5.08)	−0.52	.304
TMS Decentering	12.50 (4.55)	13.45 (5.79)	−0.66	.256
SWLS	16.77 (7.32)	19.64 (7.39)	−1.49	.071
SCL-90-R GSI	1.20 (0.77)	1.30 (0.75)	−0.48	.315
CVLT Free Recall	45.51 (13.17)	41.96 (13.00)	1.04	.152
CVLT Long Delay	9.64 (3.84)	8.75 (3.85)	0.86	.197
COWAT	32.49 (12.91)	32.96 (12.62)	−0.14	.444
Trails A	38.94 (31.49)	39.29 (13.75)	−0.05	.480
Trails B	82.97 (55.78)	86.75 (49.74)	−0.26	.397
WAIS Digit: Backwards	4.54 (1.07)	4.10 (1.04)	1.44	.078
WAIS Digit: Forwards	6.07 (1.46)	5.67 (1.02)	1.08	.142
WAIS Digit: Sequence 1	7.57 (2.71)	6.65 (2.13)	1.26	.106
WAIS Digit: Sequence 2	5.14 (1.35)	4.86 (1.46)	0.71	.241
WAIS Similarities	16.65 (5.96)	16.56 (5.09)	0.06	.477

*1, low (high school or less); 2, mid (college or some university); 3, high (university complete).
**Based on Health Canada Recommendations: 1, no risk (0 drinks/week); 2, low risk (≥2 drinks/week); 3, increased risk (3–6 drinks/week); 4, significantly increased risk (≥7 drinks/week).
***On a scale of 0 (no pain at all) to 100 (pain all the time) over the last 2 weeks.

injury (positively skewed). Second, weekly alcohol intake (positively skewed) was transformed into categories due to large frequencies of zero values (56.7%). Categorization of weekly alcohol intake aligned with the Canadian Centre on Substance Use and Addiction (2023) recommendations: 0 drinks = no risk, 1–2 = low risk of alcohol-related health consequences, 3–6 = increased risk, and ≥7 = significantly increased risk. Pain frequency (negatively skewed) was also categorized due to large frequencies of zero values (10.0%). Initially expressed on a visual analogue scale [from zero (not at all) to 100 (all the time)], pain frequency was transformed into four categories (<20, 21–40, 41–60, and >60).

Results

Thirty-five men and 25 women completed the intervention. Baseline characteristics for these participants are presented in Table 1 by gender. There was one statistically significant difference between male and female participants at baseline in that males reported lower levels of pain over the previous 2 weeks (47.54/100 *versus* 60.08/100 for females; $t = -1.73$, $p = .044$). At follow-up, BDI total scores decreased by a mean of 7.30 points ($SD = 8.34$); half of the sample met our criteria for a clinically important change. There were no differences in BDI total score reductions between men and women [7.86 ($SD = 8.10$) *versus* 6.52 ($SD = 8.76$), $t_{58} = 0.61$, $p = .545$]. Congruently, similar proportions of clinically important changes were observed for men and women (54.3% *versus* 44.0%, $\chi^2(1) = 0.62$, $p = .432$).

Zero-order correlations indicated that BDI raw change (continuous; higher scores reflect greater improvement) was negatively associated with categorized pain levels ($r = -.279$, 95% CI [−0.482, −0.043]) and positively associated with higher RAND physical subscale scores ($r = -.286$,

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Table 2. Zero-order and partial correlations between baseline characteristics and change in depression symptoms

