

Characterizing the Relationship between Moral Injury and Alcohol Use among Veterans: A Behavioral Economic Perspective

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Introduction

- Moral Injury is a psychological phenomenon that arises when a person witnesses or actively participates in something that would go against what that person would deem "wrong" (Shay, 2014)
- Moral Injury can afflict a person with a variety of symptoms including depression, anxiety, suicidality, and importantly for this study, substance use and hazardous alcohol use (Battles et al., 2018)
- Military veterans, one of the most susceptible groups to events that could cause moral injury, experience progressively worse quality of life along with increasing severity of moral injury (McDaniel, 2023)
- The Hypothetical Purchase Task, which is a methodology from the behavioral economics literature, bases itself on the law of demand and is frequently used to study addiction or health behaviors (Jacobs & Bickel, 1999)

Methodology

Study Design and Sample

- An online survey was created in SurveyMonkey and posted on Amazon Mturk for this cross-sectional study
- Inclusion criteria were the following: must be a military service member/veteran, and be aged > 18 years
- We obtained 673 volunteers for the survey, of which 28 met inclusion criteria and were paid \$2

Measures

- A hypothetical purchase task was created with the following premise: the participant noticed something while in combat that could possibly cause moral/values-based trauma (e.g., seeing the death of innocent civilians), and they were asked to determine how many years of therapy they would purchase at exponentially increasing prices (maximum price = \$163,840) to help them forget the trauma caused by the incident
- Example item: "For \$5 per year, how many years would you purchase services to help you never think about your experiences in war?"
- In this same survey, we included the Alcohol Use Disorders Identification Test (AUDIT-C), in which the participant is asked three questions about how often and how much alcohol is consumed in a given period; scores range from 0-12 (0 means no alcohol use, and 4 or higher is considered positive for hazardous alcohol use)

Data Analysis

- We calculated standard demand metrics for purchase tasks, including unconstrained intensity of demand (i.e., Q_0), maximum expenditure (i.e., O_{max}), commodity value at which demand became elastic (i.e., P_{max}), and the price at which consumption is suppressed (i.e., breakpoint)
- We used Koffarnus et al.'s (2015) equation, below, to model demand in veterans:

$$Q = Q_0 * 10^{k(e^{-\alpha Q_0 C} - 1)}$$

- We summed scores on the AUDIT-C and regressed those scores on the 4 demand indices previously described in separate linear models

Results

- Koffarnus et al.'s (2015) demand equation provided a good fit to the data provided ($R^2 = 0.44$) (Figure 1)
- Observed demand indices for the entire sample, as well as stratified by military service status, are shown in Table 1

Table 1
Demand indices calculated from the hypothetical purchase task

Index	M	SD
Q_0	41.5	72
O_{max}	6847.28	18708.72
P_{max}	28901.49	36707.06
Breakpoint	71771.43	65830.24
AUDIT-C	9.04	2.22

Table 2
Linear model results for the relationship between MIPT indices and alcohol use

	Q_0	O_{max}	P_{max}	Breakpoint
Variable	b (SE)	b (SE)	b (SE)	b (SE)
Q_0	0.04 (0.02)*			
O_{max}		0.03e-3 (0.01e-3)*		
P_{max}			0.01 e-4 (0.03)	
Breakpoint				0.01 e-4 (0.03 e-3)
Age	-0.01 (0.05)	0.027 (0.07)	-0.04 e-1 (0.06)	0.04 (0.06)
Sex	-1.11 (0.88)	0.03 (0.05)	-1.23 (0.99)	-1.23 (0.99)
Race	0.24 (1.22)	-1.12 (1.13)	-0.00 (1.60)	-0.03 (0.84)
Income	-0.04 (0.75)	0.58 (0.74)	-0.03 (0.83)	-0.03 (0.84)
Education	0.14 (0.56)	-0.62 (0.49)	-0.39 (0.58)	-0.39 (0.58)

