

September 14, 2010

RE: NRES-D-10-00091, titled "Using Latent Transition Analysis in Nursing Research to Explore Change Over Time"

Dear Editor:

We would like to gratefully acknowledge the careful critique and thoughtful comments made by our reviewers. We have made several changes to the document based on their suggestions. All changes are denoted in the manuscript materials with yellow highlighting. Specific information regarding how we addressed each comment and the location of the changes are outlined in bold below.

We would like to note one concern regarding the revisions. We have responded in two ways to the request for more information on conducting latent transition analysis. We have noted the two most useful and detailed references on latent transition procedure (last 2 lines, page 6) and we have constructed an additional Supplemental Digital Content (SDC 2) to provide this information on a general level. However, as with many research procedures, the actual procedures performed will largely be determined by the research question. In addition, the range of techniques and procedures that can be employed in latent transition analysis are too numerous to be detailed in a single paper. As such, we would like you to use your discretion in determining the utility of SDC 2 for the final paper as we believe that it may be misleading rather than helpful.

Thank you again for your consideration of our manuscript.

Responses to Reviewer Comments

Reviewer #2: This is an excellent manuscript that clearly illustrates the utility of Latent Transition Analysis for nursing research. The authors provide an overview of LTA procedure and the key applications for nursing research. Then the authors use an excellent exemplar from nursing research (an RCT of attitudinal barriers to pain management in adults with cancer) to illustrate the key concepts and utility of this data analysis method to test models of change over time in categorical variables.

Thank you for the strong support of this paper!

However, because the data used for the exemplar were drawn from an RCT, the authors should include a statement about human subjects protection and IRB approval for the RCT. This is the only change that I recommend.

A statement of IRB approval for the RCT has been added and can be found on page 4, paragraph 1, line 1.

Reviewer #3: The authors present an example analysis in order to introduce the Nursing

Research community to Latent Transition Analysis (LTA), a statistical approach for the analysis of change over time specifically designed to categorical outcome measures.

This type of research information is relevant for the audience of Nursing Research, both for researchers as well as for clinicians implicated in research activities. Categorical data are very common in the clinical setting. Therefore, analysis tools that can deal with such data are extremely useful, especially when dealing with patient file information (often recorded by clinicians, not researchers). Therefore, this approach to analysis has great potential in the clinical nursing setting for utilization of otherwise difficult to analyze data (the authors may want to use part of this information to maximize their statements about the relevance of the technique in this field).

Thank you for the suggestion. The application of LTA for clinical data was added to the advantages section of the discussion on page 11, first paragraph under “Advantages” header.

Conceptual Comments

As in previous publications that deal with a methodological topic, it is difficult to structure a manuscript in such a way that the scientific domain content itself is appreciated (in this case, the cancer patient-relevant findings) while the methodological aspect is highlighted (in this case, the use of LTA).

Having faced this problem myself in the past, my choice has been to give the readers credit for their methodological and analytical understanding and to focus on the relevant findings more than on the methodological approach. Having said that, what the authors decided is to structure their paper towards the methodological focus, but this approach should truly dominate the paper throughout.

I suggest to add specific information within the methodology and results section that can guide/teach the readers about how to perform such an analysis themselves or where to obtain additional information on each step of the process.

More specific information was given in Supplemental Digital Content. See SDC 2. There are two references that are particularly useful for conducting the analysis that were also noted as such under procedure in the methods section. See the last two lines of page 6.

For example, are there specific challenges in coding the data? Which level of statistical expertise is required?

LTA can require advanced statistical expertise. This was added as a disadvantage to the discussion section. See page 14. Other issues with conducting the analysis are also briefly noted in this section (e.g. label switching) in addition to the information given in SDC2.

Provide additional sources on how to learn how to conduct this analysis type. The syntax supplements are extremely useful in this context.

A list of sources was added to the resource page – SDC 2 and as noted above, the two most helpful references were noted in the procedures section of the paper. In addition, some simple instructions/notes were added to the syntax supplements to give more information.

The authors should include a clear statement about IRB approval.

A statement of IRB approval for the RCT has been added and can be found on page 4, paragraph 1, line 1.

In the discussion/limitation section, the authors really only address one limitation (sample requirements), followed by the advantage of distribution requirements. It is unlikely that LTA only has one limitation and has probably more than one advantage. Given that the discussion is generally too short, this is a great place for additional information about this technique and its use. The section could be renamed into "Pros and Cons of LTA" and contain additional information about dis/advantages.

Additional information was provided on some of the potential advantages and disadvantages of LTA, particularly those that would be relevant to nurse researchers. Please see the entire expanded discussion section pages 11-15. The sections were noted as “Advantages of LTA” and “Disadvantages of LTA” within the discussion section and were placed after the brief discussion of the example.

The discussion should also contain explicit statements about how LTA can provide information about effect size (i.e. in the context of odds ratios).

This was a great suggestion. This information, how to calculate odds ratios from the transition probabilities, was described and demonstrated in the Results section. See page 10, last paragraph.

The headings in the results section should reflect the 4 research questions listed on page 5. This will facilitate clarity when reading.

Headings have been changed to reflect the research questions. See pages 7-9.

The authors state that "LTA has been largely absent" in the field of nursing research. The authors should acknowledge previous utilization in this field by other authors (i.e. Gebhardt, Dusseldorp, & Maes, 1999). In addition, a quick on-line search (Google Scholar) resulted in several conference abstracts that used LTA in nursing-related domains. It is worthwhile to investigate whether any of these abstracts have meanwhile been published or are citable as conference abstracts.

The statement “LTA has been largely absent in nursing research” has been revised to clarify that “LTA has not been commonly used by nursing researchers” page 3, paragraph 2, line 2. We believe that this statement accurately reflects the published literature. While the topic of their paper may be relevant to nursing, Gebhardt, Dusseldorp, & Maes are health psychologists and their reference was therefore not added. One conference abstract

was found on LTA that was written by a nurse researcher. In short, it certainly seems fair to say that LTA is rare in the nursing literature.

Minor changes:

P.2 L.6, remove comma after studies

Good catch! Done.

P. 12 L. 4 to 8. The last three sentences all begin with the same phrase "Latent transition analysis". Two of these repetitions should be avoided.

Good point. These sentences have been altered to avoid repetitiously using the phrase "Latent Transition Analysis." See page 12, paragraph 1, lines 3 and 5.

Gebhardt, W. A., Dusseldorp, E., & Maes, S. (1999). Measuring transitions through stages of exercise: application of latent transition analysis. *Percept Mot Skills*, 88(3 Pt 2), 1097-1106.

CHECKLIST FOR STYLE

TITLE PAGE -- Provide the complete mailing address of the corresponding author.

Complete mailing address added to title page.

REFERENCES -- Please verify the publication date for Bergman & Magnusson ('97 or '98?).

The correct publication date is 1997 and was corrected to be consistent both in the text and reference list. See correction in text on page 3, line 1.

Provide legends for the supplemental digital content (SDC) at the end of the manuscript and insert the SDC citations in text (see author guidelines at <http://edmgr.ovid.com/nres/accounts/ifaauth.htm#GeneralInformation> for specific details).

A legend for the supplemental digital content was added to the end of the manuscript. SDC citations are in place in the text.