MMPI-Based Boldness and Disinhibition Predict Distinct Trajectories of PTSD Symptomology Following Combat Exposure in National Guard Soldiers

VA U.S. Department of Veterans Affairs

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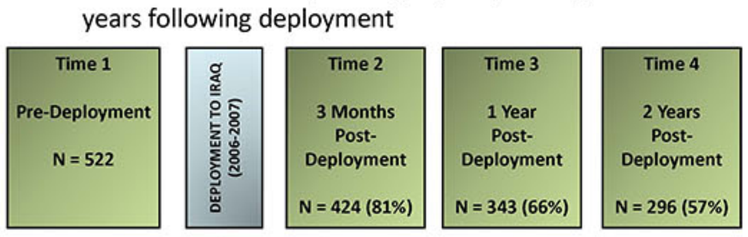
Background

- Exposure to combat is associated with significant mental health risk, including Post-traumatic Stress Disorder (PTSD) [1]
- Most soldiers are resilient and do not develop PTSD [2], but a minority experience marked distress [3]
- National Guard and Reserve troops appear to be at heightened risk for post-deployment psychological distress relative to other active duty troops [4]
- Critical to identify risk and protective factors for PTSD to screen for those most vulnerable
- Psychopathic traits (boldness and disinhibition)[5] are differentially related to internalizing and externalizing problems [6]; may reflect protective and risk factors for development of PTSD

Method

Procedure

- Participants were 522 National Guard soldiers deployed to Iraq in 2006-2007, as part of the Readiness and Resilience in National Guard Soldiers (RINGS-1) study
- Soldiers completed paper-and-pencil questionnaires to assess psychosocial functioning and psychiatric symptoms prior to their deployment to Iraq (Time 1), as well as 3 months (Time 2), 1 year (Time 2), and 2 years following deployment



Data Analytic Plan

- Preliminary analyses identified a subset of soldiers with high combat exposure during deployment (n = 301), and growth mixture modeling was used to identify trajectories of PTSD symptoms over time (Figure 2)
- A subset of items of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) were administered pre-deployment, and boldness and disinhibition scales were constructed based on previous work [7]
  - **Disinhibition** (17 items): externalizing problems starting in childhood, dishonesty, hostility (α = .76)
  - **Boldness** (16 items): social poise, confidence, low stress reaction, few fears (α = .63)
- Pre-deployment boldness and disinhibition and their interaction (product term) were entered as concurrent predictors of combat exposure
- Series of multinomial logistic regression models were run to test for the contributions of combat exposure and pre-deployment boldness and disinhibition to PTSD trajectories

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Results

Figure 1. Pre-deployment MMPI-Boldness and Disinhibition Interact to Predict Combat Exposure

	Combat Exposure Prediction	
	β Step 1	*β Step 2*
Boldness	.11*	.11*
Disinhibition	.27**	.26**
Bold x Dis		-.12*
R	.28**	.31**
ΔR^2		.015*

* p<.05; ** p<.001

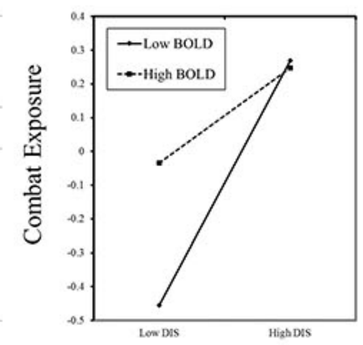


Figure 2. Trajectories of PTSD Symptoms

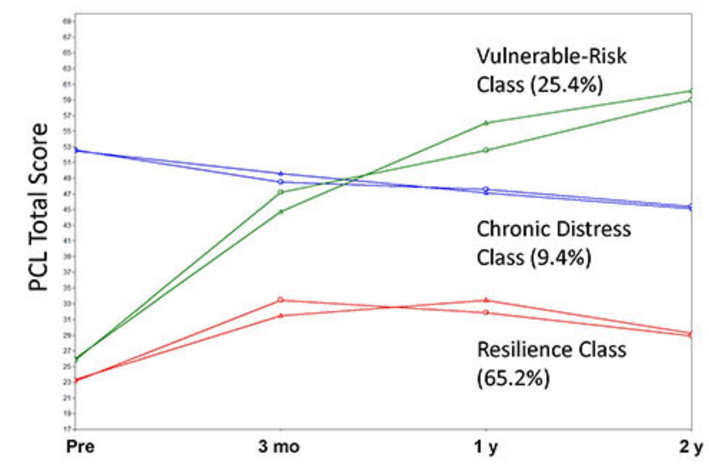


Figure 3. Pre-deployment MMPI-Boldness and Disinhibition Predict PTSD Trajectories

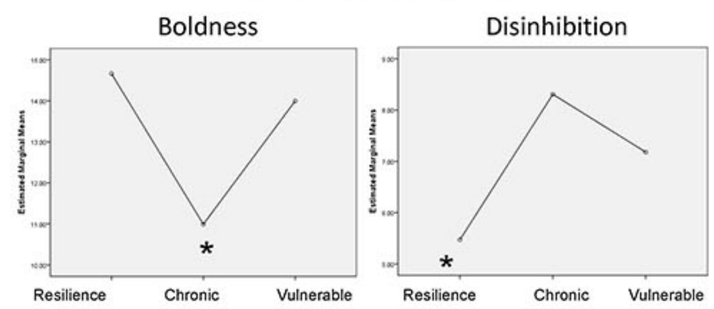
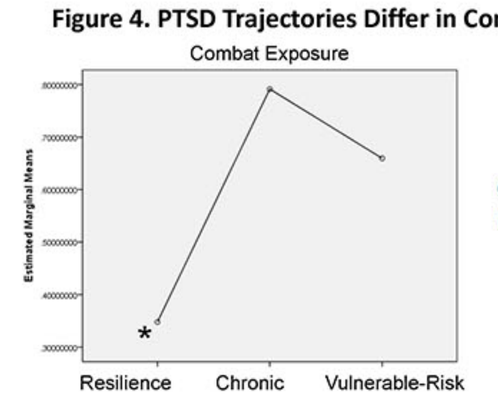


Figure 4. PTSD Trajectories Differ in Combat Exposure



F (2,298) = 10.70, *p*<.001

Chronic = Vulnerable-Risk > Resilience

Results (continued)

Table 1. Multinomial logistic regression of combat exposure and pre-deployment boldness and disinhibition predicting PTSD symptom trajectory classes

		The reference category is **Resilience**			
		B	*Sig.*	*Exp(B)*	*[95% CI]*
Chronic	Boldness	**-.59*** **	**.000**	**0.55**	**[.46 - .67]**
	Disinhibition	**.18***	**.03**	**1.20**	**[1.02 - 1.41]**
	Combat Exposure	**1.24*** **	**.001**	**3.46**	**[1.64 - 7.31]**
Vulnerable Risk	Boldness	**-.15***	**.03**	**0.86**	**[.75 - .99]**
	Disinhibition	**.11** **	**.009**	**1.12**	**[1.03 - 1.21]**
	Combat Exposure	**.73*** **	**.001**	**2.08**	**[1.33 - 3.27]**
		The reference category is **Vulnerable-Risk**			
		B	*Sig.*	*Exp(B)*	*[95% CI]*
Chronic	Boldness	**-.44*** **	**.000**	**0.65**	**[.53 - .79]**
	Disinhibition	.07	.41	1.07	[.91 - 1.27]
	Combat Exposure	.51	.18	1.66	[.79 - 3.51]

Note. B = unstandardized beta; *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$; Exp(B) = Odds ratio; 95% CI = 95 percent confidence interval.

Summary

- Boldness and disinhibition measured prior to deployment both positively predict combat exposure
  - Moderating effect of boldness at low disinhibition
- PTSD trajectories differ in combat exposure
  - Chronic and Vulnerable-Risk > Resilience
- Boldness and disinhibition predict PTSD trajectories ***above and beyond*** combat exposure
  - Relative to Resilience, Chronic and Vulnerable-Risk classes predicted by higher combat exposure, LOWER boldness, and HIGHER disinhibition
  - Chronic and Vulnerable-Risk classes distinguished only by boldness (VR > C)

Conclusions

- MMPI highly useful tool for quantifying risk and resilience factors for psychopathology
- **Boldness can be conceived as a resilience factor**
  - Increased combat exposure (fearlessness), yet protective against PTSD – highest boldness in Resilience class and boldness the only predictor that distinguished Chronic from Vulnerable-Risk
- **Disinhibition can be conceived as a risk factor**
  - Resilience class predicted by significantly lower disinhibition
- Screening for boldness and disinhibition has important implications
  - Identify individuals at risk for development of PTSD (low B, high D [particularly if in high combat areas/positions])
  - Identify individuals particularly well-suited for military service (high B, low D)

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NATIONAL VA RESEARCH WEEK MAY 16-20, 2016

Disinhibition and Threat Sensitivity as Dispositional Liabilities for Suicidal Behavior: A Longitudinal Study of Deployed National Guard Soldiers

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VA U.S. Department of Veterans Affairs

Background

Suicide in the Military

- Suicide is a significant mental health concern in military and veteran populations
- Historically, rates of suicide lower in the military relative to general population
- Since OIF/OEF, rates of suicide in veterans approximating that of general population
  - cf. Selby et al. (2010)
- Notably, risk is independent of combat and other deployment-related factors
  - LeardMann et al. (2013)

Dispositional Risk Factors

- Impulsivity and negative emotionality are personality/dispositional risk factors for suicide
  - Anestis et al. (2014); Joiner et al. (2005); O'Connor & Nock (2014)
- Disinhibition and Threat Sensitivity as *biobehavioral* dispositions that confer risk for suicidality: separately and interactively
  - Venables et al. (2015; under review)
- Why biobehavioral dispositions?
  - Heritable
  - Linked to neurobiological processes

Study Overview

Aims

- Little is known about dispositional risk factors for suicidal behavior in military populations
- We sought to address this gap by evaluating associations amongst disinhibition and threat sensitivity with suicidal behaviors in National Guard soldiers assessed before and after an extended deployment to Iraq using both cross-sectional and longitudinal analyses

Methods

- Participants were 522 National Guard Brigade Combat Team soldiers deployed to Iraq in 2006-2007 (Polusny et al., 2011)
- Assessed 1 mo. prior to deployment & ~4 mo. following a 16-month extended deployment

Disinhibition and Threat Sensitivity assessed from items of the Minnesota Multiphasic Personality Inventory – 2 – Restructured Form (MMPI-2-RF)

- Disinhibition: externalizing problems starting in childhood, impulsivity, dishonesty, hostility
  - Internal consistency (pre/post): α = .76, .76
  - Test-retest reliability (~ 2 years): r = .72
- Threat Sensitivity: social poise, confidence, low stress reactivity, few fears
  - Internal consistency (pre/post): α = .63, .60
  - Test-retest reliability (~ 2 years): r = .58
- Suicidal Behaviors: Assessed using the MMPI-2-RF SUI scale BDI-II suicidal ideation item
- Endorsement of suicidality (primarily ideation):
  - 14.8% pre-deployment and 13.4% post

Table 1. Bivariate Pearson's Correlation (r) and Regression Coefficients (B) for Prediction of Suicide Risk from Disinhibition and Threat Sensitivity Dispositional Variables

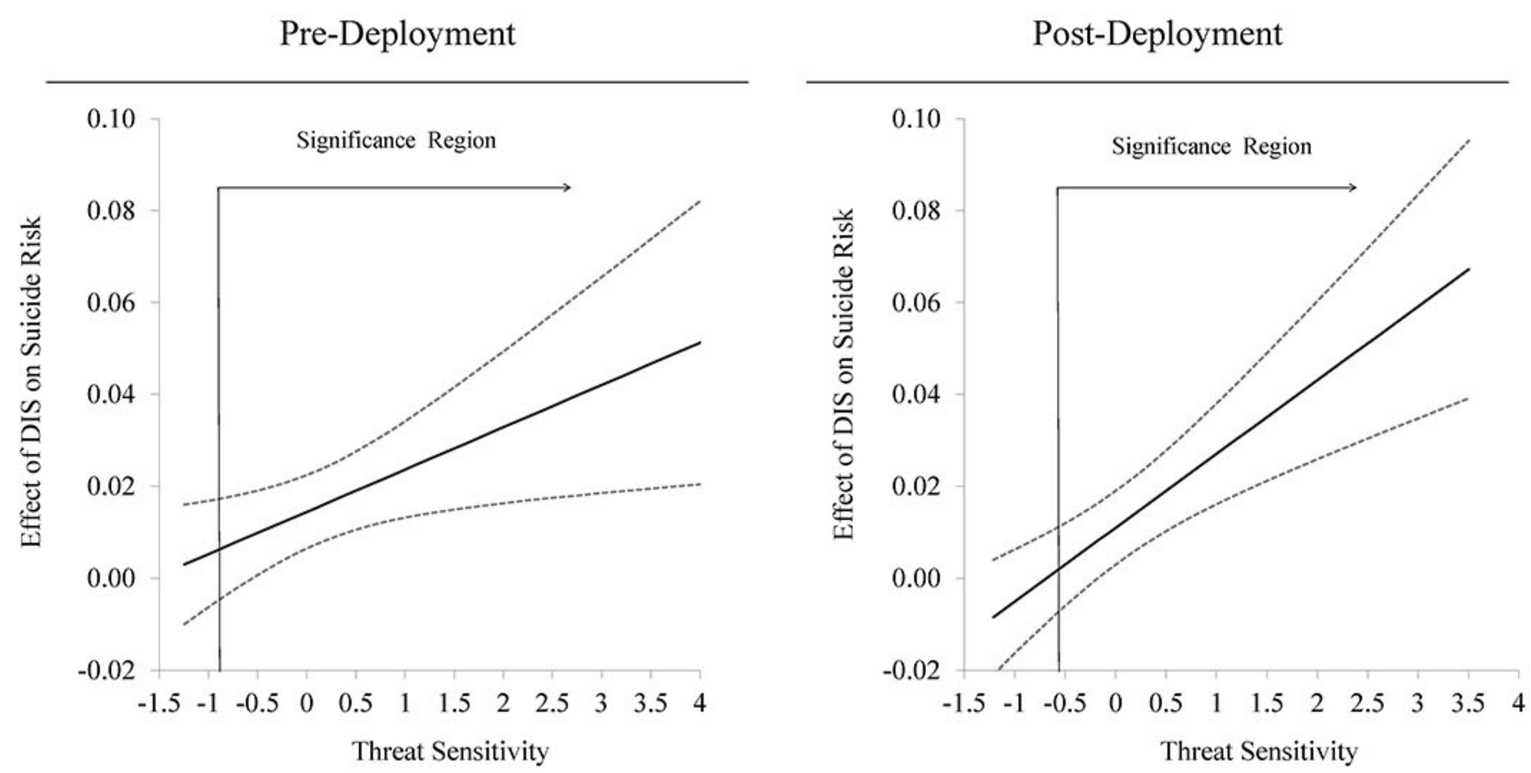
	Pre-Deployment [a]			Pre-Deployment Traits Predicting Post-Deployment Suicidality [b]			Post-Deployment [b]		
	r	*B Step 1*	*B Step 2*	*r*	*B Step 1*	*B Step 2*	*r*	*B Step 1*	*B Step 2*
Pre Suicidality	-	-	-	.28*	.21*	.21*	.28*	.19*	.18*
THT+	.38*	.37*	.37*	.22*	.14*	.13†	.37*	.31*	.30*
INH-	.18*	.15*	.14*	.13*	.10†	.10†	.18*	.16*	.15*
THT+ x INH-			.10*			-.02			.23*
R		.412*	.413*		.322*	.322*		.444*	.501*
ΔR^2			.01*			< .001			.053*

DIS = Disinhibition; THT = threat sensitivity; r = Pearson correlation coefficient; B = standardized regression coefficient; R = multiple regression coefficient; ΔR^2 = change in R^2 (i.e., change in proportion of variance accounted for in the criterion measures).

[a] N=513; [b] N=239

* $p \leq .05$; † $p < .10$

Figure 1. Interactive Effect of Disinhibition and Threat Sensitivity in Predicting Suicidal Behaviors.



Results

- Disinhibition and threat sensitivity independently and interactively predicted suicidal behaviors in cross-sectional analyses
- Replicating previous work (Venables et al., 2015), individuals at greatest risk were those scoring concurrently high on each trait
- Disinhibition and threat sensitivity predicted suicidality in longitudinal analyses (main effects only) while controlling for pre-deployment levels of suicidal behavior. However, effects were weaker for longitudinal predictions

Summary

- Assessment of dispositional processes likely important in formulating risk assessment
- Disinhibition and threat sensitivity as distal risk factors that influence processes more proximal to suicide attempts
  - Desire for death and capability to make a lethal attempt (Joiner, 2005)
- Disinhibition and threat sensitivity hypothesized to reflect dispositional traits related to the NIMH's Research Domain Criteria Initiative (RDoC)
  - DIS: deficits in inhibitory control / frontal-executive neural systems
  - THT: augmented defensive "fear" motivational systems

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Neurocognitive Functioning of Veterans Participating in a Comprehensive Pain Rehabilitation Program

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Introduction

Chronic pain is common among veterans, with recent studies indicating prevalence of 82-92% among OEF/OIF polytrauma patients (Lew et al., 2007, 2009). Cognitive complaints are among the most common sequelae of chronic pain, although evidence for objective cognitive deficits in this population has been limited. Although research has indicated that processing speed, attention, and verbal memory are often impaired in chronic pain samples (Suhr, 2012), high rates of suboptimal effort and infrequent use of PVTs limit generalizability of these findings (Greiffenstein, 2013; Johnson-Greene, 2013).

The purpose of the current study was to objectively evaluate neurocognitive performance among veterans with chronic pain participating in an interdisciplinary, comprehensive rehabilitation program for chronic pain. Brief neurocognitive assessments were conducted at admission and discharge from the program, enabling characterization of baseline neurocognitive functioning as well as measurement of possible neurocognitive treatment responses. Self-report measures of emotional distress and pain-related functional interference were also completed to provide a comprehensive assessment of psychological treatment responses.

Methods

Participants included 49 veterans (see Table 1) enrolled in a four-week, intensive outpatient, interdisciplinary pain rehabilitation program at the Minneapolis VA Comprehensive Pain Center. The Chronic Pain Rehabilitation Program (CPRP) is CARF-accredited and follows American Pain Society Evidence-Based Treatment Guidelines for rehabilitation of chronic pain (Chou, 2009), including tapering of opioid medications, reduction of polypharmacy, supervised physical exercise, and cognitive-behavioral psychotherapy.

All participants completed the following neuropsychological tests:

- Controlled Oral Word Association Test (COWAT)*
- Repeatable Battery for Assessment of Neuropsychological Status (RBANS)*
- Stroop Color-Word Test
- Test of Memory Malingering (TOMM, admission only)
- Trails A & B
- Wechsler Test of Adult Reading (WTAR; admission only)

*Alternate RBANS and COWAT forms were administered at discharge.

Veterans also completed several self-report measures of emotional distress and pain interference:

- Center for Epidemiological Studies Depression Scale (CES-D)
- Pain Catastrophizing Scale
- Patient Health Questionnaire-9 (PHQ-9)
- PEG Scale (Pain intensity, interference w/ Everyday life & General activity)
- PTSD Checklist for DSM-5 (PCL-5)

Discharge testing data were not available for nine veterans who either terminated early due to medical emergency (n = 1), were discharged or elected to leave the program before completion (n = 7), or did not complete discharge tests (n = 1).

Table 1. Demographic Information

	Admission	Discharge
Sample Size	49	40
# Females [%]	9 [18]	6 [15]
Age (M, SD)	53.71 (10.97)	54.0 (11.06)
Years of Education	13.76 (1.89)	13.80 (1.8)
Morphine Equivalence mg	17.18 (28.36)	0.25 (1.58)

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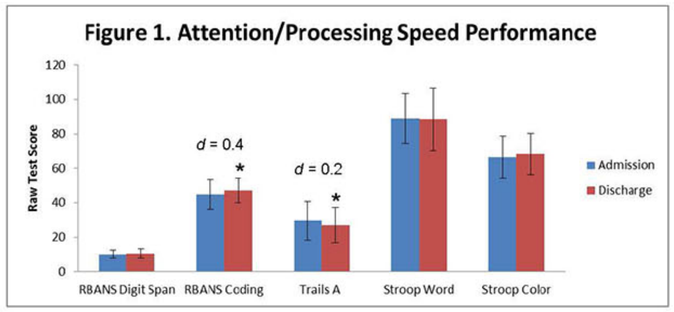
Results

All participants demonstrated adequate effort (i.e. TOMM Trial 2 raw score ≥ 45, RBANS Effort Index weighted score ≤ 3) at admission. Most participants also demonstrated adequate effort at discharge as indexed by the RBANS Effort Index (see Table 2).

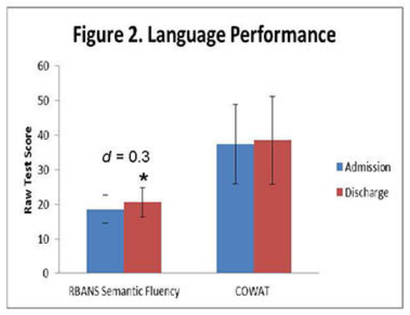
Table 2. Neurocognitive Performance Validity

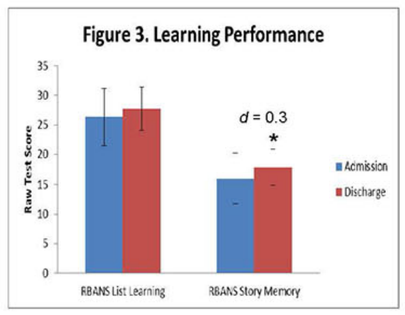
	Mean Score (SD)	Score Range	# [%] Participants w/ Adequate Effort	# [%] Participants w/ Suboptimal Effort
TOMM Trial 1	48.04 (2.23)	40-50	--	--
TOMM Trial 2	49.9 (0.31)	49-50	49 [100]	0.00
RBANS Effort Index (Admission)	0.35 (0.84)	0-3	49 [100]	0.00
RBANS Effort Index (Discharge)	0.30 (1.07)	0-6	39 [97.5]	1 [2.5]

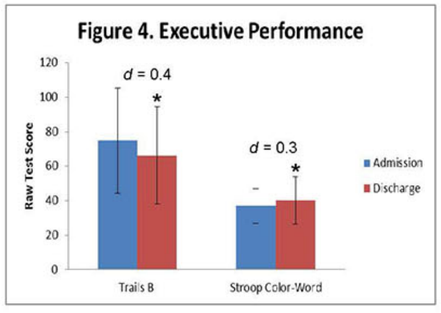
Based on standard clinical norms associated with the neuropsychological tests, participants generally performed within the low average to average range at admission, e.g. Stroop Word mean T = 40 (SD = 10); Trails B mean T = 51 (SD = 10); RBANS Total Index mean SS = 94 (SD = 12). Paired-sample t-tests revealed that veterans demonstrated modest improvements on neurocognitive measures of attention, immediate verbal recall, processing speed, and executive functions (see Figures 1-4).



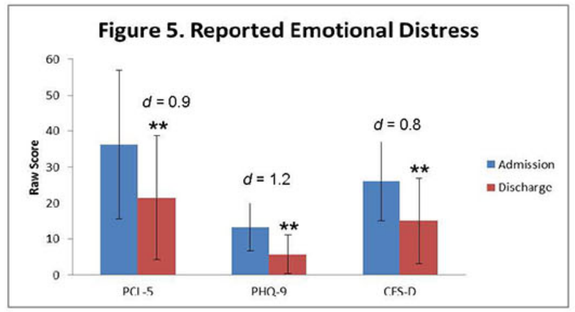
*$p \leq .05$



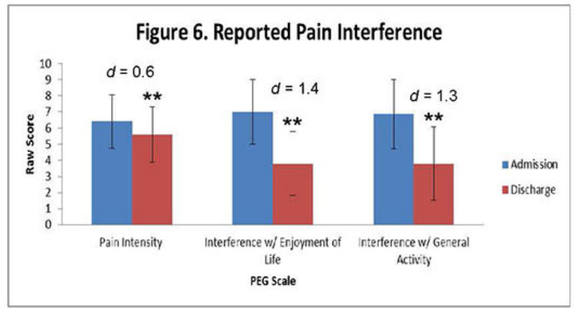


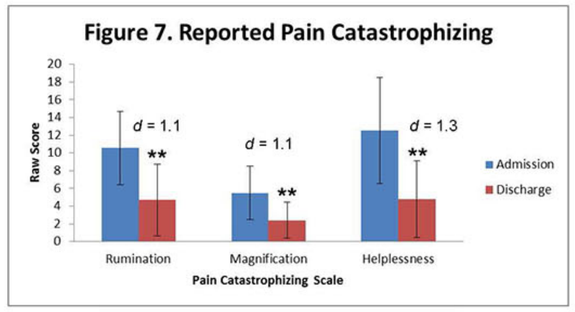


Analyses also indicated a medium reduction in reported pain intensity and large reductions in reported emotional distress and functional pain interference (see Figures 5-7).



