

# An Examination of Attentional Bias for Threat in Motor Vehicle Accident Survivors with Posttraumatic Stress Disorder

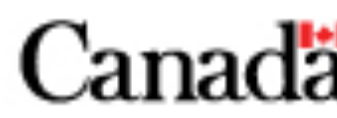


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## Introduction

- ◆ Attentional bias for threat—the asymmetrical distribution of attentional resources towards threatening stimuli in the environment—has been identified as a vulnerability for posttraumatic stress disorder (PTSD).
- ◆ Recent research suggests attentional bias for threat can be divided into three distinct components.
  - ◆ Facilitated attention is the rapid orientation of attention towards threat stimuli in the environment and would occur during early automatic processing (e.g., 100 ms).
  - ◆ Difficulty in disengagement is the impairment of one's ability to transfer attention from one threat stimulus to another stimulus in the environment and would occur during late strategic processing (e.g., 500 ms).
  - ◆ Avoidance is the preferential allocation of attentional resources at locations opposite to the threat stimulus location and would also occur during late strategic processing (e.g., 1250 ms).
- ◆ Despite motor vehicle accidents (MVAs) being one of the primary causes of PTSD in the general population, the three components of attentional bias have yet to be examined in an MVA sample.
- ◆ The present study addressed the research gap by assessing the directionality (i.e., facilitated attention, difficulty in disengagement, avoidance) and time course of attentional bias for threat in MVA survivors using a contemporary dot probe task.

## Methods

- ◆ North American participants ( $n = 128$ ; 79% women;  $M_{age} = 24$  years;  $SD = 8$ ) completed measures online.
- ◆ Participants were divided into groups based on MVA history and PTSD symptoms (i.e., *PTSD Checklist—Specific Version*).
  - ◆ MVA-High PTSD: endorsing at least two DSM-IV PTSD symptom clusters (i.e., re-experiencing, avoidance/numbing, hyperarousal) in reference to an MVA.
  - ◆ MVA-Low PTSD: endorsing less than two PTSD symptom clusters in reference to an MVA or any other trauma.
  - ◆ Control: no history of MVA and endorsing less than two PTSD symptom clusters in reference to any trauma.
- ◆ The dot probe task for the current investigation was designed using word stimuli. The task included filler, neutral-neutral, mild threat-neutral, and strong threat-neutral trials. Participants completed a total of 240 trials divided equally between each stimulus onset asynchrony (SOA) condition (i.e., 100 ms, 500 ms, 1250 ms).
- ◆ Reaction time (RT) data was used to compute attention bias indices for each threat level and SOA condition.
  - ◆ Orienting Index: Mean RT on trials when the probe replaces a neutral word in the presence of another neutral word – Mean RT on trials when the probe replaces a threat word in the presence of a neutral word.
  - ◆ Disengaging Index: Mean RT on trials when the probe replaces a neutral word in the presence of a threat word – Mean RT on trials when the probe replaces a neutral word in the presence of another neutral word.

## Results

- ◆ Group assignment was as follows: MVA-High PTSD ( $n = 18$ ), MVA-Low PTSD ( $n = 46$ ), and Control ( $n = 63$ ). All statistical analyses were performed using bootstrapping with 1000 samples.
- ◆ Few statistically significant correlations were found between the PCL-S total score and the attention bias indices (most  $ps > .05$ ).
- ◆ Mixed-model ANOVAs were used to assess for differences within group (i.e., threat level, SOA) and between groups.
  - ◆ The ANOVA for the orienting indices failed to identify a statistically main effect of group, SOA, or threat level (all  $ps > .05$ ).
  - ◆ The ANOVA for the disengaging indices also failed to identify a statistically main effect of group, SOA, or threat level (all  $ps > .05$ ).
- ◆ Mean scores for the orienting and disengaging indices were widely dispersed on both sides of zero. Between group comparisons may have been impacted by a regression towards the mean.
- ◆ Accordingly, the bias indices were further analyzed using exploratory one sample  $t$ -tests with two tailed significance.
  - ◆ At 100 ms SOA, the Control group,  $t(62) = 2.72$ ,  $p = .03$ ,  $r = .33$ , and the MVA-Low PTSD group,  $t(45) = 2.58$ ,  $p = .02$ ,  $r = .36$ , displayed difficulty in disengagement from strong threat words.
  - ◆ Also at 100 ms SOA, the MVA-High PTSD group displayed “facilitated disengagement” from mild threat words,  $t(17) = -2.99$ ,  $p = .008$ ,  $r = .59$ .

## Discussion

- ◆ In line with past research, MVA survivors with high PTSD symptoms appear to display a different attention pattern than MVA survivors with low PTSD symptoms or controls.
  - ◆ Avoidance (i.e., facilitated disengagement) of trauma-related threat may provide temporary relief for MVA survivors with high PTSD; however, avoidance likely also interferes with the re-appraisal of threat, resulting in increased anxiety.
  - ◆ The difficulty in disengagement displayed by MVA survivors with low PTSD and control subjects may reflect an adaptive response to threat in the environment.
- ◆ The differential responses to mild and strong threat words based on group assignment are congruent with previous research highlighting the specificity of attentional bias in PTSD samples.
  - ◆ The mild threat words were not inherently threatening but were directly related to MVAs (e.g., highway). The strong threat words, however, were generally threatening but less directly related to MVAs (e.g., blood). The mild threat words may have produced a larger bias in MVA survivors with high PTSD due to their increased personal relevance.
- ◆ Current results suggest attention bias modification programs developed for the treatment of anxiety pathologies may prove beneficial for the treatment of PTSD. Current results also reiterate the importance of using trauma exposure techniques in traditional interventions for PTSD (e.g., cognitive-behaviour therapy).

