

Deconstructing trait anxiety

A network perspective

Alexandre Heeren, PhD

Psychological Sciences Research Institute
& Institute of Neuroscience
Université catholique de Louvain
Belgium

States versus traits

Long and controversial history...

(e.g., Allport, 1966; Carr & Kingsbury, 1938; Zuckerman, 1960; 1983)

Best construed as occurrent and dispositional

- State designates an experience that occurs in time
- Trait designates an inferred disposition to experience certain psychological states

(Fridhandler, 1986; McCrae & Costa, 1995, Ryle, 1949)

Anxiety research



State anxiety

**An emotional episode provoked by
the anticipation of threat**

&

Trait anxiety

**A disposition to experience heightened
state anxiety**

(e.g., Eysenck, 1983; Spielberger, Gorsuch, Vagg, & Jacobs, 1983)

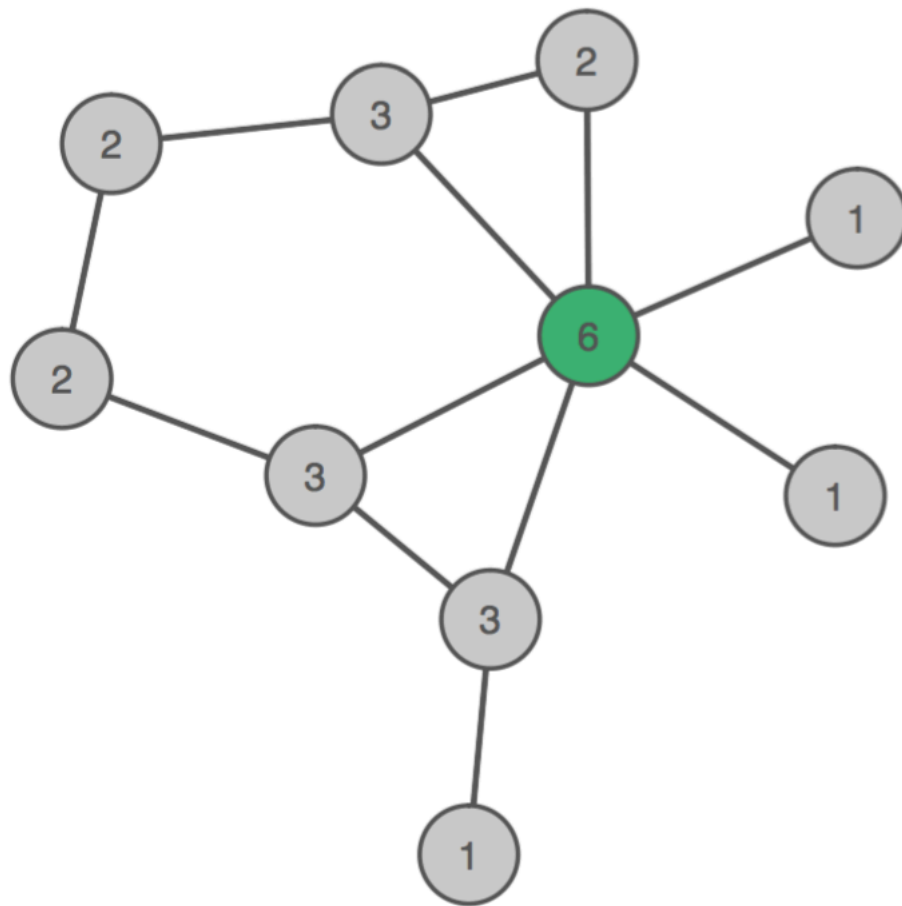
Trait Anxiety

Key construct in anxiety research

- Potential hidden « **generator** » of anxiety disorders
- Renders individuals more « **vulnerable** » to the development of anxiety and related psychopathology

(e.g., Bishop & Forster, 2013; Eysenck, Derakshan, Santos, & Calvo, 2007; Mathews & Mackintosh, 1998; Weems et al., 2007; for a review, see Gidron, 2013)

Network theory of personality



- Personality trait as a « **formative** » construct
- >< regarding personality construct as the underlying cause of the thoughts, feelings, and behaviors that supposedly reflect its presence
- **Emergent consequence** of the interactions among the constitutive elements

(e.g., Cramer et al., 2012; Mottus & Allerhand, in press; Schittmann et al., 2013)

**Uncertainty abounds regarding
whether the features of trait
anxiety can be conceptualized
as a network system?**

The **research** aims

A network approach to trait anxiety:

1

**Network
structure**

2

**Node
importance**

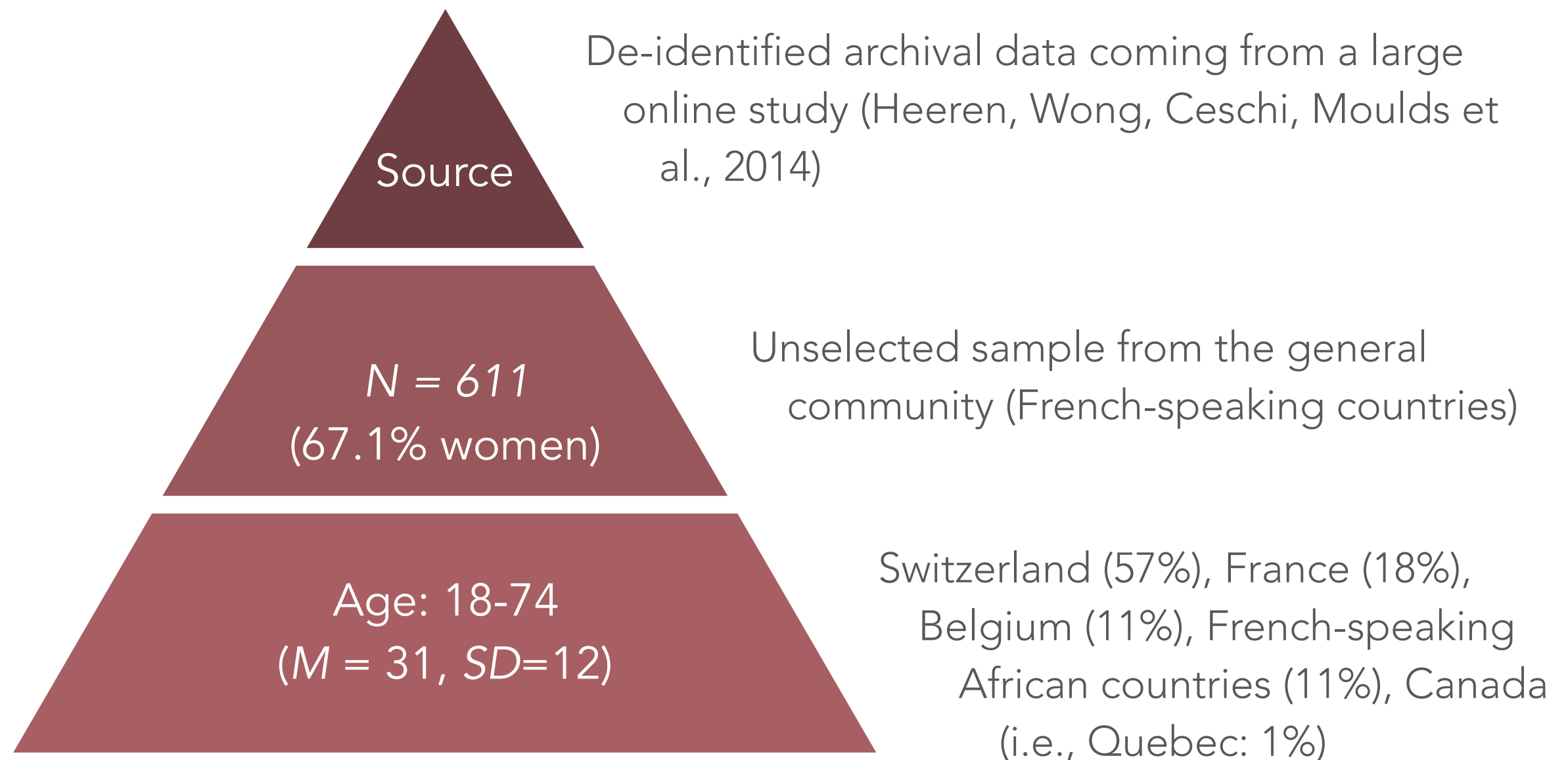
3

**Community
detection**



Methods

Participants



Materials

State-Trait Anxiety Inventory (Form Y; Spielberger et al., 1983)

Trait anxiety (STAI-T)

- 20-item scale (participants are told to respond in reference to how they generally feel)
- e.g., *I have disturbing thoughts; I feel nervous and restless; I get in a state of tension or turmoil as I think over my recent concerns and interests; I am a steady person*
- 4-point Likert-type (1, Almost Never; 2, Sometimes; 3, Often; 4, Almost Always)
- Validated French version (Spielberger et al., 1993)
- Items denoting the absence of anxiety (e.g., *I feel rested; I am a steady person*) were reverse scored
- Cronbach's alpha of .87 in the current sample

Data analytic procedure

Network estimation and visualization

- Regularized partial polychoric correlation network
- Graphical LASSO (Friedman, Hastie, & Tibshirani, 2008)
- This procedure limits spurious associations & shrinks trivially small associations to 0
- R package *qgraph* (Epskamp et al., 2012)
- γ was set to 0.5 to be confident that our edges are genuine

Data analytic procedure

Centrality analysis

- R package *qgraph* (Epskamp et al., 2012)
- Betweenness, Closeness, & Strength (Freeman, 1978/1979; Opsahl et al., 2010)
- The **betweenness** centrality of a node equals the number of times that it lies on the shortest path length between any pair of other nodes
- **Closeness** centrality indicates the average distance of a node from all other nodes in the network, and is computed as the inverse of the weighted sum of shortest path lengths to a given node from all other nodes in the network.
- **Strength** of a node is the sum of the weights of the edges attached to that node
- z-scored metrics

