

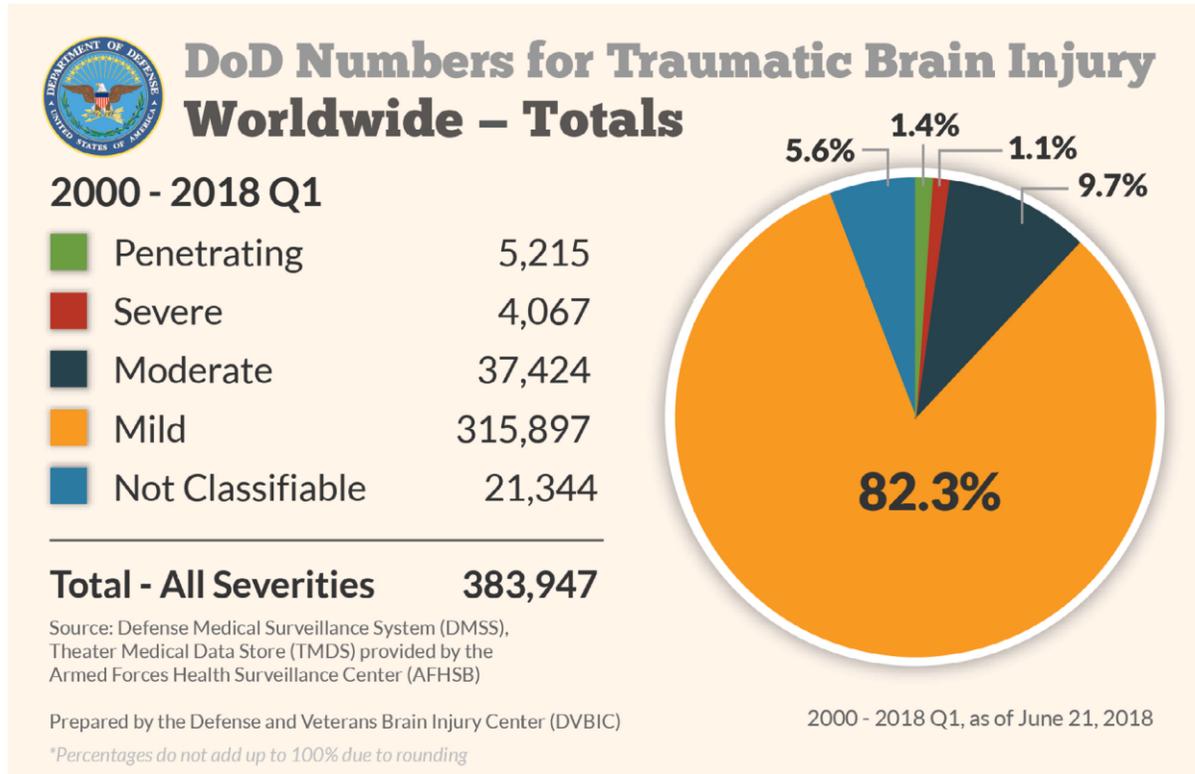
Enhanced Cognitive Rehabilitation to Treat Comorbid TBI and PTSD

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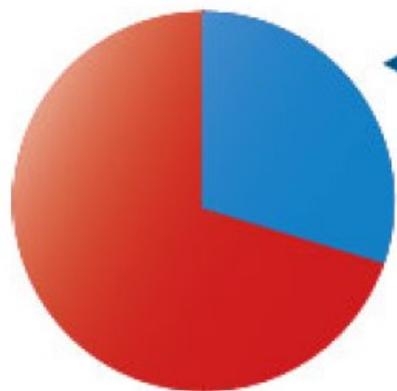
Traumatic Brain Injury



~20% of deployed Iraq/Afghanistan service members experience a TBI (Tanelian & Jaycox, 2008)



Posttraumatic Stress Disorder



70% of U.S. Adults
have experienced
some form of
trauma



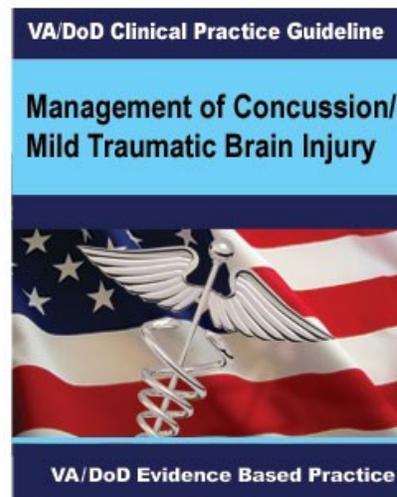
Up to 20% will
develop PTSD

» 11-20% of Iraq and Afghanistan Veterans have PTSD



Treatment Recommendations

- VA/DoD guidelines state that co-occurring disorders should not prevent veterans from receiving empirically supported treatments for PTSD and in fact assert that treatment of mood and pain are first line treatments.
- Research supports this guideline - history of TBI should not preclude trauma-focused therapies (Ragsdale & Horrell, 2016; Walter et al., 2014; Davis et al., 2013)
- Nonetheless, concern remains about the ability of those with a history of TBI to participate in structured trauma-focused treatment (Cook et al., 2014).



