



Pergamon

Archives of Clinical Neuropsychology  
19 (2004) 259–279

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Archives  
of  
CLINICAL  
NEUROPSYCHOLOGY

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## Metamemory in multiple sclerosis: exploring affective and executive contributors<sup>☆</sup>

John J. Randolph\*, Peter A. Arnett, Pamela Freske

<sup>a</sup>*Department of Psychiatry-DHMC, Dartmouth Medical School, One Medical Center Dr.,  
Lebanon, NH 03756-0001, USA*

<sup>b</sup>*The Pennsylvania State University, University Park, PA, USA*

<sup>c</sup>*Washington State University, Pullman, WA, USA*

Accepted 28 January 2003

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### Abstract

Although previous reports have examined metamemory in various neurological groups, no study to date has examined various affective and cognitive contributors to metamemory collectively in a sample of multiple sclerosis (MS) patients. In the present study, 48 MS patients completed the Memory Functioning Questionnaire (MFQ) and were administered measures assessing depression, depressive attitudes, and executive functioning. Correlational analyses indicated that certain aspects of metamemory in MS were associated with both affective and executive variables. Structural equation modeling (SEM) analyses of three a priori models revealed the best fit with one model proposing that greater executive dysfunction and depression were associated with increased self-reported memory complaints, but via the mediating influence of depressive attitudes. Although our results suggest some objective basis for metamemory complaints in MS (i.e., executive dysfunction), they also suggest that these complaints may be exacerbated by the potentially reversible influences of depression and depressive attitudes. Treatment of depression and depressive attitudes in MS may result in MS patients having more accurate perceptions of their actual memory abilities that, in turn, may lead to improvements in their quality of life.

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*Keywords:* Multiple sclerosis; Metamemory; Executive functions; Depression

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<sup>☆</sup> This work was presented in part at the 29th meeting of the International Neuropsychological Society, Chicago, IL, February 2000.

\* Corresponding author. Tel.: +1-603-650-5824; fax: +1-603-650-5842.

E-mail address: john.j.randolph@dartmouth.edu (J.J. Randolph).

## 1. Introduction

Metamemory, broadly defined as self-reported memory functioning and memory skills, has been researched extensively. Most studies have found only moderate correspondence between objective memory performance and metamemory (Kahn, Zarit, Hilbert, & Niederehe, 1975; O'Connor, Pollitt, Roth, Brook, & Reiss, 1990; Zarit, Gallagher, & Kramer, 1981), with correlations generally ranging from .20 to .30 (Hultsch, Hertzog, Dixon, & Davidson, 1988). In an attempt to explain the discrepancy between subjective memory reports and memory test performance, researchers have examined possible contributors to metamemory.

Some research has examined the relationship between metamemory and affective status, with results generally reflecting a relationship between memory complaints and increased depression (Cavanaugh & Murphy, 1986). Other studies have demonstrated that individuals with compromised executive functioning inaccurately rate their memory abilities (Janowsky, Shimamura, & Squire, 1989). However, few studies have investigated collectively various affective and cognitive contributors to metamemory, particularly in patients with multiple sclerosis (MS), a demyelinating disease of the central nervous system characterized by physical, emotional, and cognitive difficulties (Rao, 1986). Considering that depression and executive functioning impairment are relatively common emotional and cognitive sequelae of MS (Arnett et al., 1997; McIntosh-Michaelis et al., 1991; Minden & Schiffer, 1991), it is possible that these factors also impact on patients' subjective reports of memory ability. By demonstrating that memory complaints are associated with different MS-related sequelae (e.g., depression vs. executive functioning impairment), rehabilitation efforts might be directed accordingly (e.g., focus on alleviating depression vs. implementing cognitive rehabilitation). Although two studies previously examined the role of executive functioning on metamemory in MS (Beatty & Monson, 1991; Randolph, Arnett, & Higginson, 2001), and another considered the depression–metamemory connection (Gottschalk, 1995), no study to date has comprehensively considered various contributors to metamemory (e.g., depression, depressive attitudes, executive functioning) in MS patients. The present research was designed to consider contributors to metamemory in MS more comprehensively.

One possible explanation for the weak metamemory–objective memory correspondence may lie in the effects of depression and depressive attitudes. Indeed, various studies have demonstrated that depressed individuals show increased memory complaints even in the absence of impairment on objective memory tests (Cavanaugh & Murphy, 1986; Kahn et al., 1975; Rabbitt & Abson, 1991), and that a negative cognitive set is associated with lower self-appraisals of memory (Lachman, Steinberg, & Trotter, 1987). Depression is a particularly common form of psychopathology in patients diagnosed with MS, with a multiyear prevalence between 42 and 62%, and is generally moderate to severe (Joffe, Lippert, Gray, Sawa, & Horvath, 1987).

In the one previous study examining the relationship between depression and metamemory in MS, Gottschalk (1995) found that MS patients' reported memory problems were correlated with depression but not with tested memory ability. Further, studies from the non-MS literature support the notion that depression is related to metamemory reports. In an early study with non-MS depressed patients, Kahn et al. (1975) found that memory complaints were unrelated to patients' performance on story recall and paired-associates tests, but were associated with depression (Kahn et al., 1975). Similarly, Niederehe and Yoder (1989) found that depressives

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