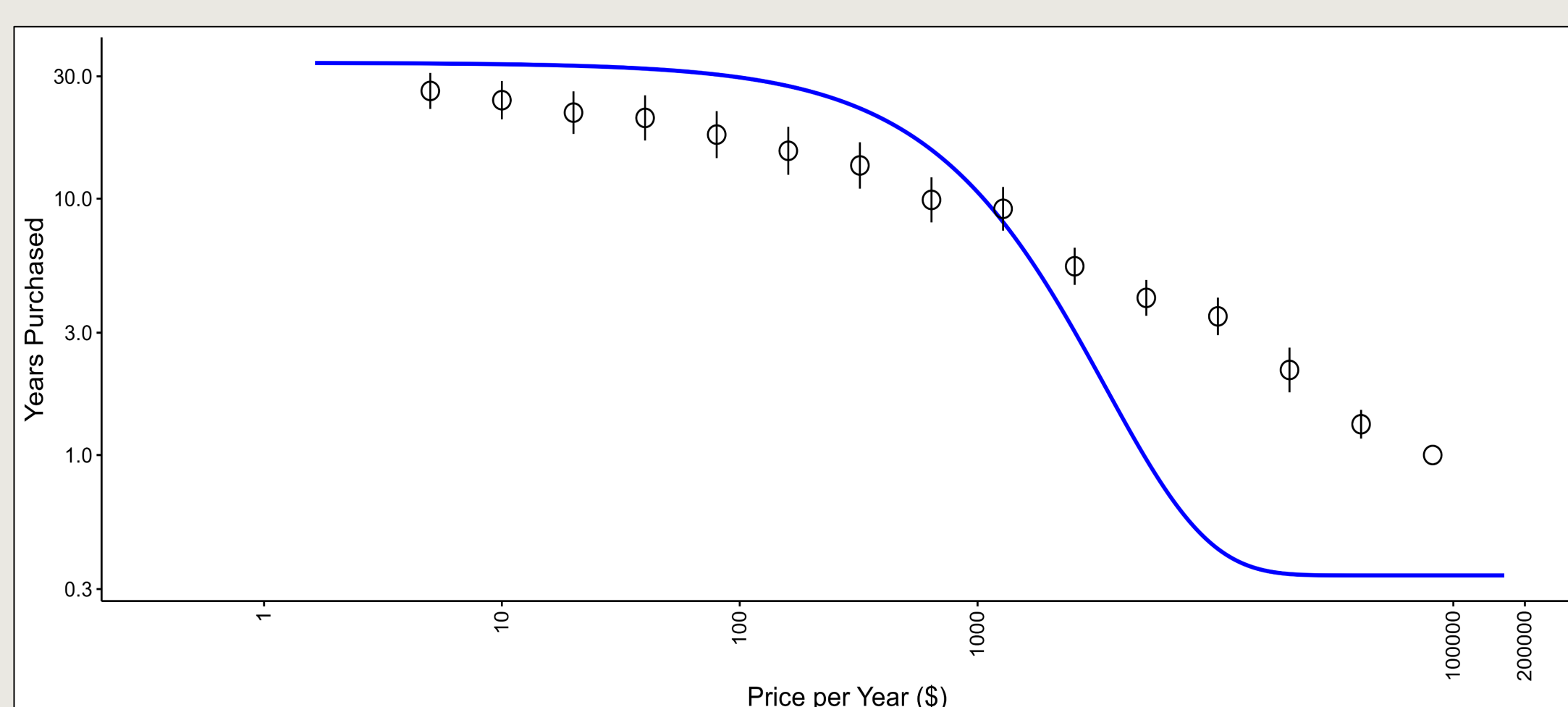


Figure 1
Hypothetical demand for services to alleviate the effects of morally injurious war experiences as a function of price in the Moral Injury Purchase Task. The graph depicts the demand curve for veterans, where years of services purchased are shown on the y-axis and the prices of those services are shown on the x-axis ($n = 28$).

Results (Cont.)

- Results of linear models showed that intensity and O_{max} were significantly associated with alcohol use, but P_{max} and breakpoint were not (Table 2; Figure 2).