Treatment

Treatment of TBI

- Symptom-specific treatments
- Psychoeducation, expectation management, cognitive rehabilitation
- Practice standards for treatment of mild to moderate TBI have been organized into a manualized treatment, Cognitive Symptom Management and Rehabilitation Therapy (CogSMART).

Treatment of PTSD

- Trauma focused therapy such as Cognitive Processing Therapy (CPT) or Prolonged Exposure (PE)
- Use cognitive behavioral treatment (CBT) approaches
- Recognize and challenge thought patterns and behaviors



Treatment of mTBI

TABLE 1 *CogSMART modules and sample strategies*

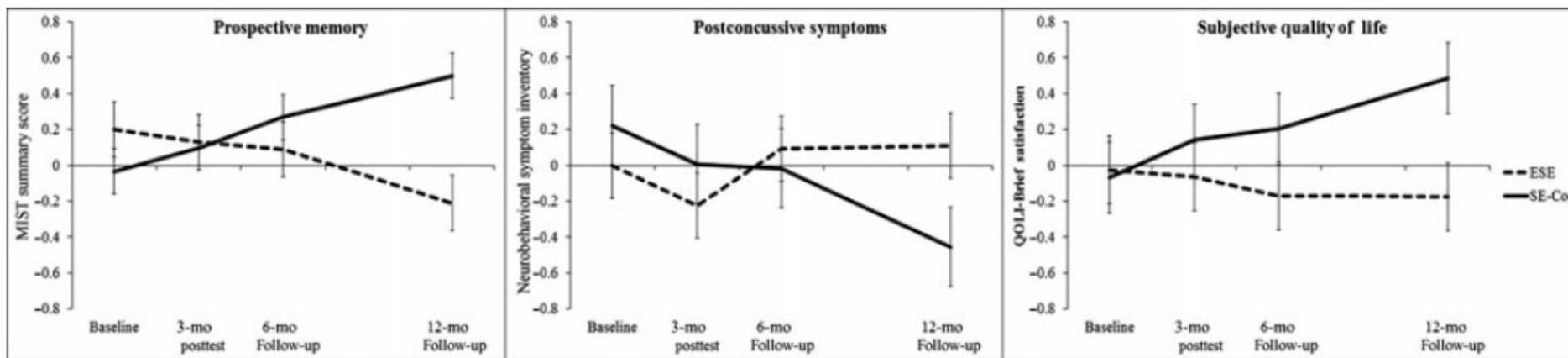
Module	Compensatory strategies and habits taught in CogSMART
Postconcussive Symptoms	<ol style="list-style-type: none"> 1. Psychoeducation regarding the natural course of postconcussive symptoms 2. Appropriate pacing, use of routines, lifestyle strategies 3. Stress reduction (eg, progressive muscle relaxation, abdominal breathing, mindfulness, visualization, grounding) 4. Sleep hygiene education, headache management, and education regarding depression, anxiety, and PTSD
Prospective Memory	<ol style="list-style-type: none"> 1. Daily calendar use 2. To-do lists and prioritizing tasks 3. Linking tasks; using "can't miss reminders" to cue tasks
Attention and Vigilance	<ol style="list-style-type: none"> 1. Conversational vigilance skills (reduce distractions, eye contact, paraphrasing, and asking questions) 2. Task vigilance skills (paraphrase instructions, use self-talk during tasks to maintain focus)
Learning and Memory	<ol style="list-style-type: none"> 1. Encoding strategies (write things down, paraphrasing/ repetition, association, chunking, categorizing, acronyms, rhymes, visual imagery, name-learning strategies) 2. Retrieval strategies (systematic searching) and organizational strategies for general learning and memory
Executive Functioning	<ol style="list-style-type: none"> 1. Six-step problem-solving method (define problem, brainstorm solutions, evaluate solutions, select a solution, try it, evaluate how it worked) 2. Self-talk while solving problems 3. Hypothesis testing and self-monitoring

Abbreviations: CogSMART, Cognitive Symptom Management and Rehabilitation Therapy; PTSD, posttraumatic stress disorder.



CogSMART Compensatory Cognitive Training for Traumatic Brain Injury: Effects Over 1 Year

Elizabeth W. Twamley, PhD; Kelsey R. Thomas, MS; Amber M. Gregory, BA; Amy J. Jak, PhD; Mark W. Bondi, PhD; Dean C. Delis, PhD; James B. Lohr, MD



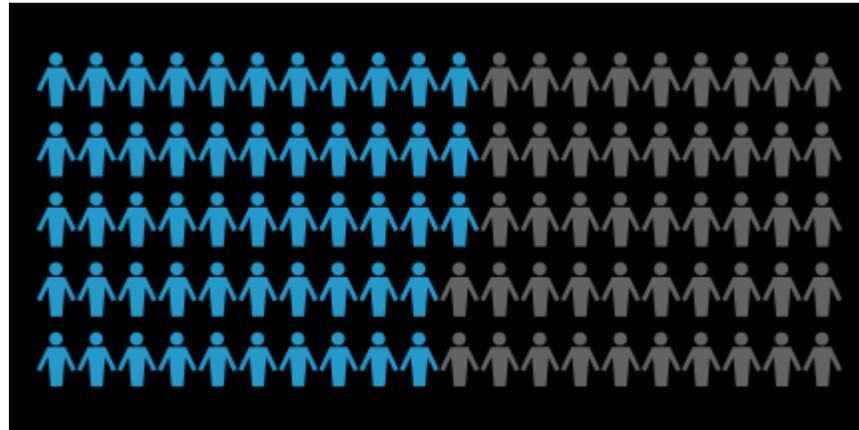
Compensatory Cognitive Training for Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn Veterans With Mild Traumatic Brain Injury

