The Mediating Role of Cognitive Fatigue on the Relationship between Anxiety and Illness Intrusiveness

CAROLINE ALTARAS, B.S., NICHOLAS A VISSICCHIO, B.A., SHONNA SCHNEIDER, B.A., SHAINA SHAGALOW, B.A. , AMANDA A PARKER, B.S. , JENNIFER MILLER, B.A., AND FREDERICK W FOLEY, PH.D.

FERKAUF GRADUATE SCHOOL OF PSYCHOLOGY, YESHIVA UNIVERSITY, BRONX, NY

HOLY NAME MEDICAL CENTER, MS CENTER, TEANECK, NJ

Learning Objectives

- Better understand the impact of anxiety of the degree to which MS patients perceive their MS as intrusive
- Examine the mediating role of cognitive fatigue on the association between anxiety and illness intrusiveness

Illness Intrusiveness

Illness intrusiveness refers to the degree to which an individual perceives his/her illness as interfering with valued aspects of life, such as ongoing activities and interests [1,2]

Impacts well-being via two pathways [2-4]

- 1) Reduced availability and participation of valued activities
- 2) Reduced perception of control

Associated with: [2]

- Poor quality of life [5,6]
- Psychological distress and mental health (depression and anxiety) [1,2,5,7]
- Fatigue [6,7]
- Physical disability [6,7]
- Sleep quality [4]

Anxiety

Unpleasant state of fear associated with an anticipation of a future threat

Prevalence: 19.3-44.5% [8]

Factors: [9-11]

- Uncertainty, unpredictability, physical and psychological limitations, social and financial strains, exacerbations, and complexities of treatment
- Some researchers have suggested that some anxiety may be due to the direct effects of physiological changes in MS (e.g. cerebral atrophy)

MS patients with higher levels of anxiety were more likely to perceive their MS as intrusive than those with lower anxiety [12]

- Cognitive distortions
- Impact of anxiety on disease factors

Cognitive Fatigue

Cognitive fatigue is a component of central fatigue characterized as a decline in the ability to sustain concentration and endure mental tasks [13,14]

Fatigue has prevalence of 60–95% in MS [15, 16]

Associated with: [10, 17, 18]

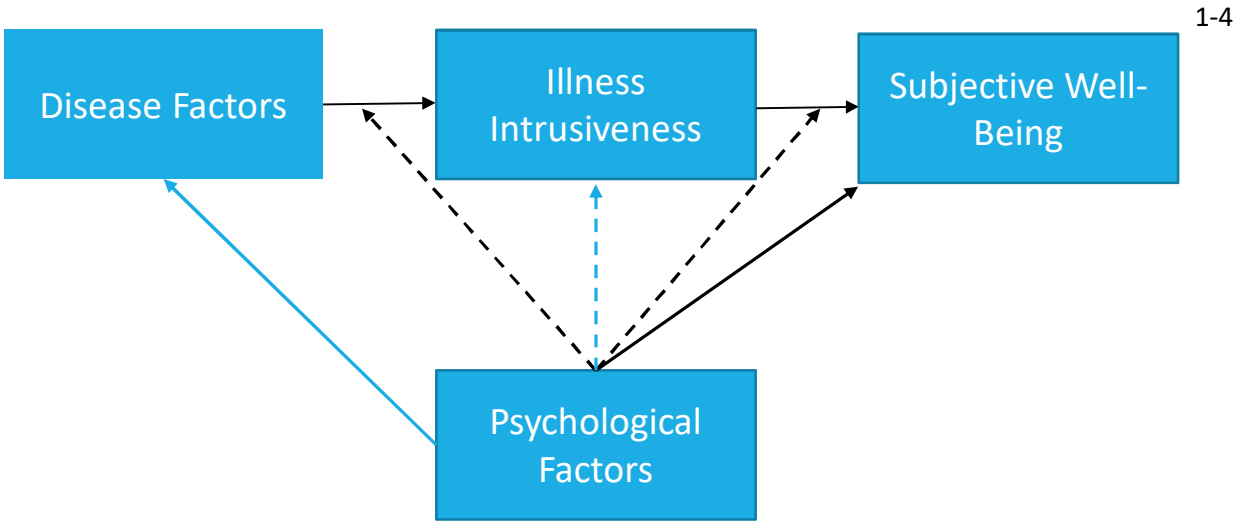
- Anxiety and depression
- Self-efficacy
- Stress
- Sleep quality
- Quality of life

