



GENERALIZED SENSORY SENSITIVITY AND PRIMARY PAIN APPRAISALS: EXPLORING ASSOCIATIONS AND IMPLICATIONS FOR NOCIPLASTIC PAIN PHENOTYPES

Dennis Smythe, B.S.^a, Aurianna Lajaunie, M.S.^b, & Jennifer Pierce, Ph.D.^b
^aMichigan State University College of Osteopathic Medicine
^bUniversity of Michigan Medical School

INTRODUCTION

- Primary appraisal describes the cognitive process of first attempting to understand whether an event is stressful and relevant to the individual. Pain may be perceived as a threat or a challenge. Such appraisals may contribute to coping strategies, care-seeking, and long-term outcomes.¹
- Nociplastic or centralized pain (e.g. fibromyalgia) conditions are associated with cognitions and behaviors related to threat, such as pain catastrophizing and kinesiphobia.
- Generalized sensory sensitivity (GSS), which encompasses the spread of pain as well as sensitivity to internal and external sensations, has been identified as an important component of nociplastic pain.²
- The present study evaluated the association between GSS and primary appraisals of pain.

METHODS

- Michigan Medicine patients completed a cross-sectional, online survey assessing the presence of chronic pain, pain phenotype, and appraisals of pain.
- The study included participants who indicated chronic pain (i.e., any body pain that has felt persistent or recurrent for 3 months or longer) and completed the pain appraisals measure.
- Measures:
 - Demographics (Gender, Age, Race)
 - Complex Medical Symptoms Inventory²
 - Modified Pain Appraisal Inventory⁴

RESULTS

- The sample included 279 participants (80% female; Mage = 40.8, SD=12.8; 86% White).
- Primary appraisals of threat and challenge exhibited a significant, but small, positive correlation ($r = .14, p = .020$).
- Univariable analyses showed that older age ($\beta = .15, p = .015$) and higher GSS ($\beta = .46, p < .001$) were associated with higher threat appraisals. GSS remained a significant predictor in the multivariable model ($\beta = .46, p < .001$).

Higher generalized sensory sensitivity is associated with higher perceived threat of pain.

RESULTS

Table 1. Sample descriptives

	% (n)	M (SD)	Range
Female	79.9% (223)		
Age		40.8 (12.8)	18-65
White	86.0% (240)		
GSS		3.0 (2.2)	0-9
Threat Appraisal		3.3 (1.4)	1-6
Challenge Appraisal		2.2 (1.1)	1-5.9

Table 2. Univariable and Multivariable Linear Regression Models Predicting Threat Appraisals of Pain

	Univariable Models				Multivariable Model			
	Coef.	β	p	95% CI	Coef.	β	p	95% CI
Female	-.31	-.09	.125	[-.714, .087]	-.35	-.10	.053	[-.714, .005]
Age	.02	.15	.015	[.003, .028]	.01	.09	.088	[-.001, .021]
White	.16	.04	.504	[-.306, .622]	.08	.02	.698	[-.329, .492]
GSS	.28	.46	<.001	[.218, .347]	.28	.46	<.001	[.216, .345]

Table 3. Univariable and Multivariable Linear Regression Models Predicting Challenge Appraisals of Pain

	Univariable Models				Multivariable Model			
	Coef.	β	p	95% CI	Coef.	β	p	95% CI
Female	-.17	-.06	.326	[-.500, .167]	-.22	-.08	.209	[-.555, .122]
Age	.00	-.05	.363	[-.015, .006]	-.01	-.07	.220	[-.017, .004]
White	.03	.01	.870	[-.354, .418]	.04	.01	.841	[-.347, .426]
GSS	.04	.09	.132	[-.014, .107]	.05	.10	.098	[-.009, .112]

DISCUSSION

- This study demonstrates a significant association between higher GSS and threat appraisals. This may elucidate a relationship between nociplastic pain and threat appraisals, as well as downstream catastrophizing present in this pain phenotype.
- Options to target GSS include pain reprocessing therapy (PRT) that focuses on reducing the threat value of pain by reconceptualizing its cause as due to non-dangerous brain processes rather than peripheral tissue damage.⁴
- Additionally, patients with chronic widespread pain report symptom invalidation from their social contacts, including medical professionals.⁵ For patients with nociplastic pain and high GSS, symptom invalidation by trusted healthcare providers may exacerbate the negative perception of pain further.
- The results of this study may argue that perhaps threat appraisals are warranted in patients with nociplastic pain given the diffuse and unrelenting nature of increased sensitivity to stimuli, as well as deficient support and empathy from others.

REFERENCES

- Jackson T, Wang Y, Fan H. Associations between pain appraisals and pain outcomes: meta-analyses of laboratory pain and chronic pain literatures. *J Pain*. 2014;15(6):586-601. doi:10.1016/j.jpain.2014.01.499
- Schrepf A, Williams DA, Gallop R, et al. Sensory sensitivity and symptom severity represent unique dimensions of chronic pain: a MAPP Research Network study. *Pain*. 2018;159(10):2002-2011. doi:10.1097/j.pain.0000000000001299
- Unruh, AM, Ritchie, JA. Development of the Pain Appraisal Inventory: Psychometric properties. *Pain Res Manage*. 1998; 3(2), 105-110.
- Ashar YK, Gordon A, Schubiner H, et al. Effect of Pain Reprocessing Therapy vs Placebo and Usual Care for Patients With Chronic Back Pain: A Randomized Clinical Trial. *JAMA Psychiatry*. 2022;79(1):13-23. doi:10.1001/jamapsychiatry.2021.2669
- JÄREMO P, ARMAN M, GERDLE B, GOTTEBERG K. FACING INVALIDATION: A FURTHER CHALLENGE WHEN LIVING WITH CHRONIC WIDESPREAD PAIN. *J Rehabil Med*. 2022;54:67. doi:10.2340/jrm.v54.67