*Daniel Storzbach, PhD; Elizabeth W. Twamley, PhD; Mai S. Roost, PhD;
Shahrokh Golshan, PhD; Rhonda M. Williams, PhD; Maya O'Neil, PhD; Amy J. Jak, PhD;
Aaron P. Turner, PhD; Halina M. Kowalski, MA; Kathleen F. Pagulayan, PhD;
Marilyn Huckans, PhD*

Objective: The purpose of the study was to evaluate the efficacy of group-based compensatory cognitive training (CCT) for Operation Enduring Freedom (OEF)/Operation Iraqi Freedom(OIF)/Operation New Dawn (OND) Veterans with a history of mild traumatic brain injury. **Method:** One hundred nineteen OEF/OIF/OND Veterans with history of mild traumatic brain injury participated at 3 sites, and 50 of the Veterans were randomized to CCT group, while 69 Veterans were randomized to the usual care control group. The CCT group participated in 10 weeks of CCT. Both CCT and usual care groups were assessed at baseline, 5 weeks (midway through CCT), 10 weeks (immediately following CCT), and 15 weeks (5-week follow-up) on measures of subjective cognitive complaints, use of cognitive strategies, psychological functioning, and objective cognitive performance. **Results:** Veterans who participated in CCT reported significantly fewer cognitive and memory difficulties and greater use of cognitive strategies. They also demonstrated significant improvements on neurocognitive tests of attention, learning, and executive functioning, which were 3 of the cognitive domains targeted in CCT. **Conclusions:** Findings indicate that training in compensatory cognitive strategies facilitates behavioral change (ie, use of cognitive strategies) as well as both subjective and objective improvements in targeted cognitive domains. **Key words:** cognitive training, mild traumatic brain injury, OEF/OIF/OND Veterans



Treatment of PTSD



For every 100 people with PTSD who receive a trauma-focused therapy (such as Cognitive Processing Therapy or PE), 53 will no longer have PTSD after about three months.



A Randomized Clinical Trial of Group Cognitive Processing Therapy Compared With Group Present-Centered Therapy for PTSD Among Active Duty Military Personnel

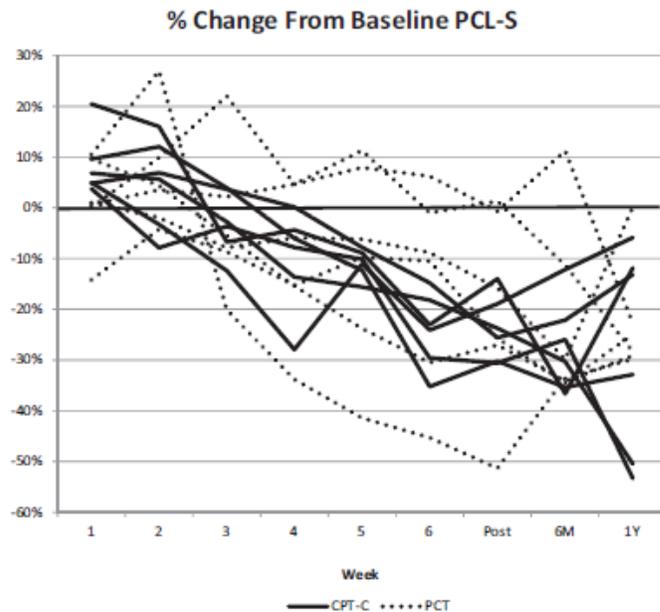


Figure 2. Percent change from baseline (set at 0) PCL-S score in 12 therapy groups. PCL-S = PTSD Checklist, Stressor Specific version; CPT-C = cognitive processing therapy, cognitive only version; PCT = present-centered therapy.

