

Measurement Properties of the Central Sensitization Inventory

¹Thomas Scerbo, SPT; ¹Joseph Colasurdo, SPT; ¹Sally Dunn, SPT; ¹Jacob Unger, SPT; ²Jo Nijs, PT, MT, PhD; ¹Chad Cook, PT, PhD, MBA, FAAOMPT
 1. Duke University 2. Vrije Universiteit

Background

- Central Sensitization (CS) is a phenomenon associated with several medical diagnoses, including **post-cancer pain, low back pain, osteoarthritis, whiplash, and fibromyalgia**.
- CS involves an amplification of pain sensitivity.
- The Central Sensitization Inventory is the first survey tool of its kind, designed to quantify CS symptom severity.

Purpose

- The purpose of this systematic review was to investigate **the measurement properties of the CSI**.
- Using the COSMIN scoring system, our goal was to assess the quality of all published evidence regarding the CSI.

Measurement Properties

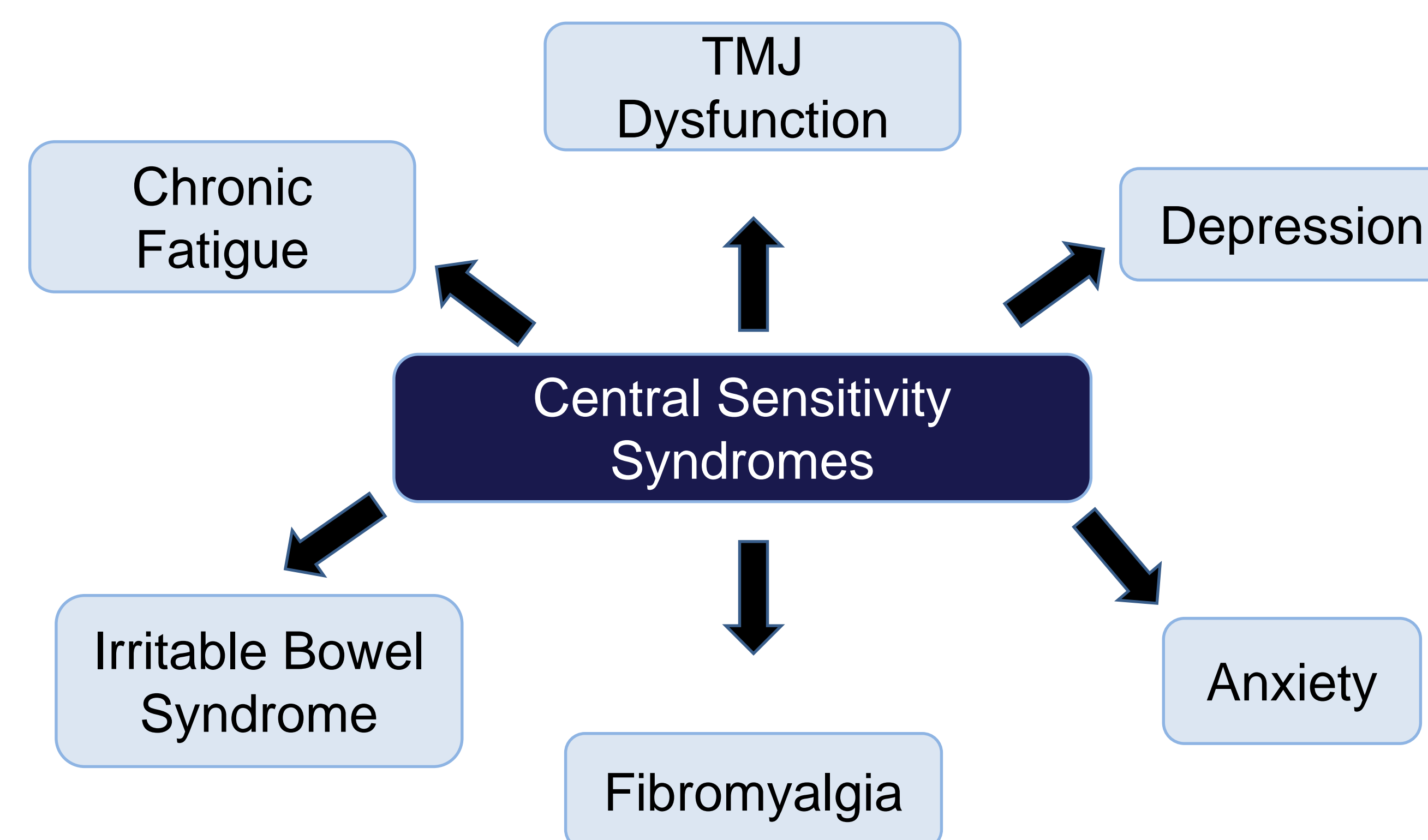
Cross-cultural validity	The degree to which the items on a translated instrument are an adequate reflection of the items on the original version of the instrument
Internal consistency	The degree of interrelatedness among the items of an instrument
Reliability	The extent to which repeated measurements agree with one another
Responsiveness	The ability of a measure to detect change over time in the phenomenon of interest
Content Validity	The degree to which an instrument measures the construct that it is supposed to measure
Structural Validity	The degree to which the scores of an instrument are an adequate reflection of the complexity of the construct
Construct Validity	The degree to which the scores of an instrument are consistent with current hypotheses regarding the construct
Interpretability	The degree to which one can assign meaning to an instrument's quantitative scores or change in scores
Criterion Validity	The degree to which the scores of an instrument are an adequate reflection of a gold standard

Methods

- Authors applied the *Preferred Reporting Items for Systematic Reviews and Meta Analyses* (PRISMA) Statement.
- Quality was assessed using the COSMIN four-point scoring system designed for systematic reviews.