Data analytic procedure

Modularity-based community detection

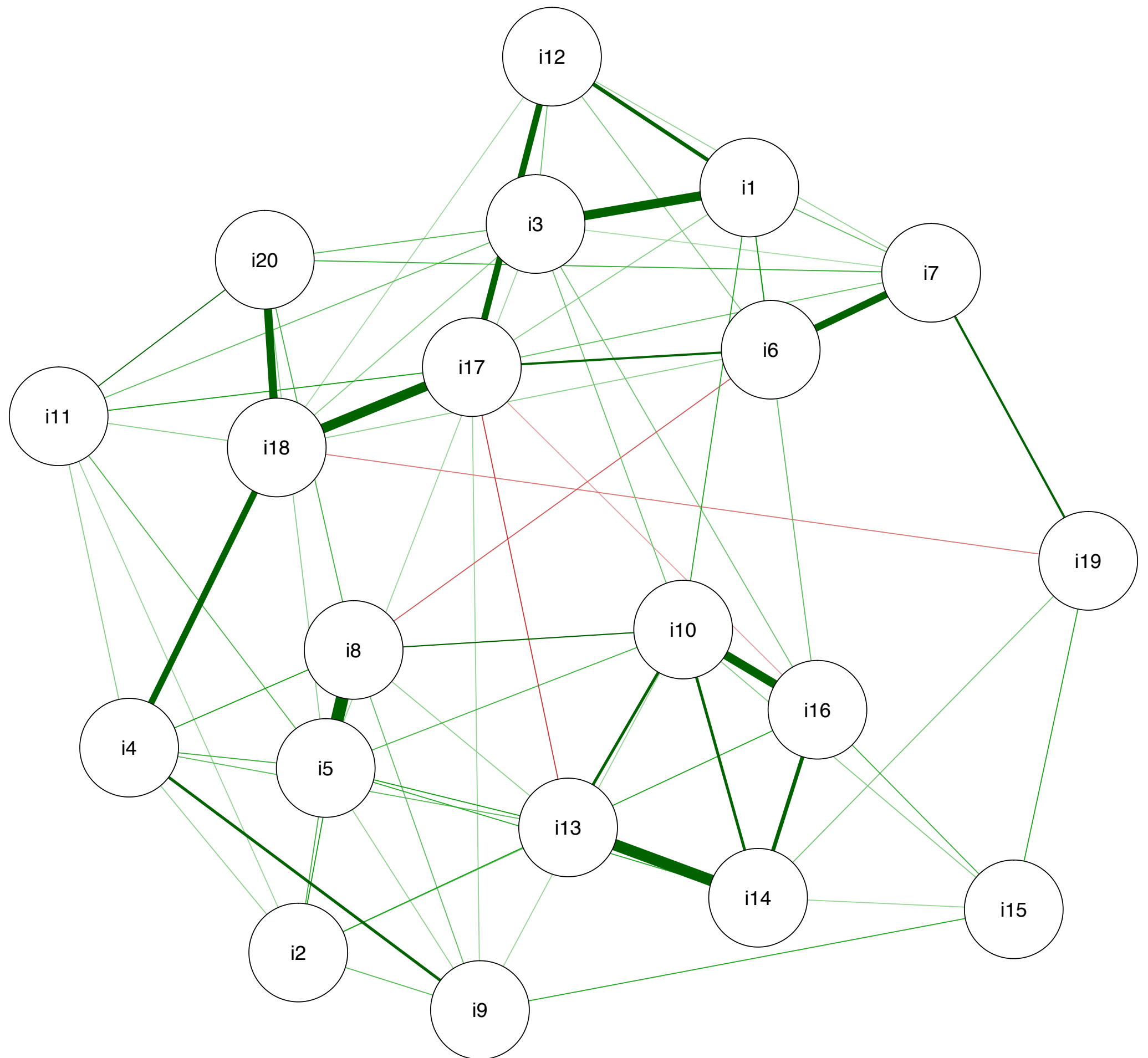
- R package *igraph* (Csardi & Nepusz, 2006)
- Spin glass algorithm (Reichardt & Bornholdt, 2006)
- $\gamma = 1$, start temperature = 1, stop temperature = .01, cooling factor = .99, spins = 20