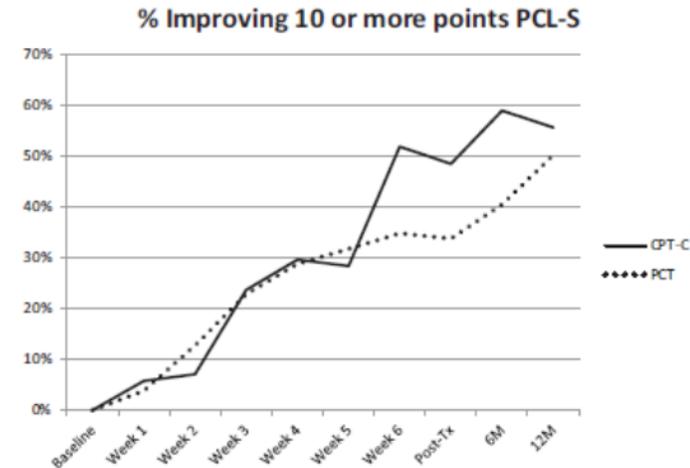
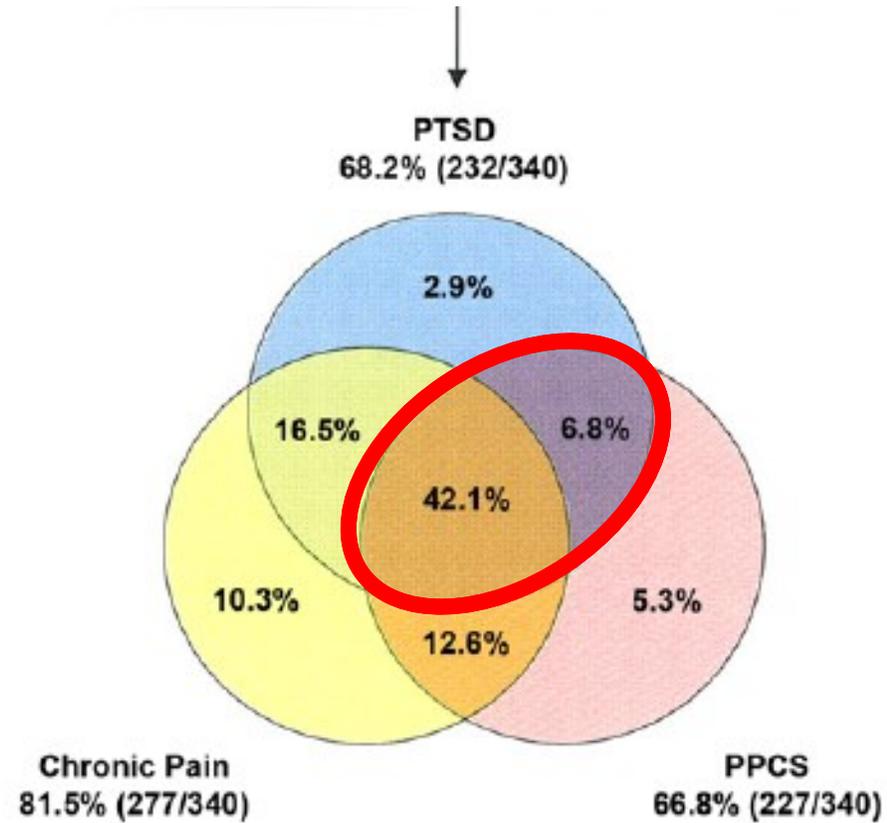


Figure 3. Percentage of participants who improved by at least 10 points (clinically significant change) on the PTSD Checklist, Stressor Specific version (PCL-S) for cognitive processing therapy (CPT-C) and present-centered therapy (PCT) at each data collection point.

(Resick et al., 2015)



Polytrauma Clinical Triad



Lew et al., 2009



Veterans Presenting for Treatment of Cognitive Complaints

- Less than 30% of Veterans with a history of concussion had objective deficits upon formal testing
- ~85% had PTSD or other comorbid mental health concerns

Correlations between neurobehavioral symptoms, mental health symptoms, overall cognitive performance, and injury variables in the pass PVT group

Variable	BAI	NSI	PCL	Impaired tests	TBIs	LOC	PTA
				(n)	(n)	(min)	(min)
BDI	.65*	.57*	.51*	.11	-.02	-.06	.02
BAI		.70*	.52*	.04	.06	.01	.10
NSI			.54*	.04	.09	.06	-.09
PCL				.05	-.04	.04	.03
Impaired tests (n)					.09	.08	-.02
TBIs (n)						.02	-.01
LOC (min)							.20

(Jak et al., 2015)



