

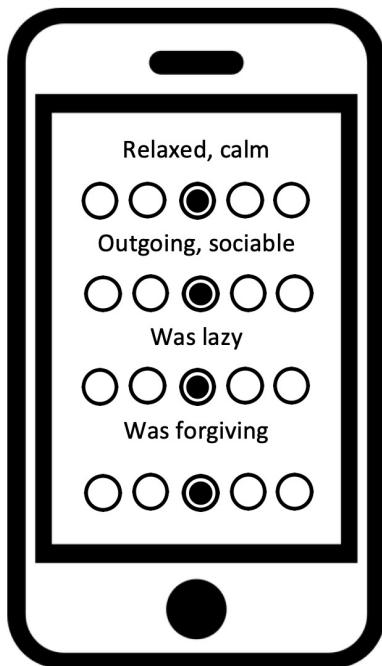
Can We Do Better? Why Short Assessments Miss the Complexity of Personality in ESM Assessments

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Washington University in St. Louis



The Promise of ESM



Trait-state convergence

(e.g. Fleeson & Gallagher, 2009)

Within-person variability

(e.g. Fleeson, 2001)

Person x Situation Interactions

(e.g. Sherman et al., 2015)

Idiographic personality structure

(e.g. Beck & Jackson, 2019a)

State Personality-Affect relationships

(e.g. Wilson et al., 2016)

Correlated change in State and Trait personality

(e.g. Beck & Jackson, 2019b)