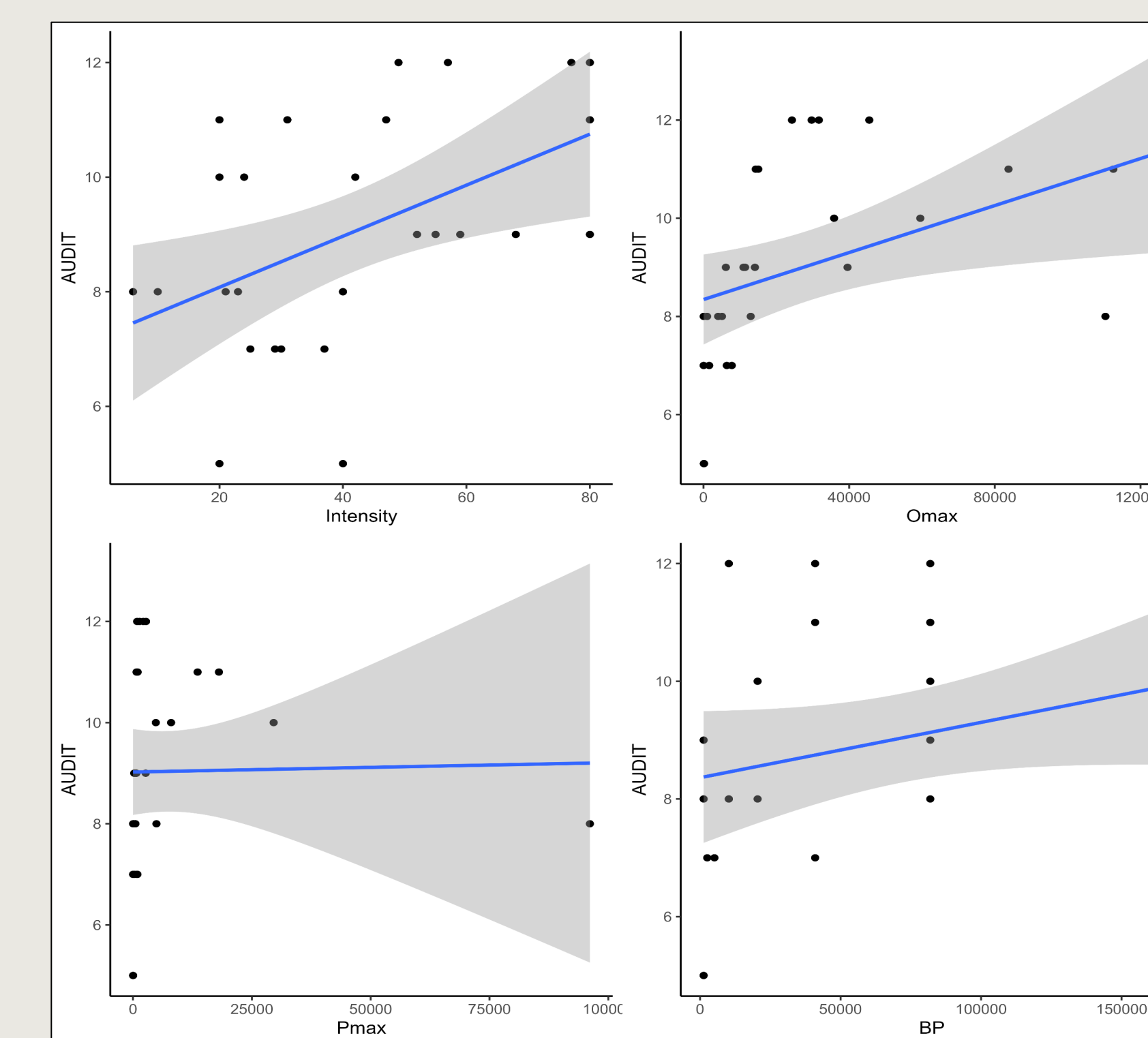


Figure 2
Set of 4 graphs indicating the relationship between each of the four demand indices on the x-axis and the respective AUDIT-C score on the y-axis. The grey area shows the 95% confidence interval, and the points are the individual data points for each of the participants. At the top left is intensity, the top right is O_{max} , the bottom left is P_{max} , and bottom right is Breakpoint.

Conclusion

Despite the lack of significance in P_{max} and Breakpoint in relation to increased alcohol use, the intensity (Q_0) and O_{max} indices indicated that there is a significant positive relationship between higher chance of hazardous alcohol use and higher susceptibility of moral injury and its effects.

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Acknowledgements

The authors would like to thank the NIH for funding to complete this summer research project. The authors would also like to thank the staff at the SI Bridge to Baccalaureate program for providing the opportunity to partake in research and providing assistance when needed.