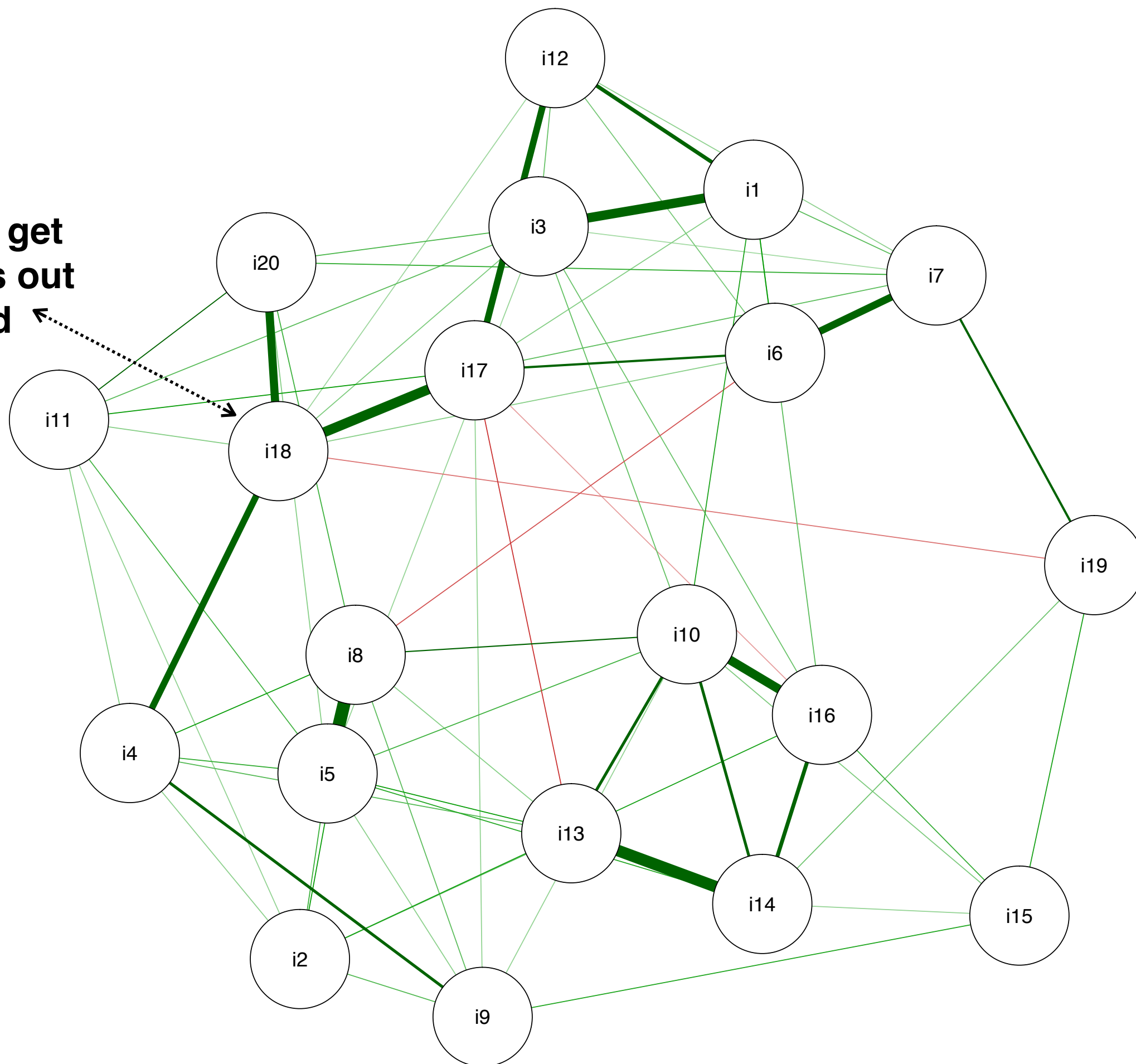
Results

1

Network structure

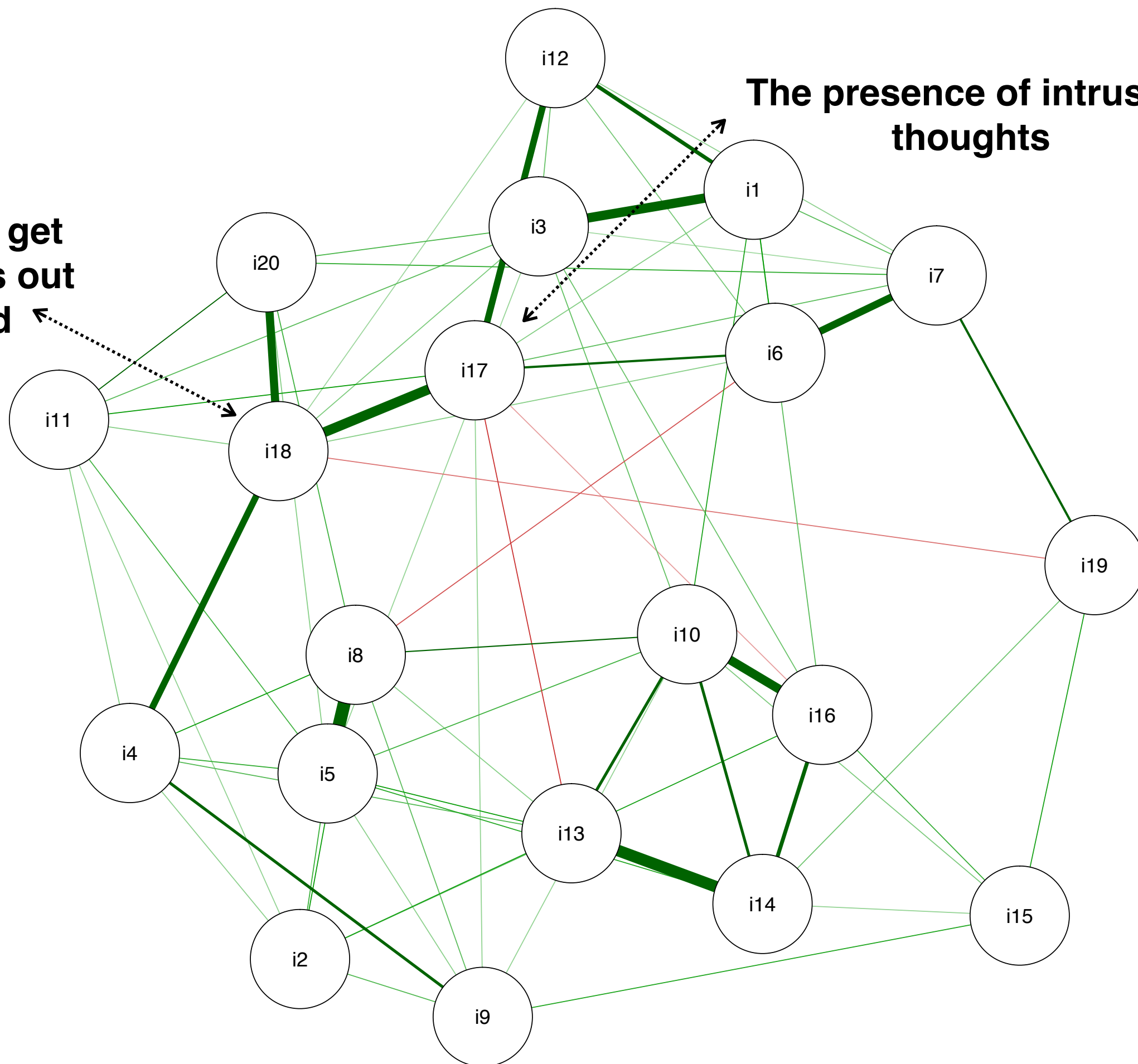


**Being unable to get
disappointments out
of one's mind** ↗



**Being unable to get
disappointments out
of one's mind** ↗

The presence of intrusive thoughts

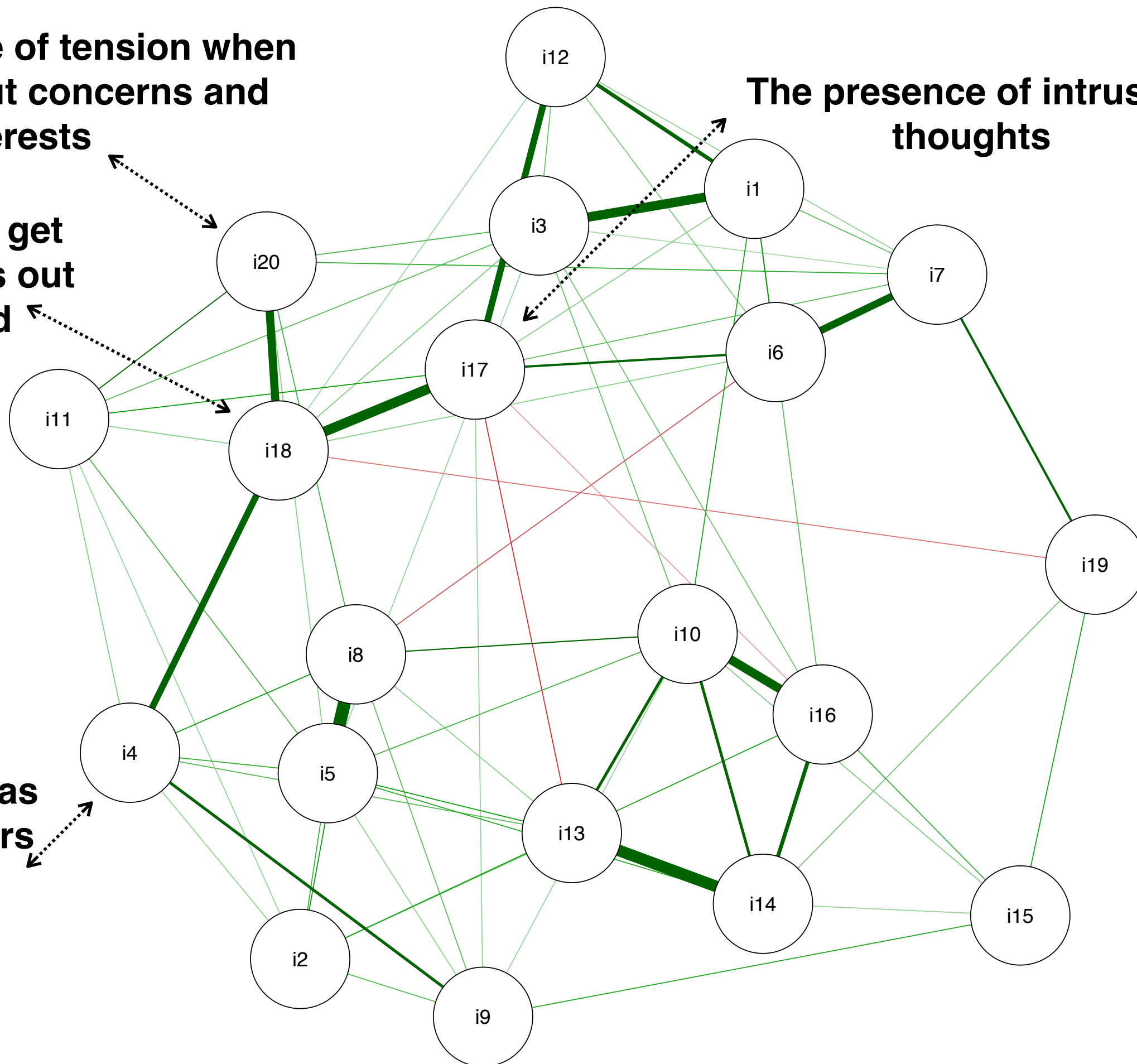


**Getting in state of tension when
thinking about concerns and
interests**