Relation of anxiety and cognitive fatigue [19,20]

- Interplay of biological, cognitive, emotional, and behavioral factors

Objective

Examine the relationship between anxiety and illness intrusiveness, and evaluate cognitive fatigue as a mediator



Methods and Demographics

Participants recruited from ongoing study at the MS Center at Holy Name Hospital in Teaneck, NJ

Data analysis is based on 60 participants

Statistical Analysis- SPSS 24.0, Process Macro

- Preacher and Hayes bootstrapping approach [21]
- Series of OLS regressions

Characteristics	M	SD
Age	47.91	12.36
Years of Education	14.98	3.90
ISS Total Score	13.13	6.91

Gender	
Female	77.3%
Male	22.7%
Race/Ethnicity	
Caucasian	75.8%
Black	15.2%
Hispanic	9.1%
Employment Status	
Unemployed	69.7%
Part-time	4.5%
Full-time	25.8%

Instruments

Illness Intrusiveness Rating Scale (IIRS) [22]

- 13 item, 7-point scale
- Total score range= 13- 91
- Subscales: 1) Instrumental; 2) Intimacy; 3) Relationship/Personal Development

Fatigue Scale for Motor and Cognitive Functions (FSMCC) [23]

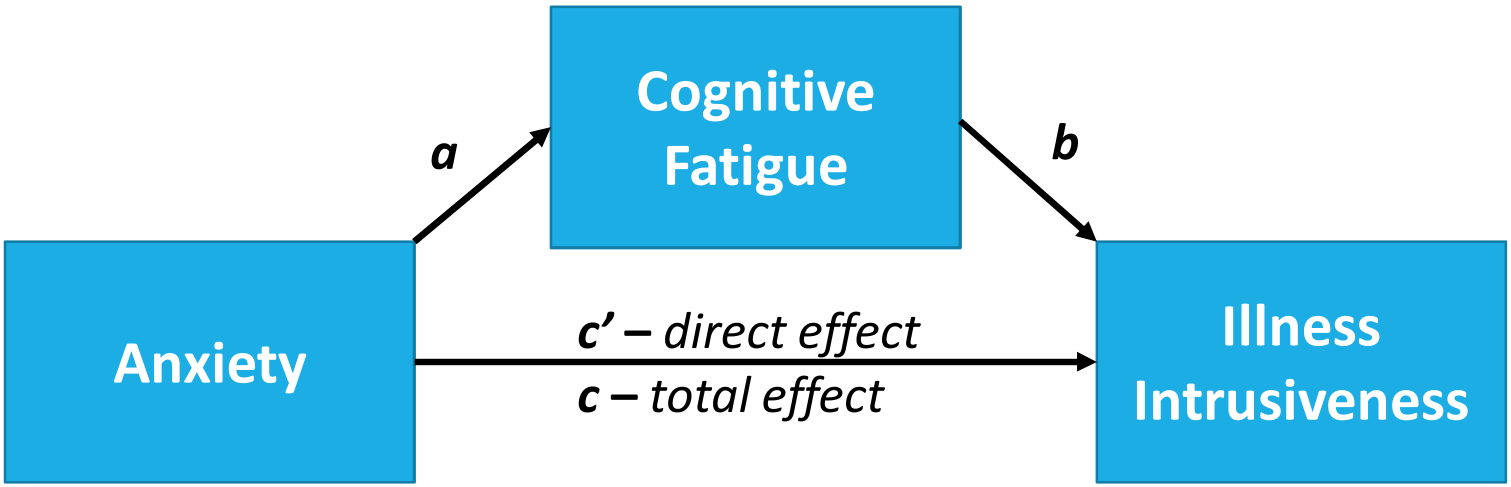
- 20 item, 5 point scale
- Ranges= *Mild:* 22-27, *Moderate*: 28-33 and *Severe*: ≥34
- Subscales: 1) Motor Fatigue; 2) Cognitive Fatigue

