Reviewer's report

Title: Motor Function in Parkinson’s Disease and Supranuclear Palsy: Simultaneous Factor Analysis of a Clinical Scale in Several Populations

Version: 1 Date: 5 February 2006

Reviewer: Laurel Beckett

Reviewer's report:

General
This paper follows up on two separate factor analyses carried out on essentially the same data for the Parkinson’s disease patients (p-on and p-off groups), but expands and goes beyond the previous publication in three important ways. First, the researchers add a third group to give a better sense of how the components of motor function and their variation across people are similar and are different in the three related diagnostic groups of patients. Second, the analyses are simultaneous, giving formal comparisons of both similarities and differences, including tests of whether certain structures are replicated or the same. Third, the authors have carried out a very careful program of building models, supported both by data and by clinical knowledge, starting with an over-fitted, very detailed model, then working back and forth between progressive simplifications and restorations of more common features, to obtain their final model. The size of their data base and the care with which this final model has been developed are unique, in my experience with clinical data in this field.

The presentation of the complex statistical analysis is very thorough. The authors have given adequate attention to possible model violations (non-normality, skewness) and to the limitations posed by small sample sizes. They have also carried out some secondary analyses such as omitting problem data points to ensure robustness of their findings. Inclusion of the LISREL code would make replication straightforward.

The data are limited to clinic populations primarily at a single university clinic, with data on one of the conditions also from a second clinic. The authors note the high reproducibility of the UPDRS, so I would expect good consistency across new physicians. A more difficult question, however, is to what extent these factor structures would generalize to other clinics. This is not really discussed, and it should be. The authors note that further study in other clinics would be desirable, and necessary to check the degree to which the structure is common or different across patient sets. But the broad outlines of the factor structure could be compared to other papers. Bennett et al. present two community-based studies, and Mayeux a third. Are the findings about the clustering similar? Do these findings suggest any hypotheses that could be explored about the etiology of the disease, or the general process of aging and its relationship to Parkinson’s? I’d like to see at least a brief discussion.

The title and abstract are fine. The writing generally is acceptable. The authors do a very good job of making the complicated analyses approachable.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
None (but I would REALLY strongly encourage discussion of similarities to population-based factor structures.)

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the
author can be trusted to correct)

1. Add to references and discuss briefly this paper:
How does the factor structure that emerges in this paper compare to yours, which focuses on later stages of disease and does not include pre-clinical? Do the two papers together shed any additional light on specifics of PD (systems affected, differentiation from other movement disorders in aging, etc.)?

2. Paper needs careful reading for some scattered small diction, grammar, and punctuation errors. Here are a few:
   a. Page 8, “way too small” should be “far too small”.
   b. page 9 last paragraph: “The major characteristics … is” should be “… are”.
   c. Top of page 14, “Equating … separately, gave…” should not have comma.
   d. Page 14, paragraph on conclusion of model search: “…accept for the (co) variances…” should be “… except for…”.
   e. Page 17, Discussion “… the relationships between the variables … is the same” should be be “… are the same”.
   f. Page 18, “The general separation… support” should be “… supports”.

Discretionary Revisions (which the author can choose to ignore)

Could you please clarify what you mean in discussion by “good fit, but only acceptable fit”? (top of page 20). I assume you mean that there may be models whose fit is good enough that you can’t reject them with the current sample size, but that there are indications that more data might well make them formally not acceptable.

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes

Declaration of competing interests:

I was on the faculty at Rush until about 2002, after I moved to UC Davis. My previous affiliation is well known, so I’m not worried about it becoming public! I don’t believe it would cause your organization any embarrassment were someone to note this, nor do I believe having at one time had an appointment at the same university as a couple of the co-authors is a bar to a careful peer review

Otherwise I have no competing interests.