**The presence of intrusive
thoughts**

**Being unable to get
disappointments out
of one's mind**

**Wishing to be as
happy as others
seem to be
(reversed)**



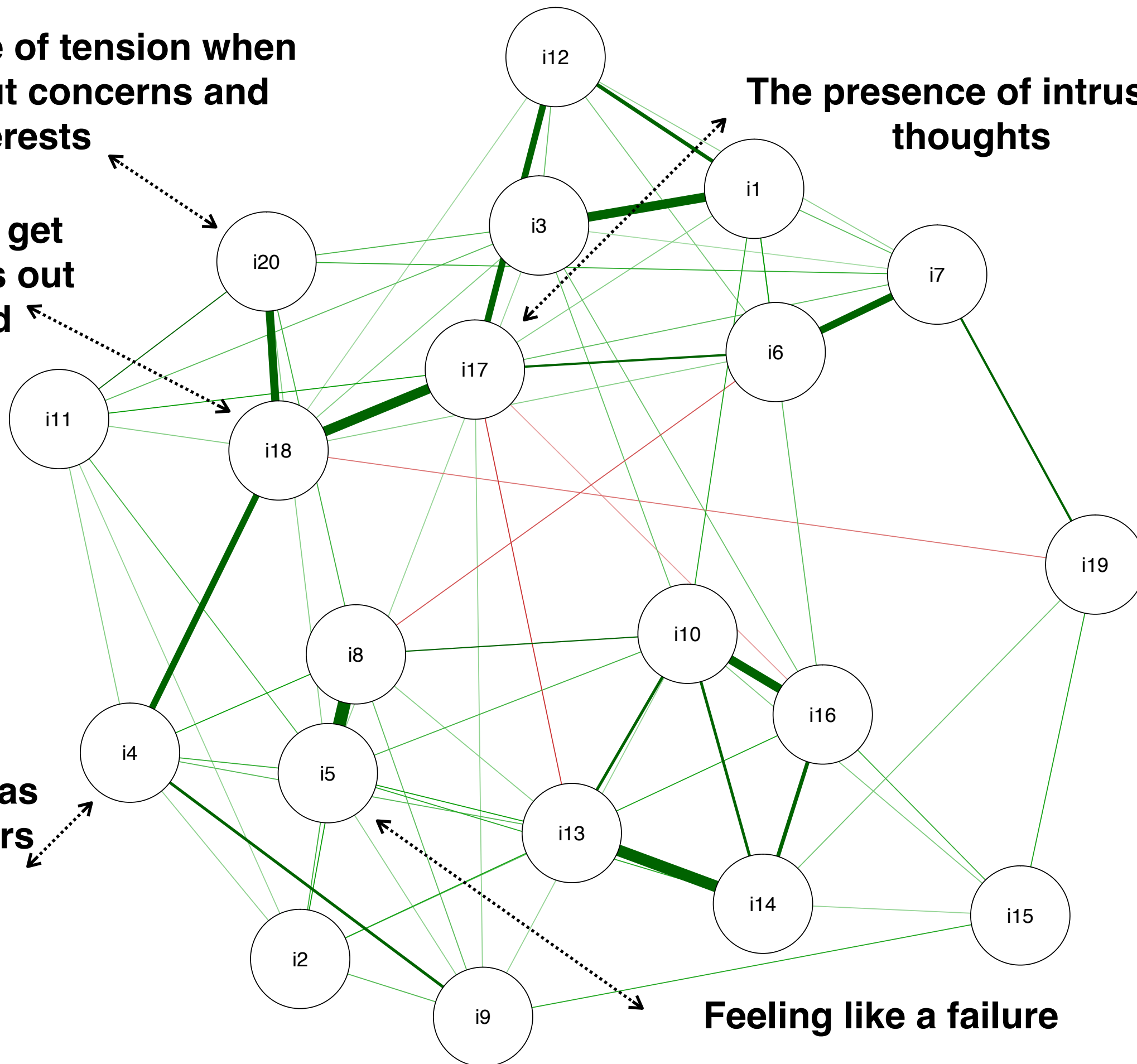
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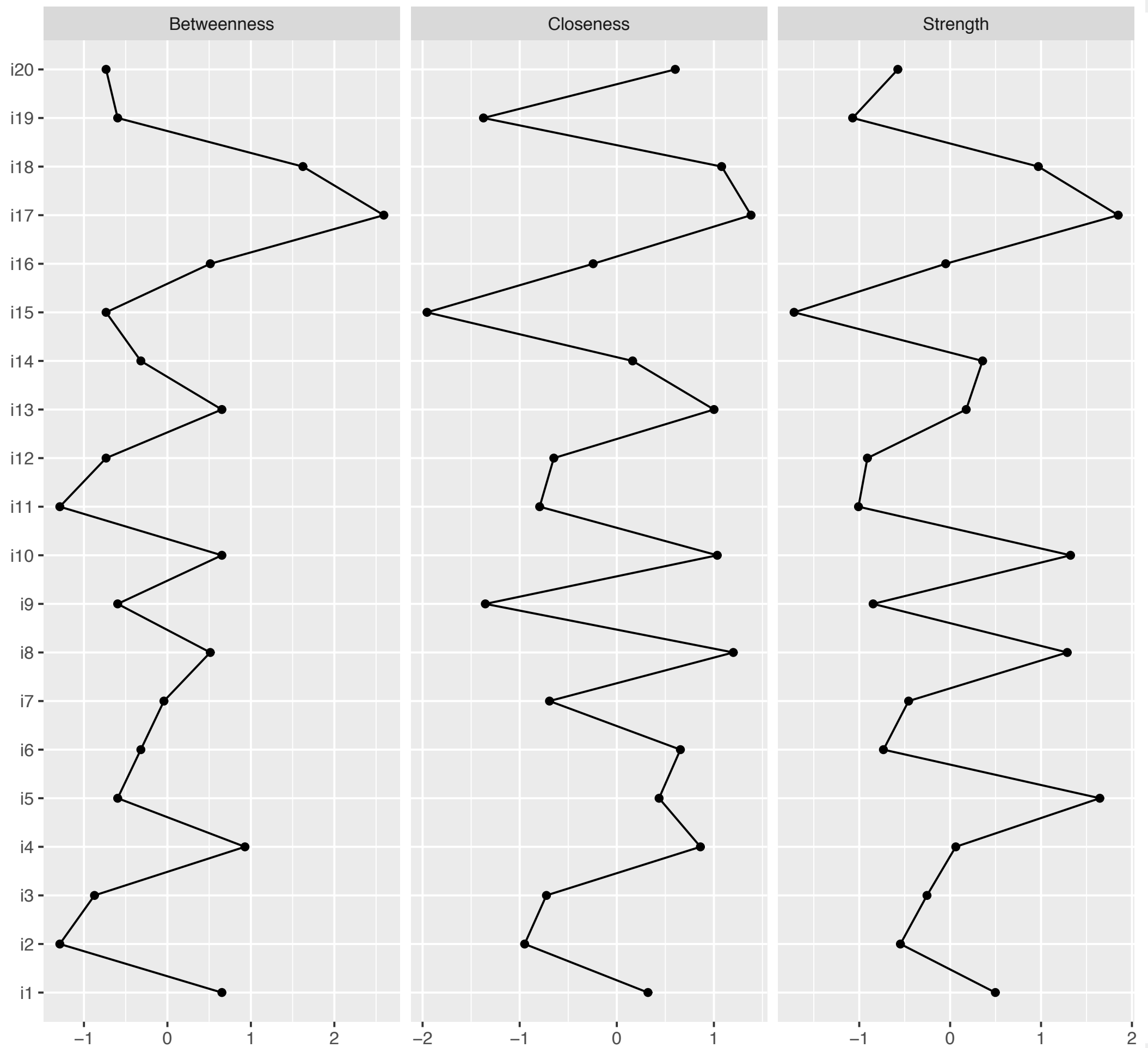
**Wishing to be as
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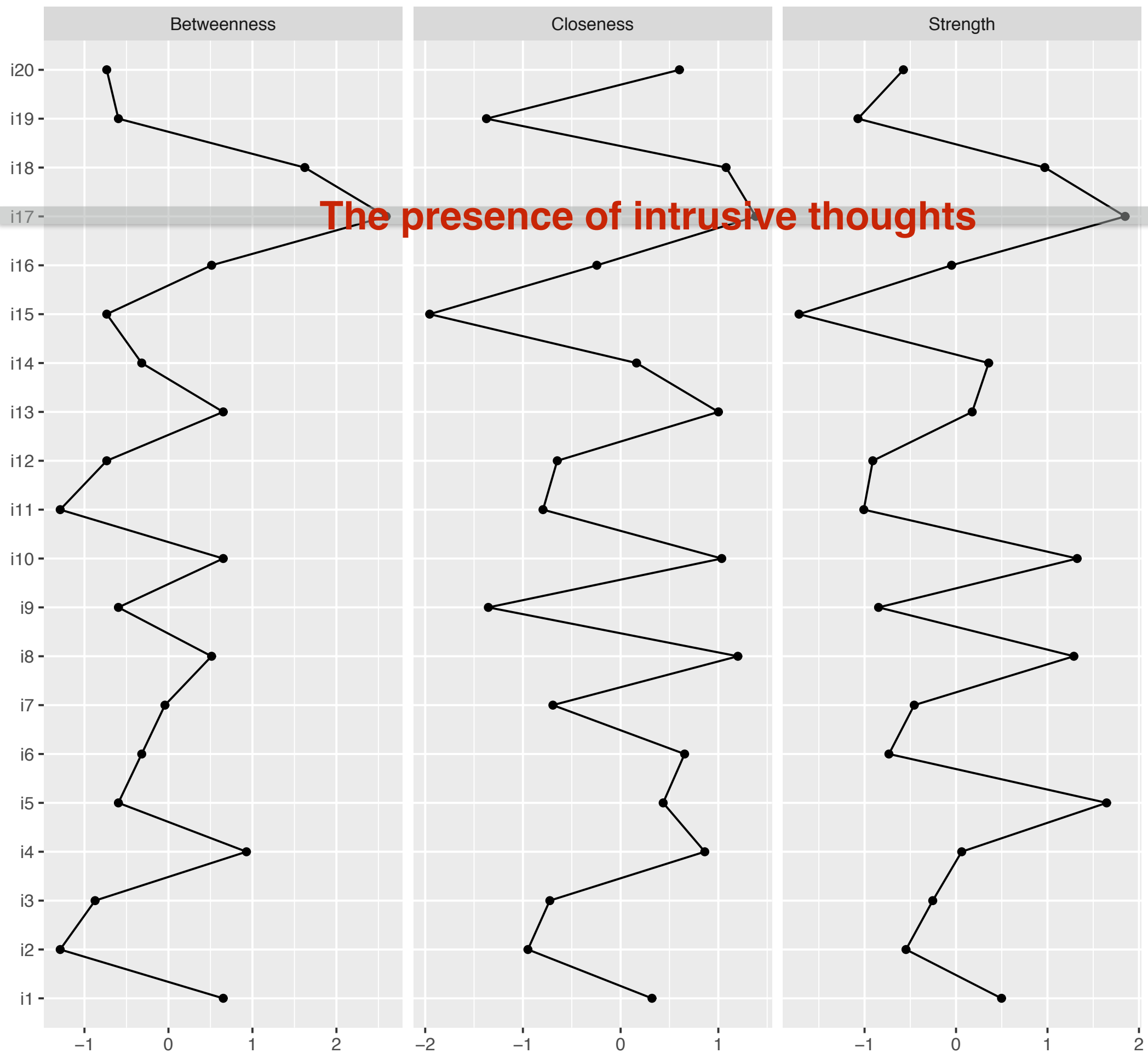
Feeling like a failure