**$p < .001$





Discussion

A sample of veterans with chronic pain enrolled in a four-week comprehensive pain rehabilitation program demonstrated modest improvement on measures of complex attention/cognitive efficiency, expressive language, immediate verbal learning, and executive abilities upon program completion. Additionally, large reductions in emotional distress were observed in addition to expected reductions in pain intensity, functional interference, and pain catastrophizing.

Contrary to previous findings in the literature, the current sample of veterans demonstrated largely intact effort on testing. Although preliminary, these results suggest that comprehensive chronic pain rehabilitation may be an effective intervention for reported cognitive difficulties in veterans with chronic pain. The observed cognitive performance gains were observed despite no formal cognitive rehabilitation interventions, and future research should address incremental utility of cognitive remediation strategies in this clinical population.

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Can MMPI-2-RF Validity Scales Predict Completion of a Dialectical Behavior Therapy – Prolonged Exposure Intensive Outpatient Program?

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Background

- Journeys is a twelve-week DBT-PE intensive outpatient program at the Minneapolis VA
- The non-completion rate (18%) is lower than outpatient PE for PTSD (Kehle-Forbes, Meis, Spoont, & Polusny, 2015)
- However, given resource-intensive nature of program, and disruption to milieu when patients end prematurely, it is important to identify factors associated with non-completion
- True Response Inconsistency and Infrequent Psychopathology Responses predict premature termination in MH outpatients (Anestis, Finn, Gottfried, Arbisi, & Joiner, 2015)
- Validity scales on the MMPI-2-RF may predict completion of Journeys, facilitate selecting veterans who are most likely to benefit, and enhance retention of veteran already enrolled
- Elevations on validity scales may reflect disingenuous engagement in treatment process and be associated with completion and outcomes

Aim & Hypotheses

- Purpose: identify MMPI-2-RF validity scales that predict completion and symptom-based outcomes measures
- Identification of likely non-completers would improve efficiency and access, as well as improve care for possible non-completers
- Hypotheses:
  - Profile invalidity will be associated with lower rates of completion
  - Profile invalidity will be associated with smaller reductions in self-report symptom measures

Methods

- Participants were 76 veterans (60% female) who began Journeys
- Trauma types and actual diagnoses varied, however the majority of veterans met criteria for PTSD and BPD
- The MMPI-2-RF was administered to all patients during first few weeks of program (unless administered shortly before screening)
- Profile validity was defined as follows:
  - High cutoffs: F = 120 or Fp ≥ 100 or VRIN /TRIN ≥ 70
  - Low cutoffs: F ≥ 105 or Fp ≥ 90 or VRIN /TRIN ≥ 70 (Goodwin, Sellbom, & Arbisi, 2013)
- Self-report measures of symptoms related to PTSD and BPD were administered at baseline and upon completion of the program
- Measures included: PTSD Checklist for DSM-5 (PCL-5); Borderline Symptom List (BSL-23); DBT Ways of Coping Skills/Dysfunction (DBT WOC Skills/Dys); Dissociative Experiences Scale (DES); Depression Anxiety Stress Scales (DASS)

Methods (Continued)

- Initially, chi-square analyses were used to test whether profile invalidity was associated with lower rates of completion, both for high and low levels of overall validity as well as high and low levels of Fp validity
- Logistic regression was used to test whether continuous Fp scores were associated with lower rates of completion, and standard regression was used to test whether continuous Fp scores were associated with outcomes (controlling for outcomes variables at baseline)

Results

Table 1. Descriptive statistics: rates of validity by MMPI-2-RF subscale

N = 76	M (SD)	T-Score	% Valid (Low/High)
F	14.7 (5.9)	~109	46%/66%
Fp	4.4 (2.6)	~81	72%/78%
VRIN	3.9 (2.0)	~53	93%
TRIN	--	--	93%
Overall—Low	--	--	37%
Overall—High	--	--	50%

Table 2. Rates of completion by overall validity

High Cutoffs	Completed	Not Completed	Completion Rate
Valid	40	10	80%
Invalid	18	8	69%
Low Cutoffs	**Completed**	**Not Completed**	**Completion Rate**
Valid	28	7	80%
Invalid	30	11	73%

- Overall profile validity was not associated with completion rate for high validity cutoffs (Pearson Chi-Square = 1.17, *ns*) or low validity cutoffs (Pearson Chi-Square = 1.17, *ns*)

Table 3. Rates of completion by validity per Fp only

Fp >/= 100	Completed	Not Completed	Completion Rate
Valid	47	12	80%
Invalid	11	6	65%
Fp >/= 90	**Completed**	**Not Completed**	**Completion Rate**
Valid	44	11	80%
Invalid	14	7	67%

Results (Continued)

- (Results from Table 3) Fp profile validity was not associated with completion rates for high validity cutoffs (Pearson Chi-Square = 1.63, *ns*) or low validity cutoffs (Pearson Chi-Square = 1.50, *ns*)
- Moreover, Continuous F scores were not associated with completion rates (B = .03, *p* = .50)
- However, continuous Fp scores were associated with completion rates at trend (B = .20, *p* = .06)
- Controlling for outcome measures at baseline, continuous Fp scores were not associated with outcome measures at Week 12 or end of treatment

Discussion

- Many Journeys patients produce invalid MMPI-2-RF profiles, and conservative cutoffs include treatment completers
- Dichotomous profile invalidity was not associated with lower rates of completion
- Higher continuous scores on Fp may be associated with lower rates of completion but this relationship was only significant at trend, and higher continuous scores on Fp were not associated with lower levels of symptoms reduction
- However, overall these results are inconsistent with previous research indicating that Fp is useful in identifying treatment non-completers (Anestis, et al., 2015)
- Previous research demonstrating the utility of Fp in predicting treatment outcomes was conducted in outpatient populations, thus it is possible that the utility of Fp is reduced in the Journeys PTSD/BPD population
- A reduction in utility in this population could be related to a perceived need on the part of veterans to communicate high levels of symptoms (e.g., to demonstrate the need for an intensive treatment program) independent of genuine and severe symptoms which are indeed present (but over-reported), whereas outpatients may over-report symptoms in the context of low levels or even the absence of genuine symptoms
- High Fp scores can prompt intervention to address possible over-reporting of symptoms, however this is largely indicated by clinical practice and not an empirical relationship between Fp scores and treatment completion or outcomes
- Limitations: completion itself may not reflect genuine engagement in treatment; sample sizes are low; outcomes are limited to self-report
- Future Directions: continue data collection; incorporate administrative data including mental health care utilization data; measure engagement or willingness per self- and/or clinician-report

References available upon request

How Does Suicidal Ideation Affect Close Others?: Using the MMPI-2-RF to Evaluate the Impact of Being Partnered with a Suicide Ideator

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Background

- Suicide is the 10th leading cause of death in the United States (WHO, 2012)
- Although suicide rates among veterans have historically been lower than the civilian population, suicide rates have been increasing among service members involved in OEF/OIF deployments. During some months, deaths by suicide have exceeded rates of soldier deaths in combat.
- Much of the research to date has been conducted on individuals who are suicidal. Very little is known about the psychological impact of being partnered with someone experiencing suicidal ideation.
- The question is especially pertinent among military couples in the months following a soldier's return from deployment, as the reintegration period already constitutes a stressor for both soldiers and their partners. Additional stress that may be caused by having a partner with suicidal ideation may further elevate stress levels, which could have negative downstream consequences for the individual's mental and physical health.

Current Study & Hypotheses

Research Question: Do partners of suicide ideators produce more distressed MMPI-2-RF profiles than partners of non-suicide ideators?

Hypotheses:

- **(1)** Male soldiers with an ideating female partner would produce a more distressed MMPI-2-RF profile compared to a matched sample of male soldiers with a non-ideating female partner.
- **(2)** Female partners of ideating male soldiers would produce a more distressed MMPI-2-RF profile compared to a matched sample of female partners of non-ideating male soldiers.

Method

Data were collected as part of the Readiness and Resilience in National Guard Soldiers (RINGS-2) study, a prospective, longitudinal study of National Guard Brigade Combat Team soldiers deployed to Iraq/Kuwait in 2011-2012 and their partners. Soldiers and partners were administered the MMPI-2-RF approximately 3 months post-deployment.

Participants were 32 male soldiers (16 with ideating female partners; 16 with non-ideating female partners who were matched on age, race, and relationship length) and 58 female partners (29 with ideating male soldiers; 29 with non-ideating male soldiers who were matched on age, race, and relationship length).

Male soldiers were 100% Caucasian. The age of male soldiers ranged from 23-46 (M = 34.16), and relationship length ranged from 6 months - 24 years (M = 10.30). Female partners were 93.2% Caucasian, 3.4% Asian, and 3.4% Other. The age of female partners ranged from 19-53 (M = 32.36), and relationship length ranged from 6 months-31 years (M = 9.55).

Method Continued

Ideation status: Endorsing ≥ 1 item on the MMPI-2-RF SUI scale.

Distress: MMPI-2-RF scale score on demoralization (RCd).

Exploratory between group comparisons of all MMPI-2-RF scales were conducted to assess for other scale differences and to inform future research.

Results

MMIP-2-RF Scales	*M:* Male Soldiers of Partner Ideators	*M:* Male Soldiers of Partner Non-Ideators	*p*-value	Partial Eta Squared	*M:* Female Partners of Soldier Ideators	*M:* Female Partners of Soldier Non-Ideators	*p*-value	Partial Eta Squared
Somatic/Cog Dys.								
RC1	8.13	4.00	0.012	0.19	3.62	3.52	0.902	0.00
MLS	**3.13**	**1.44**	**0.003**	**0.26**	1.48	2.17	0.097	0.05
GIC	0.69	0.13	0.056	0.12	0.17	0.76	0.014	0.10
HPC	1.94	0.81	0.045	0.13	1.24	0.59	0.052	0.07
NUC	2.81	1.44	0.056	0.12	0.93	0.72	0.527	0.01
COG	3.13	2.13	0.221	0.05	0.79	1.52	0.065	0.60
Emotional Dys.								
EID	7.75	6.31	0.473	0.02	7.17	9.90	0.119	0.04
RCd	4.25	4.13	0.926	0.00	3.21	4.90	0.125	0.04
RC2	3.81	2.75	0.284	0.04	2.97	4.10	0.071	0.06
RC7	4.88	3.94	0.522	0.01	3.90	4.83	0.302	0.02
HLP	0.81	0.44	0.208	0.05	0.45	0.62	0.389	0.01
SFD	0.63	0.63	1.000	0.00	0.76	1.24	0.167	0.03
NFC	1.88	1.69	0.722	0.00	2.07	2.21	0.777	0.00
STW	3.19	2.13	0.083	0.10	2.41	2.66	0.586	0.01
AXY	0.94	0.44	0.131	0.07	0.28	0.45	0.330	0.02
ANP	2.88	1.38	0.024	0.16	1.21	1.69	0.271	0.02
BRF	0.56	0.13	0.077	0.10	0.45	0.79	0.161	0.04
MSF	1.00	1.44	0.417	0.02	3.55	2.55	0.051	0.07
INTR	6.81	6.31	0.722	0.00	5.97	7.21	0.218	0.03
NEGE	6.56	4.38	0.046	0.13	5.17	5.93	0.360	0.02
Thought Dys.								
THD	1.38	1.50	0.855	0.00	1.07	0.97	0.780	0.00
RC6	1.06	1.06	1.000	0.00	0.59	0.66	0.777	0.00
RC8	2.06	2.06	1.000	0.00	1.14	1.03	0.796	0.00
PSYC	1.56	1.63	0.933	0.00	1.17	1.31	0.719	0.00
Behavioral								
BXD	6.19	6.00	0.884	0.00	2.31	3.24	0.191	0.03
RC4	5.13	4.18	0.809	0.00	2.24	3.21	0.162	0.04
RC9	11.44	9.13	0.170	0.06	5.90	5.79	0.909	0.00
JCP	1.44	1.81	0.522	0.01	0.52	0.76	0.328	0.02
SUB	1.19	0.81	0.403	0.02	0.55	0.86	0.269	0.02
AGG	2.13	1.56	0.359	0.03	0.31	0.76	0.031	0.08
ACT	2.31	2.19	0.863	0.00	1.55	1.31	0.548	0.01
AGGR	9.75	8.81	0.420	0.02	5.97	5.41	0.481	0.01
DISC	8.19	7.94	0.834	0.00	3.10	3.97	0.256	0.02
Interpersonal								
RC3	7.44	5.25	0.092	0.09	3.45	3.93	0.536	0.01
FML	**2.63**	**1.19**	**0.024**	**0.16**	**1.62**	**1.55**	**0.857**	**0.00**
IPP	3.31	2.63	0.341	0.03	4.52	4.45	0.920	0.00
SAV	3.88	3.38	0.626	0.01	2.90	3.59	0.333	0.02
SHY	1.63	1.00	0.315	0.03	2.24	2.03	0.710	0.00
DSF	0.88	0.88	1.000	0.00	0.10	0.35	0.064	0.06
Interests								
AES	0.75	1.25	0.341	0.03	2.00	1.86	0.735	0.00
MEC	5.25	5.13	0.886	0.00	1.14	1.07	0.822	0.00

Results Continued

Analysis of Variance (ANOVA) was used to assess for differences in RCd and other MMPI-2-RF subscales between (a) male soldiers with ideating female partners and male soldiers with non-ideating female partners; and (b) female partners of ideating male soldiers and female partners of non-ideating male soldiers. Analyses were also conducted using Mixed Modeling to account for potential couple effects, and an identical pattern of results was found. Additionally, no couple level effects were found. Results presented in the table are from the ANOVA analyses. Family-wise correction was used to account for multiple analyses.

Contrary to hypotheses, partners of suicide ideators (male or female) did not report higher levels of distress (RCd) on the MMPI-2-RF compared to partners of non-suicide ideators (male or female).

Exploratory analyses revealed that male soldiers with ideating female partners scored significantly higher on malaise (MLS) compared to male soldiers with non-ideating female partners, $F(1,30) = 10.40$, $p = 0.003$, *partial eta squared*= 0.26.

At the trend level, male soldiers with ideating female partners scored higher on family problems (FML) compared to soldiers with non-ideating partners, $F(1,30) = 5.62$, $p = 0.024$, *partial eta squared*= 0.16, whereas there was no difference between female partners of ideating male soldiers and female partners of non-ideating soldiers on family problems.

No other significant differences were found for male soldiers or female partners based on whether they were partnered with an ideator or not.

Discussion

Males and females who were partnered with a suicide ideator did not endorse significantly higher levels of distress on the MMPI-2-RF compared to those who were partnered with a non-ideator.

Male soldiers with ideating female partners scored significantly higher on malaise compared to male soldiers with non-ideating female partners, suggesting that men may express this distress physically.

Trending results on the family problems scale suggest is possible that female suicide ideators are more apt to talk about their distress with their partners, whereas male suicide ideators may be more apt to keep distressing thoughts and feelings to themselves. Such communication patterns may impact whether and the extent to which one's ideation status affects a close other.

Results should be interpreted with caution due to exploratory nature of analyses, low power, and multiple comparisons.

Future research would benefit from using a larger sample to better evaluate gender-specific effects. If replication produces similar results, it would suggest that increased physical complaints may be an indicator of distress among men who have ideating female partners.

Relationship between Neuropsychological Functioning and Personality

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INTRODUCTION

The Personality Psychopathology Five (PSY-5r) scales of the Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2 RF; Tellegen & Ben-Porath, 2008) provide individuals' relative standing on five personality dimensions: Aggressiveness (AGGR-r), Disconstraint (DISC-r), Psychoticism (PSYC-r), Negative Emotionality/Neuroticism (NEGE-r), and Introversion/Low Positive Emotionality (INTR-r). These scales were developed to blend clinical and normal perspectives of personality and are conceptually linked to other personality trait models, such as the Five Factor Model (Trull et al., 1995; Egger et al., 2003) and Tellegen's MPQ scales (Harkness et al., 1995). They are thought to represent stable properties of emotional systems (AGGR-r, DISC-r, NEGE-r, INTR-r) or disconnection from reality (PSYC-r).

If these scales assess stable properties, we should examine their relationships with cognitive functioning so this can be factored into interpretations of neuropsychological profiles.

The Present Study

- **Aim 1:** Examine the overall relationship between self-rated personality (MMPI-2 RF PSY-5r scales) and performance on neurocognitive tasks.
- **Aim 2:** Examine these relationships for groups diagnosed with psychiatric and neurocognitive disorders.

Hypothesized Relationships → Given that INTR-r, and to some extent NEGE-r, assess aspects of depression, we might expect them to relate to deficits in complex attention/working memory, learning/memory, executive functions, and processing speed (e.g., Gualtieri, Johnson, & Benedict, 2006). Since anxiety also relates to processing speed, working memory, and learning/memory deficits (e.g., O'Toole & Pedersen, 2011), NEGE-r is expected to relate to these aspects of cognition. Additionally, some research suggests weaker working memory with higher levels of introversion (e.g., Lieberman, 2000), indicating a possible relationship between INTR-r and this cognitive domain. Finally, individuals with psychotic spectrum disorders can experiences deficits in processing speed, attention, learning/memory, and executive functions (e.g., Bilder et al., 2000; Mesholam-Gately et al., 2009; Saykin et al., 1994). Thus, the PSYC-r scale may relate to these cognitive difficulties. Given that the personality construct assessed by DISC-r is similar to the behaviors and experiences seen in individuals with executive dysfunction (e.g., Stanford, Greve, & Gerstle, 1997), it may correlate with this cognitive domain. A literature review revealed no clear hypothesized relationships between instrumental aggression (which AGGR-r measures) and neuropsychological functioning. While executive dysfunction may relate to reactive aggression (Brower & Price, 2001; Hoaken et al., 2003), this will likely not be captured by the AGGR-r scale. As such, exploratory analyses will be conducted with AGGR-r without *a priori* hypotheses.

METHOD

Procedure → Record review of all veterans who completed neuropsychological evaluations from late March 2015 to mid-April 2016 (848 reviewed). Of those, 335 were excluded due to invalid neuropsychological profiles (n=228), MMPI-2 RF validity scales (n=35), both (n=18), or unavailable performance validity scores (n=54). There were no statistically significant differences in demographic data between excluded and included participants.

Final Sample → 513 veterans. Of those, 205 had completed the MMPI-2 RF. Individuals who completed MMPIs were more likely to be younger, female, have psychiatric diagnoses (pre- and post-evaluation), have no neurocognitive diagnosis, and have fewer deficits in processing speed, working memory, language, verbal and visual learning/memory, and executive functioning.

Participant Characteristics

	MMPI n=205	No MMPI n=308
Age - M (SD)	52.8 (14.8)	69.0 (11.9)
Sex (% male)	89.8%	97.1%
Race/Ethnicity		
Caucasian	92.6%	95.8%
African-American	4.9%	1.9%
Latino(a)	0.5%	1.6%
Native American	1.5%	0.6%
Asian-American	0%	0%
Multiracial	0.5%	0%
Education – M (SD)	13.5 (2.5)	13.4 (2.5)
Handedness (% Right)	92.2%	92.5%
Service Connection-M (SD)	57.1 (32.7)	49.1 (35.4)
Diagnoses		
Major Neurocognitive	4.4%	27.9%
Mild Neurocognitive	29.3%	38.3%
Depression	40.5%	24.7%
Anxiety	32.7%	11.9%
Bipolar	3%	3.2%
Psychotic Spectrum	2.5%	0.6%
Somatic	11.2%	0.3%
Personality Disorder	8.3%	1.2%
ADHD	6.4%	3.2%
Learning Disorder	4.4%	3.2%
Substance Use	14.6%	8.8%

Hierarchical Regression – PSY-5r Predicting Language Performance

Dependent Variable: Language Domain Mean T-score	NEGE-r		INTR-r		DISC-r		AGGR-r		PSYC-r	
	β	p	β	p	β	p	β	p	β	p
Step 1										
Gender	-.061	.443	-.053	.509	-.052	.530	-.064	.429	-.055	.477
Education	-.010	.895	-.008	.915	-.003	.974	-.009	.914	-.023	.771
PSY-5r T-score	-.089	.257	.052	.513	.034	.678	-.014	.867	-.183	.019
Step 2* - PSY-5r & Diagnoses										
PSY-5r T-score	-.101	.195	-.016	.856	.058	.485	.053	.507	-.130	.108
Neurocognitive	-.237	.003	-.263	.004	-.230	.004	-.236	.003	-.227	.005
Depression	.034	.670	.025	.776	.022	.784	.029	.715	.028	.723
Anxiety	-.051	.510	-.061	.440	-.058	.458	-.066	.401	-.040	.612
Bipolar	-.272	.001	-.284	.000	-.287	.000	-.288	.000	-.273	.001
Psychotic	-.158	.040	-.166	.031	-.172	.027	-.165	.032	-.121	.137
Somatic	.034	.667	.034	.662	.038	.629	.038	.625	.028	.723
Personality Dsx.	.145	.065	.128	.099	.121	.120	.129	.095	.130	.092
ADHD	-.036	.641	-.031	.689	-.039	.625	-.034	.661	-.029	.708
Learning Dsx.	-.017	.827	-.015	.849	-.016	.837	-.020	.800	-.021	.784
Substance Dsx.	-.027	.732	-.020	.797	-.030	.711	-.020	.800	-.018	.818

*For brevity, only variables of interest and those with significant findings (p≤.001; denoted by shading) were reported for Step 2. Note: Age is accounted for in normative T-scores for neuropsychological performances.

Remaining analyses included only veterans who had complete neuropsychological and MMPI data (n=205).

- Pearson correlations were not significant at the $p<.001$ level (Bonferroni correction) both when analyzing neuropsychological data using T-scores and severity ratings.
- In hierarchical regressions, PSY-5 scores did not significantly predict neuropsychological performance at $p<.001$. A trend was noted for INTR-r predicting executive dysfunction ($p=.005$).
- When accounting for PSY-5r scores, neurocognitive diagnosis significantly predicted neuropsychological performance for processing speed, working memory, verbal and visual learning/recall, and executive functioning ($p\leq.001$). Bipolar disorder diagnosis significantly predicted lower language performance. Trends were noted for psychotic disorder predicting lower visual recall ($p=.003$-$.005$), bipolar disorder predicting lower verbal recall ($p=.008$), and anxiety disorder predicting lower working memory ($p=.009$).

CONCLUSIONS

- The present study suggests individuals with greater cognitive dysfunction are less likely to be given long questionnaires (e.g., MMPI-2 RF), to assess psychological and personality functioning. While this may be assessed using interviews or shorter face-valid questionnaires (e.g., BDI/BAI), these tools provide little-to-no assessment of the validity of self-reported endorsements. Some neurocognitive difficulties (e.g., receptive aphasia) preclude assessment by questionnaire. However, since neurocognitive disorders frequently include psychiatric symptoms, future study is needed to determine whether individuals with significant cognitive dysfunction can reliably complete the MMPI-2 RF.
- Personality factors, as measured by PSY-5r scales, did not relate to or predict objective neurocognitive performance. This aligns with prior research, which generally does not show significant relationships between self-reported functioning and objective neurocognitive performance (French et al., 2014). However, given the high number of analyses, these results should be replicated with a larger sample.
- Certain psychiatric diagnoses predicted neurocognitive performance (or trended toward significance), suggesting assessment of psychological difficulties should be routinely examined when interpreting neuropsychological ability.

References – Available upon request

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Are Neurocognitive and Psychiatric Diagnoses Associated with PM&R Treatment Utilization Among Veterans with TBI?

