The Structure of the Mini-K and K-SF-42: A Psychological Network Approach

Joseph H. Manson[1], Kristine J. Chua[1], and Aaron W. Lukaszewski[2]
1. UCLA Department of Anthropology and Center for Behavior, Evolution & Culture
2. CSU Fullerton Department of Psychology

Background & Prediction

- *Psychological network analysis*[1, 2], an alternative to latent variable modelling, (1) explores direct associations between specific thoughts, feelings, and behaviors, and (2) treats broad traits as emergent outcomes of these links.
- Questionnaire items are nodes; measures of association (usually partial correlation coefficients) are edges.
- A node's *network centrality* (strength, closeness, betweenness) indicates its prominence as a source or recipient of causal influence[3, 4].
- The Arizona Life History Battery (ALHB) and its offshoots (Mini-K, K-SF-42) are widely used measures of human psychometric Life History Strategy (LHS)[5, 6].
- *If LHS is ontogenetically calibrated to receipt of parental investment, items pertaining to childhood relationships with parents will be central to the network of questionnaire items.*

Methods

- **Participants & Instruments:**
  - Study 1: 314 U.S. MTurkers, Mini-K (20 items)
  - Study 2: 370 U.S. students, Mini-K (19 items)
  - Study 3: 929 U.S. MTurkers, K-SF-42 (6 scales)
- **Analyses:**
  - R packages *qgraph* and *bootnet*
  - pairwise Markov random fields (PMRF)
  - Weighted, undirected network
  - LASSO estimation
  - Partial correlation coefficients (blue = positive, pink = negative). Thickness indicates strength.
  - Three estimates of each node's centrality:
    - *Strength*: sum of absolute correlation coefficients with all other nodes (direct connections)
    - *Closeness*: inverse of sum of all the shortest paths with all other nodes (indirect connections)
    - *Betweenness*: how often the node is crossed by paths between other nodes.

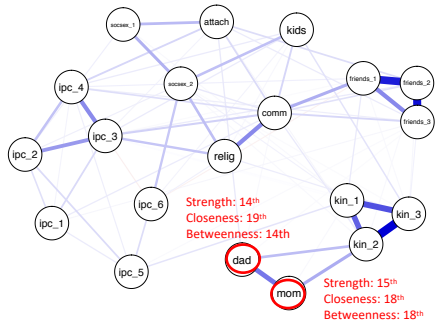
Discussion

Data from three studies decisively falsified the hypothesis that Mini-K and K-SF-42 items pertaining to childhood relationships with parents would be central to these instruments' psychological networks. Childhood environmental harshness does influence LHS trajectories[7]. However, we argue that the ALHB and its offshoots do not adequately cover the range of either (1) these causal influences (e.g. neighborhood violence), or (2) the psychometric predictors or mediators of adult LHS (e.g. interpersonal trust). Additionally, the observed network structures appear inconsistent with the existence of a unitary fast-slow continuum. Finally, psychological network analysis offers novel tools for testing hypotheses about the input-output mappings of psychological mechanisms.

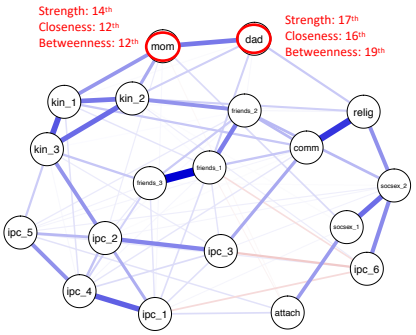
Results

- *In all three datasets, the relationships with parents items were among the most **peripheral** to the networks*

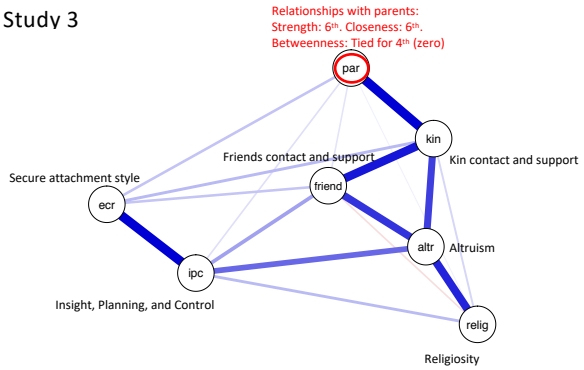
Study 1



Study 2



Study 3



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Appendix: The Mini-K[5]

Item label	Text
ipc_1	I can often tell how things will turn out.
ipc_2	I try to understand how I got into a situation to figure out how to handle it.
ipc_3	I often find the bright side to a bad situation.
ipc_4	I don't give up until I solve my problems.
ipc_5	I often make plans in advance.
ipc_6	I avoid taking risks.
mom	While growing up, I had a close and warm relationship with my biological mother.
dad	While growing up, I had a close and warm relationship with my biological father.
kids	I have a close and warm relationship with my own children.
attach	I have a close and warm romantic relationship with my sexual partner.
socsex_1	I would rather have one than several sexual relationships at a time.
socsex_2	I have to be closely attached to someone before I am comfortable having sex with them.
kin_1	I am often in social contact with my blood relatives.
kin_2	I often get emotional support and practical help from my blood relatives.
kin_3	I often give emotional support and practical help to my blood relatives.
friends_1	I am often in social contact with my friends.
friends_2	I often get emotional support and practical help from my friends.
friends_3	I often give emotional support and practical help to my friends.
comm	I am closely connected to and involved in my community.
relig	I am closely connected to and involved in my religion.