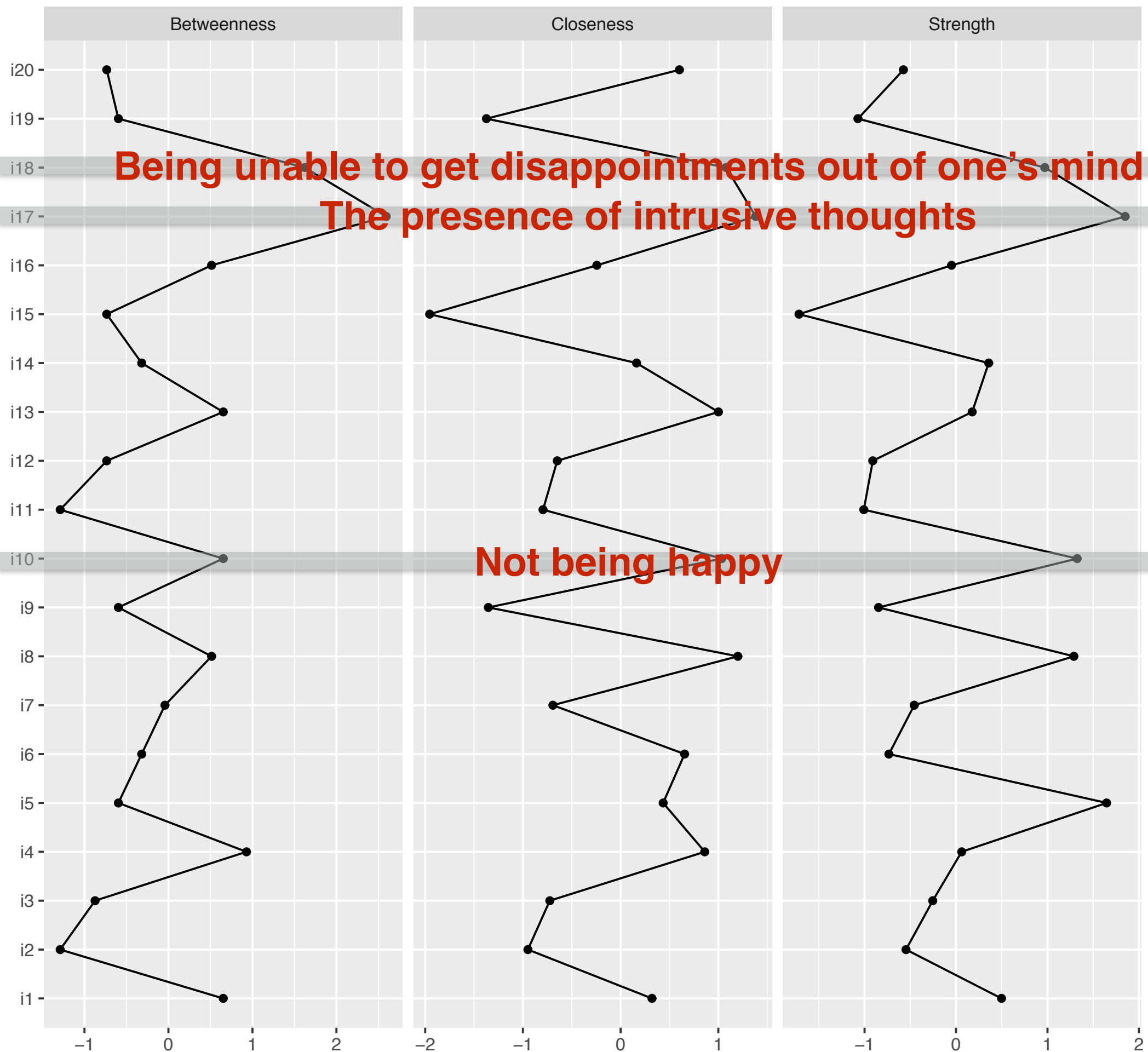


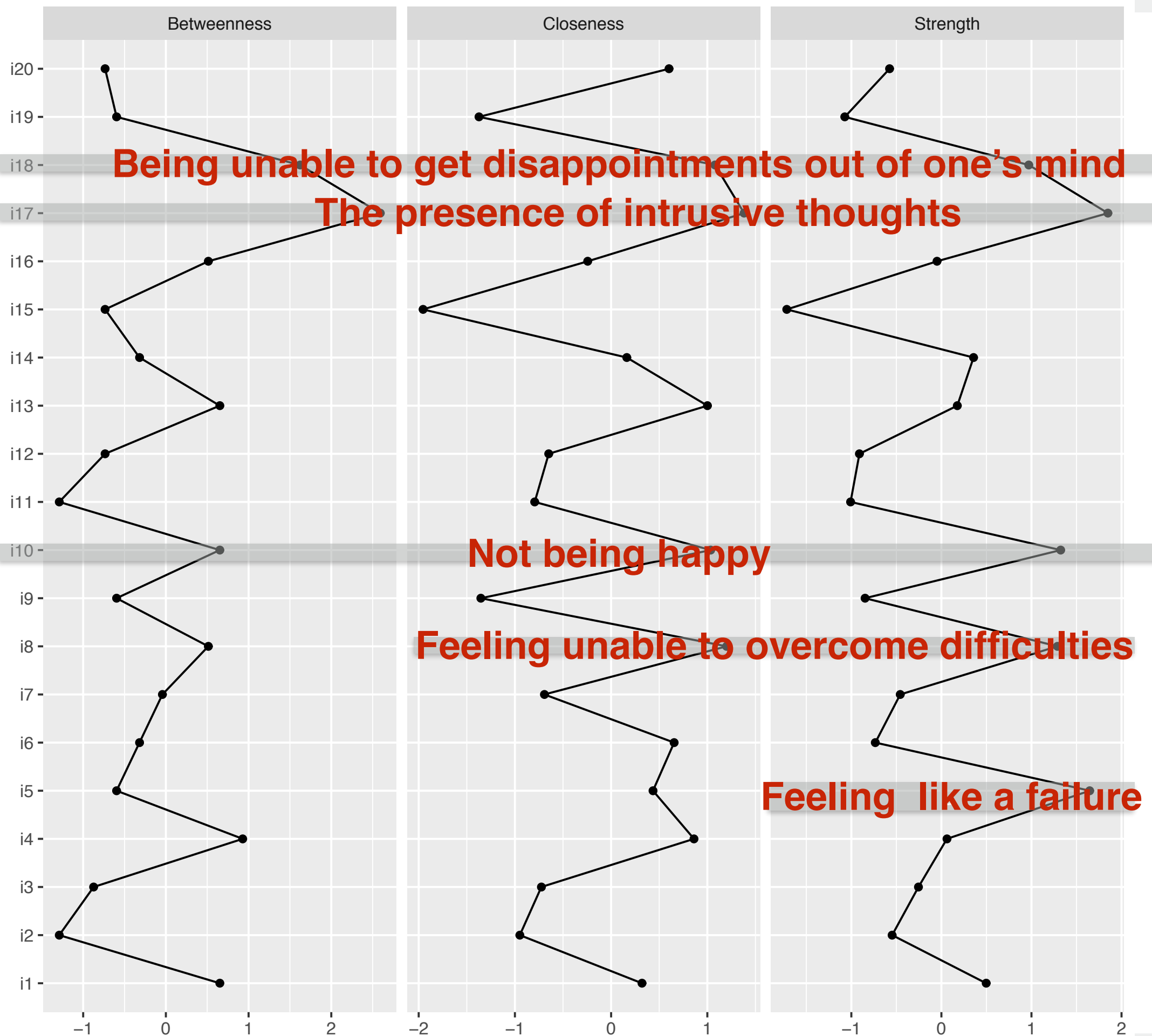
2

Node importance

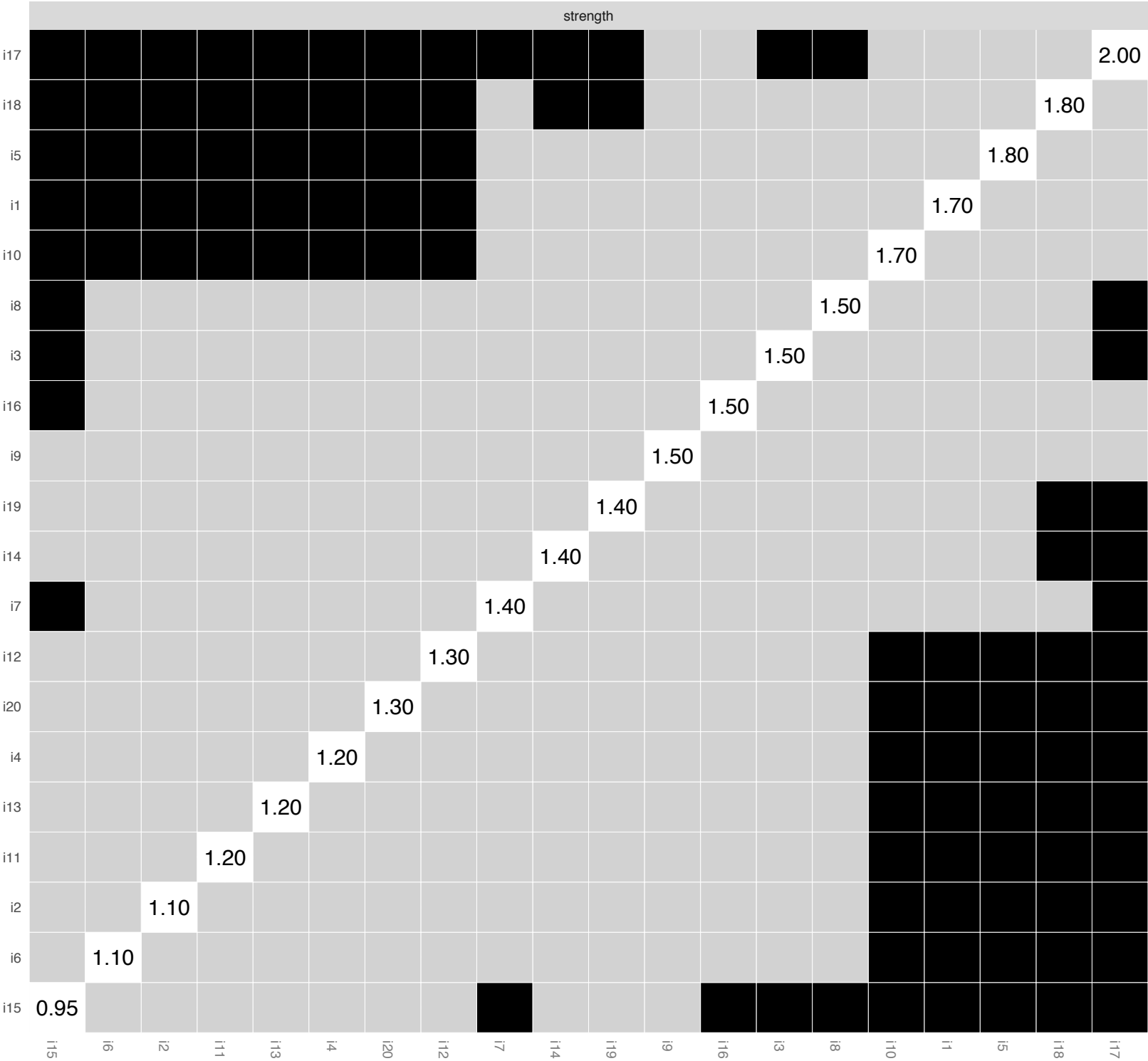








Bootstrapped Difference Test

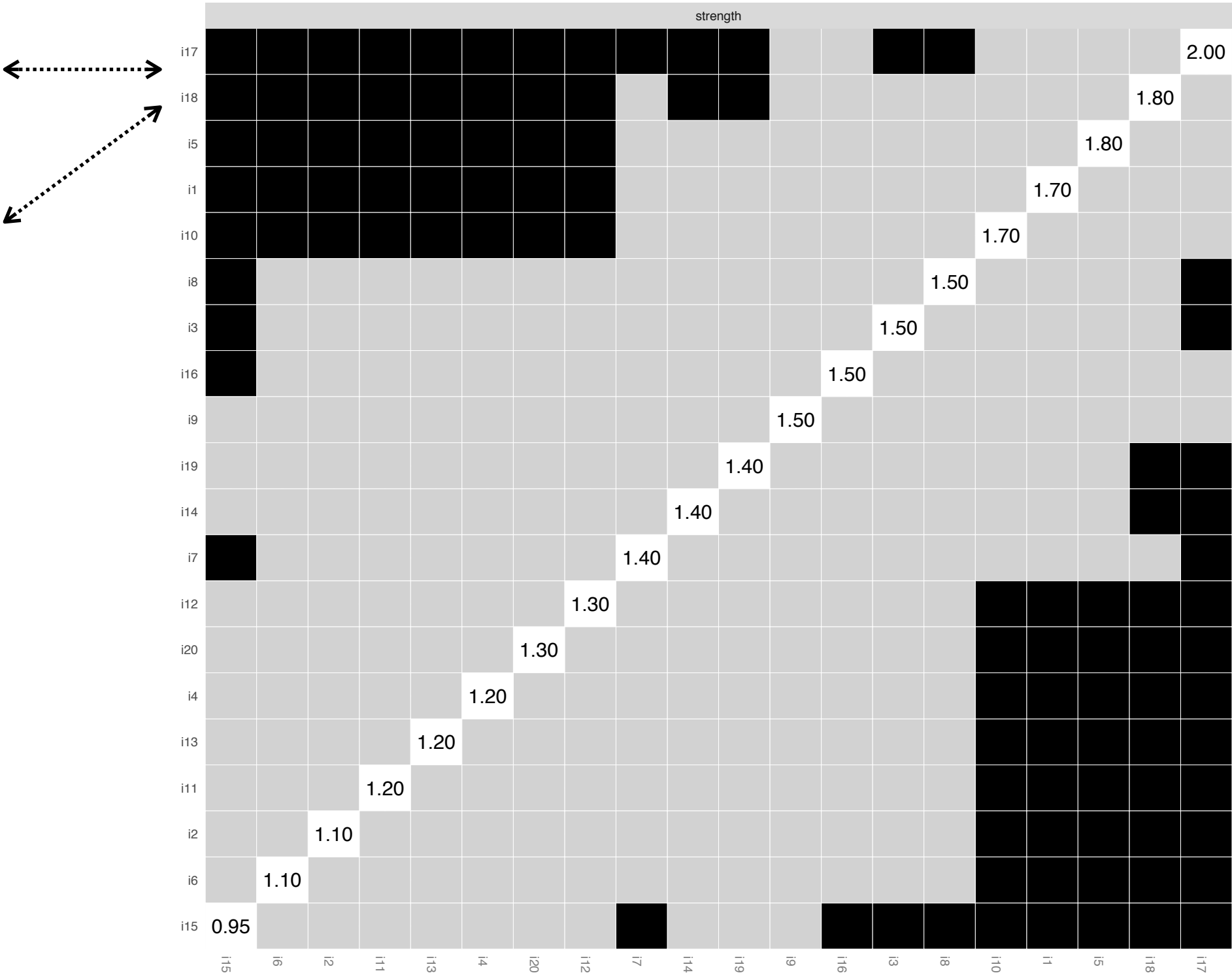


- Person-dropping bootstrap procedure indicated that strength was the most stable centrality index