Dynamic relationship between comorbid PTSD and history of mTBI

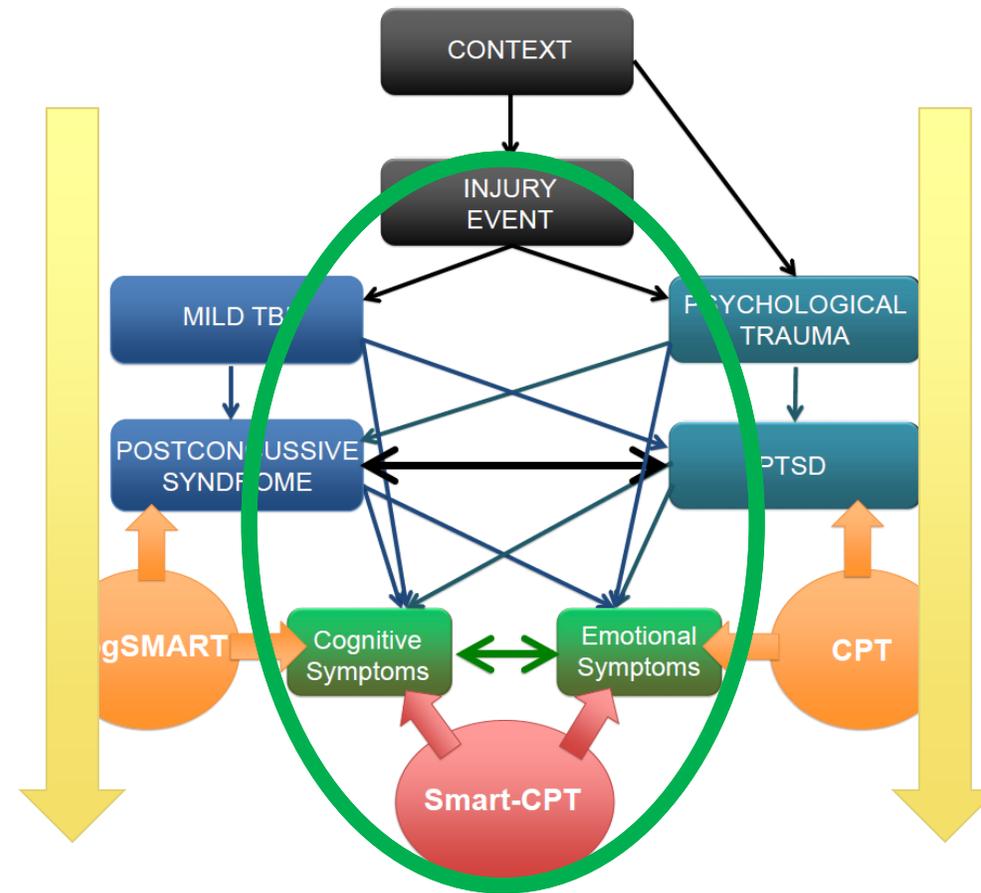


Fig. 1. Adapted from Vasterling, Bryant, and Keane (2012).



Question:

- Among Veterans with history of mTBI presenting for treatment, comorbidity of other conditions (e.g., mental health, pain) is highly likely
 - » True
 - » False



Treatment of Comorbid Conditions

- PTSD and history of concussion are highly prevalent and comorbid in Veterans
- Psychological factors play a significant role in persistence of cognitive and other post-concussive symptoms
- Empirically supported treatments that target comorbidity are lacking.



SMART-CPT

- SMART-CPT: hybrid treatment integrating principles of cognitive rehabilitation into CPT to streamline treatment and target common comorbidity.
- More time efficient for both patient and clinic: SMART-CPT takes 15 hours completed in 12 weeks vs. 24 hours completed in 12-24 weeks for CPT and CogSMART





Evaluation of a hybrid treatment for Veterans with comorbid traumatic brain injury and posttraumatic stress disorder: Study protocol for a randomized controlled trial



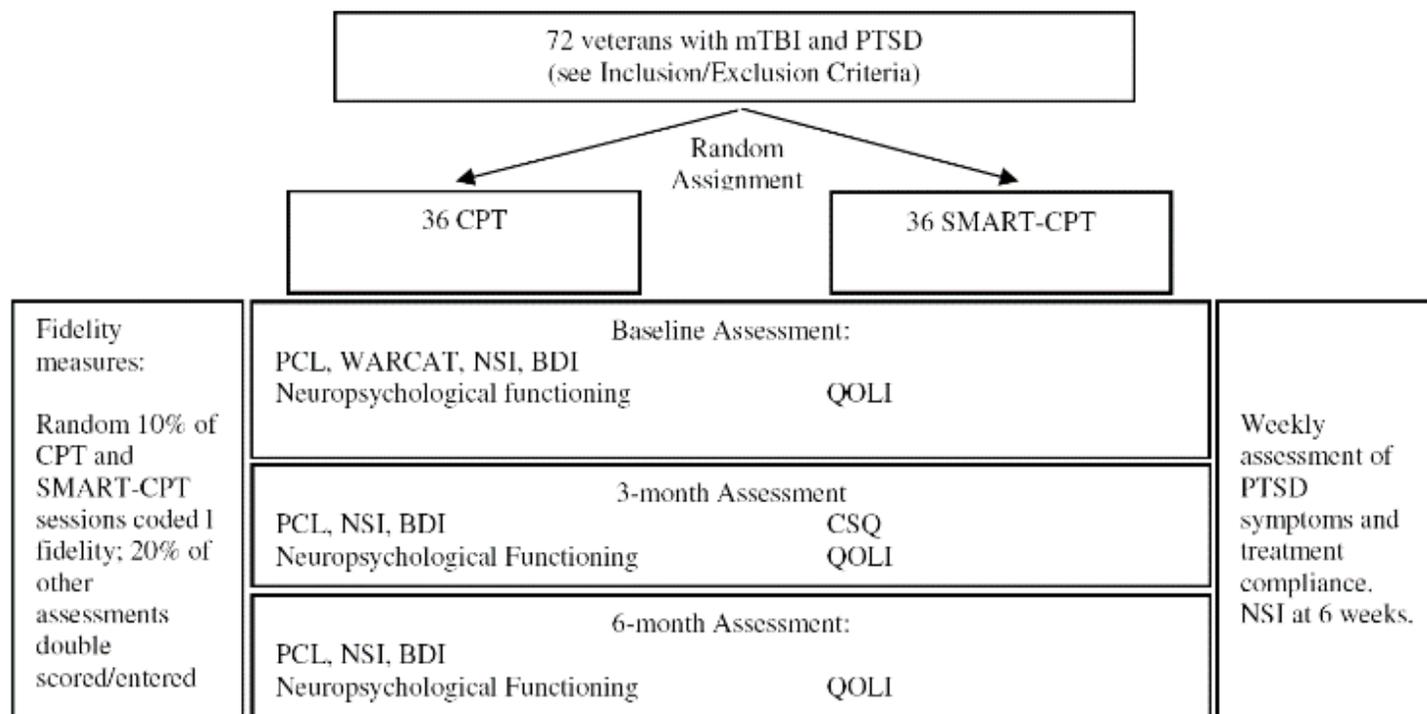
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RESEARCH PAPER