Hospital Anxiety and Depression Scale (HADS) [24]

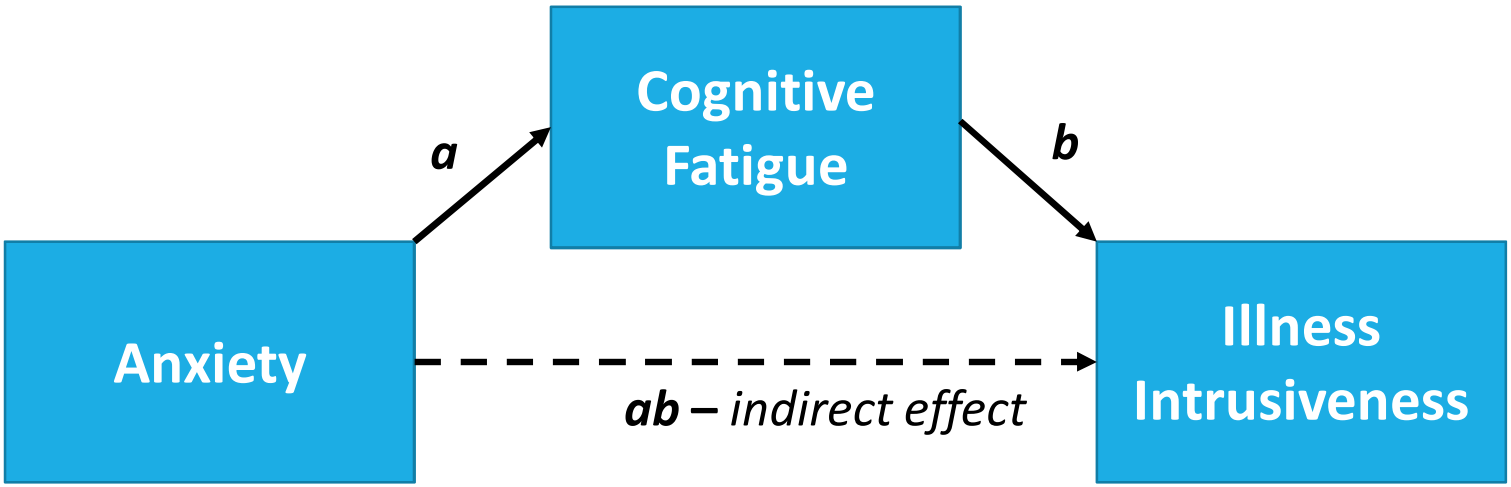
- 14 item, 4 point scale
- Range=0- no symptoms to 21- most severe symptoms
- Subscales: 1) Anxiety; 2) Depression

Scale	M (N)	SD (%)
HADS Anxiety	8.80	4.05
No Anxiety	23	38.3%
Anxiety	37	61.7%
FSMC Cognitive	37.14	9.06
None	4	6.7%
Mild	5	8.3%
Moderate	14	23.3%
Severe	37	61.7%
IIRS Total Score	52.55	20.12