- **The CS-coefficients were .59 for strength, .37 for betweenness, and .10 for closeness**

Bootstrapped Difference Test

The presence of intrusive thoughts

Being unable to get disappointments out of one's mind



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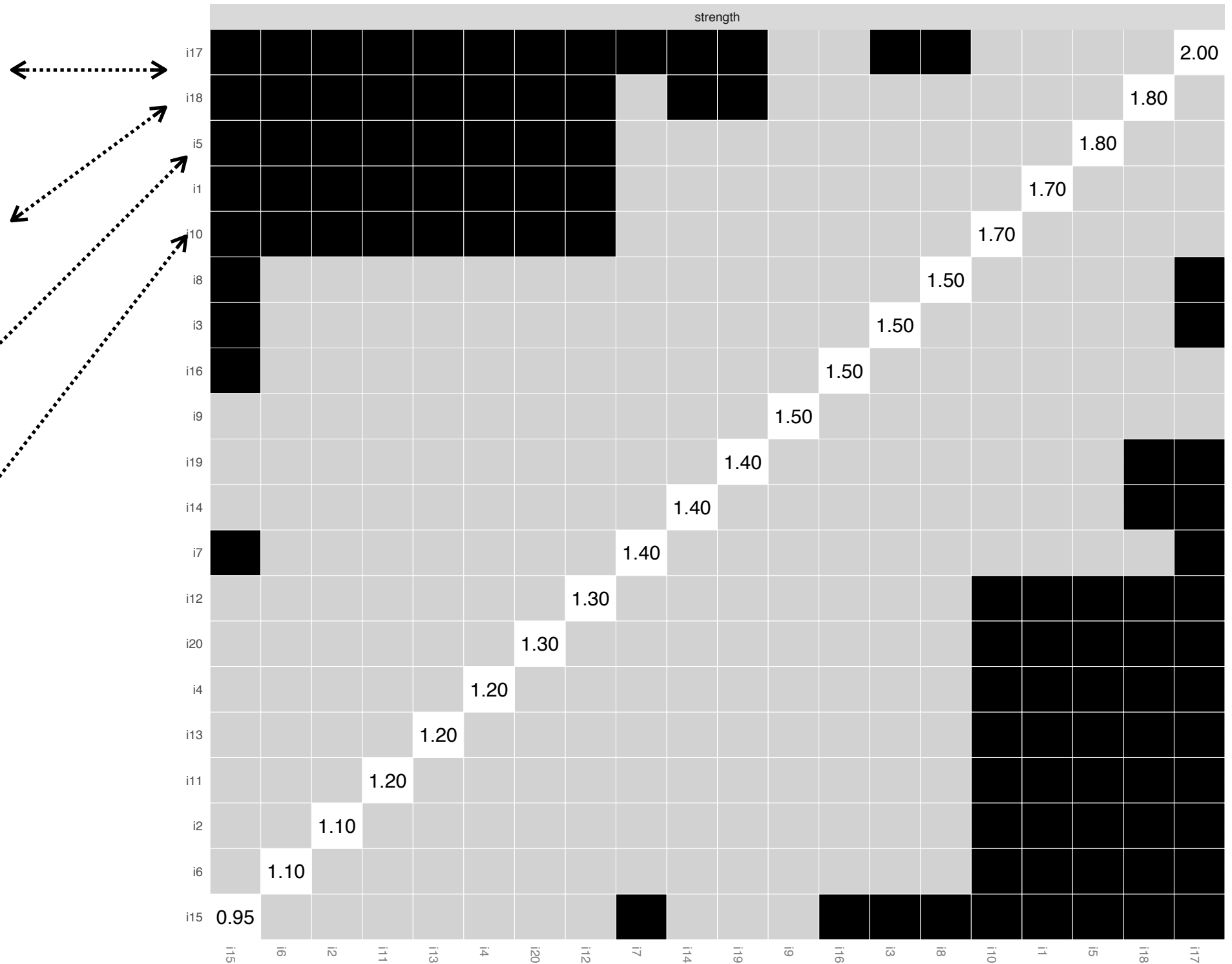
Bootstrapped Difference Test

