CLINICAL PRACTICE

Movement Disorders

Symptom-Triggered Attention to Self as a Possible Trigger of Functional Comorbidity

Anne-Catherine M.L. Huys, MD, PhD,^{1,*} (D) Kailash P. Bhatia, DM,¹ (D) Patrick Haggard, PhD,² (D) and Mark J. Edwards, PhD³ (D)

Attention is crucial in functional movement disorders (FMD), demonstrated by worsening of functional movement disorders when attention is directed towards the affected limb and improvement by distraction.

When professional sportspeople perform their highly skilled movements their attentional focus is on the goal of the movement. A strongly replicable finding in sports-related research is that adopting an "internal, body- focused attention" impairs performance compared to adopting an "external, goal-focused attention".^{1–3} How does misallocation of attention to the mechanics of motor execution lead to impaired movements? Most authors agree that automatic motor processes provide more optimal fine motor control than the slower, effortful, more conscious processes characterized by voluntary attention.^{1,4}

The Movement Specific Reinvestment Scale (MSRS) is a 10-item questionnaire testing a person's tendency to consciously monitor their movements.⁵ It contains two subscales, the conscious motor processing subscale, which evaluates awareness of the processes of one's own movements, and the more interpersonal movement self-consciousness scale, which evaluates the concern about one's "style" of movement (Table 1).

We administered the MSRS, and the hospital anxiety and depression scale to 52 people with FMD (action tremor, dystonia, myoclonus, gait disorder, weakness), to 41 age and gender matched patients with equivalent non-functional, other movement disorders (OMD) (action tremor, dystonia, myoclonus, weakness) and to 57 age and gender matched healthy controls (HC). The patients were primarily recruited from the clinical practice of experts in functional and movement disorders (MJE and KPB). As detailed in Table 1, we found that functional and other movement disorders patients scored equally highly on the MSRS, with both groups scoring significantly higher than healthy controls in the total and the two sub-scores. The FMD group had significantly higher anxiety and depression scores than their organic counterparts, which in turn had significantly higher scores than the healthy controls. There were only weak correlations between the MSRS total score and either anxiety (Pearson's correlation coefficient FMD r = .25, Spearman's rho OMD $\rho = .36$, HC $\rho = .38$) or depression (FMD r = .36, OMD $\rho = .43$, HC $\rho = .15$).

These findings suggest that having a movement disorder, regardless of whether it is of functional origin or not, and largely independently of anxiety or depression, induces increased attention to one's movement. This increase in conscious motor processing may be adaptive, and may be necessary for the patient to move safely and efficiently, if automatic motor control mechanisms are impaired. Importantly, more conscious motor processing (perhaps corresponding to MSRS subscale 1) seems to be accompanied by increased movement self-consciousness (corresponding to MSRS subscale 2) (Pearson's correlation coefficient FMD r = .54; OMD r = .75, Spearman's rho HC $\rho = .73$).

These observations might help explain why an estimated 10%–15% of movement disorders patients have an additional functional movement disorder and why 12% of patients with a neurological disease also display "symptoms unexplained by the disease".^{6,7} The increased attention to the body in patients with movement disorders triggered by the presence of physical symptoms might make them more susceptible to developing a functional neurological disorder in addition.

¹Department of Clinical and Movement Neurosciences, University College London Queen Square Institute of Neurology, London, UK; ²Institute of Cognitive Neuroscience, University College London, London, UK; ³Neuroscience Research Centre, Institute of Molecular and Cell Sciences, St George's University of London, London, UK

*Correspondence to: Dr Anne-Catherine M. L. Huys, Department of Clinical and Movement Neurosciences, University College London Queen Square Institute of Neurology, 33 Queen Square, London, WC1N 3BG, UK; E-mail: anne-catherine.huys.15@ucl.ac.uk Keywords: functional overlay, functional movement disorders, movement disorders, attention, movement specific reinvestment scale. Received 3 October 2020; revised 30 October 2020; accepted 2 November 2020. Published online 21 December 2020 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/mdc3.13120