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Introduction

Prediction of treatment utilization is an important topic in light of the cost of health care in the United States. Completed visits, as well as canceled and unattended sessions ("missed opportunities"), can impact health care cost and clinical outcomes (Keeley, Cardin & Gonzalez, 2014). Given the significant cost of interdisciplinary rehabilitation approaches (Andelic et al., 2014), prediction of treatment utilization is particularly relevant in PM&R settings. Although veterans referred for neuropsychological evaluation in PM&R settings are often diagnosed with multiple physical and/or psychiatric conditions, literature regarding interdisciplinary rehabilitation treatment utilization (e.g., PM&R), as it relates to neurocognitive and psychiatric diagnoses, is limited. Psychiatric disorders among veterans with TBI do not fully account for the difference in health care costs between those with and without TBI diagnoses (Drag et al., 2013), suggesting a possible interaction between cognitive and psychiatric diagnoses. The current study aimed to: 1. Explore the effects of neurocognitive and psychiatric disorders on engagement in interdisciplinary rehabilitation (i.e., PM&R completed visits and "missed opportunities") among veterans with TBI. 2. Investigate the interaction between neurocognitive and psychiatric disorders in predicting treatment engagement. 3. Examine the relationship between diagnostic complexity (i.e., presence of a neurocognitive disorder and multiple psychiatric diagnoses) and treatment engagement.

Methods

Design: Cross-sectional. Data were obtained from a VA Polytrauma Rehabilitation Center (PRC)/TBI site. Specifically, data were collected locally for a quality improvement database (QI), which included diagnostic information based on a neuropsychological evaluation (NPE, i.e., not historical information or rule-out diagnoses). The database was comprised of veterans with a history of TBI who underwent a NPE within the PM&R service line (N = 238). Data were collected for the QI project, and IRB approval was obtained for research purposes.

Setting: A large, Midwestern, VA PRC site that provides comprehensive interdisciplinary rehabilitation for patients with traumatic brain injury and polytraumatic injuries. Data from veterans and active duty service members sustaining TBI ranging from mild to severe were included.

Measures: All data were taken from the QI database. Data for the QI database were collected from participant's charts and included diagnostic and demographic information, TBI severity information, and PM&R visit data, which included completed/"check out" visits, cancellations, and "no show" appointments. Cancellations and "no shows" were combined to create the "missed opportunity" variable.

Results

Demographic Information	
Gender (N= 266)	Male: N = 251 (94.4%) Female: N = 15 (5.6%)
Age (N = 266)	M = 43.88 (SD = 15.48)
Education (N = 266)	M = 13.13 (SD = 1.93)
TBI severity (N = 189)	Mild: N = 189 (71.1%) Moderate-to-Severe: N = 77 (28.9%)
Presence of neurocognitive disorder (NCD) diagnosis	No: N = 103 (46.4%) Yes: N = 119 (53.6%)
NCD severity	None: N = 103 (75.7%) Mild NCD: N = 22 (16.2%) Major NCD: N = 11 (8.1%)
Presence of a mental health (MH) diagnosis	No: N = 53 (19.9%) Yes: N = 212 (79.7%)
Number of MH diagnoses	M = 1.39 (SD = 1.03)
PM&R completed visits	M = 35.87 (SD = 86.71)
PM&R "missed opportunities"	M = 14.96 (SD = 24.45)

To examine the relationship between neurocognitive disorder (NCD) diagnoses, mental health (MH) diagnoses, and PM&R utilization, four hierarchical regressions were performed using PM&R completed visits and "missed opportunities" as dependent variables.

1. The presence of an NCD and MH diagnosis significantly predicted 3.5% of the variance in PM&R completed visits , $F(2, 217) = 3.97$, $p = 0.02$. The interaction term did not predict significant additional variance ($p > 0.05$). In the final model, only the presence of an NCD diagnosis predicted significant unique variance (*beta* = 0.19, $p < 0.01$).
2. The presence of an NCD and MH diagnosis significantly predicted 4% of the variance in PM&R "missed opportunities," $F(2, 217) = 4.49$, $p = 0.01$. The interaction term did not predict significant additional variance ($p > 0.05$). In the final model, only the presence of an NCD diagnosis predicted significant unique variance (*beta* = 0.20, $p < 0.01$).
3. NCD severity and MH complexity significantly predicted 1.2% of the variance in PM&R completed visits among patients with a neurocognitive disorders , $F(2, 131) = 8.91$, $p < 0.01$. The interaction term did not predict significant additional variance ($p > 0.05$). In the final model, only NCD severity significantly predicted unique variance (*beta* = 0.35, $p < 0.01$)
4. NCD severity and MH complexity significantly predicted 1.4% of the variance in PM&R "missed opportunities," $F(2, 131) = 11.03$, $p < 0.01$. The interaction term did not predict significant additional variance ($p > .05$). In the final model, only NCD severity significantly predicted unique variance (*beta* = 0.38, $p < 0.01$).

PM&R Completed Visits				
Hypothesis #1	R^2	*F*-Value	β	*p*
Step 1:	0.35	3.97		**<.05**
NCD Dx (Y/N)			0.19	**<.05**
MH Dx (Y/N)			0.03	.69
Step 2:	0.37	2.73		0.05
NCD Dx (Y/N)			0.11	0.48
MH Dx (Y/N)			-0.02	0.85
Interaction			0.09	0.59
R^2 Change	0.00			0.59

PM&R Missed Opportunities				
Hypothesis #2	R^2	*F*-Value	β	*p*
Step 1:	0.40	4.49		**<.05**
NCD Dx (Y/N)			0.20	**<.05**
MH Dx (Y/N)			0.05	0.43
Step 2:	0.40	2.99		**<.05**
NCD Dx (Y/N)			0.16	0.31
MH Dx (Y/N)			0.03	0.78
Interaction			0.04	0.81
R^2 Change	0.00			0.81

PM&R Completed Visits				
Hypothesis #3	R^2	*F*-Value	β	*p*
Step 1:	0.12	8.91		**<.05**
NCD Severity			0.35	**<.05**
MH Dx (number)			0.03	0.76
Step 2:	0.14	7.12		**<.05**
NCD Severity			0.55	**<.05**
MH Dx (number)			0.11	0.26
Interaction			-0.26.	0.07
R^2 Change	0.02			0.07

PM&R Missed Opportunities				
Hypothesis #4	R^2	*F*-Value	β	*p*
Step 1:	0.14	11.03		**<.05**
NCD Severity			0.38	**<.05**
MH Dx (number)			0.07	0.39
Step 2:	0.16	8.04		**<.05**
NCD Severity			0.53	**<.05**
MH Dx (number)			0.13	0.15
Interaction			-0.19	0.17
R^2 Change	0.01			0.17

Discussion

Within a VA Polytrauma sample, the presence of a neurocognitive disorder diagnosis (NCD) was significantly associated with PM&R completed visits and missed opportunities. In addition, NCD severity significantly predicted PM&R completed visits and missed opportunities. Neither the presence nor the number of mental health diagnoses significantly predicted PM&R treatment utilization. We did not find a significant interaction between mental health and neurocognitive diagnoses. The effect of NCD on PM&R treatment utilization is intuitive but should be replicated in samples with more participants with moderate-to-severe TBI as this is a novel area of investigation. The lack of a relationship between mental health diagnoses and PM&R treatment utilization was unexpected given previous literature, suggesting potential methodological differences across studies. Several factors limit the interpretation of these results (e.g., cross-sectional study, preponderance of participants with mTBI; limited NCD presence and NCD severity data, resulting in unequal sample sizes across analyses; small sample of participants with major NCD; potentially underpowered NCD Severity analyses). Nevertheless, this study offers preliminary information regarding the relationship between neurocognitive and mental health diagnoses in predicting PM&R service utilization, including "missed opportunities." Exploration of the impact of specific mental health diagnoses may be informative future steps.

Neurobehavioral Symptom Inventory (NSI) Cognitive Items Do Not Predict Cognitive Dysfunction

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AACN American Academy of Clinical Neuropsychology

Introduction

The Neurobehavioral Symptom Inventory (NSI; Cicerone & Kalmar, 1995), a self-report measure of postconcussive symptoms, is part of the VA's Comprehensive Traumatic Brain Injury Evaluation (CTBIE). Recent work by French et al. (2014) concluded endorsement of NSI items intended to assess cognitive dysfunction (inattention, forgetfulness, slowed thinking/disorganization) do not reliably predict impairment on objective neuropsychological measures. Rather, NSI cognitive item endorsement was better accounted for by psychiatric distress as measured by the Personality Assessment Inventory (PAI).

The current study aimed to: (1) determine if similar findings would be observed on additional neuropsychological measures and the Minnesota Multiphasic Personality Inventory-2 – Restructured Form (MMPI-2-RF; Tellegen & Ben-Porath, 2008) and (2) delineate between veterans performing below, at, and above expectation on objective testing. It was hypothesized that self-reported cognitive dysfunction on the NSI would significantly correlate with psychiatric distress while self-reported cognitive functioning would have minimal association with measureable neuropsychological dysfunction.

Methods

This study utilized archival data from veterans who completed a Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher et al., 2001) and a neuropsychological evaluation within one year of NSI/CTBIE administration. MMPI-2 responses were transformed to MMPI-2-RF raw and scaled scores. Neuropsychological tests measuring the cognitive functions described by the NSI cognitive items were selected for statistical comparison (see Results table).

Data were collected from February 2007 to August 2015 and the final sample included 70 veterans. Veterans who self-reported a moderate/severe TBI or produced a content nonresponsive MMPI-2-RF profile (i.e., VRIN-r ≥ 80 or TRIN-r ≥ 80) were excluded. Data from 13 veterans who performed below accepted cutoffs on neuropsychological measures of performance validity were analyzed separately.

Correlations were employed to examine the relationship between NSI cognitive items and neuropsychological performances as well as MMPI-2-RF scales (see Results table). Performances on relevant neuropsychological measures were averaged to calculate an overall index of functioning. This was compared to the veteran's self-reported functioning in each domain.

Demographic Information	
Age – Mean (*SD*)	31.4 (8.5)
Years of Education – Mean (*SD*)	12.7 (1.5)
Sex M/F (% male)	67/3 (96%)
Time Between NSI & MMPI-2 Administration in Days – Mean (SD)	96.0 (87.0)
Race/Ethnicity	
Caucasian (%)	56 (74%)
Hispanic/Latino	2
African-American	1
Asian	2
American Indian/Alaskan Native	9

Results

Performances on Neuropsychological Measures and NSI Cognitive Item Endorsement (Spearman's ρ)

Neuropsychological Measure	NSI Cognitive Item		
	Attention	Memory	Processing Speed/Organization
Trails A	-0.12	-	-
WAIS-IV Digit Span	-0.10	-	-
WAIS-IV Arithmetic	0.17	-	-
Verbal Learning	-	0.09	-
Verbal Memory	-	-0.03	-
Visual Learning	-	-0.07	-
Visual Memory	-	-0.18	-
Stroop Word	-	-	**-0.34**
Stroop Color-Word	-	-	-0.25
Trails B	-	-	**-0.28**
WCST – Perseverative Errors	-	-	-0.06

Bolded values indicate p<0.05

Correlations between NSI cognitive items and relevant neuropsychological measures were generally small (inattention: 0.07-0.17; forgetfulness: 0.03-0.18) with the exception of slowed thinking/disorganization which evidenced larger correlations with Stroop subtests (0.25-0.34) and Trails B (0.28). Similarly, a linear regression indicated NSI thinking/disorganization rating predicted processing speed performance (p = .000), while inattention and forgetfulness ratings did not (p > .05). NSI cognitive items were generally more highly correlated with MMPI-2-RF scales measuring internalizing dysfunction, somatic/cognitive concerns, and perceived helplessness (attention: 0.28-0.42; forgetfulness: 0.21-0.34; slowed thinking/disorganization: 0.18-0.42). With regard to NSI cognitive items' predictive utility, only 4-12% of veterans reporting significant cognitive dysfunction exhibited scores in the impaired range on objective testing, while the majority exhibited intact (70-85%) or above average (10-26%) performances.

MMPI-2-RF and NSI Cognitive Item Endorsement (Spearman's ρ)

MMPI-2-RF Scale	NSI Cognitive Item		
	Attention	Memory	Processing Speed/Organization
RCd	**0.30**	0.20	**0.28**
RC1	**0.30**	**0.27**	0.18
RC2	**0.42**	**0.28**	**0.40**
RC7	**0.28**	**0.30**	0.25
MLS	**0.40**	**0.32**	**0.42**
NUC	0.16	0.24	0.08
COG	0.38	0.28	0.22

Bolded values indicate p<0.05

Crosstab of Overall Neuropsychological Functioning and Self-Reported Cognitive Dysfunction on the NSI

Neuropsychological Performance Index	Self-Reported Impairment on NSI	
Attention	None – Mild	Moderate - Severe
Above Average (>75%)	2 (3%)	7 (12%)
Intact (16-74%)	6 (11%)	36 (63%)
Impaired (<16%)	0 (0%)	6 (11%)
Memory	None – Mild	Moderate - Severe
Above Average (>75%)	0 (0%)	14 (24%)
Intact (16-74%)	3 (5%)	38 (67%)
Impaired (<16%)	0 (0%)	2 (3%)
Processing Speed/Organization	None – Mild	Moderate - Severe
Above Average (>75%)	3 (5%)	4 (7%)
Intact (16-74%)	15 (26%)	33 (58%)
Impaired (<16%)	0 (0%)	2 (3%)

Discussion

Consistent with previous research, self-reported cognitive complaints generally evidenced little relation to performance on objective neuropsychological measures. Individuals reporting significant cognitive dysfunction were actually more likely to exhibit strong cognitive performances as opposed to notable cognitive impairment in the domain in question. Self-reported cognitive complaints were generally more strongly related to endorsements of internalizing dysfunction and somatic/cognitive complaints.

These findings highlight the limited utility of individual's self-reported cognitive functioning in predicting observable cognitive dysfunction. Neuropsychologists can offer a valuable service to individuals undergoing assessment for a history of mild traumatic brain injury by clarifying their objective cognitive functioning and, when appropriate, accounting for the presence of significant psychiatric distress.

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MMPI-2-RF Scales and Inpatient Treatment Outcome

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INTRODUCTION

- The MMPI-2-RF contains validity scales which capture an individual's approach to the assessment, as well as substantive scales that assess personality and symptom dimensions. Researchers have theorized that MMPI-2-RF scales can be used to predict how an individual will engage in treatment[1,2,3]. However, there is little empirical data regarding this theory, and the majority has been conducted on outpatient samples. Thus far, there is one study examining MMPI-2-RF validity scales, which found that respondents with higher scores on TRIN-r and Fp-r had increased risk of premature termination in an outpatient setting[4]. Regarding MMPI-2-RF substantive scales, previous research has found that higher scores on RC3 predicted lower likelihood of seeking treatment[5], higher JCP predicted premature termination, and higher JCP and BXD predicted number of no-shows[6]. Additionally, higher externalizing predicted failure to complete drug treatment[7]. More research is needed to further define these relationships and to extend them to other settings.
- Accordingly, the current study focuses on the relationship between MMPI-2-RF scales and treatment outcomes in an inpatient sample. We hypothesized that higher scores on certain Validity scales (i.e., CNS, TRIN-r, VRIN-r, F-r, Fp-r, Fs, FBS-r, RBS-r) would predict a poorer course of hospitalization. We also expected that scales related to externalizing pathology would predict a poorer course. Although previous research associated these scales with earlier discharge in an outpatient setting, we tested whether these relationships extend to an inpatient setting, where the individual may have less control over leaving treatment.

METHODS

- Participants were 1,401 veterans who were psychiatrically hospitalized at the Minneapolis VA Health Care System. Majority were men (n = 1,315; 93.9%) and White (n = 1,218; 86.9%), with a mean age of 47.31 (SD = 13.78)
- Outcome variables from record review include:
  - Course of hospitalization. Rated on 4-point scale from "regressed" to "good".
  - Duration of hospitalization. Measured in days.
  - Disposition. Focused on substance use treatment because we theorized individuals may not engage well in inpatient psychiatric treatment if their treatment needs are related to substance use.
- Procedure used was modeled after Anestis et al[4]. First, analyses examining over- and under-reporting conducted after removing invalid profiles due to content non-responsiveness. Next, analyzed substantive scales after removing profiles deemed invalid for any reason.

CORRELATION RESULTS

	Course	Hospital Duration	SUD Tx Dispo
CNS-r	-.04	.05	-.02
VRIN-r	-.01	.04	.03
TRIN-r	-.05	.03	-.04
F-r	-.07*	.05	.04
Fp-r	**-.11****	.01	.03
Fs-r	-.05	.03	.02
FBS-r	-.01	.07*	-.01
RBS-r	-.00	**.09****	-.01
L-r	-.03	-.03	**-.10****
K-r	.03	.03	-.05

	Course	Hospital Duration	SUD Tx Dispo
RCd	-.02	.06*	.07*
RC1	-.04	.05	-.01
RC2	.02	**.08****	.04
RC3	-.08	-.03	.03
RC4	**-.10****	**-.11****	**.18****
RC6	**-.16****	.06*	-.00
RC7	-.06*	.02	.03
RC8	-.08*	.03	.02
RC9	**-.10****	-.06*	.08**

Note. *p < .05; **p < .01. SUD Tx Dispo = Substance Use Disorder Treatment Disposition. Correlations with Course are Spearman's rho correlations

For full references, see handout.

RESULTS

- Significant correlations were entered into either linear (*duration, disposition*) or logistic (*course*) multiple regression. Non-significant predictors were removed from final equations. Where appropriate, Specific Problem scales were analyzed to further characterize significant relationships with RC scales. Due to low cell counts, the course variable was dichotomized for the regression analyses.
- **Validity Scales**:
  - Fp-r significantly predicted course of hospitalization, B = -.08, Wald = 7.71, p = .005, such that those with higher scores tended to have a poorer course
  - RBS-r significantly predicted hospital duration, part r = .09, p = .001, such that higher scores were associated with a longer hospital stay
  - L-r predicted substance use treatment disposition, part r = -.10, p < .001, such that higher L-r scores were associated with lower likelihood of discharging to substance use treatment
- **Substantive Scales**:
  - When non-significant predictors were dropped, ps > .96, RC4 and RC6 were significantly, negatively related to course of hospitalization, B = -.04, Wald = 4.6, p = .032, B = -.06, Wald = 4.14, p = .042, respectively, with higher scores associated with a poorer course
    - SP scales were examined, JCP and SUB were not significantly related, ps > .10.
  - RC2 positively predicted duration of hospitalization, part r = .15, p < .001; RC4 was negatively related to duration, part r = -.15, p < .001.
    - SP scales were examined, and SUB and JCP were both related to duration, part r = -.07, p = .03, part r = -.07, p = .041, respectively.
  - RC4 positively predicted disposition to a substance use treatment, part r = .21, p < .001.
    - SP scales were examined, and SUB was significantly related, part r = 31, p < .001, whereas JCP was not, p > .47.

CONCLUSIONS

- We extended previous research on the MMPI-2-RF and treatment outcome to an inpatient sample. Though the effect sizes are small, several of the findings are either consistent with previous research or with theory. First, our findings replicate previous work suggesting externalizing difficulties predict poor treatment outcomes. Our findings also suggest that suspiciousness may contribute to difficulties as well. Additionally, SUB predicted substance use treatment disposition, further supporting the predictive validity of this scale. Individuals with high scores on these scales may need additional considerations when presenting for inpatient care. Validity scales were less related to treatment outcome than expected; however, our findings tentatively support the expected relationship between higher Fp-r and a poor course of hospitalization. These results support the ability of the MMPI-2-RF to predict treatment outcome; however, in an inpatient sample with limited opportunity for individual variability, MMPI-2-RF contributions may be smaller. Further research is needed to confirm these findings.

Characterizing Partner Sleep Functioning Over the Course of Military Deployment

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Background

- Although a number of studies indicate that significant life stressors contribute to sleep problems[1], the prospective, longitudinal course of sleep changes associated with such an event remains less known.
- Understanding the course and possible distinct trajectories of sleep complaints among individuals exposed to a stressor may be useful for prevention and targeted intervention.
- Family members of soldiers may be at risk for mental and physical health complaints[2,3]. For example, spouses of soldiers, whose partners were currently deployed, were at increased risk for being diagnosed with a mental health problem, including sleep disturbances, compared to spouses of non-deployed soldiers[4].
- Despite a few compelling theories for why deployment may have a negative impact on partner sleep[5], research in this area is preliminary and cross-sectional, precluding an examination of the course of sleep changes over time and prospective predictors of these changes.

Study Overview

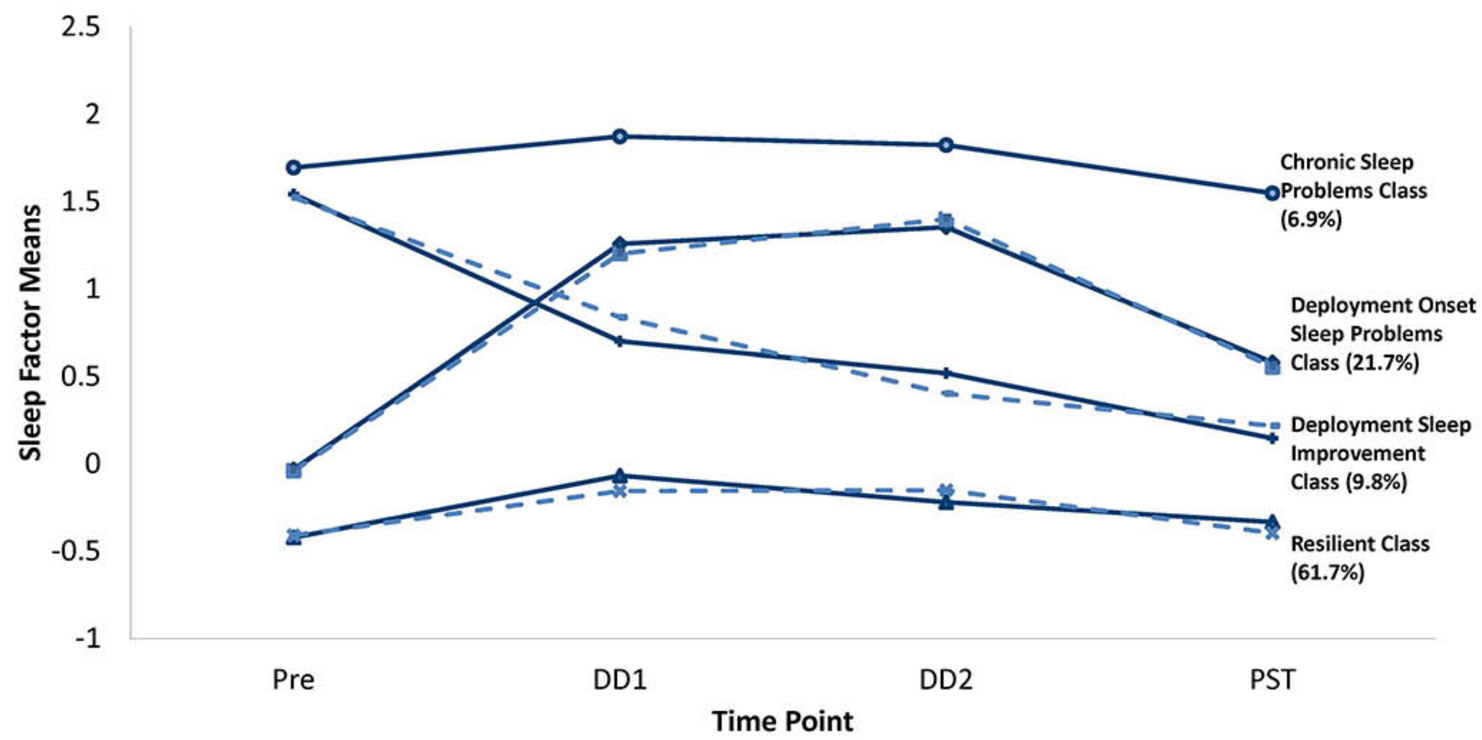
The present study aims to examine:

1. changes in partner sleep over the course of deployment in a cohort of spouses and/or cohabitating partners of deployed Army National Guard Soldiers,
2. investigate possible distinct trajectories of changes in sleep, and
3. examine individual and dyadic predictors of these trajectories, using risk and protective factors related to sleep disturbance

Procedure

- Participants were 686 cohabitating partners or spouses of National Guard Brigade Combat Team soldiers deployed to Iraq/Kuwait in 2011-2012, as part of the Readiness and Resilience in National Guard Soldiers (RINGS-2).
- Recruitment and baseline data collection took place during Family Preparation Academies (FPA), approximately within 3 months of their partners' deployment to Iraq (Time 1). Partners were then mailed paper-and-pencil questionnaires 3 months (Time 2) and 8 months into the deployment (Time 3), and 3 months after the soldiers' return from deployment (Time 4).
- A higher order latent factor of sleep complaints was used. Latent class growth analysis (LCGA), implemented in *Mplus* (version 7)[6] was used for identifying unobserved heterogeneity in patterns of sleep change over time. The derived trajectory class memberships were entered in a series of multinomial logistic regression models to test for the contributions of pre-deployment risk and protective factors.