... and more

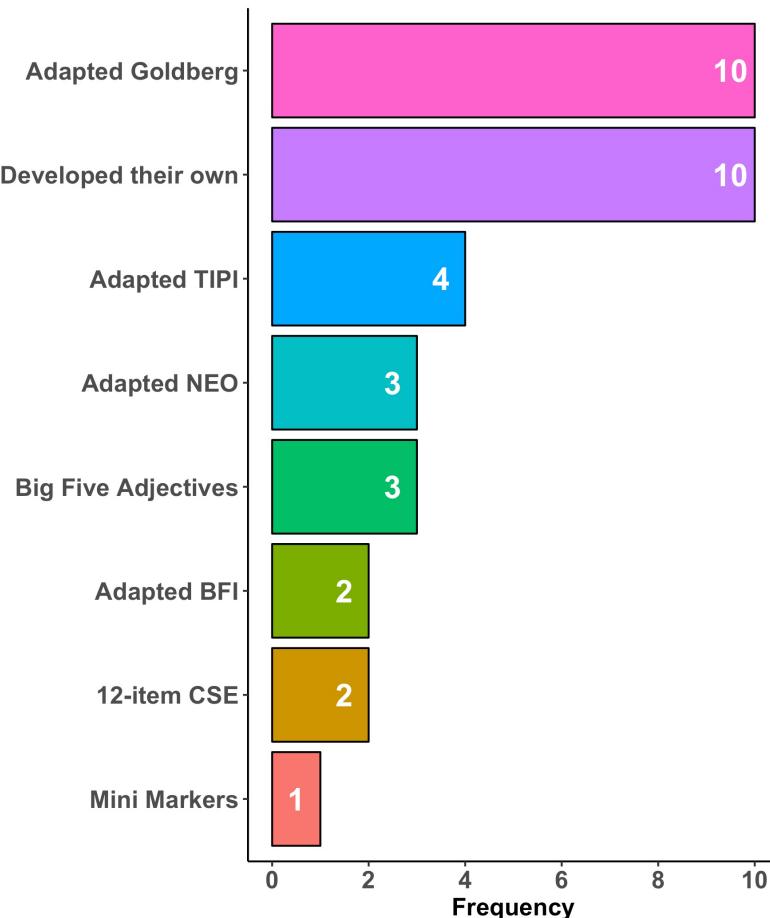
ESM Surveys

A Psychometric Dilemma

A Psychometric Dilemma

1

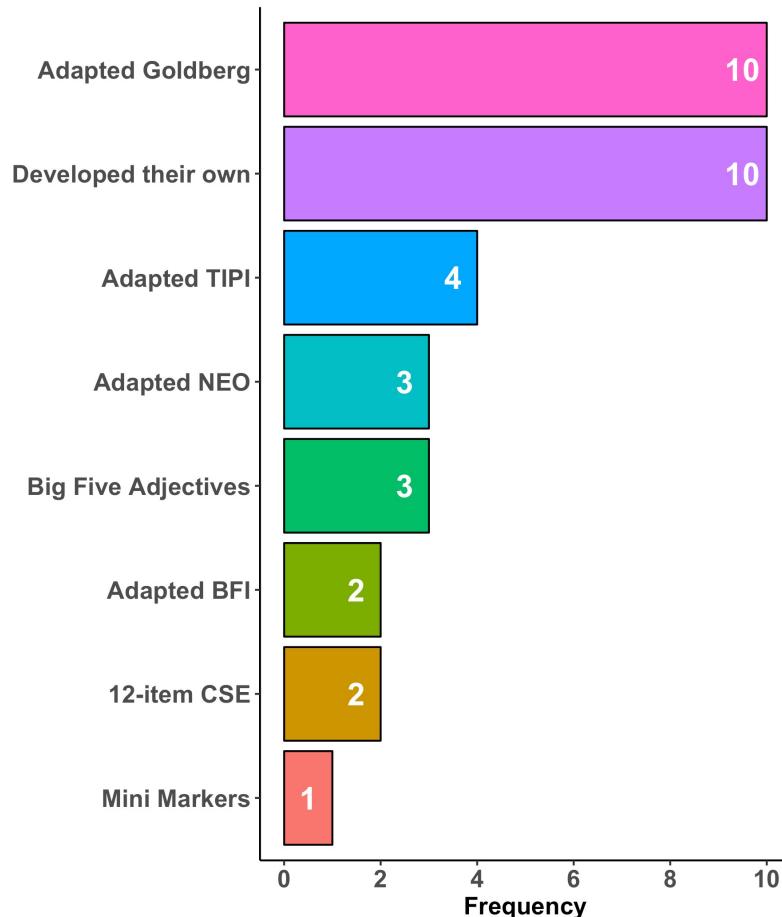
ESM Scale Use and Validation



A Psychometric Dilemma

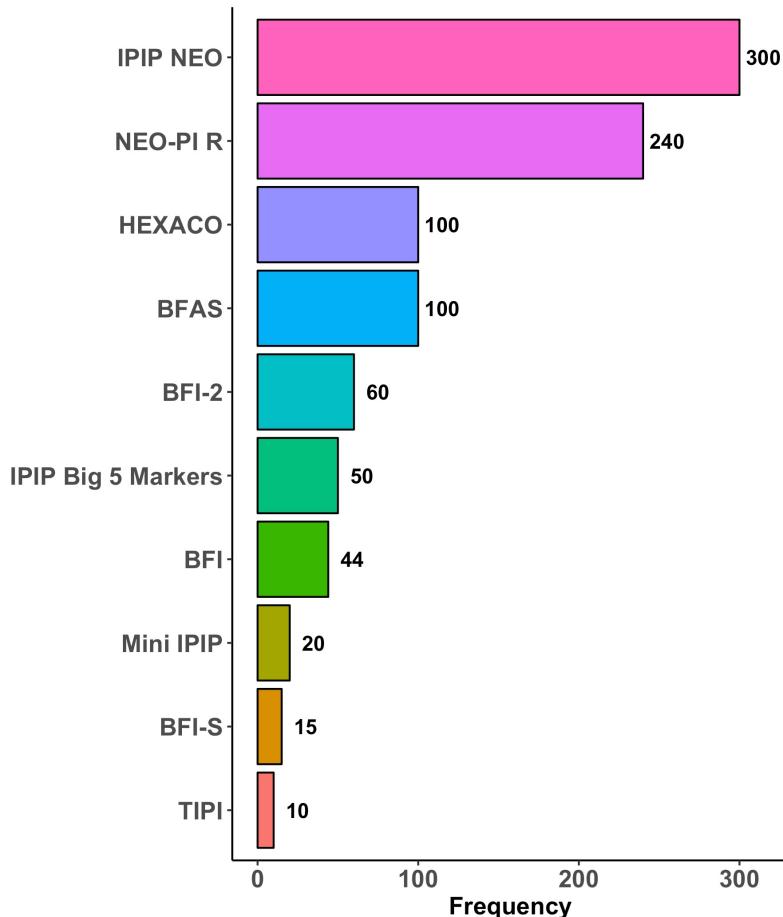
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ESM Scale Use and Validation



