

Characterizing the Relationship between Moral Injury and Demand for Cigarettes among Women Veterans

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Veteran-Nonveteran Disparities in Cigarette Use

- Studies have shown that cigarette use among military veterans is problematic
 - Klevens et al.¹ said “the difference in smoking prevalence between veterans and nonveterans was greatest among women... smoking prevalence was higher among female veterans across all age groups”
 - Male veteran prevalence (21.1%) vs female veteran prevalence (28.9%)² from 2010-2015
- I extracted data from the Population Assessment of Tobacco and Health for more recent female comparisons (Table 1)

Table 1. Cigarette use prevalence among females

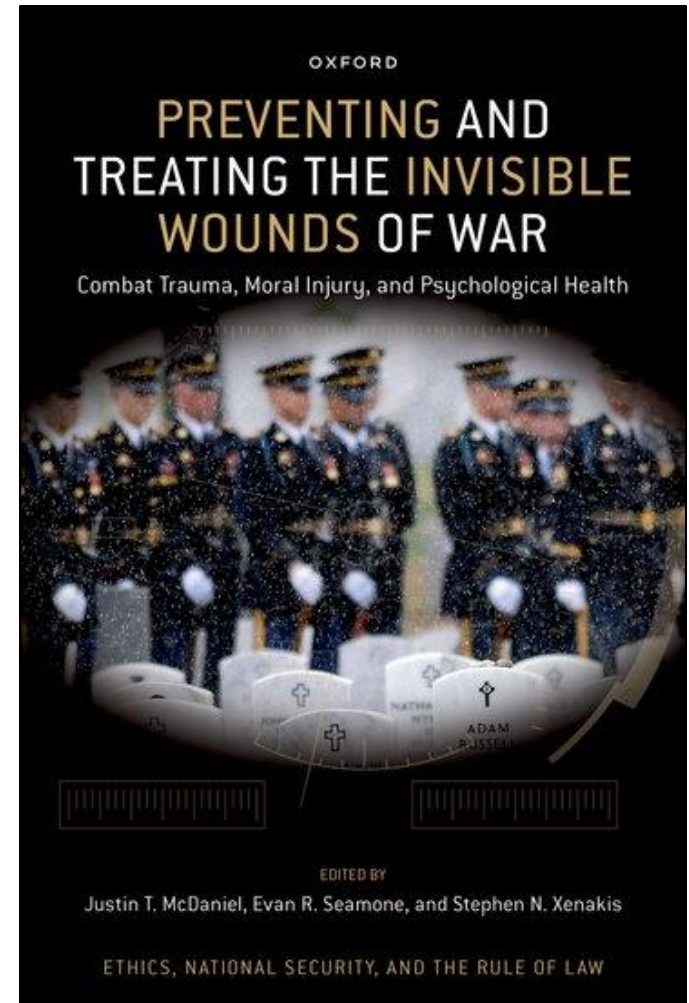
Year	Veteran Females	Non-Veteran Females
2021	16.67%	11.85%
2020	15.08%	11.58%
2019	26.91%	14.89%
2018	21.20%	15.30%
2017	21.64%	16.08%
2016	28.87%	16.85%
2015	29.47%	18.33%
2014	26.50%	18.72%
2013	36.71%	19.44%
2012	30.88%	20.22%
2011	33.33%	20.81%
2010	36.40%	21.67%
2009	34.27%	23.11%
2008	32.75%	23.19%
2007	39.04%	23.44%

¹ Klevens RM, et al. The association between veteran status and cigarette smoking behaviors. Am J Prev Med. 1995;11(4):245-250.

² Odani S, et al. Tobacco product use among military veterans – United States, 2010-2015. MMWR Morb Mortal Wkly Rep. 2018;67(1):7-12.

The Experience of War

- War is hell
- The “earth-born dreams” of a thousand saviors
- The onward marching of bootless men and women
- The ever-burning “lights of the slaughter-house”



Women in the Military

- Legislation formally allowing women to join the US military was passed in 1948
- Terrorist attacks on 9/11 marked a pivot point for women in the military
- Their experiences? ...high rates of sexual assault, combat related trauma ¹



Moral Injury

- PTSD prevalence among women veterans: 13.4% (compared to 8.0% in civilian women, 7.7% in veteran men, and 3.4% in civilian men) ¹
- Initial conceptualization of **moral injury**: “perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations” ²
 - *Symptom profile for PTSD: exaggerated startle reflex, memory loss, flashbacks, nightmares, and insomnia (generally not perpetrator)*
 - *Symptom profile for moral injury: guilt, shame, anger, and social alienation (potentially a perpetrator)*
 - *Moral injury and PTSD are correlated but distinct constructs ($b = 0.63$)* ³
- Moral injury scales: MIES, MISS-M-SF, EMIS-M, MIQ-M
- Limited work on sex differences in moral injury outcomes, but 37% of veterans report moral injury ⁴

¹ Lehavot K, et al. Post-traumatic stress disorder by gender and veteran status. *Am J Prev Med.* 2018;54(1):1-9.