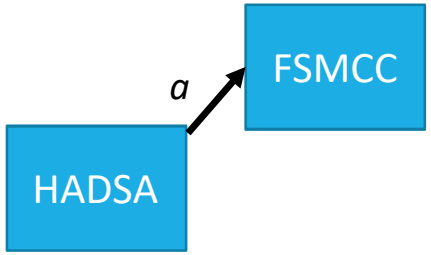
Mediational Model



Mediational Model



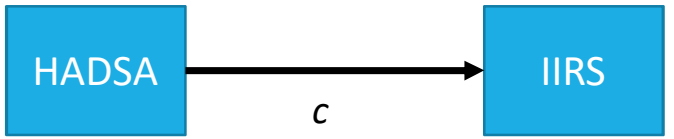
Model 1- Pathway *a*



FSMCC (Cognitive Fatigue)			
	B	**SE B**	**95% CI**
Intercept	17.776*	7.760	(2.218, 33.333)
HADSA (Anxiety)	1.318***	.243	(.831, 1.806)
Age	.042	.080	(-.118, .202)
Gender	1.549	2.340	(-3.143, 6.240)
Years of Education	-.010	.445	(-.902, .881)
ISS Total	.222	.160	(-.099, .543)
R^2= .455, $F(5, 54)$=9.011, p<.001			

Path *a*

Model 2- Pathway *c*



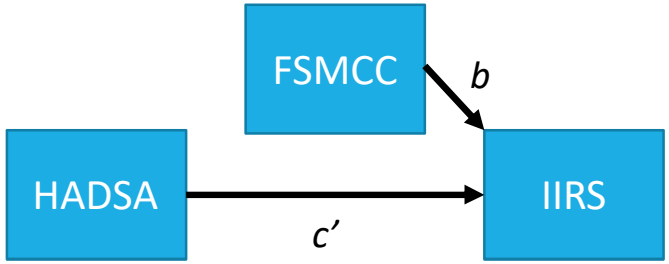
IIRS (Illness Intrusiveness)

	B	SE B	95% CI
Intercept	31.534	17.409	(-3.369, 66.437)
HADSA (Anxiety)	1.799**	.546	(.705, 2.892)
Age	-.236	.179	(-.595, .123)
Gender	10.531*	5.250	(.006, 21.056)
Years of Education	-1.102	.997	(-3.101, .898)
ISS Total	1.097**	.359	(.377, 1.817)

R^2= .423, $F(5, 54)$=7.932, p<.001

Path *c*

Model 3- Pathways *b* and *c'*



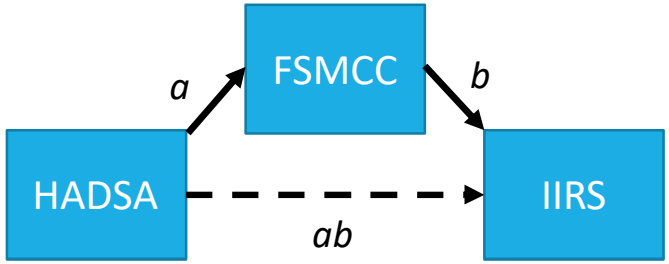
IIRS (Illness Intrusiveness)

	B	SE B	95% CI
Intercept	17.730	17.268	(-16.906, 52.366)
FSMC (Cognitive Fatigue)	.777**	.289	(.197, 1.357)
HADSA (Anxiety)	.775	.642	(-.513, 2.062)
Age	-.269	.170	(-.610, .072)
Gender	9.328	4.992	(-.684, 19.340)
Years of Education	-1.094	.945	(-2.988, .801)
ISS Total	.924**	.346	(.230, 1.618)
R^2= .493, $F(6, 53)$=8.573, p<.001			