Figure 1. Trajectories of partner sleep complaints across the deployment cycle



Note. Pre = pre-deployment; DD1 = During Deployment; DD2 = During Deployment Time 2; PST= Post deployment. Solid lines indicate observed sample means and dotted lines indicate the estimated sample means for that class.

Table 1. Multinomial logistic regression of pre-deployment factors predicting partner sleep complaints trajectory

	Deployment Onset Sleep Problems vs. Resilient			Deployment Sleep Improvement vs. Resilient			Chronic vs. Resilient		
Baseline Predictors	B	*p*	OR	B	*p*	OR	B	*p*	OR
Negative Emotionality	.07	.020	1.07*	.18	.001	1.19***	.18	.001	1.20***
Depression	.15	.001	1.16***	.19	.001	1.21***	.24	.000	1.27***
Alcohol Misuse	-.05	.192	.96	.03	.437	1.03	-.04	.452	.97
Relationship Quality	.01	.79	1.01	-.04	.299	.96	-.01	.961	1.00
Negative Communication	.01	.89	1.01	-.11	.19	.89	-.09	.36	.92
Family Stressors	.19	.02	1.21*	.27	.01	1.30**	.35	.01	1.42**

Note. OR = odds ratio; *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$.

Results

- The invariance in measurement of a Sleep Complaints factor overtime was formally tested. Fit statistics indicated the selection of the strong invariance model. The Sleep Complaints factor scores were used in the second-order latent growth model.
- A four-class model provided the best bit and is represented in Figure 1.
- Table 1 displays results for the pre-deployment factors predicting partner sleep complaint trajectories.
- Membership in the chronic, anticipatory-decline, and the vulnerable-risk classes relative to the stable, good sleep class was predicted by negative emotionality (NEGE), depression symptoms, and pre-deployment family stressors.

Summary

- Despite the majority maintaining few sleep complaints, nearly a quarter of the sample reported worsening of sleep complaints during the deployment (22%), suggesting the potential impact of deployment on sleep of at-home partners of soldiers.
- Emotional distress and family stressors are potentially modifiable factors[7] that may be targets of interventions to reduce the risk of developing sleep complaints while soldiers are deployed.
- While this study suggests a diversity of impact of deployment on military partners' sleep, more research is needed to identify additional factors to further distinguish these distinct trajectories.

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The Paths from Antisocial Behavior to PTSD

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VA | U.S. Department of Veterans Affairs

ccdor — Readiness Resilience

Background

Antisocial behavior is associated with elevated risk for PTSD, but specific underlying mechanisms are not well understood. Increased combat exposure and decreased social support may mediate this association among veterans. Antisocial behavior is best conceptualized as two related dimensions, disconstraint and aggressiveness. The former encompasses impulsivity, risk-taking, and rule-breaking, whereas the latter describes an opportunistic and hostile stance towards others. It is unclear how these two dimensions of antisocial behavior relate to PTSD or to the potential mediators of combat exposure and social support.

Hypotheses

1. We predicted that pre-deployment disconstraint and aggressiveness would be associated with post-deployment PTSD.
2. We further expected that increased combat exposure and decreased social support would mediate the effects of pre-deployment disconstraint and aggressiveness on post-deployment PTSD.

Methods

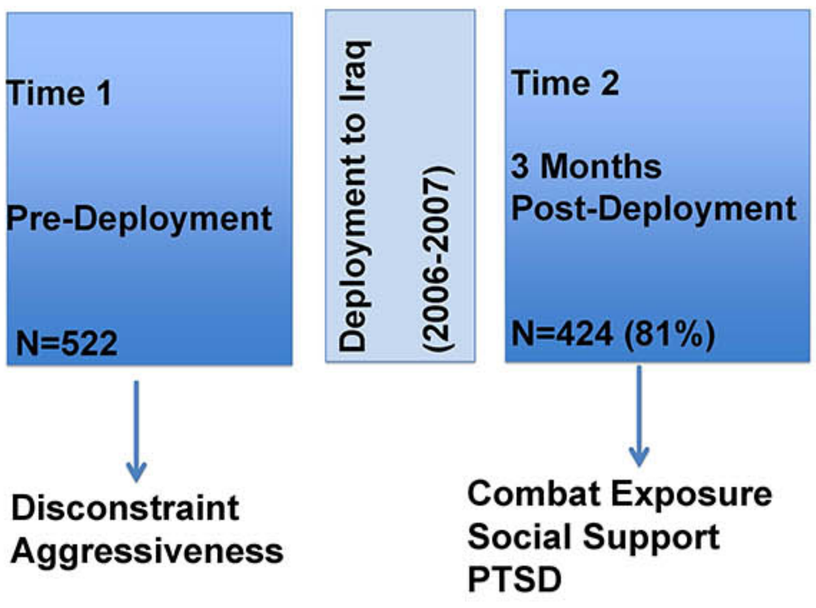
Sample

The sample consisted of 522 participants from the Readiness and Resilience in National Guard Soldiers (RINGS-1) study. Table 1 shows the demographic breakdown of the sample. Figure 1 shows the study design.

Table 1. Sample Demographics

Sex	88.5% male
Age	
Mean	29.1
Standard Deviation (SD)	8.6
Range	18-57
Race	93.9% white

Figure 1. Study Design



Measures

Table 2 lists all constructs, the instruments with which they were measured, the total number of items for each measure, and sample items.

Table 2. List of Measures

Constructs	Instruments	Items	Sample Items
Disconstraint	MMPI-RF PSY-5	16	"I was suspended from school one or more times for bad behavior."
Aggressiveness	MMPI-RF PSY-5	11	"I've been so angry at times that I've hurt someone in a physical fight."
Combat Exposure	DRRI Combat Experiences	16	"I was wounded or injured in combat."
Social Support	DRRI Unit Characteristics	12	"Members of my unit understand me."
	DRRI Post-Deployment Support	15	"I am carefully listened to and understood by family members or friends."
PTSD	PTSD Checklist	17	4 factors: Intrusion, Avoidance, Arousal, and Dysphoria

Analytic Method

We used Structural Equation Modeling (SEM) with maximum likelihood estimation to test all direct and indirect paths from disconstraint and aggressiveness to PTSD. Item parceling was used to create latent variables representing disconstraint and aggressiveness. Social support was modeled by unit support and post-deployment support. Analyses were run in the statistical program MPlus. Missing observations were handled with Full Information Maximum Likelihood modeling.

Results

Table 3. Descriptive Statistics

	Discon	Aggress	Combat Exposure	Unit Support	Post-Deploy Support	PTSD Severity
Mean	8.5	4.3	26.0	39.2	58.8	35.7
SD	2.5	1.9	7.7	11.2	8.4	14.0
Range	2-15	0-10	15-64	12-60	28-75	17-85
Possible Max	16	11	80	60	75	85

Figure 2. SEM Model

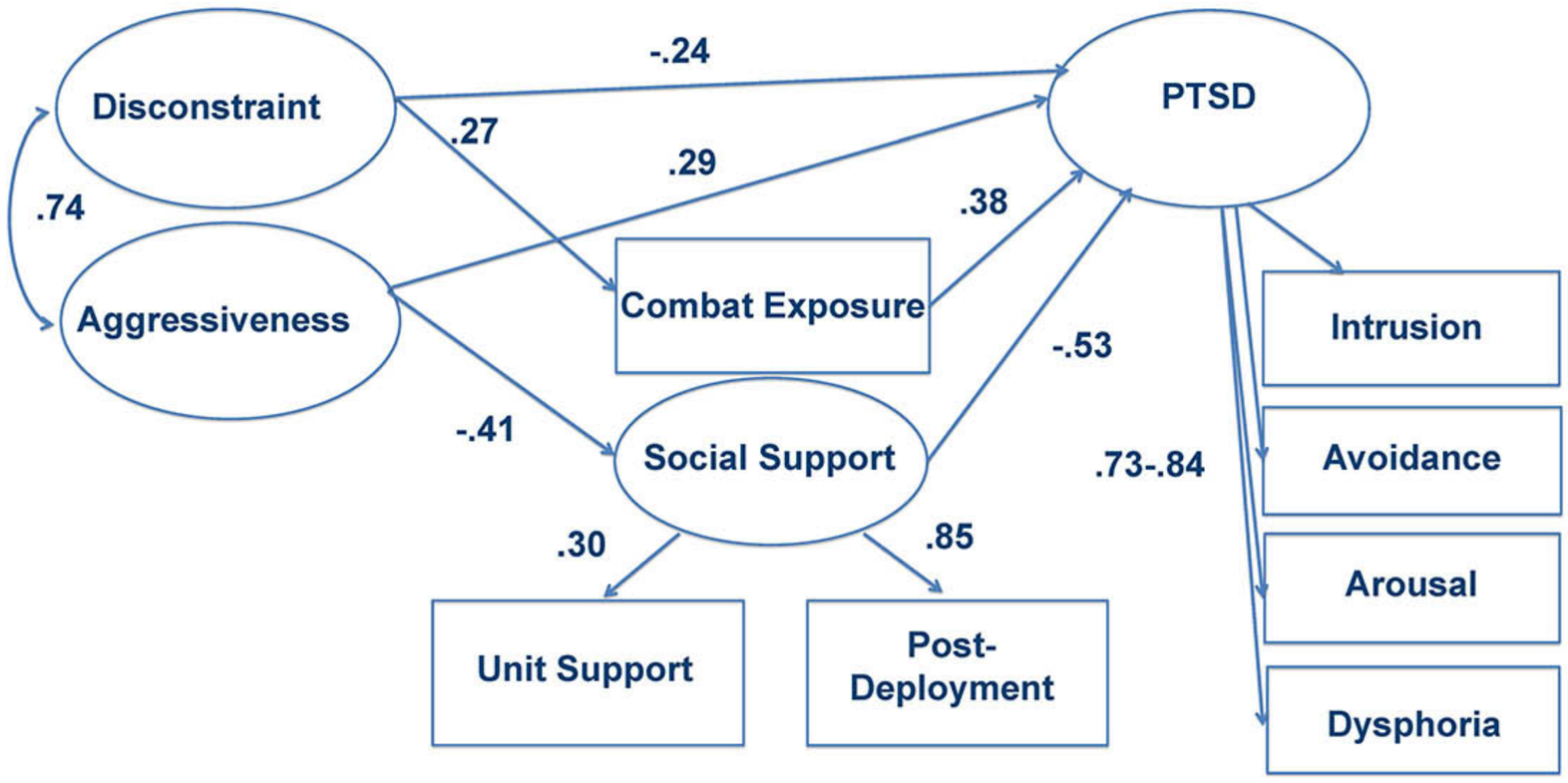


Table 3 shows descriptive statistics for disconstraint, aggressiveness, combat exposure, unit support, post-deployment support, and PTSD severity. Figure 2 shows all significant paths in the SEM model. As is shown, increased combat exposure mediates the association between disconstraint and PTSD, whereas reduced social support mediates the relationship between aggressiveness and PTSD. In addition, direct paths remained from both disconstraint and aggressiveness to PTSD, with aggressiveness predicting greater PTSD and disconstraint predicting reduced PTSD.

Implications

These results clarify the etiology of PTSD in soldiers with antisocial traits and have important implications. Prevention efforts can be tailored to the specific vulnerabilities of soldiers high on either aggressiveness or disconstraint (e.g., an important target may be strengthening the interpersonal skills of soldiers with aggressive tendencies to bolster their social support system).

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Personality Disorder Screening Rates Among National Guard OIF Soldiers and Psychosocial Functioning at Two Years Post-Deployment

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Background

Since 2008, the Department of Defense has faced allegations that military service members were wrongfully discharged with a pre-existing personality disorder (PD) diagnosis instead of a service-related posttraumatic stress disorder (PTSD) or traumatic brain injury diagnosis[1,2]. This allegation may be partially supported by evidence that the prevalence rate of PD in the United States is estimated to be approximately 10%[3,4], yet service members were discharged due to PD at rates between 1% (National Guard) and as high as 29% (Navy)[1]. To date, however, there is limited research on prevalence rates of PD in the military or the influence of PD and personality traits associated with PD on the psychosocial functioning of service members[5].

The Current Study

Aim 1) To assess the prevalence rates of probable PD diagnoses among National Guard Soldiers deployed to Operation Iraqi Freedom (OIF).

Aim 2) To assess the psychosocial functioning of National Guard OIF soldiers who screened positive for probable PD (PD+), compared to those who did not (PD-), 2-3 months post-deployment to OIF and two years later.

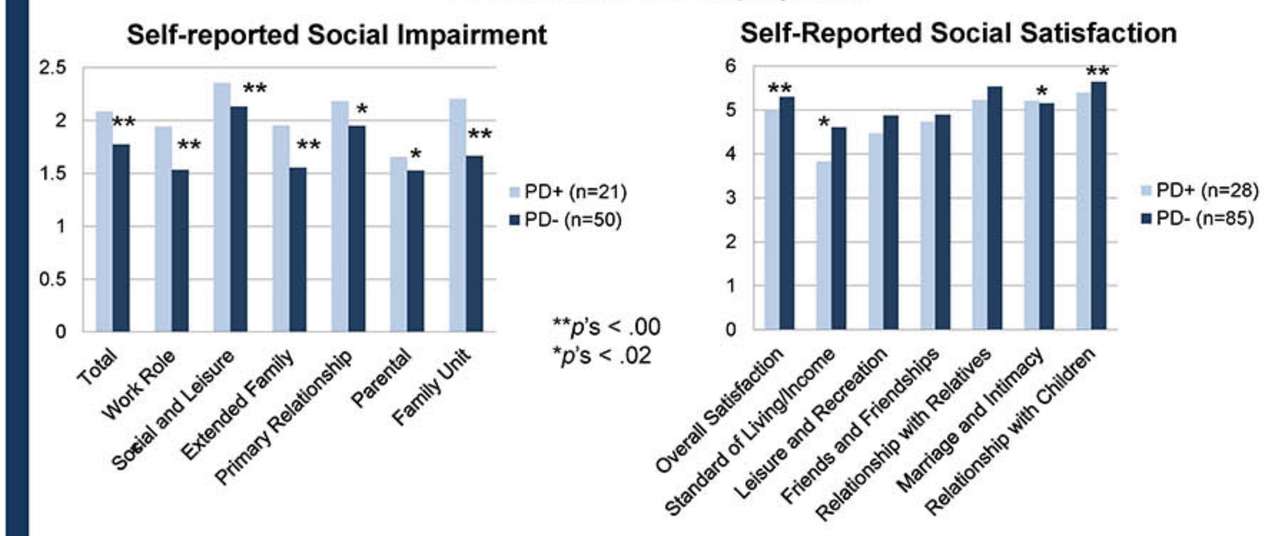
Study Overview

- Readiness and Resilience in National Guard Soldiers (RINGS) study
- Prospective longitudinal design with self-report measures collected 2-3 months post-deployment and 2 years later. Probable PD diagnoses assessed 6-12 months post-deployment.
- Measures:
  - Personality Disorder Screener: *Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II)* screens for probable PD diagnoses of Avoidant, Borderline, Dependent, Histrionic, Narcissistic, Paranoid Schizoid, and Schizotypal as well as Conduct Disorder.
  - Psychiatric Symptoms
    - *Beck Depression Inventory-2 (BDI-2)* assesses depressive symptoms.
    - *Posttraumatic Stress Disorder Checklist – Military Version (PCL-M)* assesses PTSD symptoms related to military experiences.
  - Psychosocial Functioning
    - *Social Adjustment Scale-Self Report (SAS-SR)* assesses social functioning. Higher scores are associated with greater impairment.
    - *Navy Quality of Life Survey (NQoL)* assesses satisfaction with social functioning. Higher scores are associated with greater satisfaction.

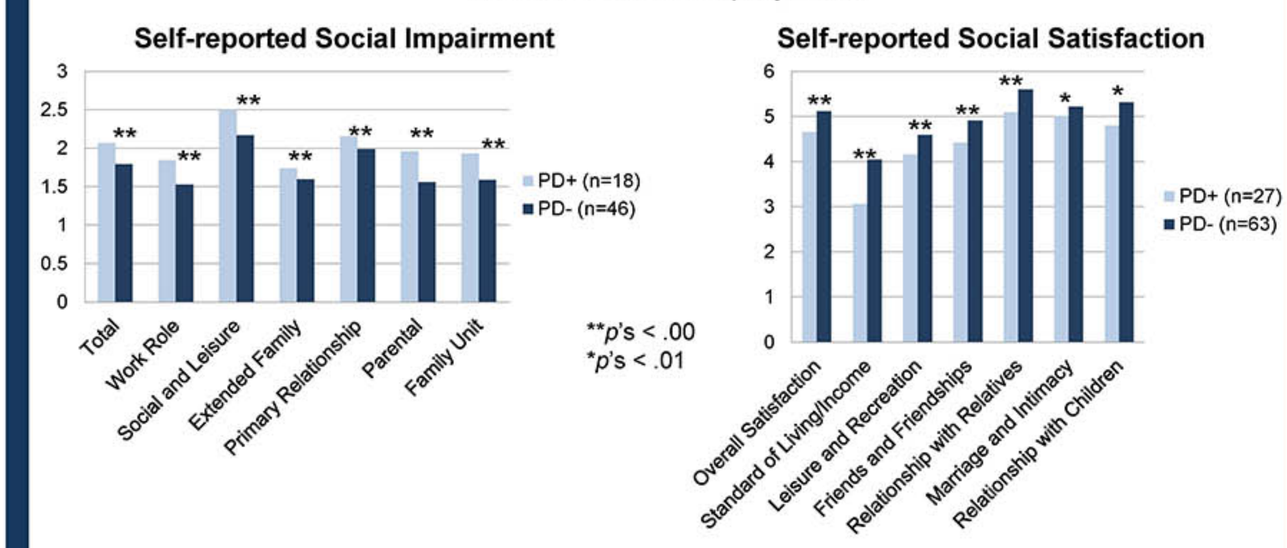
Results: Aim 2

Psychosocial Functioning

2-3 Months Post-Deployment



Two Years Post-Deployment



Results: Aim 1

Table 1: Prevalence rates of probable personality disorder diagnoses among National Guard soldiers deployed to OIF

Probable Personality Disorder Diagnosis	n	%
Avoidant	30	8.6
Borderline	47	14
Conduct Disorder	30	8.6
Dependent	2	0.6
Histrionic	7	2.1
Narcissistic	44	12.9
Paranoid	38	7.3
Schizoid	31	9.2
Schizotypal	4	1.2
Any Diagnosis	107	30.5

Discussion

Results from the current study indicate that 30.5% of National Guard OIF soldiers screened positive for at least one probable PD. PD+ soldiers also reported increased PTSD symptoms and depressive symptoms compared to PD- soldiers at both 2-3 months post-deployment and two years later. Moreover, even after controlling for the influence of post-deployment distress (PTSD symptoms) at 2-3 months post-deployment, PD+ soldiers reported greater impairment and decreased satisfaction with social roles compared to PD- soldiers. Notably, group differences were still evident at two years post-deployment. These findings suggest that PD traits may impair soldiers' psychosocial functioning above and beyond the influence of post-deployment distress. The current study supports the utility of early identification and intervention for PD traits that may influence military performance.

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VA RESEARCH | THE PATH of PROGRESS
National VA Research Week May 16-20, 2016

Mindfulness Skills Mediate Improvements in PTSD Symptoms and Quality of Life

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VA U.S. Department of Veterans Affairs

Background

- A growing body of research documents the efficacy of mindfulness-based interventions for the treatment of PTSD[1]. Our research team's controlled trial[2], the most rigorous demonstration of the efficacy of mindfulness-based stress reduction (MBSR) for PTSD to date, also showed benefits in quality of life (QOL).
- Few studies have examined the potential mechanisms by which these non-trauma-focused treatments may reduce PTSD symptoms and improve QOL.
- In our controlled trial[2], improvement in mindfulness skills was associated with greater reductions in PTSD symptom severity.

Present Study

In analyses of data from a controlled trial[2], we examined whether changes in mindfulness skills mediate improvements in PTSD symptoms and QOL.

Study Design

Participants

- Our sample was composed of 116 veterans (primarily White; mean age: 58.5 years, SD = 9.8; 84% male) with PTSD who participated in MBSR or present-centered group therapy.

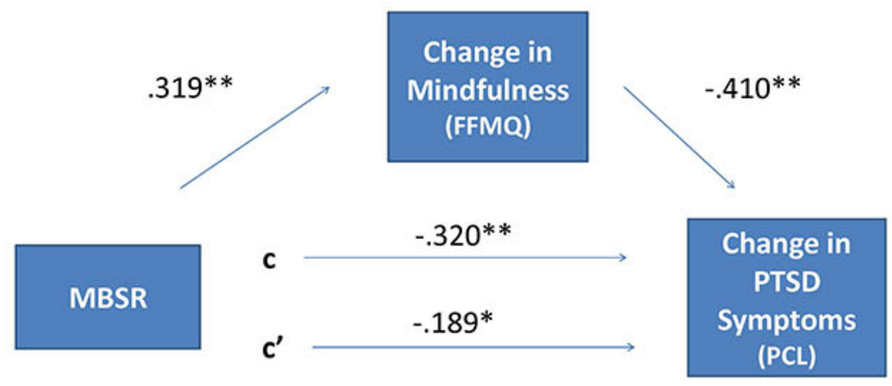
Measures

- Mechanism: Mindfulness skills
  - Five Facet Mindfulness Questionnaire (FFMQ), total score and score for each skill: **observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience**
- Outcome: PTSD symptom severity
  - PTSD Checklist (PCL), total score
- Outcome: self-reported quality of life
  - World Health Organization Quality of Life-Brief (WHOQOL-BREF), total score

Analytic Plan

- Mediation models tested the indirect effects of the MBSR intervention on PTSD symptom severity and QOL through change in mindfulness skills.
- Mediation was tested using the INDIRECT command in Mplus, which uses bootstrapped confidence intervals (5000 samples) to estimate indirect effects in mediational models.
- In addition to examining the FFMQ total score, each FFMQ subscale was evaluated through a separate mediational model.

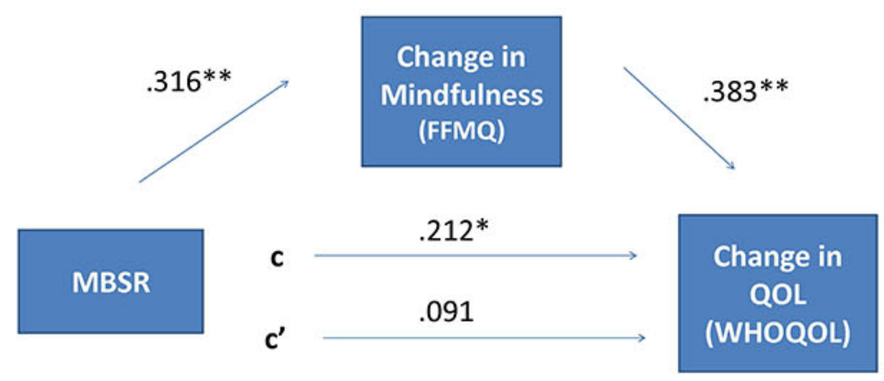
Figure 1. Change in Mindfulness Skills Mediate Improvement in PTSD Symptoms



Indirect effect: β = -.131 (*SE* = .046), *p*=.005

***p* < .05, ****p* ≤ .001**

Figure 2. Change in Mindfulness Skills Mediate Improvement in Quality of Life



Indirect effect: β =.244 (*SE* = .089), *p*=.006

***p* < .05, ****p* ≤ .001**

Results

Overall Mindfulness Skills (FFMQ total score)

- Mediated improvements in:
  - PTSD symptom severity: β = -.131 (*SE* = 0.046), *p* = 0.005 (Figure 1)
  - Quality of life: β = .244 (*SE* = .089), *p* = .006 (Figure 2)

Specific Mindfulness Skills (FFMQ by domain)

- Of the five domains of mindfulness skills, **nonreactivity to inner experience** was the most potent mediator of:
  - PTSD symptom severity: β = .101 (*SE* = 0.045), *p* = 0.025
  - Quality of life: β = .091 (*SE* = 0.039), *p* =0.018

Summary

- Improvements in mindfulness skills mediated the effect of both PTSD symptom severity and QOL.
- MBSR appeared to contribute to improved clinical and functional outcomes by fostering mindfulness skill development. In particular, non-reactivity, or the ability to notice thoughts and feelings without reacting to them, may allow trauma survivors to tolerate aversive internal experiences (e.g., trauma-related thoughts and feelings) without engaging in rigid avoidance.
- As the first known mediation analysis of an MBSR RCT for PTSD, these results extend our understanding of mindfulness skills as a mediator of mental health improvement[3] into an important patient population.

