Reviewer’s report

Title: Low contrast visual acuity testing is associated with cognitive performance in multiple sclerosis: a cross-sectional pilot study

Version: 1 Date: 30 August 2013

Reviewer: Stefan Gold

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In this study, Wieder et al. investigate the association between visual acuity (as measured by low contrast testing) and cognitive function in a comparatively large sample of MS patients. They report significant (albeit small) correlations between measures of contrast sensitivity (CS) and widely used measures of processing speed (and to a lesser degree memory) as well as OCT-derived parameters of retinal pathology (RNFL thickness).

The paper is generally clearly written and the study design and analysis straight-forward and well-described. I have just a few comments:

Minor essential revisions:

While the authors point out in the discussion that this cross-sectional analysis does not imply causality, some wording in the abstract sounds like they are suggesting that cognitive impairment reduces visual acuity. In my mind, other explanations are at least as likely, i.e. lower visual acuity could cause poorer performance in cognitive tests or lower acuity as well as poorer performance on the PASAT/SDMT could both be the result of degenerative components of MS pathology. Please rephrase.

While the associations are significant, the partial correlations suggest to me that only approximately 10% of variance in CS is accounted for by cognitive function. This should be discussed.

Moreover, the paper would in my view benefit from contrasting the reported association between CS and cognition with previous markers of brain atrophy and other MRI parameters previously shown to be associated with cognitive dysfunction in MS. What would the authors expect if one would add MRI markers to the equation? Are OCT, MRI, and CS measuring the same underlying mechanism of cognitive dysfunction? Or do they independently contribute? At least for CS and RNFL, this appears to be the case. What could that mean for our understanding of the causes of cognitive impairment in MS? The lack of MRI markers may also be briefly added to the limitations section.

Please state in the abstract that MS patients did not only undergo SDMT and PASAT testing but also completed tests of additional cognitive domains. It might be helpful to mention in the abstract that the BRB-N, a standardized and widely used neuropsych battery in MS research, was administered.

Several reports have suggested that fatigue and/or depression can affect
performance in neuropsychological tests. Have the authors obtained any measures of depressive symptoms or fatigue and if so, does entering them in the model change the results?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests