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Ideographic Modeling and Data Visualization of Sleep, Affect, and Psychotic Symptoms: A Case Example

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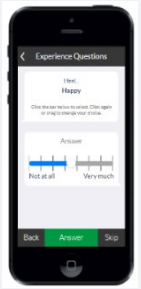
Background:

1. Psychotic disorders are heterogeneous.
2. Current diagnostic categorizations are unable to capture individuals' unique symptom experiences.
3. Newly-developed ideographic analyses and data visualization tools may be useful in assessing individuals' symptom experiences and stimulating data-informed care.

Methods:

Using an experience sampling methodology (ESM), 35 individuals aged 15-25 diagnosed as at clinical high risk for psychosis (CHR) or early psychosis (EP) provided info on positive and negative affect (PA & NA), psychotic symptoms (PSY), and sleep using a smartphone application, MetricWire.

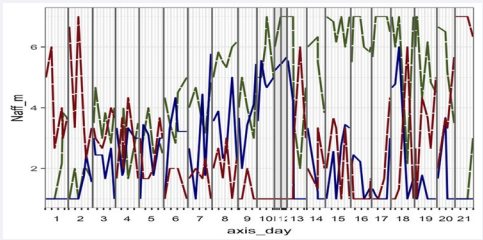


- 6 prompts per day
- 21-day data window
- Multi-item scales of PA, NA, & PSY on a 7-point Likert scale
- Follow-up at 12-mo.
- Line graphs for moment-level PA, NA & PSY
- Ribbon plot for day-level data with sleep Symptom network plots with group Iterative multiple model estimation (GIMME)
- Calculation of variability measures (MSSD) to capture dynamic experiences
- GIMME allows for modeling of lagged and contemporaneous symptom relationships
- With the inclusion of lagged parameters, GIMME models can provide directionality of detected relationships by satisfying requirements for Granger causality.

Ideographic Demonstrations

Figures depict ESM data for an adolescent Caucasian male who met criteria for CHR at baseline and transitioned to EP diagnosis at 12-month follow-up.

RIGHT: **Comparing symptom network changes over time.** Baseline and 12-mo follow-up symptom network plots w/ day-level symptom means (Fig. A & B) and with variability measures (Fig. C & D). There were fewer detected connections w/ 12-mo data despite diagnostic conversion to EP. **Comparing symptom networks with means or dynamic variables.** (Fig. A & C) and (Fig. B & D). Dynamic relationships differed between network plots w/ variability vs. symptom means.



Comparing moment-level and day level data. Line graph (Figure E) with moment-level data that depicts symptom variability *within* each day. Ribbon plot (Figure F) illustrates same data w/ sleep that shows symptom variability *across* days w/ apparent sleep disruption mid-week 2.

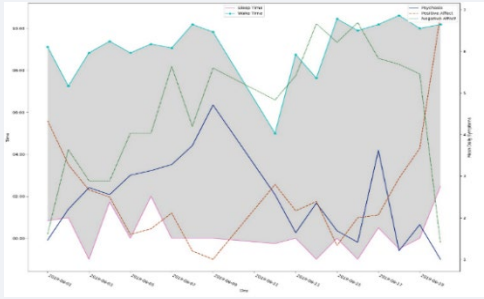
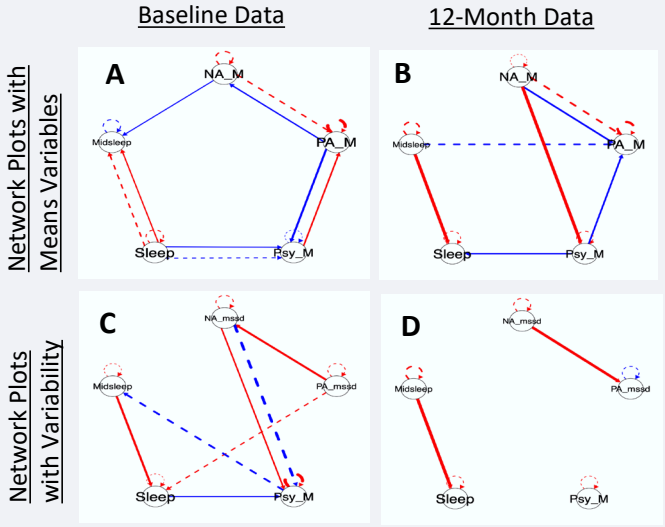


Figure E & F Legend

- Day-level negative affect
- Day-level positive affect
- Day-level psychotic symptoms
- Sleep time
- Wake time



Abbreviations for figures A-D: NA_M = negative affect means, PA_M = positive affect means, Psy = psychotic symptom means, Sleep = sleep duration, Midsleep = midpoint of sleep, mssd = mean squared successive difference

Figure A-D Legend

- Negative
- Positive
- Contemporaneous
- Lagged

Takeaways

1. Ideographic analysis of ESM data can identify important dynamic relationships for individuals with CHR or EP.
2. Ideographic approaches illustrate unique temporal and bidirectional relationships between symptoms that vary according to the temporal frame of measurement and/or analysis.
3. Ideographic analyses promote the potential of individualized, hypothesis-driven assessment and selection of treatment priorities that may improve the delivery of mental healthcare.

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