Table 1: Word Stimuli

Neutral	Neutral	Neutral	Mild Threat	Strong Threat
Momentary	Loop	Planet	Speedometer	Emergency
Relative	Fish	Card	Intersection	Deathbed
Sail	Table	Desk	Truck	Blood
Pause	Aisle	Gel	Driver	Panic
Record	Butter	Computer	Wheel	Smash
Blanket	Staple	Cotton	Highway	Mortality
Round	Binder	Justify	Mirror	Death
Pasture	Glove	Zipper	Accelerate	Trapped
Giraffe	Jacket	Send	Freeway	Scream
Curtain	Cable	Vote	Traffic	Agony

Table 2: Bias index score as a function of group, SOA, and threat level  $M(SD)$

	Control	MVA-Low PTSD	MVA-High PTSD
Orienting-M-100	-12.03 (55.44)	-7.07 (67.69)	-21.39 (44.12)
Orienting-S-100	2.52 (63.07)	.27 (44.37)	-6.09 (49.87)
Disengaging-M-100	8.49 (64.52)	2.70 (50.29)	-22.65 (32.19)
Disengaging-S-100	29.04 (84.76)	24.57 (64.56)	8.28 (47.64)
Orienting-M-500	5.74 (48.53)	-2.06(57.85)	-6.25 (33.69)
Orienting-S-500	7.68 (63.40)	-5.37 (60.16)	-5.92 (51.33)
Disengaging-M-500	14.66 (64.57)	7.59 (51.28)	-2.37 (34.94)
Disengaging-S-500	-6.25 (55.94)	7.81 (53.70)	-.27 (35.96)
Orienting-M-1250	-4.55 (47.39)	1.06 (50.67)	4.91 (45.14)
Orienting-S-1250	-10.78 (64.41)	-6.10 (39.08)	2.10 (38.71)
Disengaging-M-1250	-1.06 (61.42)	4.08 (45.49)	-1.05 (38.29)
Disengaging-S-1250	14.14 (63.42)	2.16 (50.26)	-8.05 (32.26)

Note: MVA = Motor Vehicle Accident survivors; M = Mild Threat; S = Strong Threat; SOA = Stimulus Onset Asynchrony100 = 100 ms SOA; 500 = 500 ms SOA; 1250 = 1250 ms SOA.

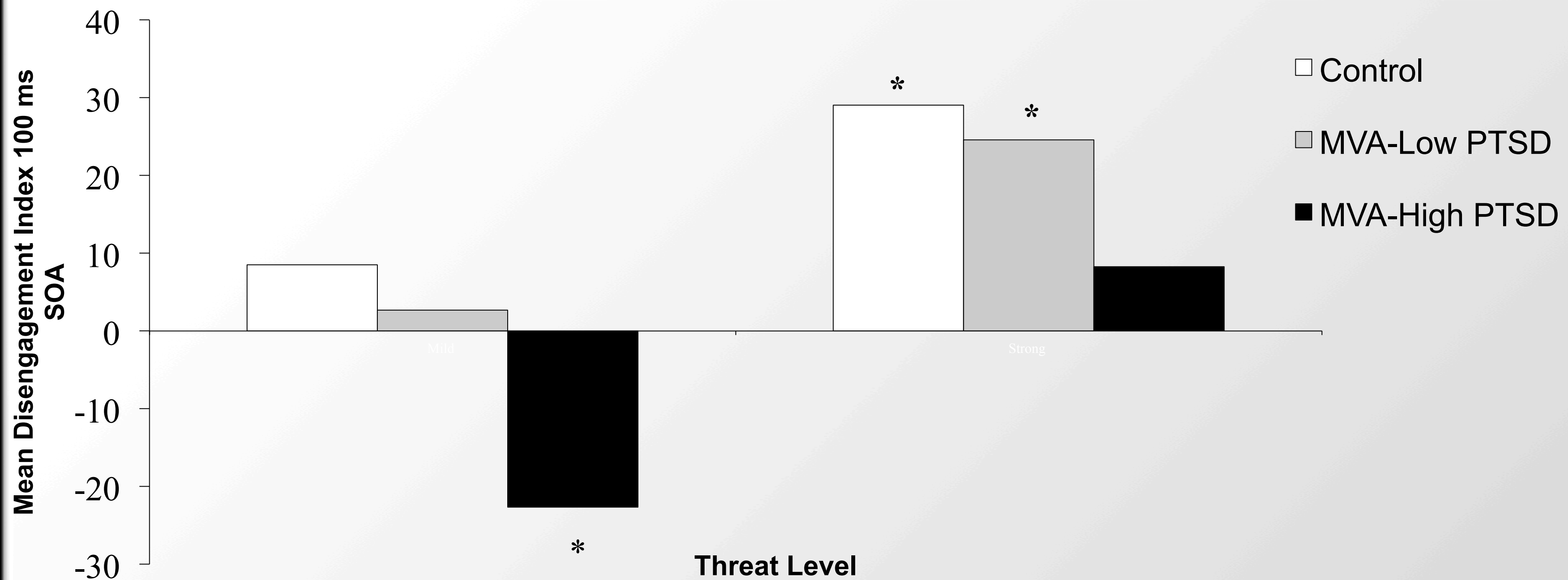


Figure 1. Mean Disengagement Bias Index at 100 ms SOA as a function of group assignment and threat level. A positive disengagement index indicates difficulty in disengagement from threat and a negative disengagement index suggests facilitated disengagement from threat. SOA = Stimulus Onset Asynchrony. \*  $p < .05$ .