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Neurocognitive Functioning of Veterans Participating in a Comprehensive Pain Rehabilitation Program

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American Academy of Clinical Neuropsychology

Introduction

Chronic pain is common among veterans, with recent studies indicating prevalence of 82-92% among OEF/OIF polytrauma patients (Lew et al., 2007, 2009). Cognitive complaints are among the most common sequelae of chronic pain, although evidence for objective cognitive deficits in this population has been limited. Although research has indicated that processing speed, attention, and verbal memory are often impaired in chronic pain samples (Suhr, 2012), high rates of suboptimal effort and infrequent use of PVTs limit generalizability of these findings (Greiffenstein, 2013; Johnson-Greene, 2013).

The purpose of the current study was to objectively evaluate neurocognitive performance among veterans with chronic pain participating in an interdisciplinary, comprehensive rehabilitation program for chronic pain. Brief neurocognitive assessments were conducted at admission and discharge from the program, enabling characterization of baseline neurocognitive functioning as well as measurement of possible neurocognitive treatment responses. Self-report measures of emotional distress and pain-related functional interference were also completed to provide a comprehensive assessment of psychological treatment responses.

Methods

Participants included 49 veterans (see Table 1) enrolled in a four-week, intensive outpatient, interdisciplinary pain rehabilitation program at the Minneapolis VA Comprehensive Pain Center. The Chronic Pain Rehabilitation Program (CPRP) is CARF-accredited and follows American Pain Society Evidence-Based Treatment Guidelines for rehabilitation of chronic pain (Chou, 2009), including tapering of opioid medications, reduction of polypharmacy, supervised physical exercise, and cognitive-behavioral psychotherapy.

All participants completed the following neuropsychological tests:

- Controlled Oral Word Association Test (COWAT)*
- Repeatable Battery for Assessment of Neuropsychological Status (RBANS)*
- Stroop Color-Word Test
- Test of Memory Malingering (TOMM, admission only)
- Trails A & B
- Wechsler Test of Adult Reading (WTAR; admission only)

*Alternate RBANS and COWAT forms were administered at discharge.

Veterans also completed several self-report measures of emotional distress and pain interference:

- Center for Epidemiological Studies Depression Scale (CES-D)
- Pain Catastrophizing Scale
- Patient Health Questionnaire-9 (PHQ-9)
- PEG Scale (Pain intensity, interference w/ Everyday life & General activity)
- PTSD Checklist for DSM-5 (PCL-5)

Discharge testing data were not available for nine veterans who either terminated early due to medical emergency (n = 1), were discharged or elected to leave the program before completion (n = 7), or did not complete discharge tests (n = 1).

Table 1. Demographic Information

	Admission	Discharge
Sample Size	49	40
# Females [%]	9 [18]	6 [15]
Age (M, SD)	53.71 (10.97)	54.0 (11.06)
Years of Education	13.76 (1.89)	13.80 (1.8)
Morphine Equivalence mg	17.18 (28.36)	0.25 (1.58)

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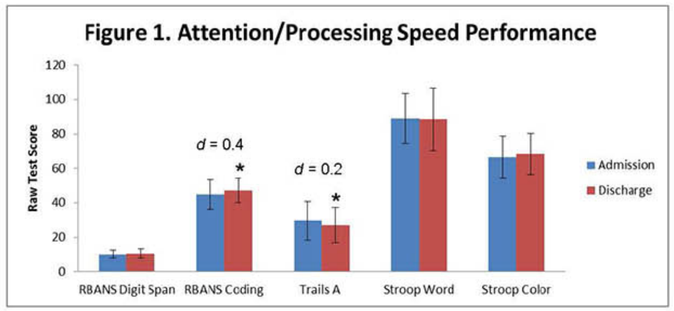
Results

All participants demonstrated adequate effort (i.e. TOMM Trial 2 raw score ≥ 45, RBANS Effort Index weighted score ≤ 3) at admission. Most participants also demonstrated adequate effort at discharge as indexed by the RBANS Effort Index (see Table 2).

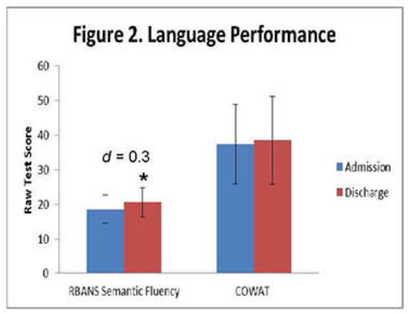
Table 2. Neurocognitive Performance Validity

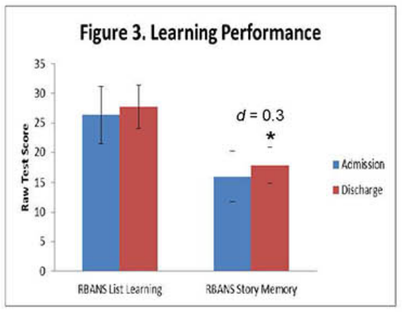
	Mean Score (SD)	Score Range	# [%] Participants w/ Adequate Effort	# [%] Participants w/ Suboptimal Effort
TOMM Trial 1	48.04 (2.23)	40-50	--	--
TOMM Trial 2	49.9 (0.31)	49-50	49 [100]	0.00
RBANS Effort Index (Admission)	0.35 (0.84)	0-3	49 [100]	0.00
RBANS Effort Index (Discharge)	0.30 (1.07)	0-6	39 [97.5]	1 [2.5]

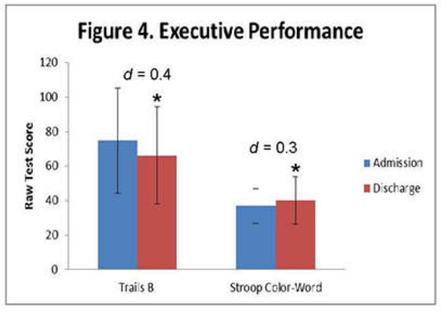
Based on standard clinical norms associated with the neuropsychological tests, participants generally performed within the low average to average range at admission, e.g. Stroop Word mean T = 40 (SD = 10); Trails B mean T = 51 (SD = 10); RBANS Total Index mean SS = 94 (SD = 12). Paired-sample t-tests revealed that veterans demonstrated modest improvements on neurocognitive measures of attention, immediate verbal recall, processing speed, and executive functions (see Figures 1-4).



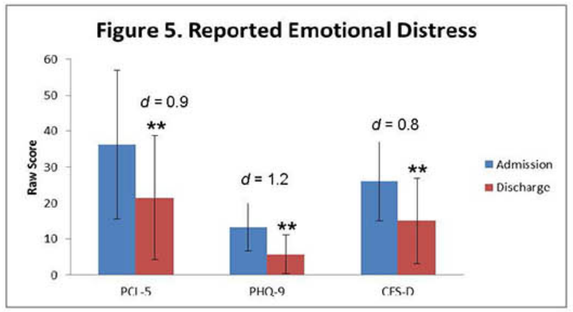
*$p \leq .05$



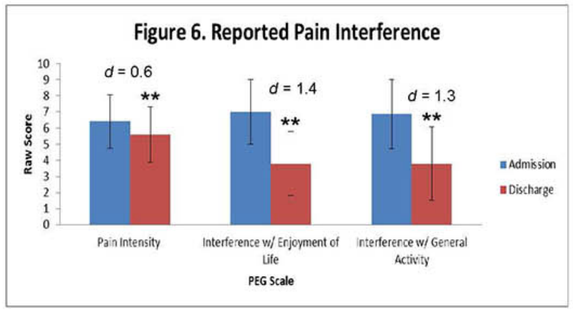


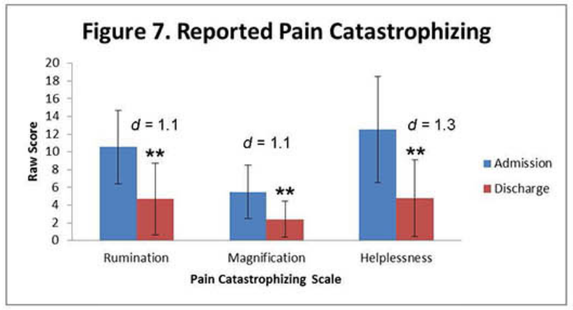


Analyses also indicated a medium reduction in reported pain intensity and large reductions in reported emotional distress and functional pain interference (see Figures 5-7).



**$p < .001$





Discussion

A sample of veterans with chronic pain enrolled in a four-week comprehensive pain rehabilitation program demonstrated modest improvement on measures of complex attention/cognitive efficiency, expressive language, immediate verbal learning, and executive abilities upon program completion. Additionally, large reductions in emotional distress were observed in addition to expected reductions in pain intensity, functional interference, and pain catastrophizing.

Contrary to previous findings in the literature, the current sample of veterans demonstrated largely intact effort on testing. Although preliminary, these results suggest that comprehensive chronic pain rehabilitation may be an effective intervention for reported cognitive difficulties in veterans with chronic pain. The observed cognitive performance gains were observed despite no formal cognitive rehabilitation interventions, and future research should address incremental utility of cognitive remediation strategies in this clinical population.

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Can MMPI-2-RF Validity Scales Predict Completion of a Dialectical Behavior Therapy – Prolonged Exposure Intensive Outpatient Program?

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Minneapolis VA Healthcare System

Background

- Journeys is a twelve-week DBT-PE intensive outpatient program at the Minneapolis VA
- The non-completion rate (18%) is lower than outpatient PE for PTSD (Kehle-Forbes, Meis, Spoont, & Polusny, 2015)
- However, given resource-intensive nature of program, and disruption to milieu when patients end prematurely, it is important to identify factors associated with non-completion
- True Response Inconsistency and Infrequent Psychopathology Responses predict premature termination in MH outpatients (Anestis, Finn, Gottfried, Arbisi, & Joiner, 2015)
- Validity scales on the MMPI-2-RF may predict completion of Journeys, facilitate selecting veterans who are most likely to benefit, and enhance retention of veteran already enrolled
- Elevations on validity scales may reflect disingenuous engagement in treatment process and be associated with completion and outcomes

Aim & Hypotheses

- Purpose: identify MMPI-2-RF validity scales that predict completion and symptom-based outcomes measures
- Identification of likely non-completers would improve efficiency and access, as well as improve care for possible non-completers
- Hypotheses:
  - Profile invalidity will be associated with lower rates of completion
  - Profile invalidity will be associated with smaller reductions in self-report symptom measures

Methods

- Participants were 76 veterans (60% female) who began Journeys
- Trauma types and actual diagnoses varied, however the majority of veterans met criteria for PTSD and BPD
- The MMPI-2-RF was administered to all patients during first few weeks of program (unless administered shortly before screening)
- Profile validity was defined as follows:
  - High cutoffs: F = 120 or Fp ≥ 100 or VRIN /TRIN ≥ 70
  - Low cutoffs: F ≥ 105 or Fp ≥ 90 or VRIN /TRIN ≥ 70 (Goodwin, Sellbom, & Arbisi, 2013)
- Self-report measures of symptoms related to PTSD and BPD were administered at baseline and upon completion of the program
- Measures included: PTSD Checklist for DSM-5 (PCL-5); Borderline Symptom List (BSL-23); DBT Ways of Coping Skills/Dysfunction (DBT WOC Skills/Dys); Dissociative Experiences Scale (DES); Depression Anxiety Stress Scales (DASS)

Methods (Continued)

- Initially, chi-square analyses were used to test whether profile invalidity was associated with lower rates of completion, both for high and low levels of overall validity as well as high and low levels of Fp validity
- Logistic regression was used to test whether continuous Fp scores were associated with lower rates of completion, and standard regression was used to test whether continuous Fp scores were associated with outcomes (controlling for outcomes variables at baseline)

Results

Table 1. Descriptive statistics: rates of validity by MMPI-2-RF subscale

N = 76	M (SD)	T-Score	% Valid (Low/High)
F	14.7 (5.9)	~109	46%/66%
Fp	4.4 (2.6)	~81	72%/78%
VRIN	3.9 (2.0)	~53	93%
TRIN	--	--	93%
Overall—Low	--	--	37%
Overall—High	--	--	50%

Table 2. Rates of completion by overall validity

High Cutoffs	Completed	Not Completed	Completion Rate
Valid	40	10	80%
Invalid	18	8	69%
Low Cutoffs	**Completed**	**Not Completed**	**Completion Rate**
Valid	28	7	80%
Invalid	30	11	73%

- Overall profile validity was not associated with completion rate for high validity cutoffs (Pearson Chi-Square = 1.17, *ns*) or low validity cutoffs (Pearson Chi-Square = 1.17, *ns*)

Table 3. Rates of completion by validity per Fp only

Fp >/= 100	Completed	Not Completed	Completion Rate
Valid	47	12	80%
Invalid	11	6	65%
Fp >/= 90	**Completed**	**Not Completed**	**Completion Rate**
Valid	44	11	80%
Invalid	14	7	67%

Results (Continued)

- (Results from Table 3) Fp profile validity was not associated with completion rates for high validity cutoffs (Pearson Chi-Square = 1.63, *ns*) or low validity cutoffs (Pearson Chi-Square = 1.50, *ns*)
- Moreover, Continuous F scores were not associated with completion rates (B = .03, *p* = .50)
- However, continuous Fp scores were associated with completion rates at trend (B = .20, *p* = .06)
- Controlling for outcome measures at baseline, continuous Fp scores were not associated with outcome measures at Week 12 or end of treatment

Discussion

- Many Journeys patients produce invalid MMPI-2-RF profiles, and conservative cutoffs include treatment completers
- Dichotomous profile invalidity was not associated with lower rates of completion
- Higher continuous scores on Fp may be associated with lower rates of completion but this relationship was only significant at trend, and higher continuous scores on Fp were not associated with lower levels of symptoms reduction
- However, overall these results are inconsistent with previous research indicating that Fp is useful in identifying treatment non-completers (Anestis, et al., 2015)
- Previous research demonstrating the utility of Fp in predicting treatment outcomes was conducted in outpatient populations, thus it is possible that the utility of Fp is reduced in the Journeys PTSD/BPD population
- A reduction in utility in this population could be related to a perceived need on the part of veterans to communicate high levels of symptoms (e.g., to demonstrate the need for an intensive treatment program) independent of genuine and severe symptoms which are indeed present (but over-reported), whereas outpatients may over-report symptoms in the context of low levels or even the absence of genuine symptoms
- High Fp scores can prompt intervention to address possible over-reporting of symptoms, however this is largely indicated by clinical practice and not an empirical relationship between Fp scores and treatment completion or outcomes
- Limitations: completion itself may not reflect genuine engagement in treatment; sample sizes are low; outcomes are limited to self-report
- Future Directions: continue data collection; incorporate administrative data including mental health care utilization data; measure engagement or willingness per self- and/or clinician-report

References available upon request

How Does Suicidal Ideation Affect Close Others?: Using the MMPI-2-RF to Evaluate the Impact of Being Partnered with a Suicide Ideator

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Background

- Suicide is the 10th leading cause of death in the United States (WHO, 2012)
- Although suicide rates among veterans have historically been lower than the civilian population, suicide rates have been increasing among service members involved in OEF/OIF deployments. During some months, deaths by suicide have exceeded rates of soldier deaths in combat.
- Much of the research to date has been conducted on individuals who are suicidal. Very little is known about the psychological impact of being partnered with someone experiencing suicidal ideation.
- The question is especially pertinent among military couples in the months following a soldier's return from deployment, as the reintegration period already constitutes a stressor for both soldiers and their partners. Additional stress that may be caused by having a partner with suicidal ideation may further elevate stress levels, which could have negative downstream consequences for the individual's mental and physical health.

Current Study & Hypotheses

Research Question: Do partners of suicide ideators produce more distressed MMPI-2-RF profiles than partners of non-suicide ideators?

Hypotheses:

- **(1)** Male soldiers with an ideating female partner would produce a more distressed MMPI-2-RF profile compared to a matched sample of male soldiers with a non-ideating female partner.
- **(2)** Female partners of ideating male soldiers would produce a more distressed MMPI-2-RF profile compared to a matched sample of female partners of non-ideating male soldiers.

Method

Data were collected as part of the Readiness and Resilience in National Guard Soldiers (RINGS-2) study, a prospective, longitudinal study of National Guard Brigade Combat Team soldiers deployed to Iraq/Kuwait in 2011-2012 and their partners. Soldiers and partners were administered the MMPI-2-RF approximately 3 months post-deployment.

Participants were 32 male soldiers (16 with ideating female partners; 16 with non-ideating female partners who were matched on age, race, and relationship length) and 58 female partners (29 with ideating male soldiers; 29 with non-ideating male soldiers who were matched on age, race, and relationship length).

Male soldiers were 100% Caucasian. The age of male soldiers ranged from 23-46 (M = 34.16), and relationship length ranged from 6 months - 24 years (M = 10.30). Female partners were 93.2% Caucasian, 3.4% Asian, and 3.4% Other. The age of female partners ranged from 19-53 (M = 32.36), and relationship length ranged from 6 months-31 years (M = 9.55).

Method Continued

Ideation status: Endorsing ≥ 1 item on the MMPI-2-RF SUI scale.

Distress: MMPI-2-RF scale score on demoralization (RCd).

Exploratory between group comparisons of all MMPI-2-RF scales were conducted to assess for other scale differences and to inform future research.

Results

MMIP-2-RF Scales	*M:* Male Soldiers of Partner Ideators	*M:* Male Soldiers of Partner Non-Ideators	*p*-value	Partial Eta Squared	*M:* Female Partners of Soldier Ideators	*M:* Female Partners of Soldier Non-Ideators	*p*-value	Partial Eta Squared
Somatic/Cog Dys.								
RC1	8.13	4.00	0.012	0.19	3.62	3.52	0.902	0.00
MLS	**3.13**	**1.44**	**0.003**	**0.26**	1.48	2.17	0.097	0.05
GIC	0.69	0.13	0.056	0.12	0.17	0.76	0.014	0.10
HPC	1.94	0.81	0.045	0.13	1.24	0.59	0.052	0.07
NUC	2.81	1.44	0.056	0.12	0.93	0.72	0.527	0.01
COG	3.13	2.13	0.221	0.05	0.79	1.52	0.065	0.60
Emotional Dys.								
EID	7.75	6.31	0.473	0.02	7.17	9.90	0.119	0.04
RCd	4.25	4.13	0.926	0.00	3.21	4.90	0.125	0.04
RC2	3.81	2.75	0.284	0.04	2.97	4.10	0.071	0.06
RC7	4.88	3.94	0.522	0.01	3.90	4.83	0.302	0.02
HLP	0.81	0.44	0.208	0.05	0.45	0.62	0.389	0.01
SFD	0.63	0.63	1.000	0.00	0.76	1.24	0.167	0.03
NFC	1.88	1.69	0.722	0.00	2.07	2.21	0.777	0.00
STW	3.19	2.13	0.083	0.10	2.41	2.66	0.586	0.01
AXY	0.94	0.44	0.131	0.07	0.28	0.45	0.330	0.02
ANP	2.88	1.38	0.024	0.16	1.21	1.69	0.271	0.02
BRF	0.56	0.13	0.077	0.10	0.45	0.79	0.161	0.04
MSF	1.00	1.44	0.417	0.02	3.55	2.55	0.051	0.07
INTR	6.81	6.31	0.722	0.00	5.97	7.21	0.218	0.03
NEGE	6.56	4.38	0.046	0.13	5.17	5.93	0.360	0.02
Thought Dys.								
THD	1.38	1.50	0.855	0.00	1.07	0.97	0.780	0.00
RC6	1.06	1.06	1.000	0.00	0.59	0.66	0.777	0.00
RC8	2.06	2.06	1.000	0.00	1.14	1.03	0.796	0.00
PSYC	1.56	1.63	0.933	0.00	1.17	1.31	0.719	0.00
Behavioral								
BXD	6.19	6.00	0.884	0.00	2.31	3.24	0.191	0.03
RC4	5.13	4.18	0.809	0.00	2.24	3.21	0.162	0.04
RC9	11.44	9.13	0.170	0.06	5.90	5.79	0.909	0.00
JCP	1.44	1.81	0.522	0.01	0.52	0.76	0.328	0.02
SUB	1.19	0.81	0.403	0.02	0.55	0.86	0.269	0.02
AGG	2.13	1.56	0.359	0.03	0.31	0.76	0.031	0.08
ACT	2.31	2.19	0.863	0.00	1.55	1.31	0.548	0.01
AGGR	9.75	8.81	0.420	0.02	5.97	5.41	0.481	0.01
DISC	8.19	7.94	0.834	0.00	3.10	3.97	0.256	0.02
Interpersonal								
RC3	7.44	5.25	0.092	0.09	3.45	3.93	0.536	0.01
FML	**2.63**	**1.19**	**0.024**	**0.16**	**1.62**	**1.55**	**0.857**	**0.00**
IPP	3.31	2.63	0.341	0.03	4.52	4.45	0.920	0.00
SAV	3.88	3.38	0.626	0.01	2.90	3.59	0.333	0.02
SHY	1.63	1.00	0.315	0.03	2.24	2.03	0.710	0.00
DSF	0.88	0.88	1.000	0.00	0.10	0.35	0.064	0.06
Interests								
AES	0.75	1.25	0.341	0.03	2.00	1.86	0.735	0.00
MEC	5.25	5.13	0.886	0.00	1.14	1.07	0.822	0.00

Results Continued

Analysis of Variance (ANOVA) was used to assess for differences in RCd and other MMPI-2-RF subscales between (a) male soldiers with ideating female partners and male soldiers with non-ideating female partners; and (b) female partners of ideating male soldiers and female partners of non-ideating male soldiers. Analyses were also conducted using Mixed Modeling to account for potential couple effects, and an identical pattern of results was found. Additionally, no couple level effects were found. Results presented in the table are from the ANOVA analyses. Family-wise correction was used to account for multiple analyses.

Contrary to hypotheses, partners of suicide ideators (male or female) did not report higher levels of distress (RCd) on the MMPI-2-RF compared to partners of non-suicide ideators (male or female).

Exploratory analyses revealed that male soldiers with ideating female partners scored significantly higher on malaise (MLS) compared to male soldiers with non-ideating female partners, $F(1,30) = 10.40$, $p = 0.003$, *partial eta squared*= 0.26.

At the trend level, male soldiers with ideating female partners scored higher on family problems (FML) compared to soldiers with non-ideating partners, $F(1,30) = 5.62$, $p = 0.024$, *partial eta squared*= 0.16, whereas there was no difference between female partners of ideating male soldiers and female partners of non-ideating soldiers on family problems.

No other significant differences were found for male soldiers or female partners based on whether they were partnered with an ideator or not.

Discussion

Males and females who were partnered with a suicide ideator did not endorse significantly higher levels of distress on the MMPI-2-RF compared to those who were partnered with a non-ideator.

Male soldiers with ideating female partners scored significantly higher on malaise compared to male soldiers with non-ideating female partners, suggesting that men may express this distress physically.

Trending results on the family problems scale suggest is possible that female suicide ideators are more apt to talk about their distress with their partners, whereas male suicide ideators may be more apt to keep distressing thoughts and feelings to themselves. Such communication patterns may impact whether and the extent to which one's ideation status affects a close other.

Results should be interpreted with caution due to exploratory nature of analyses, low power, and multiple comparisons.