The presence of intrusive thoughts

Being unable to get disappointments out of one's mind

Feeling like a failure

Not being happy

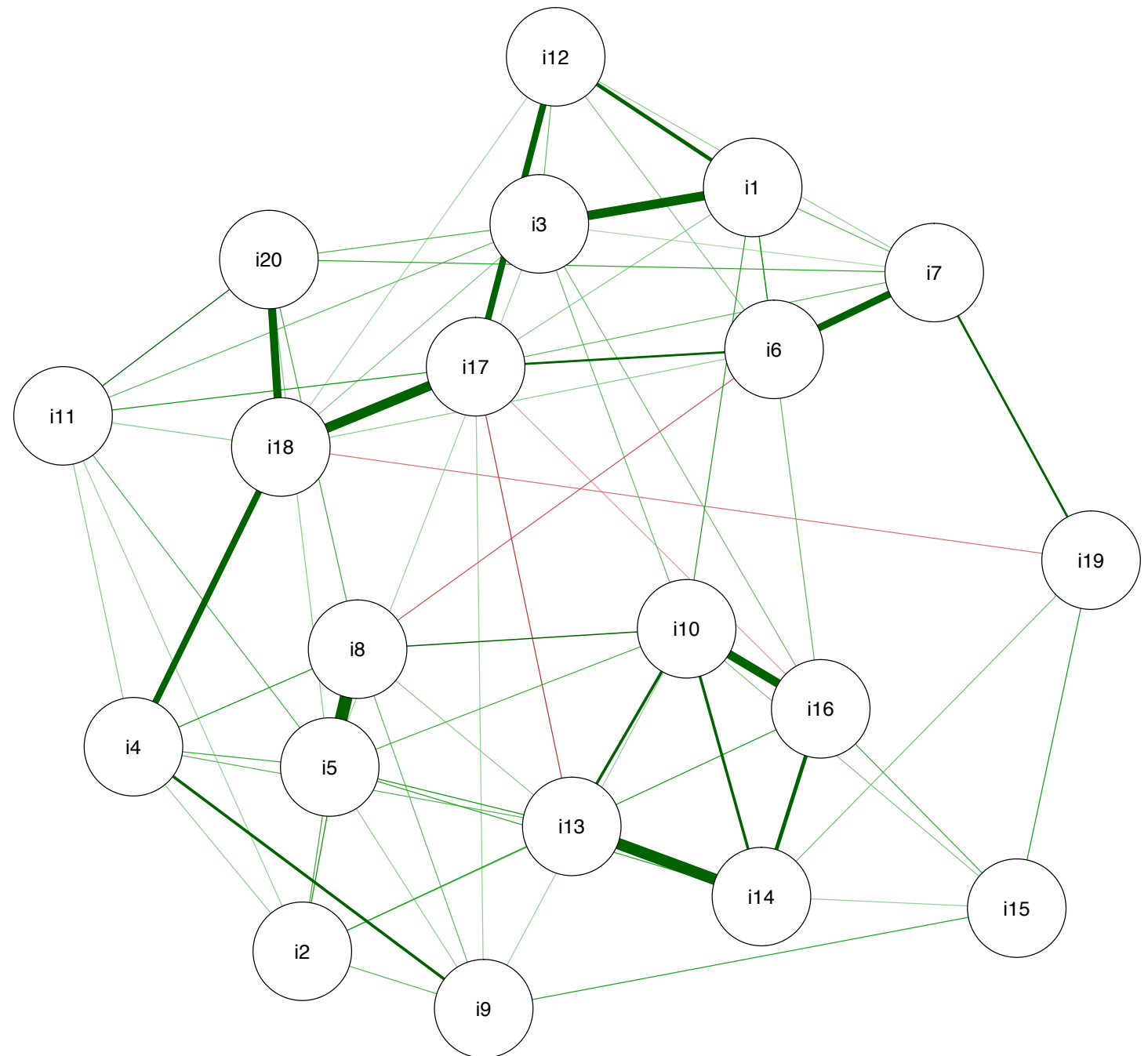


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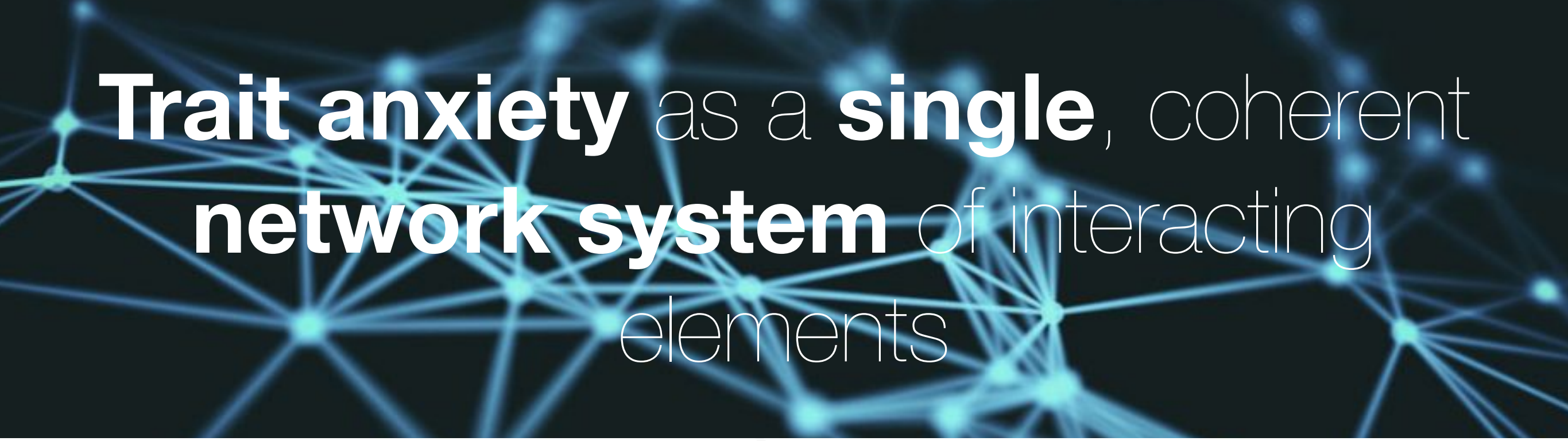
3

Community structure

Single community structure



Discussion



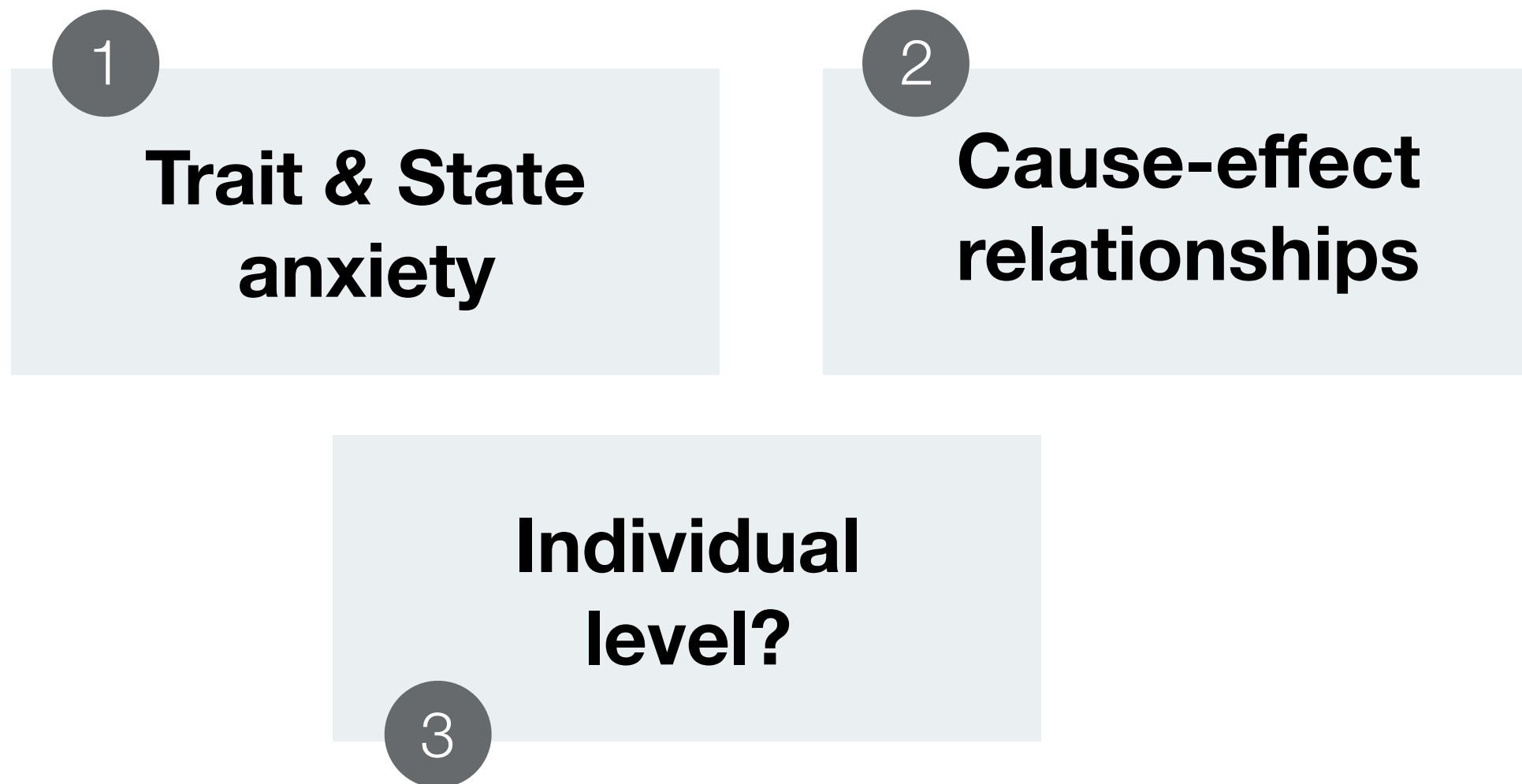
Trait anxiety as a **single**, coherent **network system** of interacting elements

Theoretical implications

- Network theory of personality: Trait anxiety as a **network**
(e.g., Cramer et al., 2012; Möttus & Allerhand, in press)
- Intrusive thoughts and being unable to get disappointments out of one's mind: **central features** of trait anxiety
(e.g., Armstrong & Olatunji, 2012; Clark & Rhyno, 2005; De Raedt & Koster, 2010)

Limitations and future directions

A network approach to trait anxiety:



Want to
know
more...

Anxiety, Stress, & Coping

ANXIETY, STRESS, & COPING, 2018
VOL. 31, NO. 3, 262–276
<https://doi.org/10.1080/10615806.2018.1439263>

 **Routledge**
Taylor & Francis Group



Deconstructing trait anxiety: a network perspective

Alexandre Heeren ^{a,b,c}, Emily E. Bernstein^a and Richard J. McNally^a

^aDepartment of Psychology, Harvard University, Cambridge, MA, USA; ^bPsychological Science Research Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium; ^cInstitute of Neuroscience, Université Catholique de Louvain, Brussels, Belgium

ABSTRACT

Background and objectives: For decades, the dominant paradigm in trait anxiety research has regarded the construct as signifying the underlying cause of the thoughts, feelings, and behaviors that supposedly reflect its presence. Recently, a network theory of personality has appeared. According to this perspective, trait anxiety is a formative construct emerging from interactions among its constitutive features (e.g., thought, feelings, behaviors); it is not a latent cause of these features.

