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Functional Somatic Symptoms in Children and Adolescents: The Stress-System Approach to Assessment and Treatment

Kasia Kozlowska, Stephen Scher, and Helene Helgeland

Online Supplement 1.3

Further Reading: Annotated Supplemental Bibliography

Chapter 1. Introduction

Original References by Dr Kenneth Nunn Pertaining to the Mind-Body Program

Dr Kenneth Nunn set up the Mind-Body Program Nunn at the Royal Alexandra Hospital in 1994 in response to the presentation of children with functional paralysis of the legs (Nunn, 1998) (see pages 274–276 pertaining to conversion disorder) and pervasive refusal (Thompson and Nunn, 1997).

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Articles by Bruce Perry and Frank Putnam

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Chapter 4. The Stress-System Model for Functional Somatic Symptoms

Sigmund Freud and the Hypothesis of Child Sexual Trauma as the Origin of Functional Somatic Symptoms

This belief likely dates back to Freud's early observations of childhood sexual trauma as the origin of functional somatic symptoms in his patients (Freud 1962 [1896]). Later, Freud came to favour, in lieu of sexual trauma, the role of sexual fantasy or unconscious fears and wishes, and coined the term *conversion* to describe the process by which unacceptable mental contents (usually unconscious sexual conflicts) were transformed into somatic symptoms (Freud 1953 [1905]). Nonetheless, the idea that sexual abuse was potentially important in the aetiology of functional somatic symptoms continued to linger.

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Adverse Childhood Experience (ACE) Studies

Similar findings to those of the original ACE study (of adults) run by Vincent Felitti and colleagues (1998) have been reported in studies with children (Flaherty et al. 2009; Kerker et al. 2015; Boullier and Blair 2018). Jack Shonkoff, paediatrician and director of the Center on the Developing Child at Harvard University, has noted that more than 50 reports from the ACE Study over the past 20 years have confirmed the association between ACEs and subsequent health problems, as first reported by Felitti (Shonkoff, 2016).

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Association Between Adverse Childhood Experiences (ACEs) and Functional Somatic Symptoms

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For FND, see Bowman & Markland (1999), Kozlowska and colleagues (2011), Steffen and colleagues (2015), Steffen-Klatt and colleagues (2019), Kletenik and colleagues (2019), and Diez and colleagues (2020); for irritable bowel syndrome, see Bradford and colleagues (2012), Knight and colleagues (2015), and Park and colleagues (2016); for irritable bladder see Jundt and colleagues (2007); for fibromyalgia and widespread pain, see McInnes and colleagues (2019), Coppens and colleagues (2017), Nicol and colleagues (2016), and Yavne and colleagues (2018); for chronic fatigue syndrome, see Heim and colleagues (2006); and for functional somatic syndromes in general, see Rask and colleagues (2013) and Fischer and colleagues (2014).

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Association Between Attachment and Functional Somatic Symptoms

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For a lay summary of the research program, see Kozlowska (2016), and for a short neuroscience summary, see Kozlowska (2017).

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Studies About the Autonomic System in Children with FND, Mixed Functional Symptoms, and Pain

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Studies Indicating Activation of the Motor System

Reaction times to emotion faces are a proxy measure for motor readiness. Kozlowska and colleagues (2013) found that in children with FND, the reaction times were faster for all emotion faces. In that study, the raw scores for the reaction times can be found in Table 2 (p. 276). For a visual representation of these data and t-test results, see Kozlowska (2016).

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Studies Suggesting a Shift Toward Low-Grade Inflammation

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Studies Documenting the Percentage of Comorbid Pain Alongside Other Functional Neurological Symptoms

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Chapter 8. The HPA Axis and Functional Somatic Symptoms

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Chapter 9. The Immune-Inflammatory System and Functional Somatic Symptoms

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Elevated Inflammatory Markers in Patients with Functional Somatic Symptoms Are Associated with Dysregulation of the HPA Axis and with Markers Showing Changes in Body Composition and Tissue Integrity

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Chapter 10. The Role of the Gut in the Neurobiology of Functional Somatic Symptoms

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Chapter 12. The Brain Stress Systems II: The Mind Level of Brain Operations

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Concrete Physical Exercises Using Large Muscle Groups for Providing Containment

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Resources for Progressive Muscle Relaxation

For a progressive muscle relaxation script, see https://www.baylor.edu/content/services/document.php/183466.pdf.

Resources for Bottom-Up Mindfulness Practice Resources

For resources, see Cyruba: Make Meditation Yours. *Meditation Exercises*. https://www.cyruba.org/meditation-exercises/

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Other Trauma-Processing Interventions

Radical exposure tapping

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Chapter 15. Treatment Interventions II: Working with the Mind

For a discussion (and references) to the three different waves of cognitive-behavioural therapy, see Online Supplement 15.1

Additional Resources for Visualization Scripts and Mindfulness Exercises

For a visualization script using imagery of protective light, see the following:

Inner Health Studio (2018). *Protective Light Visualization Relaxation Script*. https://www.innerhealthstudio.com/protective-light.html

For additional exercises, see the following:

Prevent (2017). Cure Your Headache with This 1-Minute Meditation. https://www.prevention.com/health/a20499696/cure-your-headache-with-this-1-minute-meditation

Budilovsky, J. & Adamson, E. (2003). *The Complete Idiot's Guide to Meditation*, New York, Penguin [in particular, 'For Chronic Pain, Especially Back Pain', p. 317].

A wealth of mindfulness exercises are now available on the internet. For example, search for 'Leaves on a Stream' mindfulness exercises, or see 'Thought Clouds' on the Stanford Medicine website, https://mindful.stanford.edu/2015/06/thought-clouds/.

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