Future research would benefit from using a larger sample to better evaluate gender-specific effects. If replication produces similar results, it would suggest that increased physical complaints may be an indicator of distress among men who have ideating female partners.

Impact of Mild Traumatic Brain Injury on Personality

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INTRODUCTION

Personality is defined as individual patterns of thoughts, feelings, and behaviors that emerge in childhood and remain relatively stable throughout adulthood. This pattern is sometimes disrupted after traumatic brain injury (TBI):

- Some studies note increased neuroticism, lower extraversion and conscientiousness, and higher rates of personality pathology after TBI (Hibbard et al., 2000; Koponen et al., 2002; Kurtz et al., 1998; Norup & Mortensen, 2014; Tate, 2003; van Reekun et al., 1996).
  - These effects have been found for both mild TBI (mTBI) and more severe TBI.
  - Personality disruptions are distressing and interfere with functional outcomes (e.g., Diaz et al., 2012; Hannay et al., 2004; Lezak, 1978, 1987; Thomsen, 1984)
- However, some studies find no personality changes after TBI (Lannoo et al., 1997; Rush et al., 2006).

A significant number of OEF/OIF veterans sustain mTBIs (9-23%; e.g., Hoge et al., 2008; Polusny et al., 2011; Terrio et al., 2008). As such, it is important to examine mTBI precipitated changes to personality in veteran populations.

Literature Critiques & Aims of the Present Study

1) Thus far, no studies have prospectively and longitudinally examined personality changes following mTBI using dimensional measures. Longitudinal prospective studies are essential since there can be retrospective bias in self-report of change in personality (e.g., Ebner-Priemer & Trull, 2009; Iverson et al., 2009). Also, previous studies have either examined normal personality traits (e.g., using Five Factor Model) or pathological personality (e.g., personality disorder diagnosis), which may miss dimensional gradients between normal personality variants and categorical personality pathology descriptions.

- **Aim 1:** Examine personality, assessed prospectively (before and after mTBI), using a dimensional measure that blends clinical and normal perspectives of personality (the MMPI-2 RF PSY-5 scales).

2) Several factors affect self-reports of personality and psychopathological functioning: PTSD/distress (e.g., Arbisi et al., 2011; Erbes et al., 2013), combat exposure (e.g., Koffel et al., in preparation), somatic preoccupation (e.g., Polusny et al., in preparation), and compensation-seeking (e.g., Thomas & Youngjohn, 2009).

- **Aim 2:** Examine changes in post-injury self-reported personality when controlling for these variables.

METHOD

Participants → 241 Minnesota National Guard soldiers with pre- and post-deployment MMPI and mTBI screening data (from the Readiness and Resilience in National Guard Soldiers [RINGS] study)

Participant Characteristics	
Age - M (SD)	30.0 (8.8)
Sex (% male)	84.4%
Race/Ethnicity	
Caucasian	221 (91.7%)
African-American	4 (1.7%)
Hispanic/Latino	3 (1.2%)
Native American	3 (1.2%)
Asian-American	2 (0.8%)
Other	2 (0.8%)
Education – M (SD)	14.6 (2.1)
Self-Reported mTBI	47 (19.5%)
Diagnosed Concussion*	35 (14.5%)
C & P Involvement	117 (48.5%)
Service Connection M (SD)	43.6 (27.8)

*Retrospective diagnosis from 2007-2013

Procedure → Prospective longitudinal design

Time 1
~1 month pre-deployment (2006)

- ► Demographics
- ► Personality – Shortened MMPI-2 RF PSY-5
- ► Somatic Complaints – PRIME MD
- ► Distress – PCL-C

Time 2
3-11 months post-deployment (2007-2008)

- ► Self-reported Deployment mild TBI
- ► Personality – Full MMPI-2 RF PSY-5
- ► Somatic Preoccupation – MMPI-2 RF RC1
- ► DRRI Combat Exposure Scale
- ► Distress – PCL-M

Record Review
Administrative data (from Aug. 2007 - June 2015)

- ► Retrospective clinical diagnosis of concussion
- ► Involvement in Compensation & Pension evaluation

Hierarchical Regression – Predicted Change in PSY-5

Self-Reported TBI

Dependent Variable: Post-Deployment PSY-5r scores	NEGE-r		INTR-r		DISC-r		AGGR-r		PSYC-r	
	β	p	β	p	β	p	β	p	β	p
Step 1										
Gender	.001	.990	.036	.533	-.114	.032	-.172	.004	-.054	.433
Age	.040	.528	.208	.000	-.093	.056	-.012	.822	-.044	.491
Pre – PSY-5	.476	.000	.568	.000	.694	.000	.556	.000	.332	.000
Pre – Somatic	.073	.345	.008	.904	-.013	.836	.047	.509	.116	.179
Pre – Distress	.120	.123	.102	.134	.059	.311	.132	.051	.086	.305
Step 2*										
mTBI	.167	.007	.123	.030	-.001	.981	.097	.094	.083	.225
Combat	.105	.104	.093	.125	.055	.316	.082	.182	.074	.308
Step 3*										
Gender	-.002	.970	.037	.542	-.115	.043	-.184	.003	-.017	.792
Age	.000	.996	.213	.000	-.093	.064	-.026	.643	-.036	.542
Pre – PSY-5	.380	.000	.546	.000	.680	.000	.502	.000	.230	.003
mTBI	.001	.990	.050	.398	-.010	.850	.070	.248	-.059	.359
Post – Distress	.286	.000	.096	.169	.074	.244	.187	.010	-.074	.337
Post – Somatic	.426	.000	.211	.004	-.025	.704	-.004	.960	.582	.000
C & P	.011	.822	-.076	.159	.030	.535	.010	.862	.007	.909

*For brevity, only variables of interest and those with significant findings (denoted with shading) were reported for Steps 2 and 3.

The same pattern of results were found for participants who were later diagnosed with a concussion.

CONCLUSIONS

- Both self-reported mild TBI and clinician-diagnosed concussion significantly predicted change in the NEGE-r and INTR-r PSY-5r scales when accounting for gender, age, pre-deployment distress and somatic complaints, and deployment combat exposure.
- However, change in PSY-5r scores were **no longer significantly predicted by mTBI or concussion** when accounting for post-deployment distress (PCL) and somatic preoccupation (RC1). Rather, **distress** significantly predicted change in **NEGE-r and AGGR-r**, and **somatic preoccupation** significantly predicted change in **NEGE-r, INTR-r, and PSYC-r**.
- Accounting for all these variables, age significantly predicted change in INTR-r and gender significantly predicted change in DISC-r and AGGR-r.
- Involvement in C&P evaluation did not significantly predict personality change.
- In conclusion, reported personality changes appear related to individuals' level of current distress, somatic preoccupation, age, and gender rather than a direct effect of mild TBI.

References – Available upon request

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Externalizing Versus Arousal and Reactivity: Evaluating Changes in DSM-5 PTSD Diagnostic Criteria

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Introduction

- One of the most notable changes to the DSM-5 PTSD diagnostic criteria is the addition of:
  - "irritable or aggressive behavior"
  - "reckless or self-destructive behavior"
- New criteria found in Increased arousal (Criterion E)
- The degree to which these behaviors represent posttraumatic responses versus externalizing behaviors is presently unclear.
- Examining self-reported (pre-trauma) history of externalizing behavior alongside DSM-5 symptom endorsement will allow for preliminary evaluation of the impact of these new symptoms.
- Differentiating between pre-existing risk factors and trauma reactions is important because:
  - It provides clarification related to the composition of newly diagnosed group.
  - Risk factors have different treatment implications than "new symptoms."

Purpose

- Consider the impact of additional DSM-5 symptoms on the diagnosis of PTSD.
- Evaluate the relationship between history of externalizing and new DSM-5 PTSD symptoms
- Examine the relationship between externalizing behaviors and attitudes towards evidence based treatments for PTSD.

Participants

- Eligibility criteria:
  - Chart diagnosis of PTSD
  - not currently engaged in psychotherapy (no more than 1 visit per month in the past 12 months)
  - Not diagnosed with psychotic disorder, or cognitive disorder, no current suicidal ideation, no active substance use disorder.
  - No past participation in PE/CPT
- A random subset of VA users at the Minneapolis VAHCS meeting these criteria were contacted to participate in the study.
- **14 male veterans** agreed to participate in the study:
  - **Mean age = 60.9, SD = 10.8**
  - **12 Vietnam era, 1 Gulf War, 1 OEF/OIF**
  - One participant discontinued prior to completing the CAPS
- Participants received a $50 gift card for participating.
- Though female veterans were eligible to participate, none elected to do so.

Procedure

- Potential participants with chart diagnoses of PTSD were screened based on aforementioned selection criteria, and eligible participants were contacted via postal letter and phone.
- Interested participants were scheduled for a 90-minute appointment consisting of several self-report measures, a semi-structured follow-up interview and administration of the Clinician Administered PTSD Scale for DSM-IV (CAPS)
- Semi-Structured interview aimed to evaluate the temporal nature of positive endorsement of externalizing items by asking participants if positively endorsed items would have been endorsed prior to age 15, prior to deployment, in the months following deployment or at a later date.
- Participants were also asked several questions related to their attitudes towards evidence based treatments.

Measures

Self-report:

- PTSD Checklist (PCL-4/5 hybrid)
  - 17 items for PCL-4, 20 items for PCL-5
- Externalizing Spectrum Inventory-Brief Form (ESI-BF)
  - Validated measure of problem behaviors and traits in the domain of impulse control deficiencies
  - e.g., "I have smacked someone who upset me."
  - "I enjoy a good physical fight."

Interviewer Administered:

- Semi-structured interview evaluating the temporal nature of positive endorsement of externalizing items:
  - Before age 15? Before deployment? After deployment?
- Clinician Administered PTSD Scale (CAPS)
- Semi-structured interview evaluating attitudes towards evidence based treatments
  - E.g., would you feel comfortable trying this treatment?

Self-Report Measures

CAPS PTSD Diagnosis:	Mean (SD)	
	Yes (N = 5)	No (N = 8)
PCL-4 Total	47.6 (13.9)	33.6 (12.7)
PCL-5 Total	56.2 (15.2)	37.4 (14.5)
ESI-BF General Disinhibition	5.7 (3.6)	7.6 (2.3)
ESI-BF Excitement seeking	0.2 (0.44)	2.1 (2.4)

ESI Items	False	True prior to deployment	True after deployment
I often act on immediate needs.	3	5	6
I've often missed things I promised to attend.	6	1	7
My impulsive decisions have caused problems for loved ones.	3	3	8
I jump into things without thinking.	6	6	2
I often get bored quickly and lose interest.	4	4	6
I have a hard time waiting patiently for things that I want.	5	6	3
My impulsive decisions have caused problems for loved ones.	4	3	7
I have hit someone in the face or head in anger.	5	5	4
When someone hits me, I hit back.	3	9	2
I return insults.	5	7	2
PCL-5 Items			
Feeling irritable or angry or acting aggressively.	1	5	8
Taking too many risks, or doing things that cause you harm.	5	5	4
Feeling irritable or having angry outbursts.	2	4	8

PTSD Diagnoses:

- 5 of the 13 participants (39%) met full diagnostic criteria for PTSD within the past month based on the CAPS.
- 11 of 13 participants (85%) met diagnostic criteria for PTSD on the PCL-4, based on sufficient endorsement of moderate or higher symptoms in each of the symptom clusters based on DSM-IV.
- 9 of 12 participants (75%) met diagnostic criteria for PTSD based on the PCL-5, based on sufficient endorsement of moderate or higher symptoms in each of the symptom clusters, based on DSM-5.

Discussion:

PTSD Diagnoses:

- In spite of all participants carrying a chart diagnosis of PTSD, most did not currently meet criteria for the disorder based on a CAPS interview.
- The PCL-4 and the PCL-5 both yielded a high rate of false positives in comparison with CAPs diagnoses.
- Though the majority of participants in the sample did not currently meet criteria for PTSD, all of them cited some negative impact related to PTSD in the qualitative interview, or cited medication as an explanation for their functionality.
- Additionally, during the interview, only 3 of the participants stated that they believe that it is possible to recover from PTSD (though the majority stated that they believed things could improve).
- Reliance on self-report screeners for PTSD may continue to be problematic with DSM-5 diagnostic criteria.

Externalizing Behavior:

- The small sample size and low rate of PTSD diagnoses prevented statistical analysis of the relationship between history of externalizing and PTSD symptom endorsement.
- All participants reported being exposed to combat, and most listed this as their index event.
  - In spite of this, many participants reported that they would have endorsed ESI items and relevant PCL-5 Items prior to trauma exposure.
  - Such behavioral patterns may cloud the water related to PTSD diagnosis in light of new PTSD symptoms.

Barriers and Limitations:

- Recruitment was much more difficult than initially anticipated:
  - 185 charts reviewed, 83 (45%) removed because of eligibility criteria (mainly mental health treatment history)
  - Of those contacted, 75 (73%) declined verbally or did not respond to three phone calls.
  - Of those scheduled, 13 (48%) either canceled or no-showed appointments.
  - 14 of the 102 eligible veterans identified actually participated in the study.
- Low rates of current PTSD were also unanticipated.
- There may be concerns related to the generalizability of this information to the larger veteran population.
- Excluding psychotic/substance use disorders also reduces generalizability.

Future Directions:

- More research is needed to understand the relationship between pre-existing tendencies towards externalizing behaviors and diagnosis of PTSD under the new DSM-5 criteria.
- Researchers and clinicians should also pay closer attention to the departure between clinicians and consumers in terms of symptom endorsement, and course of disorder, as this may have significant implications for PTSD research and treatment alike.

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Multimethod Assessment of Emotion Skills Related to Risk for Sexual Victimization

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Background

- 1 in 8 women experience sexual victimization,[1] and women who have experienced childhood sexual abuse (CSA) are 2-3 times more likely to experience adult sexual victimization (ASV).[2] As many as 59% of women with a history of sexual assault report both CSA and ASV.[3]
- Identification of risk factors for revictimization (RV) is imperative, and alexithymia has been identified as a risk factor for sexual assault,[4] with research showing increased report of alexithymia for individuals with a history of CSA.[5]
- Although previous research has examined affect regulation skills, often in the form of self-reported alexithymia,[6] little research has examined objective, behavioral measures of emotion skills in individuals with CSA, ASV, and RV.

Goal of the Current Study

- This study aims to examine behavioral measures of emotion skills in addition to self-reported measures in women with CSA, ASV, RV, and no sexual victimization history.

Hypotheses

- Women revictimized will show increased self-reported and behavioral emotion skills deficits.
- The CSA only group will be resilient and will show similar self-reported and behavioral emotion skills scores as the control group.
- Emotion skills will predict total sexual victimization severity above and beyond a history of CSA.

Methods

Participants

- 113 female Veterans receiving medical treatment at the Minneapolis VAMC
- Ethnicity: 88.5% Caucasian
- Mean age: 47.5 (SD = 9.7)

Conditions

- Differences in self-reported and behavioral emotion skills were examined between the following groups: No sexual victimization history (Control; N = 32); CSA Only (N = 17); ASV Only (N = 29); and RV (N = 35).

Materials

- A brief demographic questionnaire collected standard demographic information including age, ethnicity, military history, and education level.
- Childhood Sexual Abuse Subscale from the Wyatt Sex History Questionnaire (WSHQ).[7]
- Sexual Experiences Survey (SES).[8]
- Toronto Alexithymia Scale-20 (TAS-20).[9]
- Japanese and Caucasian Facial Expressions of Emotion and Neutral Faces (FACNEUF).[10]
- Attitudinal Comprehension portion of the Aprosodia Battery.[11]

Procedure

Consent & Baseline Questionnaires

↓

Behavioral task 1: Facial Expression Recognition

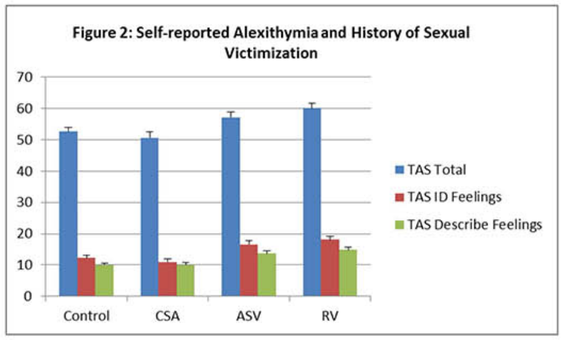
↓

Behavioral task 2: Verbal prosody

↓

Sarcastic or Sincere?

Results: Self-reported Alexithymia and History of Sexual Victimization



Significant group differences in self-reported alexithymia ($F(3, 107) = 6.01$; $p < .05$), ability to identify feelings ($F(3, 107) = 8.05$; $p<.05$), and ability to describe feelings ($F(3, 107) = 10.65$; $p<.05$) were found, where ASV and RV groups reported more impairment than control and CSA only groups.

Table 1: Regression Analyses Examining Associations between Emotion Skills and ASV Severity

	Final Model Coefficients					
Step/Variable	B	SE B	β	R^2	Change in R^2	F Change
Analysis 1: Total Severity						
Step 1. Covariate (CSA History)	4.33	.53	.59*	.38	.38	66.94
Step 2. Predictor (TAS Total)	.11	.03	.28*	.46	.08	15.12
Analysis 2: Total Severity						
Step 1. Covariate (CSA History)	4.34	.53	.59*	.38	.38	66.94
Step 2. Predictor (TAS Identifying Feelings)	.16	.04	.28*	.46	.08	15.89
Analysis 3: Total Severity						
Step 1. Covariate (CSA History)	4.17	.53	.57*	.38	.38	66.94
Step 2. Predictor (Describing Feelings)	.25	.06	.31*	.47	.09	18.55
Analysis 4: Total Severity						
Step 1. Covariate (CSA History)	4.64	.54	.63*	.40	.40	72.19
Step 2. Predictor (Negative Facial Expression ID Reaction Time)	.00	.00	.15*	.42	.02	4.02

Note. * $p < 0.05$, significant, † $p > 0.10$, marginally significant

Controlling for CSA history, self-reported alexithymia, difficulty describing feelings, difficulty identifying feelings, and longer reaction time for identification of negative facial expressions were significantly associated with ASV severity.

Table 2: Regression Analyses Examining Associations between Behavioral Measures of Emotion Skills and ASV Severity, Controlling for CSV Severity and Self-reported Alexithymia

	Final Model Coefficients					
Step/Variable	B	SE B	β	R^2	Change in R^2	F Change
Analysis 1: Total Severity						
Step 1. Covariate (CSA History)	4.35	.52	.59*	.38	.38	66.94
Step 2. Covariate (TAS Total)	.11	.03	.28*	.46	.08	15.12
Step 3. Predictor (Sarcastic Verb % Correct)	-2.25	1.35	-.12†	.47	.01	2.77
Analysis 2: Total Severity						
Step 1. Covariate (CSA History)	4.29	.52	.58*	.38	.38	66.94
Step 2. Covariate (TAS Total)	.12	.03	.31*	.46	.08	15.12
Step 3. Predictor (Sincere Verb RT)	-.001	.00	-.14†	.48	.02	3.84
Analysis 3: Total Severity						
Step 1. Covariate (CSA History)	4.38	.52	.59*	.40	.40	70.39
Step 2. Covariate (TAS Total)	.11	.03	.29*	.48	.08	15.81
Step 3. Predictor (Negative Facial Expression ID RT)	.00	.00	.16*	.50	.02	5.09

Note. * $p < 0.05$, significant, † $p > 0.10$, marginally significant

Controlling for CSA history and self-reported alexithymia, a lower percentage of sarcastic verbalizations correctly identified and a lower percentage of sincere verbalizations correctly identified were marginally associated with ASV severity. Longer reaction time for identification of negative facial expressions was significantly associated with ASV severity.

Discussion

Implications:

- Current results suggest that both self-reported and behaviorally demonstrated emotion skills deficits are associated with increased risk for adult sexual victimization severity.
- Interventions designed to reduce risk by teaching emotion skills have been found to be beneficial, particularly those that focus on teaching individuals to identify and label emotions.[12] However, social skills training focused on behavioral demonstration of emotion skills (e.g., facial expression recognition and production) may be additionally helpful for victims of sexual assault.

Future Directions:

- Given that behavioral emotion skills deficits do appear to be present for victims reporting RV, a greater range of behavioral demonstration of emotion skills should be assessed in future research (e.g. facial expression mimicry, emotional and physical reactivity to emotion-inducing stimuli, and satisfaction with emotional functioning in social relationships).
- Use of psychobiological measures (e.g. EMG to detect mimicry of facial expressions; EKG to assess cardiovascular reactivity to emotional stimuli) in future studies may lend more insight into potential physiological differences affecting emotion skills in this population.

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Pain, Personality, PTSD, and Opioid Use among Veterans

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INTRODUCTION

Chronic Pain and Opioids

- Chronic Pain, defined as pain lasting longer than 3-6 months, affects a significant proportion of military veterans
- It predicts vocational problems, substance use, and sleep disturbance in the community and Post Traumatic Stress Disorder (PTSD) and Substance Use Disorder in military samples
- Opioids Prescriptions , commonly used for chronic pain, have doubled nationwide since 1994
- Nearly 32% of VA veterans are prescribed opioids for pain

MH Diagnosis, PTSD, and Opioid Risk

- There is a lack of evidence for long-term opioid use
- Comorbid substance disorder increases risk of opioid misuse
- Comorbid MH disorder increase injury and accident risk for those taking opioids
- Comorbid PTSD increases risk of opioid-related negative outcomes beyond that of MH Diagnosis in general

Predicting Opioid Use

- Use predicted by other substance use or mental health diagnosis
- Younger age, higher number of healthcare visits, higher use predict abuse
- Female veterans, black veterans and partnered veterans less likely to misuse opioids
- There is a general lack of useful clinical info or assessment tools to predict opioid risk

Opioid use and Personality

- Personality may be a useful factor in predicting use
  - *disconstraint* (disinhibition, impulsivity, risk-taking)
  - *low positive emotionality* (reduced capacity to experience pleasure or positive engagement)
  - *negative emotionality* (neuroticism)
- Disconstraint and Low Positive Emotionality are associated with other substance use

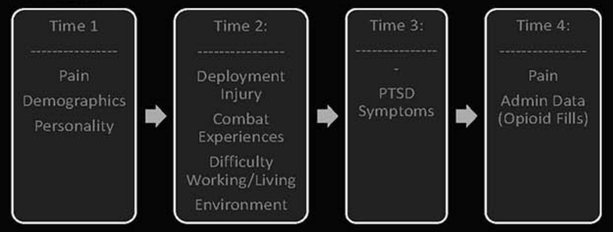
METHODS

Participants and Procedures

- 522 National Guard Brigade Combat Team soldiers
- Returned from an overseas deployment in June, 2007 (Readiness and Resilience in National Guard Soldiers: RINGS Study).
- Soldiers were assessed using a variety of instruments at several time points:

- The T1 survey assessment measured specific personality traits, PTSD symptomology, pain, along with other variables detailed below.
- After deployment, subsequent surveys measured deployment related experiences, pain, and PTSD symptoms.
- This dataset was further augmented by appending opioid related administrative data extracted from the electronic medical record for a relevant period time.
- The majority in this sample were White (93%), male (89%), unmarried (54%), and enlisted (90%).

Measures



ANALYSIS

- Spearman Rank Order correlations were examined for significant univariate relationships between variables of interest.
- Then, we conducted two types of regression to test relationships between hypothesized personality, pain, opiate, and post-traumatic stress variables.
  - Poisson regression was used to estimate how measured variables were related to pain complaints 2-years post-deployment.
  - Negative binomial regression was used to assess the level to which measured variables were related to number of opiate prescription fills.
- Odds ratios for significant regression variables were constructed by dichotomizing according to the variable median for all variables except for opioid fills, which was dichotomized by those participants who had less than three fills, and those that had three or more.