SMART-CPT for veterans with comorbid post-traumatic stress disorder and history of traumatic brain injury: a randomised controlled trial

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Interventions

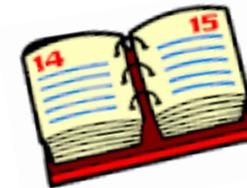
- SMART-CPT: Incorporates TBI psychoeducation, compensatory strategies for attention, memory, and executive functioning, more concrete language, written and verbal repetition and reviews of key CPT points, and simplified and restructured homework pages into standard CPT.
 - 12 sessions, est. 75 minutes each (actual avg. 87 min.)
 - Veteran provided with manual with all in-session material, handouts, and homework
- CPT – strategies for challenging maladaptive thought processes related to trauma
 - 12 sessions, est. 60 minutes each (actual avg. 67 min)
 - Veteran provided with homework handouts



SMART-CPT Modifications

CogSMART strategies integrated into CPT:

- Active breaks
- Self-talk
- Calendar use – remember appts/homework & other important activities, organize time/priorities including to-do lists
- Home for important items
- Strategic reminders (notes/visual cues, alarms)
- Visual imagery
- Retrieval strategies
- Goal setting and planning
- Brain storming and problem solving



SMART-CPT Modifications

- Provide written copies of session agendas and session reviews
- Patient handouts include written summaries of key topics discussed orally in session
 - » E.g., PTSD symptoms, fight/flight/freeze, just world belief, natural vs manufactured emotions, hindsight bias, self blame, five themes
- Color-coded A-B-C and challenging beliefs worksheets (CBWs) to clearly separate sections
- CBWs are also simplified
- More concrete language
- Repetition of key points
- Built-in breaks



Challenging Beliefs Worksheet

A. Situation	B. Thought(s)	D. Challenging Thoughts	E. Problematic Patterns	F. Alternative Thought(s)
Describe the event, thought or belief leading to the unpleasant emotion(s).	Write thought(s) related to Column A. Rate belief in each thought below from 0-100% (How much do you believe this thought?)	Use Challenging Questions to examine your automatic thoughts from Column B. Is the thought balanced and factual or extreme?	Use the Patterns of Problematic Thinking Worksheet to decide if this is one of your problematic patterns of thinking.	What else can I say instead of Column B? How else can I interpret the event instead of Column B? Rate belief in alternative thought(s) from 0-100%
	<div style="background-color: #333; color: white; text-align: center; padding: 2px;">C. Emotion(s)</div> Specify sad, angry, etc., and rate how strongly you feel each emotion from 0-100%	Evidence For? Evidence Against? Habit or fact? Interpretations not accurate? All or none? Extreme or exaggerated? Out of context? Source unreliable? Low versus high probability? Based on feelings or facts? Irrelevant factors?	Jumping to conclusions: Exaggerating or minimizing: Disregarding important aspects: Oversimplifying: Over-generalizing: Mind reading: Emotional reasoning:	<div style="background-color: #333; color: white; text-align: center; padding: 2px;">G. Re-rate Old Thought(s)</div> Re-rate how much you now believe the thought(s) in Column B from 0-100% <div style="background-color: #333; color: white; text-align: center; padding: 2px;">H. Emotion(s)</div> Now what do you feel? 0-100%



Challenging Beliefs Worksheet

<p>A Activating Event "Something happens"</p>	<p>B Belief/Stuck point "I tell myself something"</p> <p style="text-align: right; color: red;">Rate strength of belief from 0-100% ____ %</p>	<p>C Consequence How does the stuck point make me feel?</p> <p style="text-align: right; color: green;">Rate strength of emotion _____ %</p>
<p>D Challenging Questions</p> <p>Evidence for the stuck point?</p> <p>Evidence against the stuck point?</p> <p>Are you taking the situation out of context and only focusing on one aspect of the event? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>E Thought Distorting</p> <p><input type="checkbox"/> Jumping to conclusions</p> <p><input type="checkbox"/> Exaggerating or minimizing</p> <p><input type="checkbox"/> Disregarding important aspects</p> <p><input type="checkbox"/> Oversimplifying</p> <p><input type="checkbox"/> Over-generalizing</p> <p><input type="checkbox"/> Mind reading</p> <p><input type="checkbox"/> Emotional reasoning</p>
<p>F New Belief What can I tell myself in the future?</p> <p style="text-align: right; color: green;">Rate strength of new belief from 0-100 % _____ %</p> <p style="text-align: right; color: green;">Re-rate belief in old thought from B from 0-100% _____ %</p>		<p>G New Consequence How does the new belief make me feel?</p> <p style="text-align: right; color: orange;">Rate strength of new emotion from 0-100% _____ ?</p>