Path *b*

Path *c'*

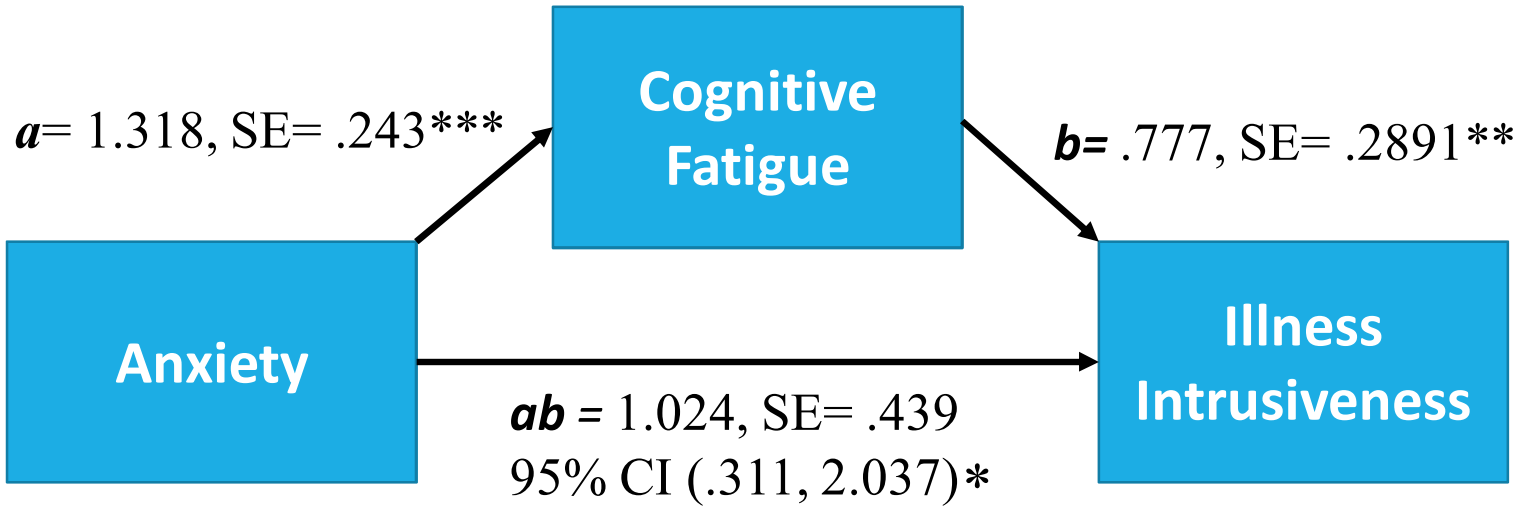
Indirect Effect- Pathway *ab*



	Total. Direct, and Indirect Effects			
	Effect	**SE**	**95% CI**	***p***
Total effect: *c*	1.799	.546	(.705, 2.892)	.0017
Direct effect: c’	.775	.6420	(-.513, 2.062)	.2330
Indirect effect: *ab*	1.024	.439	(.311, 2.037)	*
Sobel Test	1.024	.4312		.0176

* The 95% CI does not include zero suggesting the mediation effect is significant at $p < .05$

Conclusion


Cognitive Fatigue
a= 1.318, SE= .243***
b= .777, SE= .2891**
Anxiety
Illness Intrusiveness
ab = 1.024, SE= .439
95% CI (.311, 2.037)*

Conclusion and Future Directions

Findings indicate that the positive association between anxiety and the degree to which an individual perceives their MS as intrusive is mediated by the individual's perception of cognitive fatigue

Anxiety was no longer a significant predictor of illness intrusiveness after controlling for cognitive fatigue

Cross-Sectional Design

Examine individual subscales, motor fatigue, and depression

References

1. Devins, G.M., et al., *Psychosocial impact of illness intrusiveness moderated by self-concept and age in end-stage renal disease.* Health Psychology, 1997. **16**(6): p. 529-538.

2. Devins, G.M., *Illness intrusiveness and the psychosocial impact of lifestyle disruptions in chronic life-threatening disease.* Adv Ren Replace Ther, 1994. **1**(3): p. 251-263.

3. Devins, G.M., et al., *Context moderates illness-induced lifestyle disruptions across life domains: A test of the illness intrusiveness theoretical framework in six common cancers.* 2006. **15**: p. 221-233.

4. Devins, G.M., et al., *Restless sleep, illness intrusiveness, and depressive symptoms in three chronic illness conditions: rheumatoid arthritis, end-stage renal disease, and multiple sclerosis.* Journal of Psychosomatic Research, 1993. **37**(2): p. 163-170.