² Litz BT, et al. Moral injury and moral repair in war veterans: A preliminary model and intervention strategy. *Clin Psychol Rev.* 2009;29:695-706.

³ Bryan CJ, et al. Moral injury, PTSD, and suicidal behavior among national guard personnel. *Psych Trauma.* 2017;10(1):36-45.

⁴ Norman SB, et al. Moral injury among US combat veterans with and without PTSD and depression. *J Psych Res.* 2022;154:190-197.

Moral Injury Unpacked - MISS-M-SF

- I feel betrayed by leaders who I once trusted
- I feel guilt over failing to save the life of someone in war.
- I feel ashamed about what I did or did not do during this time.
- I am troubled by having acted in ways that violated my own morals or values.
- Most people are trustworthy.
- I have a good sense of what makes my life meaningful.
- I have forgiven myself for what happened to me or others during combat
- All in all, I am inclined to feel that I am a failure.
- I wondered what I did for God to punish me.
- Compared to when you first went into the military, your religious faith since then has strengthened.

Betrayal

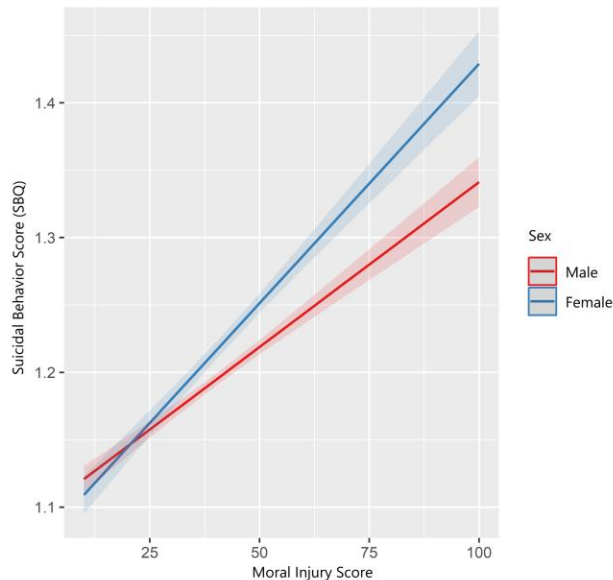
Perpetration

Forgiveness

Spirituality

Correlates of Moral Injury

- Moral injury severity associated with decreasing overall quality of life ¹
- Moral injury severity associated with suicidality and substance use ²



Moral injury and quality of life among military veterans

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ABSTRACT

Introduction Moral injury concerns transgressive harms and the outcomes that such experiences may cause. A gap in the literature surrounding moral injury, and an outcome that may be important to include in the mounting evidence toward the need for the formal clinical acknowledgement of moral injury, has to do with the relationship between moral injury and quality of life. No studies have examined this relationship in US military veterans—a population that is disproportionately exposed to potentially morally injurious events.

Methods A nationwide cross-sectional survey was conducted yielding 1495 military veterans. Participants were asked questions about moral injury and quality of life, among other things. Multivariable linear regression was used to characterise the adjusted relationship between moral injury and quality of life.

Results Moral injury (mean=40.1 out of 98) and quality-of-life (mean=69.5 out of 100) scores were calculated for the sample. Moral injury was inversely associated with quality of life in an adjusted model, indicating that worsening moral injury was associated with decreased quality of life (adjusted unstandardised beta coefficient (b)=-0.3, p<0.001). Results showed that age moderated said relationship, such that ageing veterans experienced an increasingly worse quality of life with increasingly severe moral injury (b=-0.1, p=0.003).

Conclusions Results of the study showed that moral injury was inversely associated with quality of life and that this relationship rapidly worsens with age. More work is needed to more precisely understand this relationship and to determine the best strategies for intervention.

Original research

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Some veterans who are deployed to war experience things that conflict with their value system, leading to the development of moral injury. Moral injury is known to affect many aspects of health, particularly health behaviours such as alcohol or drug use.

WHAT THIS STUDY ADDS

⇒ Little to nothing is known about the broader quality-of-life implications for veterans living with moral injury. This study provides the evidence that moral injury may significantly decrease a veteran's overall quality of life.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The military should provide moral injury prevention programmes and conduct surveillance of moral injury to provide more targeted and timely psychological services.