Design: In this study, we characterized trait anxiety as a network system of interacting elements.

Methods: To do so, we estimated a graphical gaussian model via the computation of a regularized partial correlation network in an unselected sample ($N=611$). We also implemented modularity-based community detection analysis to test whether the features of trait anxiety cohere as a single network system.

Results: We find that trait anxiety can indeed be conceptualized as a single, coherent network system of interacting elements.

Conclusions: This radically new approach to visualizing trait anxiety may offer an especially informative view of the interplay between its constitutive features. As prior research has implicated trait anxiety as a risk factor for the development of anxiety-related psychopathology, our findings also set the scene for novel research directions.

ARTICLE HISTORY

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Trait anxiety; network analysis; graph theory; graphical gaussian model; anxiety; network theory of personality

No conflict of interest to declare.



Declaration of interest



Emily E. Bernstein

Harvard University, Cambridge, MA, USA



Prof. Richard J. McNally

Harvard University, Cambridge, MA, USA

A background image showing a complex network of glowing blue lines connecting various nodes, resembling a neural network or a data visualization.

Acknowledgements



Feel inspired



My funders

Thank you for your attention

contact: alexandre.heeren@uclouvain.be

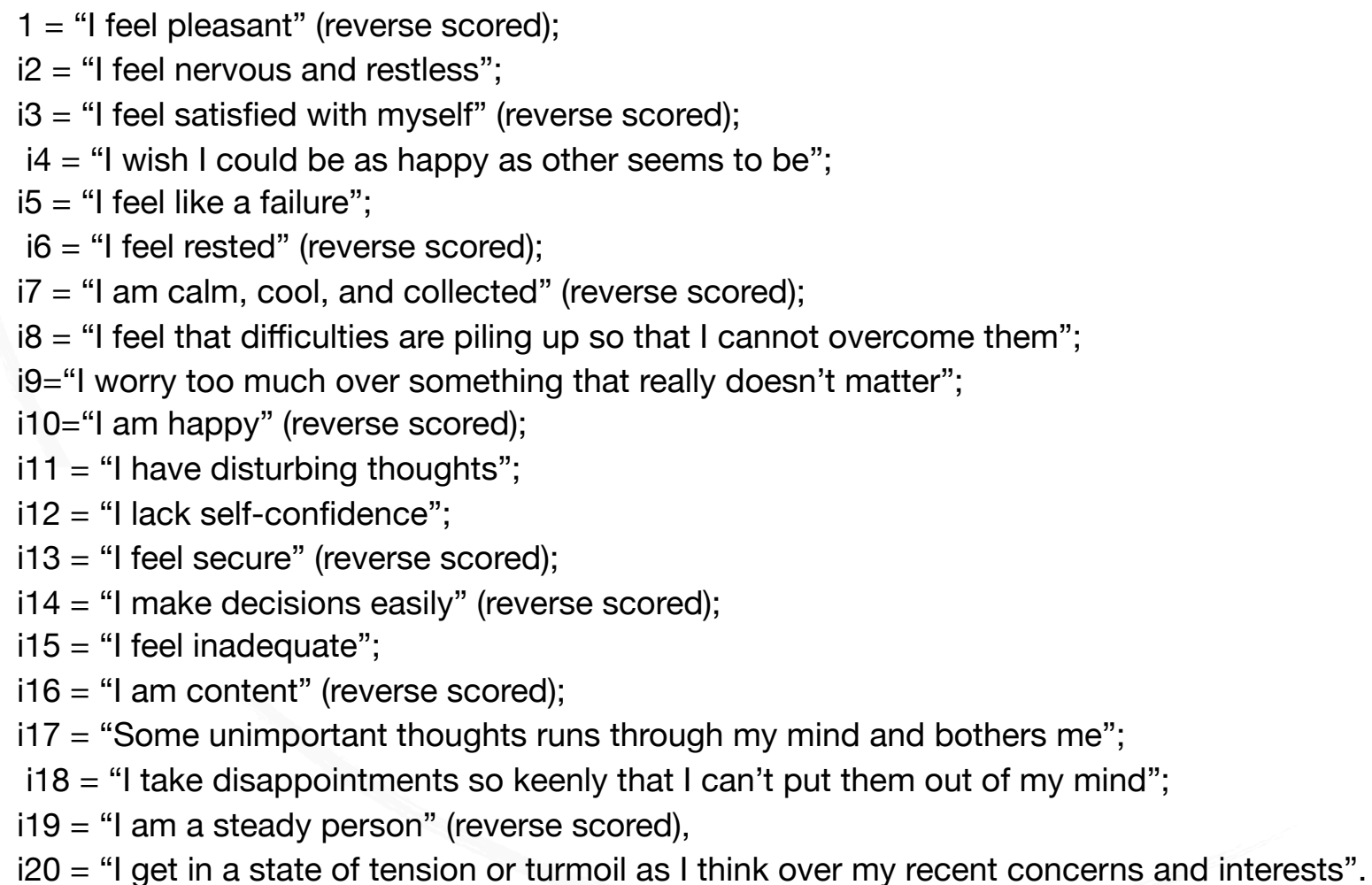




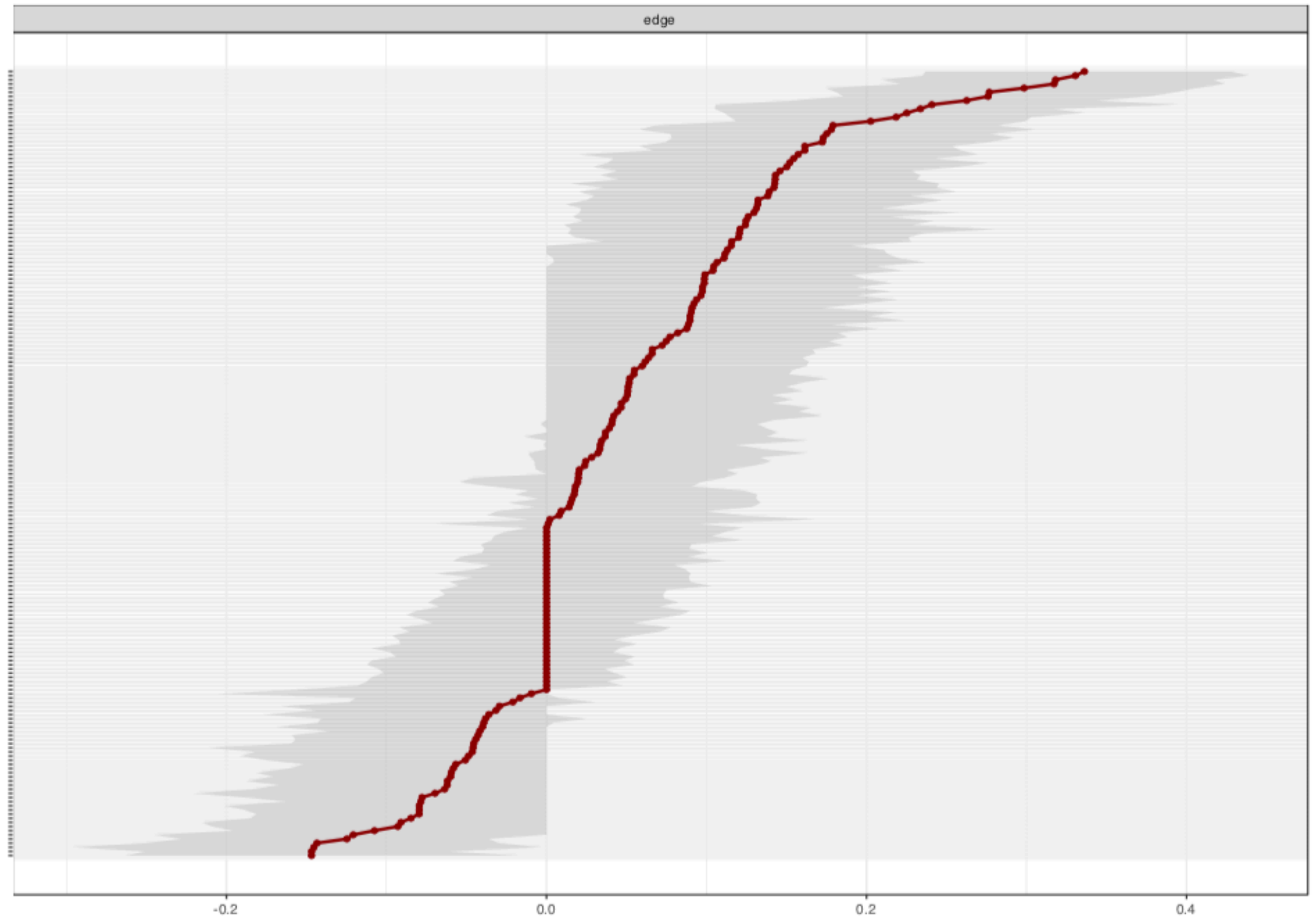
***No doors should be closed in the
study of personality***

Allport (1946)

Supplementary materials



Accuracy of the edge weights: Non-parametric bootstrap



State-Trait Anxiety Inventory (STAI)

Charles D. Spielberger



State form (STAI-S)

- 20-item instrument (e.g., *I am tense*; *I am upset*) in reference to how participants are feeling at the moment
- 4-point scale ranging from 1 (“not at all”) to 4 (“very much so”).

Trait form (STAI-T)

- 20-item instrument (e.g., *I worry too much*; *I feel nervous*) in reference to how participants generally feel
- 4-point scale ranging from 1 (“almost never”) to 4 (“almost always”).

(e.g., Spielberger, Gorsuch, Vagg, & Jacobs, 1983)