5. Turpin, K., et al., *Deterioration in the health-related quality of life of persons with multiple sclerosis: the possible warning signs.* Multiple Sclerosis Journal, 2007. **13**(8): p. 1038-1045.

6. Shawaryn, M.A., et al., *Determinants of health-related quality of life in multiple sclerosis: the role of illness intrusiveness.* Multiple Sclerosis Journal, 2002. **8**(4): p. 310-318.

References

7. Shahrbanian, S., et al., *Contribution of symptom clusters to multiple sclerosis consequences.* Quality of Life Research, 2015. **24**(3): p. 617-629.

8. Marrie, R.A., et al., *The incidence and prevalence of psychiatric disorders in multiple sclerosis: a systematic review.* Multiple Sclerosis Journal, 2015. **21**(3): p. 305-317.

9. Giesser, B.S., *Primer on multiple sclerosis*. 2015: Oxford University Press.

10. Hartoonian, N., et al., *Predictors of anxiety in multiple sclerosis.* Rehabilitation Psychology, 2015. **60**(1): p. 91-98.

11. Garfield, A.C. and N.B. Lincoln, *Factors affecting anxiety in multiple sclerosis.* Disability and Rehabilitation: An International, Multidisciplinary Journal, 2012. **34**(24): p. 2047-2052.

12. Snyder, S., et al., *Psychological and physical predictors of illness intrusiveness in patients with multiple sclerosis.* Journal of the neurological sciences, 2013. **332**(1): p. 41-44.

13. Chaudhuri, A. and P.O. Behan, *Fatigue in neurological disorders.* The lancet, 2004. **363**(9413): p. 978-988.

14. Cantor, F., *Central and peripheral fatigue: exemplified by multiple sclerosis and myasthenia gravis.* PM&R, 2010. **2**(5): p. 399-405.

References

15. Nagaraj, K., et al., *Prevalence of fatigue in patients with multiple sclerosis and its effect on the quality of life.* Journal of neurosciences in rural practice, 2013. **4**(3): p. 278.

16. Hadjimichael, O., T. Vollmer, and M. Oleen-Burkey, *Fatigue characteristics in multiple sclerosis: the North American Research Committee on Multiple Sclerosis (NARCOMS) survey.* Health and Quality of Life Outcomes, 2008. **6**(1): p. 100.

17. Trojan, D.A., et al., *Fatigue in multiple sclerosis: association with disease-related, behavioural and psychosocial factors.* Multiple Sclerosis Journal, 2007. **13**(8): p. 985-995.

18. Pardini, M., et al., *Frontal networks play a role in fatigue perception in multiple sclerosis.* Behavioral neuroscience, 2010. **124**(3): p. 329.

19. Van Kessel, K. and R. Moss-Morris, *Understanding multiple sclerosis fatigue: A synthesis of biological and psychological factors*. 2006, Elsevier Science: Netherlands. p. 583-585.

20. Knoop, H., K. Van Kessel, and R. Moss-Morris, *Which cognitions and behaviours mediate the positive effect of cognitive behavioural therapy on fatigue in patients with multiple sclerosis?* Psychological medicine, 2012. **42**(01): p. 205-213.

References

21. Preacher, K.J. and A.F. Hayes, *SPSS and SAS procedures for estimating indirect effects in simple mediation models.* Behavior research methods, 2004. **36**(4): p. 717-731.

22. Devins, G.M., et al., *The emotional impact of end-stage renal disease: Importance of patients' perceptions of intrusiveness and control.* International Journal of Psychiatry in Medicine, 1983. **13**(4): p. 327-343.

23. Penner, I., et al., *The Fatigue Scale for Motor and Cognitive Functions (FSMC): validation of a new instrument to assess multiple sclerosis-related fatigue.* Multiple sclerosis, 2009. **15**(12): p. 1509-1517.

24. Zigmond, A.S. and R.P. Snaith, *The Hospital Anxiety and Depression Scale*. 1983, Blackwell Publishing: United Kingdom. p. 361-370.