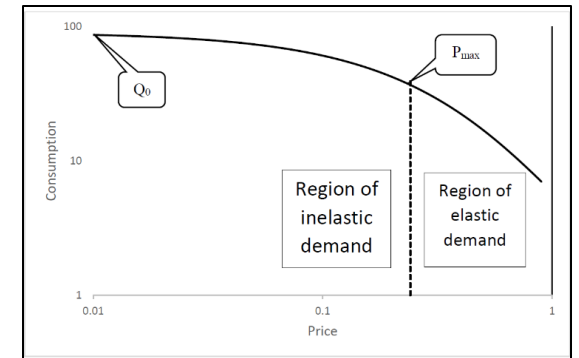
rior when you've got 12 [soldiers] and you are trying to deal with 250 [people] who are all throwing bottles, bricks and everything else at you—men and women. Again, you sometimes ... do things that perhaps are quite heavy handed which retrospectively you think should I have done that". Although this instance describes a scenario in which an act of commission against one's value system occurred, moral injury may also include acts of omission or betrayal.⁴

¹ McDaniel JT. Moral injury and quality of life among military veterans. *BMJ Mil Health*. 2023. doi: 10.1136/military-2023-002457

² McDaniel JT, et al. Moral injury is a risk factor for substance use and suicidality among US military veterans with and without traumatic brain injury. *J Relig Health*. 2023. *In Press*.

Initial Attempts to Characterize Moral Injury Severity in Women vs. Men

- Ideas borrowed from the Cigarette Purchase Task to develop the Moral Injury Purchase Task ¹
 - Participants (n = 26) read a scenario that presents a potentially morally injurious event and a return to home base
 - Respond to several questions, where prices escalate (up to \$163,840), such as: "For \$5 per year, how many years would you purchase services to help you never think about your experiences in war. [___ Years]"
 - Also assessed scores on the Moral Injury Events Scale (MIES)
- P_{\max} by sex: women (M = \$33,317.99, SD = 45,199.38) and men (M = \$874.59, SD = 515.11)
- MIES scores by sex: women (M = 43.56, SD = 9.89) and men (M = 39.33, SD = 2.52)



Moral Injury and Tobacco Use

- Although there is a fair amount of work on moral injury and substance use/mental health, there is possibly no work on moral injury and tobacco use
 - Some work has established a correlation between PTSD and smoking¹
- Given that moral injury may impact women veterans potentially more severely than men, it seems important to examine moral injury and tobacco use in women veterans specifically

Moral Injury and the Cigarette Purchase Task (Methods)

- Participants recruited from Amazon MTurk, Reddit, and a veteran-serving non-profit organization (n =46)
- Inclusion criteria: must identify as a woman, be a US veteran, and identify as a current cigarette smoker
- Measures: FTND, CPT, MISS-M-SF (cut point for probable moral injury set at ≥ 36 out of 100), demographics
- Stein et al.'s ¹ algorithm detected 2 unsystematic responses (these participants were excluded)
- Koffarnus et al.'s ² modified exponential demand model was used to fit curves to the data by moral injury group
- Calculated various demand indices (Q_0 , alpha, P_{max} , Q_{max} , and breakpoint)
- Convergent validity established by correlating FTND scores with demand indices

¹ Stein, JS, et al. Identification and management of nonsystematic purchase task data: Toward best practice. *Exp Clin Psychopharmacol.* 2015;23(5):377-386.

² Koffarnus, MN, et al. A modified exponential behavioral economic demand model to better describe consumption data. *Exp Clin Psychopharmacol.* 2015;23(6):504-512.

