

Peer-review report of

Bringmann, L. F., Ariens, S., Ernst, A. F., Snippe, E. & Ceulemans, E. (2024). Changing networks: Moderated idiographic psychological networks. *advances.in/psychology*, 2, e658235. <https://doi.org/10.56296/aip00014>

Round 1

Dear Authors,

Thank you for submitting your manuscript titled **Changing Networks: Moderated Idiographic Psychological Networks** to our special issue on network methods in psychology. Your innovative approach to modeling moderated, idiographic psychological networks using intensive longitudinal data has the potential to make a valuable contribution to the field.

After reading your paper and the reviewer's comments, I agree with all major and minor issues they raised (summarized below).

The reviewer found several strengths in your work, including:

1. Demonstrating the feasibility of incorporating contextual/moderator variables into idiographic network models to test theory-driven hypotheses.
2. Illustrating analysis of disparate variables within the same statistical framework.
3. Direct estimation of mean levels over time, enhancing clinical interpretability.
4. Moderation of all VAR model parameters, including the innovation variances.

The reviewer also provided some constructive feedback to improve your manuscript further:

1. Elaborating on this approach's scope of application and scalability, particularly regarding the number of variables, lags, and moderators that can be included while still achieving model convergence.
2. Discussing the pros and cons of alternative approaches (e.g., Bayesian) and how they compare to your method in terms of dimensionality and convergence issues.
3. Explicitly noting the reliance on imputation for handling missing moderator data as a limitation, and discussing the sensitivity of results to differences in imputation and how measurement error in moderators could be addressed.
4. Making minor revisions to improve clarity and consistency, such as expanding abbreviations, providing a conceptual overview of the Kalman filtering approach, and ensuring consistency in figure axes.

Please consider these suggestions and revise your manuscript accordingly. The reviewer and I think that addressing these comments, particularly those related to model convergence and constraints, would strengthen your work.

We are excited to receive your revised manuscript. Please provide a point-by-point response to the reviewer's comments detailing the changes you have made.

Thank you for considering our journal for your research. If you have any questions, please do not hesitate to contact us.

Sincerely,

Hudson Golino

Reviewer 1

Overall Evaluation: This is an innovative and timely manuscript that introduces an important new approach for modeling moderated, idiographic psychological networks using intensive longitudinal data. The authors illustrate the utility of the proposed fixed moderated time series modeling approach through two empirical case examples with patients receiving treatment for depression. The rationale for allowing parameters, including the means and innovation variances, to vary as a function of contextual moderators is clearly described and clinically relevant. Overall, this is a great article, and I recommend this be published with small revisions. The authors have laid out the motivation for the work well and given very clear explanations of the method and how they implement it. The provided code on OSF is well documented and notated. Additionally, the manuscript makes several notable contributions, including:

1. Demonstrating the feasibility of incorporating contextual/moderator variables into idiographic network models to test theory-driven hypotheses about network changes. This answers calls for more hypothesis-driven and person-specific approaches to network analysis.
2. Illustrating analysis of disparate variables (e.g., sleep quality, mood) within the same statistical framework through careful handling of time scales and missing data.
3. Direct estimation of mean levels over time, which enhances clinical interpretability.
4. Moderation of all VAR model parameters, including the innovation variances. Testing moderation of innovations could provide insight about unmeasured variables or emotion reactivity.

The methods section offers a clear, step-by-step description of the state-space modeling framework and fixed moderated time series analysis approach to equip

readers to reproduce the analyses. The empirical examples effectively showcase the approach and highlight distinct network changes linked to moderators.

I have several suggestions to further improve the manuscript, which I elaborate below. Overall, this innovative methods contribution substantially advances the idiographic network literature and offers tools for more hypothesis-driven and clinically informative network models. With some revisions addressing the comments below, I believe this manuscript could make a valuable contribution suitable for publication.

Major Comments:

1. A main limitation, touched on by the authors, is that model convergence was challenging even in the simple case of 2 variables and 1-2 moderators illustrated here. I think it would be useful to elaborate on the scope of application/scalability of this approach. For example, what is the feasibility with more variables or lags? What are limitations on the number of moderators versus process variables for model convergence? This information would help readers understand practical constraints on model complexity.
2. Along similar lines, the authors note that alternatives to fixed moderated time series analysis exist (e.g., Bayesian approaches). I think mentioning pros/cons of potential alternatives and how they compare on dimensionality/convergence issues would further contextualize the utility of this method.
3. The handling of missing data is clearly described. However, the reliance on imputation for handling missing moderator data should be explicitly noted as a limitation, especially given assumed measurement without error for moderators. Elaborating on sensitivity of results to differences in imputation, and how measurement error in moderators could be addressed, would strengthen this work.

Minor Comments:

1. Introduction, line 29: Expand the abbreviation ILD before using it.
2. The description of model estimation procedures is very technical. Consider adding a conceptual overview of the Kalman filtering approach before delving into the mathematical details to increase accessibility.
3. The empirical examples effectively demonstrate the application of this approach. However, the selective choice of exemplar cases limits generalizability. This caveat should be stated explicitly when describing the sample selection procedure.
4. Line 96: Sentence “Nevertheless, interests in clinical...”, the phrase “including also” is redundant. Reword this.
5. Line 244: “In case of a Gaussian...” rephrase to “In the case of a Gaussian..” or something equivalent
6. Figure 2: The y-axis are different, it would be better since they’re side by side to have them both go from -10 to 30.

7. Appendix A: An appendix is referenced but I do not see one in the paper or on OSF. Commenting to make sure this is part of the editorial process and that it will be added later.
8. Figure 5: Again, match the y-axes of the plots.
9. Line 684: Sentence beginning “By introducing...” The phrase “allos to” needs to be changed to “allows us to”
10. Conclusion: The limitations and need for further research are well described. Consider emphasizing the innovative contributions this work makes despite limitations as a strengths-based conclusion.

In summary, I find this to be a methodologically rigorous and conceptually innovative manuscript. The authors illustrate an important new technique for moderated, idiographic network analysis using intensive longitudinal data. Addressing the comments above, particularly around model convergence and constraints, would further strengthen this nicely done piece of research. With revision, I believe this manuscript could make an important contribution to advancing methods at the intersection of personalized and temporal network modeling.

Round 2

Dear Dr. Bringmann and colleagues.

Thank you for submitting your revised manuscript titled "Changing Networks: Moderated Idiographic Psychological Networks" to our special issue on network methods in psychology. I appreciate the time and effort you have put into addressing the reviewer's comments and suggestions.

After carefully reviewing your response letter and the revised manuscript, I am pleased to inform you that your paper is now accepted for publication in our special issue. The paper will now be sent into production, and you can expect the journal to contact you in case there's a need for any further copyediting.

The revised manuscript successfully incorporates the reviewer's feedback, which has significantly strengthened the paper. In particular, the added discussions on model scalability, convergence issues, and the sensitivity of results to imputation methods provide important context for understanding the practical applications and limitations of your approach. The conceptual overview of the Kalman filtering approach also enhances the accessibility of the technical details for a broader readership.

Moreover, your innovative contributions to the field of idiographic network analysis, including the incorporation of contextual moderators, the analysis of different types of variables within a unified framework, and the direct estimation of mean levels over time, make this paper a valuable addition to the literature.

Congratulations on your innovative work, and thank you for choosing our journal as the venue for your research. We look forward to sharing your findings with our readers.

Best wishes,
Hudson Golino