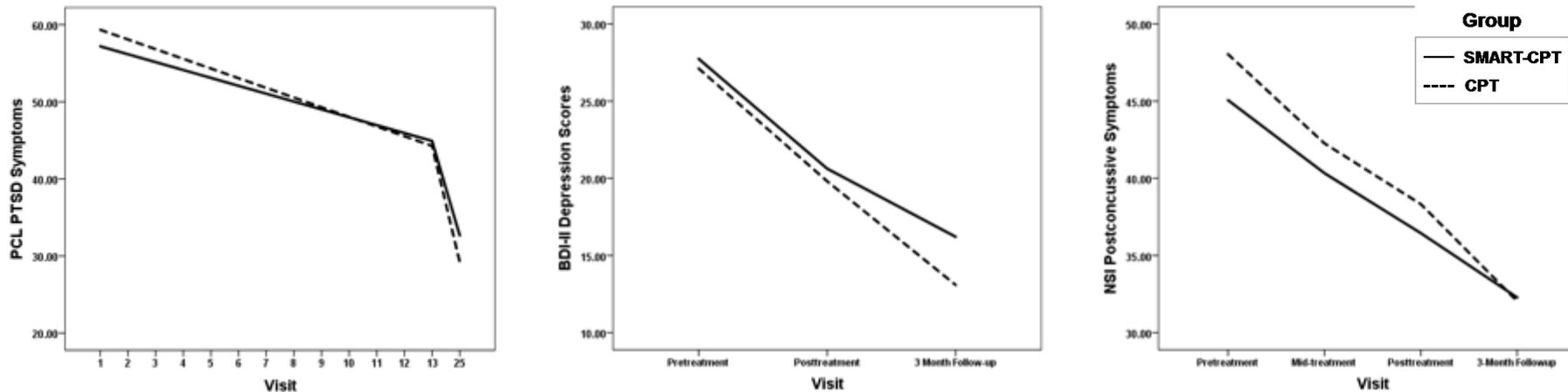


Participants

	Total Sample (N=100)	CPT-C (N=49)	SMART-CPT (N=51)	t, χ^2 , or F (df)	p
Age, years	34.39 (7.89)	33.94 (7.27)	34.82 (8.50)	-.56 (98)	.578
Education, years	13.69 (1.83)	13.88 (1.65)	13.51 (1.98)	1.00 (98)	.317
Male, %	89.0%	87.8%	90.2%	$\chi^2=.15$ (1)	.758
Non-Caucasian, %	53%	59.2%	47.1%	$\chi^2=1.48$ (1)	.155
Loss of Consciousness, minutes ^z	4.50 (8.84)	5.49 (8.90)	3.61 (8.78)	1.05 (95)	.297
Number of TBIs	2.81 (1.92)	2.90 (1.99)	2.73 (1.87)	.44 (97)	.661
Percentage Service Connection Treatment	57.10 (38.70)	56.73 (37.88)	57.45 (39.84)	-.09 (98)	.927
Treatment Completion, %	53.0%	49.0%	56.9%	$\chi^2=.62$ (1)	.548
Prior PTSD Treatment, %	57.0%	55.1%	58.8%	$\chi^2=.14$ (1)	.840
Prior Cognitive Rehabilitation, %	1.0%	2.1%	0%	$\chi^2=1.03$ (1)	.495
Total sessions completed	7.96 (4.74)	7.37 (4.95)	8.53 (4.51)	-1.23 (98)	.222
Average time per session, minutes	79.77 (19.24)	72.65 (16.06)	86.03 (19.77)	-3.53 (90)	.001
Symptom Severity					
PCL-S	59.35 (10.65)	61.06 (9.92)	57.63 (11.17)	1.61 (96)	.111
NSI	46.56 (14.12)	48.61 (14.92)	44.51 (13.10)	1.45 (96)	.151
BDI-II	27.68 (10.27)	27.29 (9.62)	28.06 (10.96)	-.37 (95)	.714
Cognitive ^h					
WRAT Reading	97.02 (10.00)	97.08 (10.63)	96.96 (9.44)	.27 (1,95)	.603
WAIS-IV Processing Speed Index	91.51 (13.21)	90.10 (15.18)	92.88 (10.93)	.22 (1,94)	.639
CVLT-II 1-5 Learning Total	45.37 (9.93)	43.35 (9.72)	47.39 (9.83)	3.25 (1,95)	.075
CVLT-II SDFR	-.54 (.96)	-.67 (.93)	-.40 (.98)	.85 (1,95)	.358
CVLT-II LDFR	-.69 (1.13)	-.86 (1.07)	-.52 (1.19)	.79 (1,95)	.376
WAIS-IV Digit Span	8.36 (2.59)	8.35 (2.53)	8.38 (2.67)	.64 (1,96)	.426
D-KEFS Trail-Making Number-Letter Switching	8.85 (2.78)	8.73 (2.77)	8.96 (2.81)	.02 (1,94)	.879
D-KEFS Color Word Inhibition	7.80 (4.04)	7.66 (4.45)	7.94 (3.65)	.05 (1,93)	.829
WCST-64 Total Errors	48.08 (8.90)	48.06 (8.93)	48.10 (8.97)	.04 (1,94)	.835
TOMM Trial 2	47.45 (4.54)	46.69 (5.29)	48.18 (3.58)	-1.65 (98)	.103
TOMM Retention Trial	46.80 (5.54)	45.94 (6.59)	47.63 (4.20)	-1.53 (98)	.128
QOLI-B General Life Satisfaction	4.07 (1.30)	4.19 (1.21)	3.96 (1.38)	.86 (95)	.390