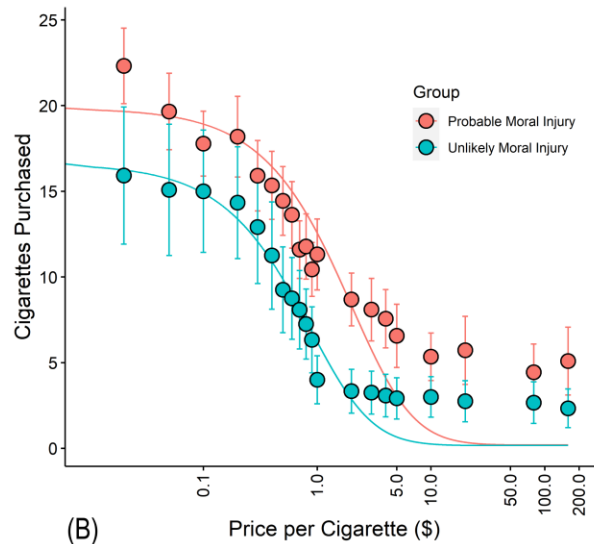
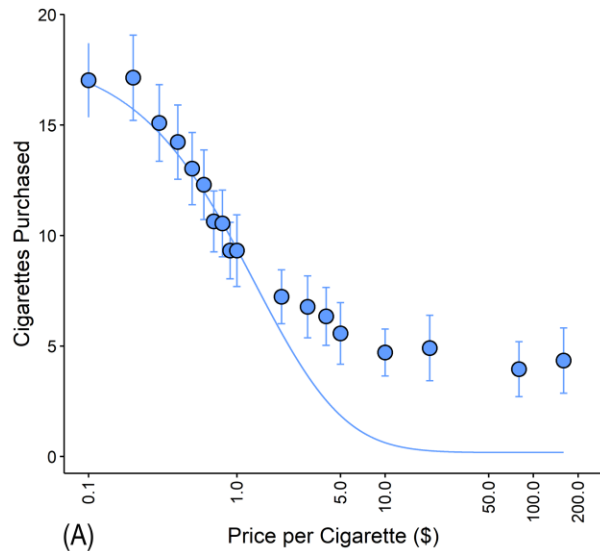
Moral Injury and the Cigarette Purchase Task (Results)

- Demographic characteristics of the study sample by moral injury status are shown in the table to the right

Variable	Unlikely Moral Injury		Probable Moral Injury		p
	n	%	n	%	
Race/Ethnicity					
White	8	66.67	19	59.38	
Black/African American	1	8.33	6	18.75	
Hispanic/Latino	0	0.00	2	6.25	
Asian/Asian American	3	25.00	3	9.37	
American Indian/Alaskan Native	0	0.00	2	6.25	
Native Hawaiian/Other Pacific Islander	0	0.00	0	0.00	
Other Race	0	0.00	0	0.00	0.443 ^a
Annual Income					
≤ \$30,000	2	16.67	3	9.37	
\$30,001 to \$59,999	6	50.00	17	53.13	
≥ \$60,000	4	33.33	12	37.50	0.792 ^a
Educational Attainment					
≤ High School Diploma	0	0.00	3	9.37	
Some College or Associate's Degree	3	25.00	11	34.38	
≥ Bachelor's Degree	9	75.00	18	56.25	0.393 ^a
Age (Years)					
	M	SD	M	SD	
	37.50	10.00	42.59	12.73	0.220 ^b
Length of Military Service (Years)					
	7.17	6.70	16.41	9.8	0.004 ^b

Moral Injury and the Cigarette Purchase Task (Results)

- Derived behavioral economic demand indices from the cigarette purchase task among women veterans by moral injury severity are shown in the table, while the figure displays the demand curves for the 2 groups



	Unlikely Moral Injury (n = 12)		Probable Moral Injury (n = 32)			
Index	M	SD	M	SD	p	Hedge's g
Q_0	13.55	8.11	22.24	12.76	0.044	0.74
α	0.01	0.06	0.02	0.09	0.968	0.12
Q_{max}	6.29	4.14	17.29	13.58	0.031	0.93
P_{max}	1.20	0.41	2.76	2.28	0.073	0.79
Breakpoint	13.69	27.58	29.13	35.13	0.443	0.46

Moral Injury and the Cigarette Purchase Task (Results)

- Convergent validity evidence for various derived cigarette purchase task demand indices among women veterans by moral injury severity (shown in the table to the right)

	Unlikely Moral Injury (n = 12)				
Variable	Q_0	α	Q_{max}	P_{max}	Breakpoint
Q_0					
α	-0.39				
Q_{max}	-0.23	-0.41			
P_{max}	-0.24	-0.41	0.99**		
Breakpoint	0.33	-0.33	0.09	-0.07	
FTND	0.05	-0.53	0.68*	0.68*	-0.35
	Probably Moral Injury (n = 32)				
Q_0					
α	-0.11				
Q_{max}	-0.11	-0.13			
P_{max}	-0.13	-0.14	0.99**		
Breakpoint	-0.36	-0.36	0.16	0.46*	
FTND	-0.08	-0.21	0.42*	0.45*	0.21

Conclusions

- Women who go to war experience significant adversity and trauma
- Moral injury is common in women who return from war and this psychological phenomenon is associated with many adverse outcomes
- Little is known about the impact of moral injury on tobacco use
 - Need for continued research, particularly intervention studies

Thank you!

- Any questions?