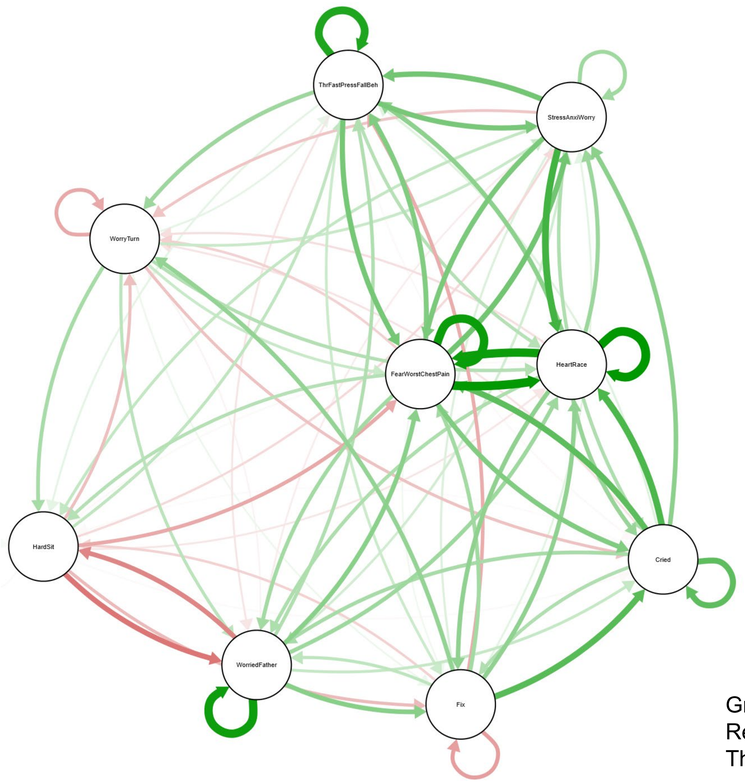
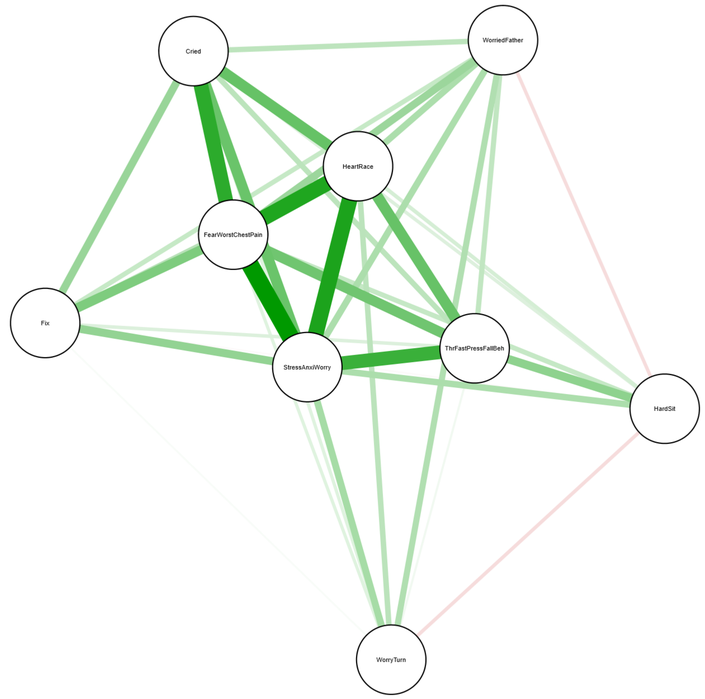
Differences Between an Intraindividual Lead-Lag Bivariate Network Analysis and Concurrent Bivariate Network Analysis

Katelyn Heselton, Amber Lopez, Hannah Tristan, Casey Thornton M.A., Gregory H. Mumma Ph.D.
Department of Psychological Sciences, Texas Tech University

Lead-Lag Bivariate Network



Concurrent Bivariate Network



katelyn.heselton@ttu.edu
g.mumma@ttu.edu

Introduction

- A network analysis (NA) approach to psychopathology considers interrelations between the presenting symptoms to be the primary focus (McNally, 2016).
- In NA, the investigator can assess the relations between variables at the same time point (concurrent) or over time (lead-lag).
- Although the NA approach has become popular at the interindividual level, there has been a paucity of research using intraindividual network analysis to tailor treatment (e.g., David et al., 2017; Thornton, 2019).
- The current study compared the intraindividual lead-lag and concurrent bivariate NA of the same person to create an individualized treatment plan targeting the most influential nodes.

Method

Participant

- The participant was a 26-year-old woman diagnosed with GAD and OCPD via semi-structured interviews.

Procedure

- An individualized questionnaire comprised of highly relevant items was administered three-times daily for approximately one month (i.e., 83 observations) through Qualtrics using ecological momentary assessment.
- Data was first detrended at the item-level, and then a correlation matrix of items was used to create the concurrent network, and a correlation matrix of concurrent (i.e., time *t*) and lagged (i.e., *t* – 1) variables was used to create the lead-lag network.

Results

- For the concurrent NA, "Stress, Anxiety, & Worry" showed the strongest betweenness (2.37) and strength (1.37), indicating it was most often on the shortest path between other variables and also had the greatest number of connections (Opsahl, Agneessens, & Skvoretz, 2010).
- On the lead-lag NA, "FearTheWorst&ChestPain" had the greatest betweenness (2.22), in-degree (largest amount of incoming directed paths; 1.67), and out-degree (largest amount of outgoing paths; 1.58).

Conclusion

- Given this information, treatment may focus on cognitions associated with the worst happening (e.g., decatastrophizing) and reduction of physiological arousal (e.g., diaphragmatic breathing; Clark & Beck, 2010).
- Although both networks provided information used in treatment planning, the lead-lag network provided increased specificity with respect to dynamic information (e.g., incoming and outgoing).
- This study demonstrates how these two intraindividual NAs provide information useful for personalized treatment planning and future research may assess effectiveness.