	BDI raw change (continuous)						BDI clinically significant change (yes/no)					
	Zero-order			Partial‡			Zero-order			Partial†		
		95% CI			95% CI			95% CI			95% CI	
Baseline characteristic	*r*	Lower	Upper	*r*	Lower	Upper	r_{pb}/ϕ	Lower	Lower	r_{pb}/ϕ	Lower	Upper
Age	0.035	−0.210	0.321	0.052	−0.210	0.333	0.075	−0.180	0.296	0.098	−0.166	0.340
Partner (yes/no)	0.059	−0.191	0.370	0.060	−0.195	0.368	0.117	−0.156	0.372	0.119	−0.152	0.363
Employed (yes/no)	−0.145	−0.402	0.149	−0.155	−0.430	0.148	−0.101	−0.355	0.163	−0.114	−0.372	0.160
Education*	−0.102	−0.336	0.153	−0.115	−0.357	0.151	−0.201	−0.454	0.050	−0.218	−0.479	0.037
Alcohol intake**	−0.191	−0.372	0.019	−0.204	−0.389	0.011	−0.085	−0.356	0.208	−0.102	−0.376	0.198
Pain***	**−0.279**	**−0.482**	**−0.043**	**−0.268**	**−0.477**	**−0.039**	−0.228	−0.465	0.013	−0.211	−0.446	0.028
Years since injury****	0.195	−0.084	0.416	0.186	−0.095	0.415	0.137	−0.133	0.405	0.123	−0.156	0.395
BDI-II Total	0.228	−0.050	0.457	0.227	−0.050	0.461	0.076	−0.192	0.328	0.075	−0.197	0.328
RAND Physical	**0.286**	**0.033**	**0.532**	**0.284**	**0.039**	**0.520**	**0.324**	**0.053**	**0.547**	**0.321**	**0.051**	**0.542**
RAND Mental	0.145	−0.179	0.413	0.140	−0.176	0.405	0.078	−0.200	0.329	0.071	−0.208	0.324
TMS Curiosity	0.009	−0.254	0.264	0.011	−0.250	0.272	0.130	−0.131	0.392	0.129	−0.151	0.402
TMS Decentering	0.012	−0.307	0.358	0.014	−0.310	0.360	0.099	−0.155	0.356	0.098	−0.163	0.364
SWLS	−0.059	−0.322	0.280	−0.045	−0.301	0.279	0.145	−0.119	0.401	0.168	−0.110	0.420
SCL-90-R GSI	−0.125	−0.336	0.130	−0.121	−0.334	0.137	−0.153	−0.362	0.093	−0.147	−0.364	0.105
CVLT Free Recall	0.062	−0.269	0.403	0.052	−0.295	0.394	0.126	−0.123	0.364	0.114	−0.138	0.361
CVLT Long Delay	−0.046	−0.331	0.299	−0.050	−0.368	0.307	0.179	−0.104	0.432	0.171	−0.104	0.427
COWAT	−0.232	−0.487	0.052	−0.231	−0.486	0.046	−0.155	−0.383	0.101	−0.154	−0.395	0.101
Trails A	−0.031	−0.234	0.185	−0.031	−0.225	0.182	−0.046	−0.302	0.188	−0.046	−0.303	0.200
Trails B	−0.034	−0.223	0.199	−0.032	−0.227	0.198	−0.073	−0.325	0.181	−0.072	−0.337	0.183
WAIS Digit: Backwards	−0.026	−0.330	0.257	−0.044	−0.349	0.243	−0.039	−0.343	0.256	−0.060	−0.368	0.232
WAIS Digit: Forwards	−0.056	−0.379	0.210	−0.156	−0.428	0.144	−0.139	−0.424	0.149	−0.156	−0.428	0.144
WAIS Digit: Sequence 1	−0.106	−0.342	0.130	−0.183	−0.445	0.125	−0.166	−0.436	0.149	−0.183	−0.445	0.125
WAIS Digit: Sequence 2	−0.221	−0.494	0.083	−0.266	−0.505	0.051	−0.253	−0.502	0.060	−0.266	−0.505	0.051
WAIS Similarities	0.043	−0.255	0.360	0.059	−0.210	0.341	0.060	−0.202	0.324	0.059	−0.210	0.341

*1, low (high school or less); 2, mid (college or some university); 3, high (university complete).
**Based on Health Canada Recommendations: 1, no risk (0 drinks/week); 2, low risk (≥2 drinks/week); 3, increased risk (3–6 drinks/week); 4, significantly increased risk (≥7 drinks/week).
***On a scale of 0 (no pain at all) to 100 (pain all the time) over the last two weeks; intervals of <20, 21–40, 41–60, >60.
****Log_{10} of years since injury. ‡Adjusted for gender.

95% CI [0.033, 0.532]). BDI clinically significant improvement (yes/no) was also associated with higher RAND physical subscale scores ($r = .324$, 95% CI [0.053, 0.547]). These findings were mirrored in partial correlations (adjusting for gender): $r = -.268$; 95% CI [–0.477, –0.039]; $r = 0.284$, 95% CI [0.039, 0.520]; and $r_{pb} = 0.321$, 95% CI [0.051, 0.542], respectively. No other baseline characteristics were associated with statistically significant change in BDI measures. See Table 2.

Discussion

The results presented here indicate that the success of an MBCT intervention for depression in a sample with TBI was largely independent of baseline factors. Of the variables examined, only higher pain levels and lower scores on the physical component of the RAND (where pain is measured) were associated with a less successful response to the intervention. This aligns with previous research showing that pain has the potential to negatively impact depression outcomes (Bair *et al.*, 2003). While the complex, bi-directional relationship between pain and depression is beyond the scope of the current work, the recognition of this association within our sample is an important consideration for health care providers and their patients with TBI seeking to build effective treatment plans for depressive symptoms.