RESULTS

Table 1. Spearman Rank Correlations between for Post Deployment Pain Complaints and VA Opioid Prescriptions Fills

	Post-deployment Pain Complaints		VA Opioid Prescription Fills	
	Correlation Coefficient	Sig.	Correlation Coefficient	Sig.
Gender	0.20	0.00	0.02	0.71
Age	0.08	0.19	0.08	0.07
Rank	0.18	0.00	0.01	0.77
Pre-deployment Pain Complaints	0.39	0.00	0.09	0.03
Disconstraint	0.04	0.48	0.03	0.43
Neuroticism/Negative Emotionality	0.22	0.00	0.09	0.05
Introversion/Low Positive Emotionality	-0.03	0.64	0.02	0.58
Deployment Injury	0.17	0.01	0.18	0.00
Combat Experiences	0.19	0.00	0.06	0.22
Difficult living/working Environment	0.25	0.00	0.09	0.06
PTSD Symptoms	0.49	0.00	0.23	0.00
Post-deployment Pain Complaints			0.16	0.01

Table 2. Results of Regression Analyses Predicting Post-deployment Pain Complaints and VA Opioid Prescription Fills

Poisson Regression Analysis Predicting Post-deployment Pain Complaints

			95% Wald Confidence Interval		Hypothesis Test	
Parameter	B	Std. Error	Lower	Upper	Wald Chi-Square	Sig.
Gender (male)	-.285	.1449	-.569	-.001	3.874	.049
Rank (officers)	-.337	.1559	-.642	-.031	4.660	.031
Injury	-.157	.1113	-.375	.061	1.986	.159
Age	.008	.0056	-.003	.019	1.834	.176
Pre-deployment Pain Complaints	.096	.0366	.025	.168	6.949	.008
Disconstraint	.003	.0207	-.037	.043	.021	.884
Negative Emotionality	.003	.0127	-.022	.028	.051	.822
Introversion	-.005	.0178	-.039	.030	.065	.799
Combat Experiences	.002	.0074	-.012	.017	.087	.768
Difficult Living/Working Environment	.005	.0053	-.006	.015	.791	.374
PTSD Symptoms	.013	.0036	.006	.020	13.671	.000

Negative Binomial Regression Analysis Predicting VA Opioid Prescription Fills

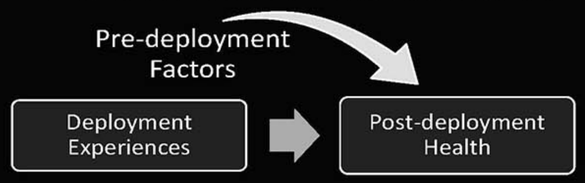
			95% Wald Confidence Interval		Hypothesis Test	
Parameter	B	Std. Error	Lower	Upper	Wald Chi-Square	Sig.
Gender (male)	-.255	.4390	-1.116	.605	.338	.561
Rank (officers)	.252	.3179	-.371	.875	.629	.428
Injury	.516	.3142	-.100	1.132	2.699	.100
Age	.079	.0150	.049	.108	27.716	.000
Pre-deployment Pain Complaints	-.322	.1005	-.519	-.125	10.247	.001
Disconstraint	.145	.0571	.033	.257	6.410	.011
Negative Emotionality	.163	.0330	.098	.227	24.225	.000
Introversion	.050	.0383	-.025	.125	1.700	.192
Combat Experiences	.003	.0238	-.044	.049	.013	.908
Difficult Living/Working Environment	.039	.0129	.013	.064	8.937	.003
PTSD Symptoms	.027	.0101	.007	.046	6.933	.008
Post-deployment Pain Complaints	.135	.0923	-.046	.316	2.135	.144

Table 3. Odds Ratios for Post-deployment Pain Complaints and VA Opioid Prescription Fills

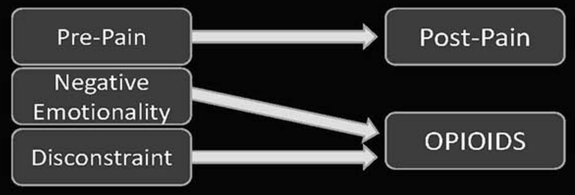
		95% Confidence Interval		
	Value	Lower	Upper	Sig.
Post-deployment Pain Complaints				
Pre-deployment Pain Complaints	3.44	1.82	6.53	0
PTSD Symptoms	4.3	2.53	7.29	0
VA Opioid Prescription Fills				
Pre-deployment Pain Complaints	1.49	0.68	3.3	0.317
Neuroticism/Negative Emotionality	2.05	1.04	4.05	0.039
Disconstraint	1.56	0.79	3.07	0.203
Difficult living/working Environment	4.14	1.76	9.77	0.001
PTSD Symptoms	15.5	3.6	66.73	0
Post-deployment Pain Complaints	3.22	1.24	8.33	0.016

CONCLUSIONS

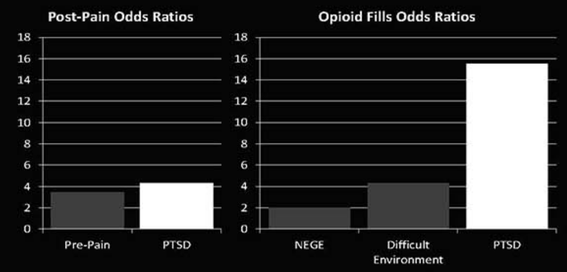
- Post-deployment health disturbances are not solely the result of deployment experiences. Rather, pre-deployment factors significantly predict post-deployment pain complaints and opioid prescriptions.



- Though pain and opioid use are related, different pre-deployment factors are associated with each. Post-deployment pain complaints do not predict opioid prescriptions, Rather, consistent with findings regarding other substances, negative emotionality and disconstraint are more strongly associated with number of prescriptions.



- Individuals with higher levels of PTSD are more than 4 times as likely to report more pain complaints and more than 15 times as likely to have more than 3 opioid fills post-deployment. Because PTSD symptoms appear to predict both pain and prescriptions post-deployment to a greater degree than other significant variables, PTSD may play an extensive role in both pain and substance use mechanisms.



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Predicting Outcomes in an Inpatient Rehabilitation Setting for TBI/Polytrauma: Comparing Length of Stay and Clinical Intervention Variables

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Introduction

Inpatient rehabilitation for traumatic brain injury (TBI) often consists of an interdisciplinary model of care (Ben-Yishay & Prigatano, 1990; Cicerone et al., 2008) that includes physical therapy, neuropsychology, speech/language pathology, occupational therapy, nursing, and other professional services. However, the nature of clinical interventions in rehabilitation settings, and the outcomes of these interventions, are not consistently defined or characterized across studies (Brasure et al., 2012), which makes predicting rehabilitation outcomes challenging. Several studies have failed to show a significant effect of interdisciplinary rehabilitation for moderate-to-severe TBI (Brasure et al., 2013). Length of stay (LOS) is associated with several rehabilitation outcomes (e.g., Malec et al., 1993), but spontaneous recovery can confound conclusions regarding the predictive value of this variable (Brasure et al., 2012). The number of therapy contacts during the rehabilitation stay, and Relative Value Units (RVU's), which capture three components of patient care (clinician work, practice expense, and malpractice expense), may better characterize the complex nature of rehabilitation services provided by interdisciplinary teams. The current study aims to compare the predictive value of LOS with clinical intervention variables (i.e., number of contacts and RVU's) across four outcome domains: level of disability (assessed by two measures), post-injury symptoms, level of supervision, and satisfaction with life.

Methods

Design: Cross-sectional. Data were obtained from a VA Polytrauma Rehabilitation Center (PRC)/TBI Model System (TBIMS) site. Additional data were collected locally through an independent project approved by a local IRB.

Setting: A large, Midwestern, VA PRC site that provides comprehensive interdisciplinary rehabilitation for patients with traumatic brain injury and polytraumatic injuries. Data from veterans and active duty service members sustaining moderate-to-severe TBI were included.

Measures: Measures included the Functional Independence Measure (FIM; UDSMR, 1997), Neurobehavioral Symptom Inventory (NSI; Cicerone & Kalmar, 1995), Supervision Rating Scale (SRS; Boake, 1996), Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), and the Disability Rating Scale (Wright, 2000). Measures were collected upon admission and discharge, and at one year following discharge.

Results

Participants: Forty-eight veterans and active duty service members (mean age = 41.69, *SD* = 16.58; 96% male; mean education = 13.3 years, *SD* = 1.92; mean LOS = 67.78 days, *SD* = 63.61); employment status (mean hours worked per week = 41.00, SD = 10.72); marital status: 34% single, 42% married, 16% divorced, 4% separated, 4% widowed, with moderate-to-severe TBI.

Statistical Analyses: Length of stay did not significantly predict any outcome measure (NSI Change: $Y = -0.01$, $X = -1.28$, $SE_b = 0.66$, $p = 0.06$, $R^2 = 0.08$; SRS: $Y = 0.01$, $X = 1.85$, $SE_b = 0.68$, $p = 0.16$, $R^2 = 0.08$; FIM Change: $Y = 0.07$, $X = 34.05$, $SE_b = 6.52$, $p = 0.35$, $R^2 = 0.02$; SWLS: $Y = 0.12$, $X = 36.11$, $SE_b = 8.13$, $p = 0.18$, $R^2 = 0.04$; DRS: $Y = 0.07$, $X = 53.47$, $SE_b = 10.76$, $p = 0.57$, $R^2 = 0.01$).

Due to delays in accessing clinical data from VACO, we were unable to complete analyses examining work RVU and number of visits. Our expectation is that these metrics will be a stronger predictor of outcome than LOS. We hope to present/publish these data when they become available.

Patient Characteristics	M	SD
Age	41.69	16.58
Years of education	13.13	1.92
Length of stay (in days)	67.78	63.61
Hours worked per week	41.00	10.72
SRS	2.57	2.50
NSI (change score)	- 2.22	3.09
SWLS	19.19	8.99
DRS	4.56	3.26
FIMS (change score)	36.96	27.85

Regression Table for All Hypothesized Relationships Between Length of Stay and Rehabilitation Outcomes (reported per outcome variable)

	B	SE_b	β	p	R^2
NSO change	-0.01	0.66	-1.28	0.06	0.08
SRS	0.01	0.68	1.85	0.16	0.08
FIM Change	0.07	6.52	34.05	0.35	0.02
DRS	0.12	8.13	36.11	0.18	0.04
SWLS	0.07	10.76	53.47	0.57	0.10

Discussion

Characterization of TBI rehabilitation interventions and outcomes is central to systematic evaluation of the effectiveness of rehabilitation programs.

Based on the treatment theory described by Whyte (2014), the current study aimed to characterize the interventions provided within an inpatient TBI/polytrauma rehabilitation program and identify active ingredients associated with rehabilitation outcomes. Consistent with expectations, length of stay did not significantly predict level of disability, post-injury symptoms, level of supervision, or satisfaction with life.

Number of clinical visits and RVU's are believed to represent active ingredients of rehabilitation which may offer a more nuanced approach to describing inpatient rehabilitation and may better capture the complexity of rehabilitation interventions compared to length of stay. Thus, we expect that these measures will be more closely associated with rehabilitation outcomes compared to LOS. We plan to obtain these data in 2014.

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Examining the self-medication hypothesis of alcohol misuse to treat PTSD and depression symptoms

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Background

- Posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) commonly co-occur with alcohol use disorder (AUD) following deployment
- The self-medication hypothesis has garnered substantial support for explaining the high comorbidity of PTSD and MDD with AUD
  - Self-medication hypothesis: alcohol is used to cope with (self-medicate) distressing psychiatric symptoms
- Previous studies examining the self-medication hypothesis of PTSD symptoms have examined the different PTSD symptom clusters to determine if a particular PTSD symptom cluster (I.e., reexperiencing, avoidance, numbing, or hyperarousal) is more associated with AUD
  - There have been mixed findings in the literature and studies have not yet examined PTSD's dysphoria factor (general distress) which is conceptually similar to depression
- Current study used a cross-lagged panel design to examine the temporal relationship between 1) PTSD and AUD and 2) MDD and AUD to further explore the self-medicating process
  - This approach is often used to infer causal associations in the data derived from nonexperimental, longitudinal research designs

Aim & Hypotheses

Aim of the present study: To determine if the self-medication hypothesis was supported for both PTSD and depression symptoms following deployment and if the self-medication process was more specific to PTSD-specific symptoms (e.g., avoidance) or non-specific symptoms (i.e., dysphoria)

Hypotheses:

1. Time 1 PTSD symptoms would predict Time 2 AUD symptoms (and Time 1 AUD symptoms would not predict Time 2 PTSD symptoms)
2. Time 1 depression symptoms would predict Time 2 AUD symptoms (and Time 1 AUD symptoms would not predict Time 2 depression symptoms)
3. Time 1 dysphoria symptoms would predict Time 2 AUD symptoms (and Time 1 AUD symptoms would not predict Time 2 dysphoria symptoms)
4. Neither Time 1 reexperiencing, avoidance, or hyperarousal would predict Time 2 AUD

Method

- Sample: 440 members of the Minnesota National Guard deployed to Iraq Iraq from March 2006 to July 2007 (Readiness and Resilience in National Guard Solders; RINGS Study)
- Soldiers were administered surveys 3 months following deployment (Time 1) and again 15 months following deployment (Time 2)
- Measures:
  - PTSD: PTSD Checklist- Military Version (PCL-M)
  - MDD: Beck Depression Inventory- Second edition (BDI-II)
  - AUD: Alcohol Use Disorders Identification Test (AUDIT)
- Data Analytic Plan: A series of three, two part regression models were run:
  1. Time 2 alcohol use (AUDIT scores) were regressed on Time 1 Alcohol use and PTSD total (PCL) scores
  2. Time 2 PTSD (PCL) scores were regressed on Time 1 PTSD and alcohol scores
  3. Time 2 alcohol use was regressed onto Time 1 alcohol use and the four PTSD factors separately (i.e., there were four additional regression analyses computed for each PTSD factor)

Results

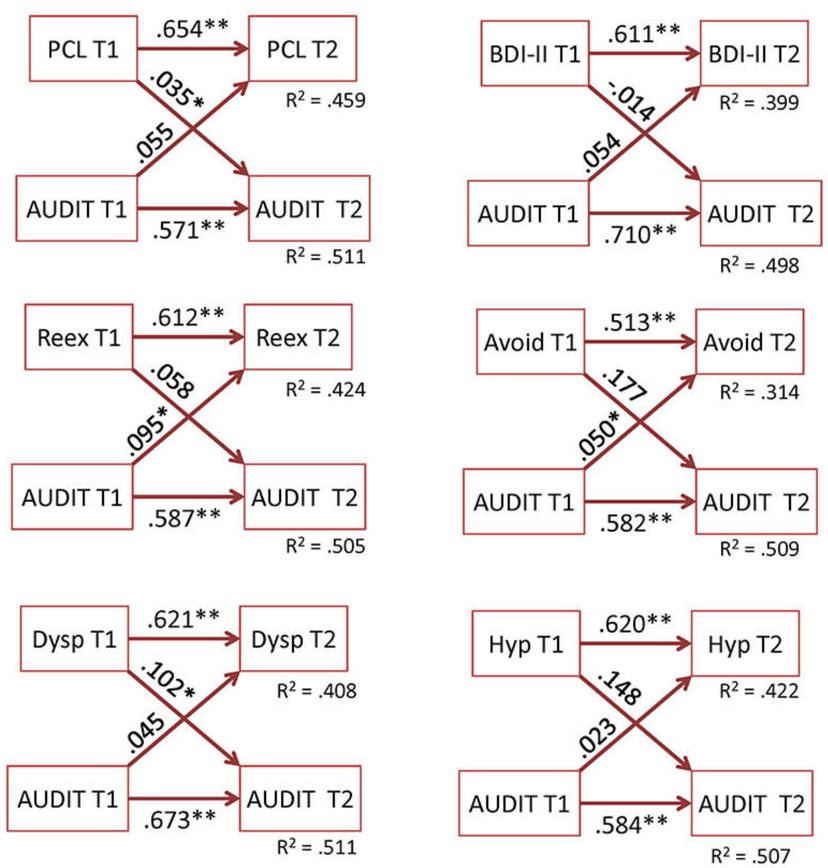
Demographic Background

n = 440	n (%)
Male	389 (88.5)
Caucasian/White	381 (86.6)
married	213 (48.5)
Enlisted	377 (85.6)
Combat exposure	400 (91)
	M (*SD*)
Age	30.1 (8.9)
Schooling	14.3 (2.0)

Measures

	M (*SD*)
PCL Time 1	35.7 (14.0)
PCL Time 2	35.8 (14.9)
BDI-II Time 1	9.7(8.2)
BDI-II Time 2	11.2 (9.5)
AUDIT Time 1	7.2 (6.0)
AUDIT Time 2	6.0 (5.1)

Cross-Lagged Analyses



Note: * = p< .05; ** = p< .01

Reex = Reexperience; Avoid = Avoidance; Dysp = Dysphoria; Hyp = Hyperarousal

Discussion

- Results of the cross-lagged analyses support the self-medication theory for PTSD but not depression
  - Time 1 PTSD symptoms predicted change in Time 2 AUD symptoms (after accounting for Time 1 AUD symptoms), supporting hypothesis 1
  - Time 1 depression symptoms did not predict change in Time 2 AUD symptoms, not supporting hypothesis 2
  - These results suggests that Veterans who consume alcohol to cope with distressing psychiatric symptoms do so primarily in response to PTSD symptoms but not depressive symptoms
- PTSD Factors:
  - Time 1 dysphoria symptoms predicted change in Time 2 AUD symptoms (consistent with hypothesis 3)
  - Time 1 AUD symptoms predicted change in both Time 2 reexperiencing and avoidance symptoms (inconsistent with hypothesis 4)
- Clinical Implications: Results highlight the importance of simultaneously targeting both PTSD and AUD symptoms in treatment
  - Individuals who are motivated to cope with distressing PTSD symptoms do so to self-medicate dysphoria
  - Both reexperiencing and avoidance symptoms immediately following deployment are predictive of change in alcohol use one year following deployment
- Limitations: results based solely on self-report measures from a predominately male, Caucasian, National-Guard sample

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Distress and Perceived Stigma as Predictors of Preferences for Non-traditional Services

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Abstract

The purpose of this study is to examine distress and perceived stigma as predictors for the use and preference of non-traditional mental health services among veterans. Ethnic differences in these relationships were also examined.

First Hypothesis: Veterans with higher levels of distress and higher levels of perceived stigma will be more likely to prefer, and to use, non-traditional services.
Second Hypothesis: Ethnic minority veterans will be more likely to prefer, and to use, non-traditional services.

Introduction

- Stigma is widely recognized in research literature as a barrier to mental health care (Brown et al., 2010; Cheng, Kwan, & Sevig, 2013; Conner, Copeland, Koeske, & Reynolds, 2010; Conner, Koeske, & Brown, 2012; Kim, Britt, Klocko, Riviere, & Adler, 2011).
- There are two types of stigma—public stigma and self-stigma (Corrigan, 2004). Public stigma is the negative perception of the general public about mental illness, leading to stereotyping and discrimination. Internalized stigma, which is also termed as self-stigma is the internalization of public stigma, leading to lower self-esteem and self-efficacy .
- Among veterans, stigma and barriers to mental health treatment are associated with feelings of weakness, embarrassment, and perceived scheduling challenges; these negative beliefs are associated with lower levels of engagement in mental health care (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009).
- Status as a racial/ethnic minority poses additional challenges to seeking mental health care. Ethnic minorities are even less likely to seek treatment and more likely to drop out prematurely (Pole, Gone, & Kulkarni, 2008) compared to their majority counterparts.
- Thus, the exploration of veterans' preferences for alternative treatments can help to address these obstacles directly. Furthermore, is important to consider the worldviews of ethnic minority veterans and work toward developing culturally sensitive treatment modalities.

Method

Research Design. This is an original survey data study, which utilized stratified random sampling (1000 surveys equally distributed to Caucasians, Latino/Latinas and African Americans) of VISNS23 Veterans. Three waves of the survey were mailed to Veterans managing a mental illness. Exclusion criteria included dementia and presence of substance use in the absence of a mental health disorder. A total of 381 veterans provided usable responses; 361 males and 51 females with an age range of 24-93, including 178 Caucasians, 106 African Americans, and 62 Latino/Latinas.
Measures. Distress was operationalized using the Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995). Perceived stigma was operationalized using the Perception of Stigmatization by Others for Help-seeking scale (PSOSH; Vogel, Wade, & Ascheman, 2009). Nontraditional service use was operationalized using the Service Utilization scale (SU; Erbes, Westermeyer, Engdahl, & Johnsen, 2007). Non-traditional service preference was operationalized using the Service Provider and Setting Preference scale developed for this study—a 12-item measure assessing where (e.g., hospital, religious organization), who (e.g., physician, clergy, veteran) and type of services (e.g., counseling, medication, yoga) respondents preferred. All measures were assessed for reliability and validity.
Procedures. The researchers employed hierarchical regression analyses (IBM SPSS version 19). The criterion variables were the use of non-traditional services and preferences for non-traditional services. The criterion variables were measured as separate and continuous variables. Distress was entered in the first step and perceived stigma was entered in the second step.

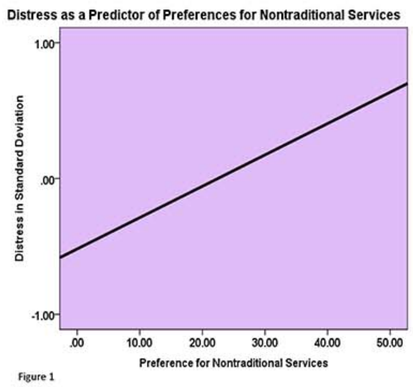

Figure 1

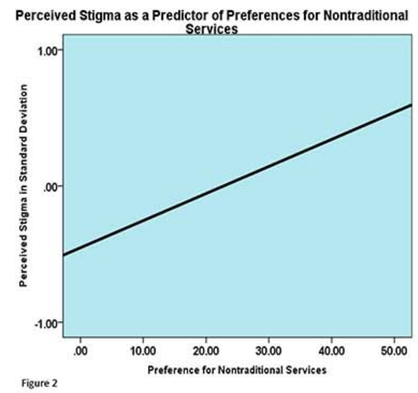

Figure 2

Results

First Hypothesis: Distress (β = .05, p =.38) and perceived stigma (β = .02, p = .78) did not predict veterans' use of non-traditional services. Distress (β = .21, p < .001) and perceived stigma (β = .16 , p < .01) predicted veterans' preferences for non-traditional services. R Square indicated 8.1 % of the variance was accounted for by distress and an additional 1.9 % by perceived stigma. Please refer to Figures 1 and 2.
Second Hypothesis: No significant ethnic differences were identified on use of non-traditional services F (2, 340) = 2.28, p = .10 and preferences for non-traditional services F (2, 339) = 2.09, p = .13. Although not statistically significant, minority participants gave higher ratings on items tapping use of and preferences for non-traditional services than Caucasians. In addition, African Americans gave higher ratings on items tapping preferences for traditional services than Caucasians F (2, 228) = 5.67, p < .01 and Latinos preferred to receive mental health counseling from medical providers (i.e., psychiatrist, physicians) more than Caucasians F (2, 310) = 4.11, p = .02.

Discussion

- Findings indicated that alternative treatments may help to address barriers to treatment.
- Distress and perceived stigma predicted veterans' preferences for non-traditional services (e.g., settings, providers, treatment).
- Although not statistically significant, preliminary findings suggest that ethnic minority veterans may prefer more traditional *and* non-traditional services compared to Caucasian veterans. This may be associated with differences between Caucasian and ethnic minority veterans in access to care.
- Future research should examine preferences for non-traditional services and ways to improve access to effective alternative services in addressing barriers to mental health treatment.

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Higher self-report of headache impact and pain intensity predict failure on aggregate performance validity tests (PVTs) in Veterans with mild traumatic brain injury (mTBI)

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Introduction

- One of the signature injuries of the Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) wars is traumatic brain injury (TBI).
- Recently, several studies have demonstrated no impact of mTBI after adjusting for PTSD and/or mood disturbance.
- Headaches, however, are one symptom that have not been fully accounted for by PTSD alone.
- A high percentage of veterans from (OEF/OIF) wars have been found to fail performance validity tests (PVTs), the reasons for which remain under investigation.
- Suhr & Spickard (2012) suggested that headache-related fear and the avoidance of cognitively effortful tasks ("cogniphobia"; Martelli, Zasler, Grayson, & Liljedahl, 1999) to prevent headaches or headache exacerbation may be one contributing factor to PVT failures.
- Given that headaches have been found to be a frequently endorsed symptom in OEF/OIF veterans, the purpose of the present study was to explore the relation between veterans' report of current pain intensity, daily impact of headaches, and PVT failure.

Method

•Subjects included 115 veterans or active duty servicemen/women who were referred for a clinical neuropsychological evaluation.

•All participants were deployed as part of OEF/OIF.