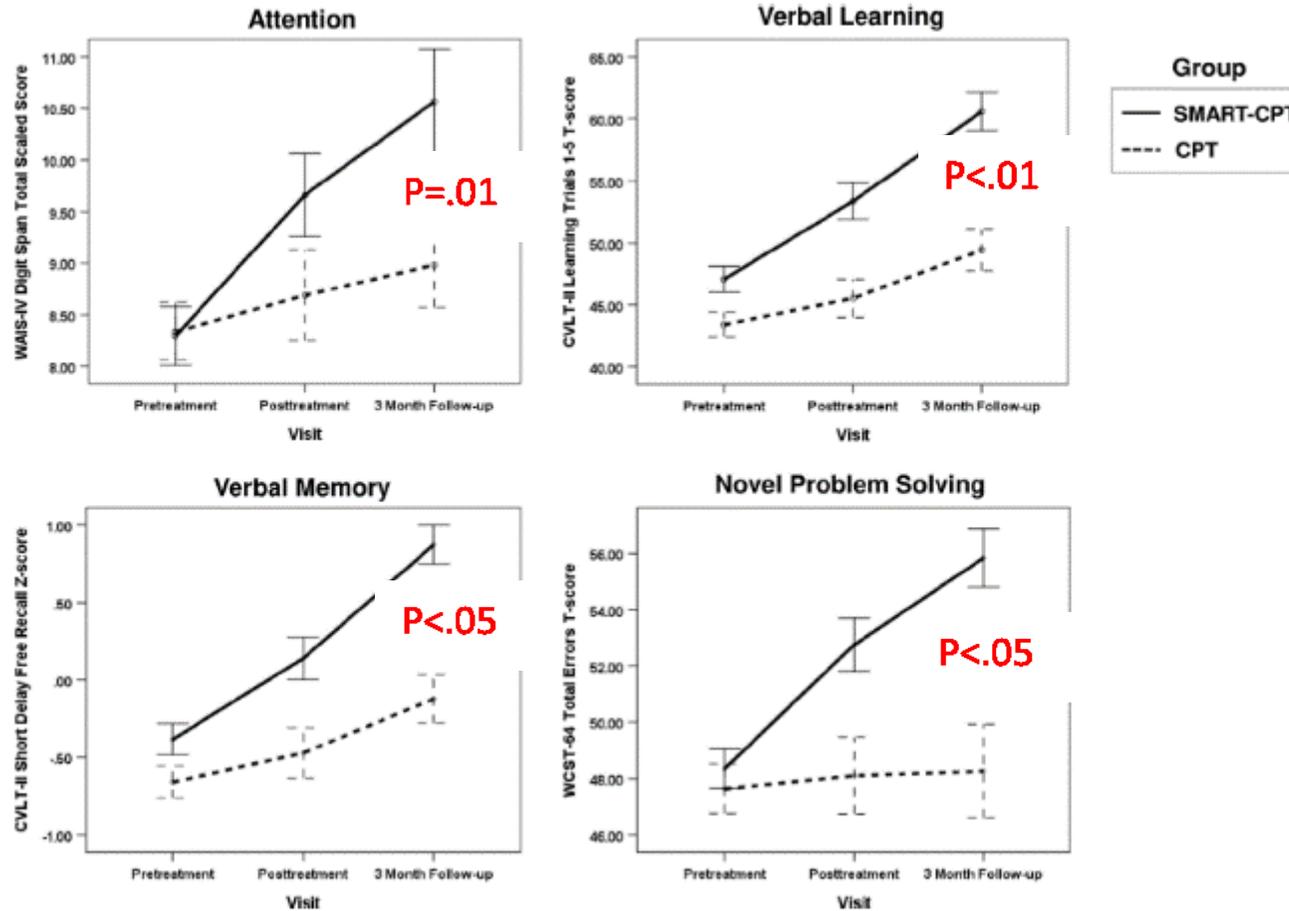
Change in Mental Health and Neurobehavioral Symptoms



- Statistically and clinically significant improvement in PTSD, depression, and postconcussive symptoms - No group differences
- Similarly, significant improvement in quality of life (general life satisfaction, daily activities, family, health), but no group differences



Change in Cognitive Functioning



Summary

- Individuals with a history of concussion and persistent post-concussive symptoms can successfully complete structured and empirically supported mental health therapies with or without modifications
- Both CPT and SMART-CPT resulted in clinically significant reductions in PTSD and post-concussive symptomatology as well as improvements in quality of life
- Adding compensatory cognitive strategies to mental health treatment does provide differential benefit in the cognitive domains of attention, learning/memory, and novel problem solving
- SMART-CPT has the potential to defragment care and significantly improve treatment for this clinically complicated group



Thank you!

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