Women in our study reported higher levels of pain at baseline, but gender did not appear to have a strong influence on the association between pain and response to the intervention. That men and women disclose and experience pain differently, something most likely due to a mix of biological and psychosocial factors, is documented in the literature (Bartley and Fillingim, 2013). So, while our findings align with the concept that gender plays a role in pain, our findings do not support the notion that such gender differences extend to influence the relationship between pain and response to MBCT for depression. In fact, gender did not play an important role in any of the relationships between baseline characteristics and treatment response. This supports work by Cuijpers *et al.* (2014) whose meta-analysis suggested that gender does not modify successful responses to cognitive behavioural therapy for depression.

Given that TBI may involve changes in cognition and MBCT calls upon cognitive skills, the fact that our results show no relationship between baseline measures of cognitive performance and treatment response is encouraging. Our intervention did involve minor adaptations designed to support the cognitive challenges experienced by individuals who have experienced a TBI (aimed at facilitating focus, memory, and understanding). However, further research would be required to determine whether these adaptations played a role in the success of the MBCT intervention within this population.

Conclusion

Overall, this work suggests that MBCT should be considered an option for treatment of depression symptoms in most individuals with TBI. Furthermore, our results suggest that the effective treatment of pain symptoms may increase the effectiveness of MBCT for depression.

Data availability statement. The data that support the findings of this study are available from the corresponding author, H.M., upon reasonable request.

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Author contributions. **Hillary Maxwell:** Formal analysis (lead), Investigation (equal), Project administration (equal), Writing - original draft (lead); **Sacha Dubois:** Conceptualization (supporting), Formal analysis (supporting), Methodology (supporting), Writing - review & editing (equal); **Dwight Mazmanian:** Investigation (supporting), Methodology (supporting), Supervision (supporting), Writing - review & editing (equal); **Lana Ozen:** Conceptualization (supporting), Formal analysis

(supporting), Writing - review & editing (equal); **Carrie Gibbons:** Data curation (equal), Project administration (equal), Writing - review & editing (equal); **Michel Bédard:** Conceptualization (lead), Funding acquisition (lead), Methodology (lead), Supervision (lead), Writing - review & editing (equal).

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Competing interests. The authors declare none.

Ethical standards. Research conformed to the Declaration of Helskini and Canada's Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. Research Ethics Board approval was granted by St Joseph's Care Group (2007023) and Lakehead University (106 07-08) in Thunder Bay, Ontario; the University Health Network (08-047) in Toronto, Ontario; and the Ottawa Hospital (2009 913-01H) in Ottawa, Ontario.

Key practice points

(1) MBCT offers a promising treatment option for most individuals experiencing depression symptoms following TBI.
(2) Treatment response to MBCT did not vary by cognitive impairment levels.
(3) As with other types of CBT, the response to MBCT may mitigated by pain levels.

Further reading

Bédard, M., Felteau, M., Marshall, S., Cullen, N., Gibbons, C., Dubois, S., Maxwell, H., Mazmanian, D., Weaver, B., Rees, L., Gainer, R., Klein, R., & Moustgaard, A. (2014). Mindfulness-based cognitive therapy reduces depression symptoms in people with a traumatic brain injury: results from a randomized controlled trial. *Journal of Head Trauma Rehabilitation*, *29*, 13–22. https://doi.org/10.1097/HTR.0b013e3182a615a0

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-Based Cognitive Therapy for Depression*. Guilford Press.

References

Bair, M. J., Robinson, R. L., Katon, W., & Kroenke, K. (2003). Depression and pain comorbidity: a literature review. *Archives of Internal Medicine*, *163*, 2433–2445. https://doi.org/10.1001/archinte.163.20.2433

Bartley, E. J., & Fillingim, R. B. (2013). Sex differences in pain: a brief review of clinical and experimental findings. *British Journal of Anaesthesia*, *111*, 52–58. https://doi.org/10.1093/bja/aet127

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory-II (BDI-II)*. The Psychological Corporation, Harcourt Brace.

Bédard, M., Felteau, M., Gibbons, C., Klein, R., Mazmanian, D., Fedyk, K., & Mack, G. (2005). A mindfulness-based intervention to improve quality of life among individuals who sustained traumatic brain injuries: one-Year follow-up. *The Journal of Cognitive Rehabilitation*, *Spring*, 2–7.