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movements when I carry them out.	3.9 (1.8)	<pre>pcorr < .0001 η²⁼.17 F(2,147) = 11.31 pcorr < .0001</pre>	p = .83 d = -0.04 7 - 1.20		
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I am aware of the wav mv mind and body 2.7(1.8) 4.3(1.8)		p _{corr} < .0001	1		
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movement.		η ²⁼ .13 Γ/2 412) 24 Γ2	r = .12		
Movement self-consciousness subscale 10.1 (6.0) 18.0 (7.2) 1	7.2) 16.9 (6.8)	F(2, 147) = 21.52	t(91) = 0.70	Z = -4.85	Z = -5.01
		p _{corr} < .0001 ^{n²⁼ 73}	р = .48 d = 0 15	1000.>d	p < .0001
T am self-conscious about the way T 2 5 (1 7) 4 0 (1 0)	1 9) 4 2 (1 8)	F(2 147) = 14 95	07 = -0.49		
I all SETT-CONSTICUS about the way I Z.S. (I.V.) 4.0 (I.S.) Look when I am moving.	(0.1) 7.4 (6.1	$p_{corr} = .0001$	p = .62		
		η ²⁼ .17	r =05		
I sometimes have the feeling that I am 1.6 (1.2) 3.4 (1.9)	1.9) 2.9 (1.9)	F(2,147) = 16.08	Z = 1.43		
watching myself move.		p _{corr} < .0001 ^{n²⁼ 18}	p = .15 r = 15		
I am concerned about mv stvle of 1.8 (1.4) 3.7 (1.8)	1.8) 3.7 (1.7)	F(2,147) = 24.34	t(91) = 0.11		
moving.	~	p _{corr} < .0001	p = .91		
		η ²⁼ .25	d = 0.02		
If I see my reflection in a shop window, 2.3 (1.6) 2.6 (1.7)	1.7) 2.4 (1.8)	F(2, 147) = 0.57	Z = 0.58		
I WIII EXAMINE MY MOVEMENTS.		$p_{corr} = .5/$	ос. = q Эв ч		
I am concerned about what people think 1.9(1.4) 4.1(1.8)	3.7 (1.9)	F(2, 147) = 24.33	t(91) = 1.01		
about me when I am moving.		p _{corr} < .0001	p = .32		
Hornital anviotion damascian casas (HANC)		η ²⁼ .25	d = 0.21		
HOSpirlar anxiety and depression score (HAUS) 4.9 (3.3) 7.6 (3.8) 10 HADS-anxiety	3.8) 10.2 (4.9)	$v^2(2) = 34.35$	t(91) = -2.80	Z = -3.57	
		p = .0001	p = .006	p = .0004	
		η ²⁼ .22	d = -0.59	r =36	
HADS-depression 2.5 (2.6) 4.4 (2.7)	2.7) 8.9 (4.6)	$\chi^{2}(2) = 57.34$	Z = -4.90	Z = -3.73 p = .0002	
		p = .0001	p < .6901	r =38	
		ac:	+0.		

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Author Roles

Research Project: A. Conception, B. Organization,
 C. Execution; (2) Statistical Analysis: A. Design, B. Execution,
 C. Review and Critique; (3) Manuscript: A. Writing of the first draft, B. Review and Critique, C. Final version.

A.-C.H.: 1A, 1B, 1C, 2A, 2B, 3A, 3C K.B.: 3B P.H.: 2A, 2C, 3B M.E.: 2C, 3B

Disclosures

Ethical Compliance Statement: The study was approved by the local ethics committee (London-Bromley Research Ethics Committee, reference: 16/LO/1463), and participants gave their written, informed consent. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

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Data Availability: Our ethics agreement prevents data being openly available, but individual researchers may request deidentified participant data from the corresponding author.

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