•All subjects were evaluated in the outpatient Polytrauma/TBI Clinic at one of five VA Medical Centers given histories of known or suspected mTBI.

•The sample was divided into two groups based on PVT performance, such that one group passed all PVTs and the other failed two or more, with at least one PVT being the Word Memory Test (WMT).

•The two groups did not significantly differ on any demographic variables, although there was a trend towards those who failed PVTs being older.

•Logistic regressions were conducted to determine if self-reported impact of headaches or current pain intensity can predict group membership, after controlling for the tendency to exaggerate (MMPI-2-RF FBS raw).

Table 1. Demographics

Variable	Mean (SD)	*p*-value
Age	32.3 (7.8)	.057
Sex (% male)	93	--
Education	13.1 (1.6)	.446
Ethnicity (%)		.738
Caucasian	72.2	
African American	10.4	
Latino	11.3	
Multiracial	1.7	
Other	4.3	

Measures

- The following PVTs were administered within the context of the participant's clinical neuropsychological evaluation and were included in the analyses:

Test	Cutoff Score
Test of Memory Malingering (TOMM)	Trial 2 < 45
Word Memory Test	IR , DR, or CNS ≤ 82.5%
California Verbal Learning Test (CVLT-II)	Forced Choice <14
Reliable Digit Span	<7
Rey 15 Item Test + Recognition	Combined score <20

- The following self-report measures were administered:

  Headache Impact Test (HIT-6): assesses the impact of headaches on an individual's functioning and well-being.

  Brief Pain Inventory (BPI): assesses the severity of pain and impact of pain on daily functioning.

Data Analysis & Results

- MMPI-2-RF FBS scale was included as a covariate in all analyses to control for symptom validity.
- Individuals who failed 2 or more PVTs endorsed significantly more headache impact and general pain intensity than those who passed all PVTs, even after controlling for symptom exaggeration with the MMPI-2-RF FBS scale (HIT-6: $F(2, 112) =$ $p < .001$; BPI: $p < .001$).
- Ratings on the HIT-6 significantly predicted group membership (fail vs. pass) above and beyond the variance accounted for by over-reporting (FBS: $B = .098$, S.E. B = .057, Wald = 2.966, 95% CI [.987, 1.233] $p = .085$; HIT-6: $B = .112$, S.E. B = .036, Wald = 9.917, 95% CI [1.043, 1.199], $p = .002$). Please see Table 3.
  - Sensitivity and specificity were not optimal (Sensitivity = 62.5%, Specificity = 72.3%).
- Ratings on the BPI significantly predicted group membership above and beyond the variance accounted for by over-reporting (FBS: $B = .091$, S.E. B = .04, Wald = 5.129, 95% CI [1.012, 1.085], $p = .024$; BPI: $B = .386$, S.E. B = .145, Wald = 7.079, 95% CI [1.107, 1.954], $p = .008$). Please see Table 4.
  - Specificity was noticeably stronger than sensitivity (Sensitivity = 55.6%, Specificity = 78.3%).

Conclusions

- Results reveal that PVT failures are not entirely explained by over-reporting of symptoms, as measured by the MMPI-2-RF FBS scale. This is consistent with studies that reveal distinctions between *performance* versus *symptom* validity tests (e.g., Demakis et al., 2008).
- Results also suggest that those who report a high degree of functional impact from their headaches, as well as high levels of pain , are more likely to fail PVTs even when controlling for response bias.
- Although recent studies have shown high rates of PVT failures in OEF/OIF samples, factors that contribute to such failures have not been well investigated.
- Current results provide preliminary evidence to suggest that pain and the perceived impact of headaches may contribute to the high rates of PVT failures observed in OEF/OIF samples to date and warrants additional investigation.

Table 2. Mean Ratings on HIT-6 and BPI Measures for Pass and Fail Groups

Measure	Group	Mean (SD)
HIT-6	Pass	59.28 (8.98)
	Fail ≥ 2	66.53 (5.83)
BPI	Pass	4.34 (1.78)
	Fail ≥ 2	5.48 (1.45)

Table 3. Summary of Binary Logistic Regression Analyses for HIT-6 Predicting Group (Pass vs. Fail) Membership, Controlling for Over-Reporting

Variables	B	SE B	Wald	df	*p*-value	Exp (B)
FBS	.098	.057	2.966	1	.085	1.103
HIT-6	.112	.036	9.917	1	.002	1.119

Table 4. Summary of Binary Logistic Regression Analyses for BPI Predicting Group (Pass vs. Fail) Membership, Controlling for Over-Reporting

Variables	B	SE B	Wald	df	*p*-value	Exp (B)
FBS	.091	.04	5.129	1	.024	1.095
BPI	.386	.145	7.079	1	.008	1.470

Table 5. Classification Table for HIT-6 Performance Predicting Group Membership

		Predicted		% Correct
		Pass	Fail ≥ 2	
Observed	Pass	47	18	72.3
	Fail ≥ 2	18	30	62.5
Overall Percentage				68.1

Table 5. Classification Table for BP Performance Predicting Group Membership

		Predicted		% Correct
		Pass	Fail ≥ 2	
Observed	Pass	47	13	78.3
	Fail ≥ 2	20	25	55.6
Overall Percentage				68.6

Relationship Between Personality Dimensions and Observed Support Behavior in Veteran Couples

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Background

Perceptions of social support correlate robustly with many of the challenges that Veterans and their partners face following combat deployments, including psychiatric illnesses and decreased relational well-being. Personality characteristics are also linked to many post deployment outcomes (e.g., alcohol use disorders, PTSD, posttraumatic growth, mental health service utilization), but little is known about the effects of veterans' and partners' personality on social support processes, including enacted support (i.e., observable support behaviors) and perceptions of support. Thus, the central objectives of this study involve the examination of the relations between personality characteristics and support behaviors and perceptions in a behavioral observation paradigm.

Main Hypotheses:

Personality dimensions will be associated with observer-coded support behaviors (H1) and self-reported perceptions of support (H2) during a dyadic discussion task.

Current Progress:

Data have been collected from 26 couples over the past 6 months. To obtain an adequate sample size for this pilot protocol (N = 50 couples), recruitment was expanded from only veterans engaged in EBTs for PTSD (i.e., PE or CPT) on Team L to any veteran currently engaged in psychotherapy for a trauma-related concern. Recruitment is projected to be concluding by late September. Behavioral coding, data entry, and preliminary data analyses are currently underway.

Method

Veterans who are currently engaged in psychotherapy and also in a married and cohabitating relationship were recruited to participate. Each partner completed a background survey, an MMPI-2RF, and pre- and post- interaction surveys. Veterans were prompted to identify a specific goal they hope to address during treatment. Couples engaged in a 10-minute videotaped interaction discussing this goal. Veteran and partner behavior will be coded by a team of trained observers.

Background Survey	Interaction	Pre- and Post-Interaction Survey	Observer Ratings
1. Demographics 2. PCL 3. MOS Support Scale 4. MMPI2-RF	Veteran describes one goal he/she has for treatment.	1. Support 2. Responsiveness 3. Mood	Independent raters code videotapes.

Next Steps

Coding Process:
Coding of the video tapes began in June. A team of 8 undergraduate and graduate students were asked to watch all videotapes to familiarize themselves with the data. They were then divided into two teams, with 4 coding Veteran behavior and 4 coding Partner behavior. Training included review of basic principles of coding dyadic data, definitions of specific constructs of interest (e.g., support behavior, receptivity to support), review of exemplars, and practice coding. Coders will remain blind to all hypotheses and other data throughout this process.

Planned Analyses:
Actor-Partner Interdependence Modeling (APIM; Kashy & Kenny, 2000; Kashy, Kenny, & Cook, 2006) will be used to address the non-independence in the data. Prior to analysis, data will be screened response patterns that may be invalid, outliers will be windzorized, and all independent variables will be grand-mean centered (Aikin & West, 1991). Models will assess for relations between personality characteristics and mean coder ratings of support (H1) and veteran- and partner-reported perceived support (H2).

Current Results:
Bivariate correlations from the background survey between MOS Support Scale and PCL sub- and full scales reveal a positive relation between veteran symptoms and general perceptions of social support, and a negative relation between symptoms and support for partners. Contextual factors (e.g., salience of the patient role) may have influenced this preliminary finding. Scatterplots of these relations reveal almost all veterans reported high levels of support, with a small handful of those lower symptom levels reporting low support.

Participants

N = 26 couples

Soldiers	Partners
87% Male	82% Female
96% Caucasian	96% Caucasian
70% Married	70% Married
Age (mean) = 44	Age (mean) = 42
PCL (mean) = 47.65	PCL (mean) = 15.43
PCL (SD) = 19.65	PCL (SD) = 18.67

Preliminary Correlations

	Veteran Perceived Support (MOS)	Partner Perceived Support (MOS)
Veteran PCL - total	.24	-.10
Veteran PCL - reexperiencing	.28	-.10
Veteran PCL - avoidance	.44*	.04
Veteran PCL – dysphoria	.16	-.15
Veteran PCL - hypervigilance	.14	-.09
Partner PCL – total	-.07	-.38^
Partner PCL - reexperiencing	-.02	-.28
Partner PCL - avoidance	-.07	-.39^
Partner PCL – dysphoria	-.20	-.44*
Partner PCL - hypervigilance	.02	-.32

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Comparing WAIS-IV Reliable Digit Span (RDS) and Age Corrected Scaled Score's (ACSS) Performance Validity Cutoffs when Veterans' Effort is Determined by One or More Criterion Measures

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Introduction

- Recent studies have demonstrated a high rate of invalid test performance, or performance validity test (PVT) failures, among veterans and military service members, with rates ranging from 17% to 58% (Armistead-Jehle, 2010; Whitney et al., 2009).
- Categories of PVTs include indices embedded within traditional neuropsychological instruments and freestanding measures.
- The Wechsler Adult Intelligence Scale (WAIS) includes a number of embedded measures of effort, such as the original Reliable Digit Span (RDS; Greiffenstein, Baker, & Gola, 1994) and Digit Span age-corrected scaled score (ACSS). The former is based on the sum of the longest strings of digits forward and backward where both trials are passed, and the latter is based on the Digit Span total raw score.
- Jasinski and colleagues (2011) conducted a meta-analysis to evaluate RDS and ACSS effectiveness in detecting non-credible effort and recommended mean cut scores of 7.1 (*SD*=0.3) and 6.8 (*SD*=1.9), respectively. A review and cross-validation study found that the RDS cut score ≤ 7 resulted in sensitivity of 58% with specificity < 90%, while a cut score ≤ 6 resulted in lower sensitivity (30%) with 96% specificity (Schroeder et al., 2012). Comparatively, ACSS cut scores between ≤ 4 and ≤ 6 have sensitivities between 25-50% and specificities between 83% and 97% (Axelrod et al., 2006).
- Since the publication of the latest edition of the WAIS (WAIS-IV) added a new sequencing portion to the original Digit Span subtest, the classification power of the ACSS inclusive of Sequencing as compared to the original RDS remains unclear. Studies to date have varied based on the criterion measure used and patient sample studied.
- Larrabee (2008) and Victor et al. (2009) have demonstrated that multiple PVT failures increases the probability of detecting non-credible effort over and above the failure on one PVT alone.
- As such, the purpose of the current study was to be the first known study to compare the sensitivity and specificity of RDS and ACSS inclusive of Sequencing when the effort criterion was determined by one well-established PVT or any three aggregated PVT failures, in a sample of Iraq/Afghanistan veterans with combat-related mild traumatic brain injury (TBI).

Measures

- The following measures were administered within the context of the participant's clinical neuropsychological evaluation and were included in the analyses:
  - Word Memory Test (WMT)
  - Test of Memory Malingering (TOMM)
  - California Verbal Learning Test-Second Edition, Forced-Choice (CVLT-II)
  - Rey 15 plus Recognition Test

Methods

- Participants were 230 veterans referred for a clinical neuropsychological evaluation given histories of known or suspected combat-related mild TBI.
- All participants were deployed as part of Operation Enduring Freedom (OEF) and/or Operation Iraqi Freedom (OIF), and their branches of service were as follows: Army (n = 146, 63.5%), Marines (n = 38, 16.5%), National Guard (n = 18, 7.8%), Navy (n = 17, 7.4%), and Air Force (n = 11, 4.8%).
- All participants were evaluated at Polytrauma Network Sites and referred for evaluation through a nationwide VA TBI screening process.
- The participants were consecutively referred veterans across 5 VA hospitals.
- All participants provided informed consent to participate in the study. They were administered a semi-structured clinical interview and administered a standardized neuropsychological battery.
- The majority of patients were male (n = 216), with a mean age of 32.08 years (SD = 7.40).
- Ethnicity of the participants was as follows: Caucasian (n = 155, 67.4%), Latino (n = 40, 17.4%), African American (n = 25, 10.9%), Multiracial (n = 4, 1.7%), and Other (n = 6, 2.6%).
- Mean years of education was 13.14 (SD = 1.68).

Results

- Sensitivity and specificity for established RDS (≤7) and ACSS (≤6) cut scores are included in Table 1. When effort was classified by WMT failure, both RDS and ACSS yielded modest sensitivity rates (41.8% and 38.8%, respectively), with generally adequate specificity (88.5% and 90.6%, respectively).
- Receiver operating characteristic (ROC) analyses were conducted to determine how well RDS (≤7) and ACSS (≤6) discriminated between passes and failures on the WMT. The area under the curve (AUC) for RDS (≤7) was .65 (CI = .58-.72) and for ACSS (≤6) was .65 (CI = .58-.72).
- When the effort criterion was established by failure on ANY three PVTs, RDS and ACSS sensitivity increased (63.2% and 73.7%, respectively) but at the expense of declines in specificity (73.9% and 77.7%, respectively).
- ROC analyses conducted to determine how well RDS (≤7) and ACSS (≤6) discriminated between passes and failures across any combination of three PVTs found that the area under the curve (AUC) for RDS (≤7) was .69 (CI = .55-.82) and for ACSS (≤6) was .76 (CI = .64-.88).

Table 1

RDS and ACSS Sensitivity and Specificity When Effort is Based on any Combination of Criterion Failures

Failure	N	RDS ≤ 7 Sensitivity	RDS ≤ 7 Specificity	N	ACSS ≤ 6 Sensitivity	ACSS ≤ 6 Specificity
w+t+c+r	6	75	72.5	7	87.5	75.7
w+t+c	10	66.7	73.5	11	73.3	76.7
w+t+r	10	70	72.7	8	80	75.9
w+c+r	7	70	72.7	9	90	76.4
w+t	21	52.5	75.8	23	57.5	80
w+c	15	62.5	74.8	16	66.7	78.2
w+r	10	62.5	73.4	12	75	77.1
w	56	41.8	88.5	52	38.8	90.6
w (alone)	28	34.6	73.8	22	27.1	73.8
t+c+r	6	75	72.5	7	87.5	75.7
t+c	11	68.8	73.8	12	75	77.1
t+r	7	70	72.7	8	80	75.9
t	22	52.4	76.1	25	59.5	80.9
t (alone)	0	0	70.7	1	1	73.8
c+r	7	70	72.7	9	90	76.4
c	16	64	75.1	17	68	78.5
c (alone)		No one	failed		cvlt in	isolation
r	10	55.5	73.1	12	66.7	76.9
r (alone)		No one	failed		rey in	isolation

Note. PVT measures were denoted by w (Word Memory Test), t (Test of Memory Malingering), c (California Verbal Learning Test-Second Edition, Forced-Choice), or r (Rey 15 plus Recognition Test).

Table 2

RDS and ACSS Effort Sensitivity and Specificity When Effort is Determined by Failure on any Two or Three Criterion Measures

	RDS ≤ 7		RDS ≤ 6		ACSS ≤ 7		ACSS ≤ 6	
	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
Failed any 2 measures	53.7	78.4	27.8	93.2	66.7	69.9	57.4	83
Failed any 3 measures	63.2	73.9	36.8	90.5	73.7	64.5	73.7	77.7

Conclusions

- The current data suggest, for OEF/OIF veterans with a history of mild TBI, the WAIS-IV Digit Span ACSS (≤6) may be a preferable embedded effort index compared to the RDS.
- Compared to the RDS, the ACSS also does not require any additional computation.
- Whether the effort criterion was established using WMT failure or failure on any combination of three SVTs, the ACSS (≤6) allowed for better, while often modest, specificity.
- Restraint from over-reporting or over-interpreting the ACSS embedded measure of effort, or any single measure of effort, should be used. Collecting multiple PVT failures increases the likelihood of detecting non-credible effort (Larrabee, 2008).

Validation of the Validity-10 Scale of the Neurobehavioral Symptom Inventory with the MMPI-2-RF and Test of Memory Malingering

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Introduction

The VA Health Care System has developed a protocol for screening OEF/OIF veterans for the presence of traumatic brain injury (Belanger et al., 2012; Donnelly et al., 2011). Following a positive screen, veterans are referred for a comprehensive TBI evaluation (CTBIE) that gathers combat/medical history and the Neurobehavioral Symptom Inventory (NSI; Cicerone & Kalmar, 1995), a 22-item reliable and valid self-report measure of postconcussive symptoms.

The CTBIE has no standardized validity measures, so identifying an embedded index of symptom overreporting appeared indicated. Vanderploeg et al. (2013) examined a number of proposed measures from the NSI for this purpose, using validity criteria from the Mild Brain Injury Atypical Symptoms (mBIAS) and the Personality Assessment Inventory (PAI) for validation, and determined that the NSI Validity-10 performed best as an index of overreporting.

The present study sought to extend this finding by cross-validating the Validity-10 with symptom validity and specific problem scales from the MMPI-2-RF and a measure of performance validity (TOMM) for veterans assessed within a PM&R setting.

Methods

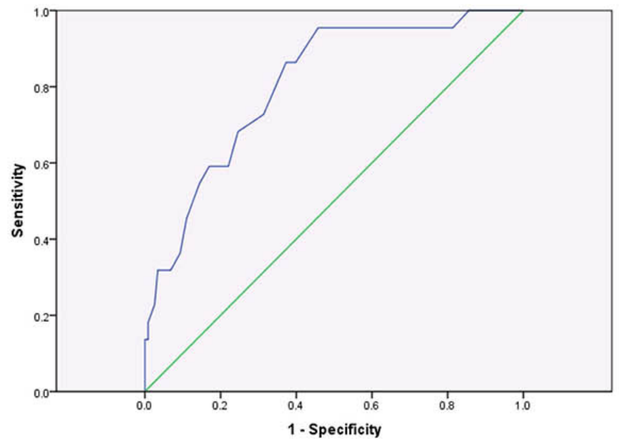
This study used data from veterans followed in PM&R at a VA Polytrauma Rehabilitation Center (PRC). Data was collected from 2009 to present and the current study includes 163 veterans. Responses from the NSI were obtained from the second level evaluation. Receiver operating characteristic (ROC) curve analyses were employed to examine relations between the NSI Validity-10, MMPI-2-RF variables of interest (F-r, Fs, FBS-r, RBS, MLS, COG, NUC, HPC) , and the TOMM.

Variables of Interest		Criterion Cutoff
NSI Validity-10	10-item combination of unlikely/bizarre symptoms (e.g., noise sensitivity) and infrequent symptoms (e.g., vision problems)	
MMPI-2-RF		
F-r	Overreporting of psychological, cognitive and somatic symptoms	120
Fs	Overreporting of somatic complaints	100
FBS-r	Non-credible presentation of somatic and/or cognitive symptoms	100
RBS	Non-credible memory complaints	100
MLS	Generalized sense of poor health and physical debilitation	90*
COG	Assortment of cognitive difficulties	90*
NUC	Various neurological problems	90*
HPC	Various complaints about head and neck pain	90*
TOMM	Performance validity test of memory	45

Demographic Information	
Age mean (SD)	34.9 (12.3)
Sex (% male)	94%
Race/Ethnicity	
Caucasian	137 (84%)
Hispanic/Latino	3 (1.8%)
African-American	2 (1.2%)
Unknown/Declined to answer	21 (12.9%)
Education	
<High School	7 (4.3%)
High School	88 (54%)
>High School	68 (41.7%)

Results

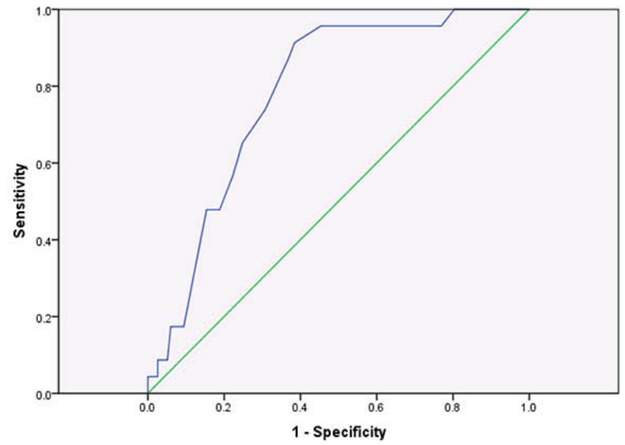
The relations between Validity-10 and variables of interest were strongest for somatically oriented scales (Fs, COG, NUC) and the TOMM. According to sensitivity and specificity values, Sensitivity and specificity for each variable using a Validity-10 cutoff of 17 are as listed below.



Fs

Fs ≥ 100: 22
Fs < 100: 118

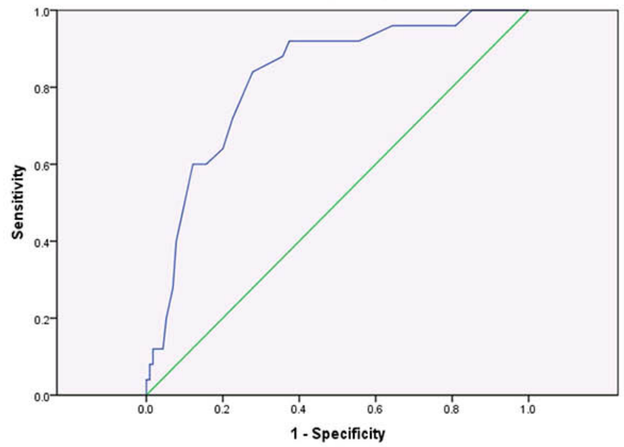
AUC: .807, p<.001
Sensitivity: 72.7%
Specificity: 68.6%



COG

COG ≥ 90: 23
COG < 90: 117

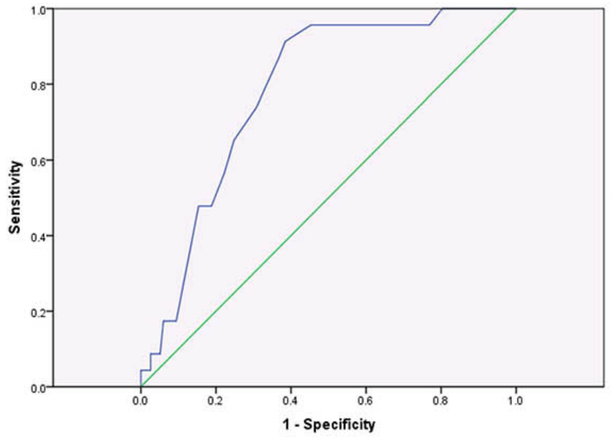
AUC: .781, p<.001
Sensitivity: 73.9%
Specificity: 69.2%



NUC

NUC ≥ 90: 25
NUC < 90: 115

AUC: .822, p<.001
Sensitivity: 84%
Specificity: 72.7%



TOMM

TOMM < 45: 14
TOMM ≥ 45: 106

AUC: .805, p<.001
Sensitivity: 78.6%
Specificity: 74.5%

Discussion

Overall, results suggest that a high percentage of veterans undergoing the CTBIE perform outside of established cutoffs on measures of symptom and performance validity. The strongest relations between NSI Validity-10 and variables of interest emerged for scales representing somatic preoccupation and invalid memory performance.

The Validity-10 with the best balance of sensitivity and specificity in this study was 17, which were lower than cutoffs suggested by Vanderploeg et al., (2013) (>22). Possible reasons for differences between studies include different measures utilized across studies, and different sample sizes and characteristics.

Results of this study suggest that providers may use the NSI Validity-10 score to guide appropriate treatment referrals. For example, an individual scoring above the cutoff may be better served by referral to mental health services rather than traditional comprehensive rehabilitation services. Tailored treatment would also positively impact service utilization on a systemic level.

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