Bédard, M., Felteau, M., Marshall, S., Cullen, N., Gibbons, C., Dubois, S., Maxwell, H., Mazmanian, D., Weaver, B., Rees, L., Gainer, R., Klein, R., & Moustgaard, A. (2014). Mindfulness-based cognitive therapy reduces depression symptoms in people with a traumatic brain injury: results from a randomized controlled trial. *Journal of Head Trauma Rehabilitation*, *29*, 13–22. https://doi.org/10.1097/HTR.0b013e3182a615a0

Bédard, M., Felteau, M., Marshall, S., Dubois, S., Gibbons, C., Klein, R., & Weaver, B. (2012). Mindfulness based cognitive therapy: benefits in reducing depression following a traumatic brain injury. *Advances in Mind-Body Medicine*, *26*, 14–20.

Benton, A. L., Hamsher, D. S. K., & Sivan, A. B. (2017). *Controlled Oral Word Association Test* [Dataset]. https://doi.org/10.1037/t10132-000

Canadian Centre on Substance Use and Addiction (2023). *Canada's Guidance on Alcohol and Health: Final Report*. http://www.ccsa.ca/

Cuijpers, P., Weitz, E., Twisk, J., Kuehner, C., Cristea, I., David, D., DeRubeis, R. J., Dimidjian, S., Dunlop, B. W., Faramarzi, M., Hegerl, U., Jarrett, R. B., Kennedy, S. H., Kheirkhah, F., Mergl, R., Miranda, J., Mohr, D. C., Segal, Z. V., Siddique, J., ... **& Hollon, S. D.** (2014). Gender as predictor and moderator of outcome in cognitive behavior therapy

and pharmacotherapy for adult depression: an 'individual patient data' meta-analysis. *Depression and Anxiety*, *31*, 941–951. https://doi.org/10.1002/da.22328

Delis, D. C., Kramer, J. H., Kaplan, E., & Ober, B. A. (2000). *California Verbal Learning Test* (vol 2). Psychological Corporation.

Derogatis, L. R. (1994). *SCL-90-R Administration, Scoring, and Procedures Manual: Third Edition*. National Computer Systems.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*, 71–75.

Hays, R. D., Sherbourne, C. D., & Mazel, R. M. (1993). The RAND 36-Item Health Survey 1.0. *Health Economics*, *2*, 217–227. https://doi.org/10.1002/hec.4730020305

Kabat-Zinn, J. (2009). *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (vol 15). Random House, Inc.

Kangas, M., & McDonald, S. (2011). Is it time to act? The potential of acceptance and commitment therapy for psychological problems following acquired brain injury. *Neuropsychological Rehabilitation*, *21*, 250–276. https://doi.org/10.1080/09602011.2010.540920

Kim, E., Lauterbach, E. C., Reeve, A., Arciniegas, D. B., Coburn, K. L., Mendez, M. F., Rummans, T. A., Coffey, E. C., & **ANPA Committee on Research** (2007). Neuropsychiatric complications of traumatic brain injury: a critical review of the literature (a report by the ANPA Committee on Research). *Journal of Neuropsychiatry and Clinical Neurosciences*, *19*, 106–127. https://doi.org/10.1176/jnp.2007.19.2.106

Kinnunen, K. M., Greenwood, R., Powell, J. H., Leech, R., Hawkins, P. C., Bonnelle, V., Patel, M. C., Counsell, S. J., & Sharp, D. J. (2011). White matter damage and cognitive impairment after traumatic brain injury. *Brain*, *134*, 449–463. https://doi.org/10.1093/brain/awq347

Koponen, S., Taiminen, T., Portin, R., Himanen, L., Isoniemi, H., Heinonen, H., Hinkka, S., & Tenovuo, O. (2002). Axis I and II psychiatric disorders after traumatic brain injury: a 30-year follow-up study. *American Journal of Psychiatry*, *159*, 1315–1321. https://doi.org/10.1176/appi.ajp.159.8.1315

Krpan, K. M., Levine, B., Stuss, D. T., & Dawson, D. R. (2007). Executive function and coping at one-year post traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, *29*, 36–46. https://doi.org/10.1080/13803390500376816

Kuyken, W., Warren, F. C., Taylor, R. S., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., Segal, Z., Speckens, A., Teasdale, J. D., Van Heeringen, K., Williams, M., Byford, S., Byng, R., & Dalgleish, T. (2016). Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: an individual patient data meta-analysis from randomized trials. *JAMA Psychiatry*, *73*, 565. https://doi.org/10.1001/jamapsychiatry.2016.0076

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto Mindfulness Scale: development and validation. *Journal of Clinical Psychology*, *62*, 1445–1467.