Analysis



- Quality of evidence from all publications was "Good" to "Excellent" according to COSMIN criteria.
- Interpretability and Construct Validity were qualitatively scored in lieu of COSMIN criteria.

Results

- Eight studies met inclusion criteria.
- Measurement property reports were good to excellent for all studies according to the COSMIN scoring system.
- Interpretability measures were consistent among publications.
- Construct validity was strong when examined among other CS validated measures.

Measurement Properties	Number of Publications
Cross-Cultural Validity	2
Internal Consistency	3
Reliability	4
Responsiveness	1
Content Validity	3
Structural Validity	2
Criterion Validity	5

Conclusions

- The CSI is a **valid** and **reliable** outcome measure.
- Items on the CSI are broad by design.
- A gold standard definition of CS is still needed to strengthen future CS-related outcome measures.
- Many items on the CSI are common elements of anxiety and depressive disorders.

Clinical Relevance

- The CSI is designed to **quantify symptom severity**, and does so effectively.
- Established threshold values make CSI scores easily interpretable.
- Translations of the CSI hold the same strong measurement properties as the original.

Acknowledgements / References

Choi, Y. (2014). *An examination of the validity of the central sensitization inventory with chronic disabling occupational musculoskeletal disorders*. (75), ProQuest Information & Learning, US. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2014-99220-133&site=ehost-live&scope=site> Available from EBSCOhost psych database.

Cuesta-Vargas, A. I., Roldan-Jimenez, C., Neblett, R., and Gatchel, R. J. (2016). Cross-cultural adaptation and validity of the Spanish central sensitization inventory. *Springerplus*, 5(1), 1837.

Curatolo, M., and Arendt-Nielsen, L. (2015). Central hypersensitivity in chronic musculoskeletal pain. *Phys Med Rehabil Clin N Am*, 26(2), 175-184.

Fernandez-Carnero, J., Fernandez-de-Las-Penas, C., de la Llave-Rincon, A. I., Ge, H. Y., and Arendt-Nielsen, L. (2009). Widespread mechanical pain hypersensitivity as sign of central sensitization in unilateral epicondylalgia: a blinded, controlled study. *Clin J Pain*, 25(7), 555-561.

Fernandez-Lao, C., Cantarero-Villanueva, I., Fernandez-de-las-Penas, C., Del-Moral-Avila, R., Menjon-Beltran, S., and Arroyo-Morales, M. (2011). Widespread mechanical pain hypersensitivity as a sign of central sensitization after breast cancer surgery: comparison between mastectomy and lumpectomy. *Pain Med*, 12(1), 72-78.

H. Merskey, N. B. a. t. I. T. F. o. T. (1994). Part III: Pain Terms, A Current List with Definitions and Notes on Usage. In N. B. a. t. I. T. F. o. T. H. Merskey (Ed.), *Classification of chronic pain*. (second edition ed., pp. 209-214). Seattle, USA: IASP Press.

Hansson, P. (2014). Translational aspects of central sensitization induced by primary afferent activity: what it is and what it is not. *Pain*, 155(10), 1932-1934.

Kim, S. H., Yoon, K. B., Yoon, D. M., Yoo, J. H., and Ahn, K. R. (2015). Influence of Centrally Mediated Symptoms on Postoperative Pain in Osteoarthritis Patients Undergoing Total Knee Arthroplasty: A Prospective Observational Evaluation. *Pain Pract*, 15(6), E46-53.

Kregel, J., Vuijk, P. J., Descheemaeker, F., Keizer, D., van der Noord, R., Nijs, J., . . . van Wilgen, P. (2015). The Dutch Central Sensitization Inventory (CSI): Factor Analysis, Discriminative Power and Test-Retest Reliability. *Clin J Pain*.

Lee, Y. C., Nassis, N. J., and Clauw, D. J. (2011). The role of the central nervous system in the generation and maintenance of chronic pain in rheumatoid arthritis, osteoarthritis and fibromyalgia. *Arthritis Res Ther*, 13(2), 211.

Lluch, E., Torres, R., Nijs, J., and Van Oosterwijck, J. (2014). Evidence for central sensitization in patients with osteoarthritis pain: a systematic literature review. *Eur J Pain*, 18(10), 1367-1375.

Mayer, T. G., Neblett, R., Cohen, H., Howard, K. J., Choi, Y. H., Williams, M. J., . . . Gatchel, R. J. (2012). The development and psychometric validation of the central sensitization inventory. *Pain Pract*, 12(4), 276-285.