



# Examination of Tonic Immobility in a Lab-Based Experimental Paradigm

Taylor Kaminsky, Danielle Morabito, Norman B. Schmidt  
Florida State University



## Introduction

### What is tonic immobility (TI)?

- TI is a defense strategy in human behavior. that commonly occurs in response to traumatic events such as sexual assault. (Bados et al., 2014)
- Tonic immobility is characterized as the last defense response in humans when life is believed to be at risk (Abrams et al., 2009).
- TI is associated with higher risk and poorer recovery from posttraumatic stress disorder (PTSD). (Hagenaars & Hagenaars, 2019)

### What is anxiety sensitivity (AS)?

- AS is the fear of anxiety-related symptoms and their consequences (Reiss et al., 2002)
- AS includes 3 domains: physical, cognitive, and social (Lim, 2014)
- AS has been established as a malleable, transdiagnostic risk factor for psychopathology including PTSD (Taylor, 2003)

### The current study

- Research suggests that AS may be associated with individual differences in threat responding (Nelson et al 2015) Thus, the current study sought to examine the potential links between AS and TI

## Method

### Participants & Procedures

- Age ( $M=18.87$ ,  $SD = 1.14$ )
- Trauma-exposed participants recruited from SONA subject pool.
- Participants voluntarily completed an informed consent form, self-report measures, and an image viewing task.

### Image Viewing Task

- Participants viewed three blocks of images (neutral, pleasant, unpleasant) from the International Affective Picture System in random order (Lang et al., 1999).
- Participants viewed each image (24 per block) for 3 seconds for a total time trial of 3.6 minutes.
- Assessment of standing balance and postural sway was measured through the validated Nintendo Wii Balance Board (WBB) (Clark et al., 2010).

### Measures

#### Tonic Immobility Questionnaire (TIQ-R)

12- item self-report measure used to assess tonic immobility across a range of traumatic events (Abrams et al., 2009).

- Initial item: “have you experienced an extremely stressful or traumatic event in which you felt frozen or paralyzed with fear?”

#### Anxiety Sensitivity Index-3 (ASI-3)

18-item self report measure designed to assess levels of anxiety sensitivity. It is widely used as a measure of fear of anxiety-related symptoms and sensations. (Taylor et al., 2007)

- Sample item: “When I feel pain in my chest, I worry that I’m going to have a heart attack”

Participant Demographics	N=98
<b>Self-identified Gender</b>	
Female	75.5%
Male	23.5%
Non-Binary	1.0%
<b>Self-identified Race</b>	
White	91.8%
Black	5.1%
Asian	2.0%
Hispanic	18.4%
Other	1.0%
<b>Prior TI Experience</b>	22.4%

## Abstract

Humans engage in a large variety of behaviors that stem from our evolutionary history. One key aspect of human behavior is threat responding, including fight, flight, and freeze responses. Tonic immobility is a type of freeze response experienced when a threat or danger is perceived as inescapable, causing the organism to become frozen or immobile. Research on individual differences in threat responding suggests that individuals with higher anxiety sensitivity scores may be more prone to experiencing tonic immobility. Anxiety sensitivity is a measurement of the fear of anxiety-related symptoms and their consequences. It is made up of three components, including the cognitive, social, and physical aspects of anxiety. The aim of this current study is to further examine the link between anxiety sensitivity and tonic immobility. Trauma-exposed, English-speaking adults ( $N = 98$ ) were recruited using the FSU psychology subject pool. Participants completed an informed consent form, Tonic Immobility Questionnaire, and the Anxiety Sensitivity Index - 3. The participants also completed an image viewing task involving neutral, positive, and mutilation images. The results showed that both low physical anxiety sensitivity and a high cognitive anxiety sensitivity were associated with prior tonic immobility experiences. Additionally, high anxiety sensitivity scores in both cognitive and social domains predicted self-reported immobility during the image-viewing task. These findings provide evidence that there is a consistent link between higher cognitive anxiety sensitivity and the likelihood of experiencing immobility in response to threat. However, the potential effects of physical and social anxiety sensitivity may be context dependent.

## Results

- Linear regressions were used to examine whether AS predicted prior TI experience:
  - $t = 1.47$ ,  $\beta = 0.15$ ,  $p = .145$

Table 1

Prior TI Experience

Predictor	t	$\beta$	p
AS Physical	-1.991	-0.319	0.049
AS Cognitive	2.836	0.339	0.006
AS Social	1.493	0.211	0.139

Note. Multiple linear regressions with AS sub-scales predicting prior TI

- Linear regressions were also used to examine whether AS predicted immobility during the image viewing task:
  - $t = 5.25$ ,  $\beta = 0.47$ ,  $p < .001$

Table 2

Elements Predicting Immobility During Image Viewing Task

Predictor	t	$\beta$	p
AS Physical	-0.180	-0.026	0.857
AS Cognitive	3.090	0.338	0.003
AS Social	2.189	0.283	0.031

Note. Multiple linear regression with AS subscales predicting immobility during image viewing.

## Discussion

- Results suggest that high physical and cognitive AS may be associated with higher likelihood to experience TI during a traumatic event.
- Meanwhile, results indicate that cognitive and social AS may be associated with greater immobility during a lab-based paradigm designed to assess threat responding.
- AS may lead to differences in threat responding because those who score high in the cognitive subscale of AS are more likely to perceive an anxiety inducing situations as being direct risk of harm.
- Differential findings related to AS physical and social components may reflect differences in the environment. While the individual may have faced more physical demands and distress during a traumatic event, an individual may feel more social pressure in the context of a laboratory task.
- The results of the study bring about several further potential research questions. The data shows that a high physical and cognitive AS are potentially linked to experiencing TI. However, we are unsure why social AS is not an indicator and leaves room for further study.

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