Lubbers, J., Geurts, D., Hanssen, I., Huijbers, M., Spijker, J., Speckens, A., & Cladder-Micus, M. (2022). The effect of mindfulness-based cognitive therapy on rumination and a task-based measure of intrusive thoughts in patients with bipolar disorder. *International Journal of Bipolar Disorders*, *10*, 22. https://doi.org/10.1186/s40345-022-00269-1

Matsumoto, M., & Nishimura, T. (1998). Mersenne twister: a 623-dimensionally equidistributed uniform pseudo-random number generator. *ACM Transactions on Modeling and Computer Simulation*, *8*, 3–30. https://doi.org/10.1145/272991.272995

Nolen-Hoeksema, S. (2001). Gender differences in depression. *Current Directions in Psychological Science*, *10*, 173–176. https://doi.org/10.1111/1467-8721.00142

Ozen, L. J., Dubois, S., Gibbons, C., Short, M. M., Maxwell, H., & Bédard, M. (2016). Mindfulness interventions improve depression symptoms after traumatic brain injury: are individual changes clinically significant? *Mindfulness*, *7*, 1356–1364. https://doi.org/10.1007/s12671-016-0577-x

Perry, D. C., Sturm, V. E., Peterson, M. J., Pieper, C. F., Bullock, T., Boeve, B. F., Miller, B. L., Guskiewicz, K. M., Berger, M. S., Kramer, J. H., & Welsh-Bohmer, K. A. (2016). Association of traumatic brain injury with subsequent neurological and psychiatric disease: a meta-analysis. *Journal of Neurosurgery*, *124*, 511–526. https://doi.org/10.3171/2015.2.JNS14503

Public Health Agency of Canada (2020). *Injury in Review, 2020 edition: Spotlight on Traumatic Brain Injuries Across the Life Course*. https://www.canada.ca/en/public-health/services/injury-prevention/canadian-hospitals-injury-reporting-prevention-program/injury-reports/2020-spotlight-traumatic-brain-injuries-life-course.html

Reitan, R. M. (1958). Validity of the Trail Making Test as an indicator of organic brain damage. *Perceptual and Motor Skills*, *8*, 271–276.

Ryan, L. M., & Warden, D. L. (2003). Post concussion syndrome. *International Review of Psychiatry*, *15*, 310–316. https://doi.org/10.1080/0954026031000160692

Salk, R. H., Hyde, J. S., & Abramson, L. Y. (2017). Gender differences in depression in representative national samples: meta-analyses of diagnoses and symptoms. *Psychological Bulletin*, *143*, 783–822. https://doi.org/10.1037/bul0000102

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-Based Cognitive Therapy for Depression. A New Approach to Preventing Relapse*. Guilford Press.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-Based Cognitive Therapy for Depression*. Guilford Press.

Swick, D., Honzel, N., Larsen, J., Ashley, V., & Justus, T. (2012). Impaired response inhibition in veterans with post-traumatic stress disorder and mild traumatic brain injury. *Journal of the International Neuropsychological Society*, *18*, 917–926. https://doi.org/10.1017/S1355617712000458

Thase, M. E., Reynolds, C. F., Frank, E., Simons, A. D., McGeary, J., Fasiczka, A. L., Garamoni, G. G., Jennings, J. R., & Kupfer, D. J. (1994). Do depressed men and women respond similarly to cognitive behavior therapy? *American Journal of Psychiatry*, *151*, 500–505. https://doi.org/10.1176/ajp.151.4.500

Tunvirachaisakul, C., Gould, R. L., Coulson, M. C., Ward, E. V., Reynolds, G., Gathercole, R. L., Grocott, H., Supasitthumrong, T., Tunvirachaisakul, A., Kimona, K., & Howard, R. J. (2018). Predictors of treatment outcome in depression in later life: a systematic review and meta-analysis. *Journal of Affective Disorders*, *227*, 164–182. https://doi.org/10.1016/j.jad.2017.10.008

Wang, J., Ren, F., Gao, B., & Yu, X. (2022). Mindfulness-based cognitive therapy in recurrent mdd patients with residual symptoms: alterations in resting-state theta oscillation dynamics associated with changes in depression and rumination. *Frontiers in Psychiatry, 13*. https://www.frontiersin.org/articles/10.3389/fpsyt.2022.818298

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale*. The Psychological Corporation.

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