2

Defining the personality space

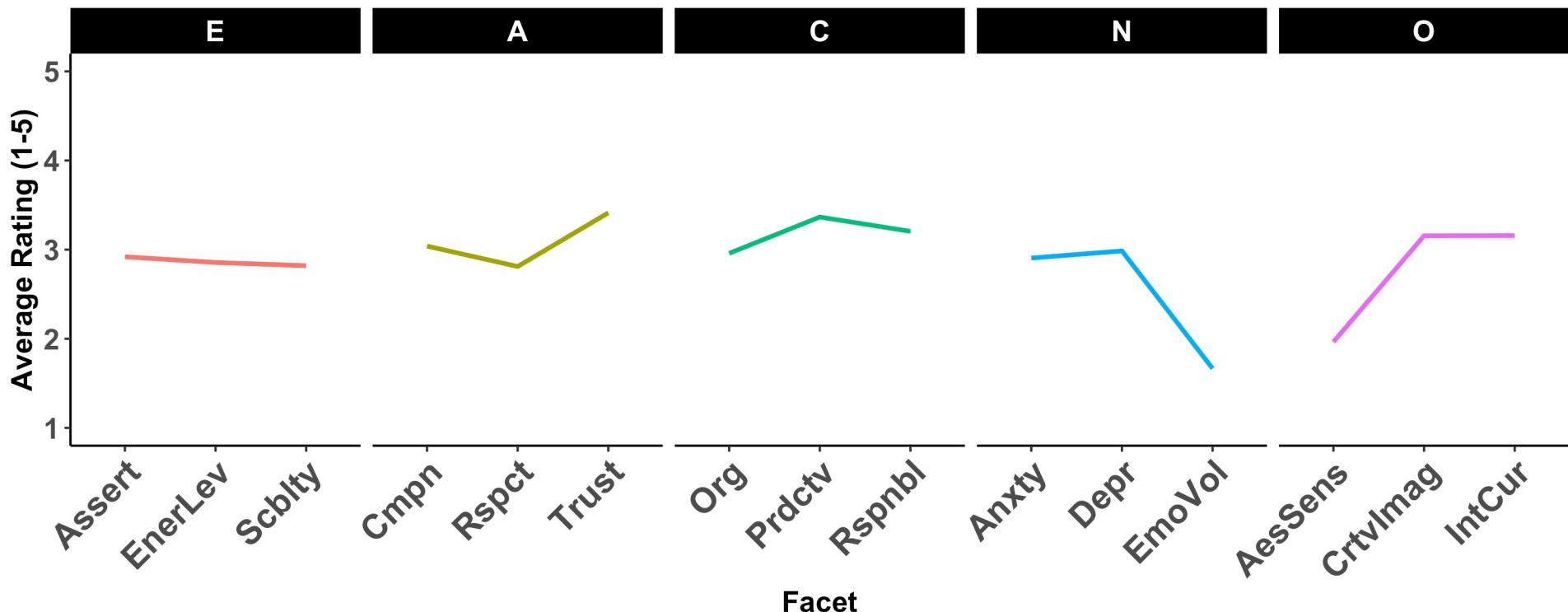


1 ESM Scale Use and Validation

Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Was outgoing, sociable.	Was compassionate, had a soft heart.	Tended to be lazy.	Was relaxed, handled stress well.	Had little interest in abstract ideas.
Was talkative.	Was polite, courteous to others.	Was reliable, could always be counted on.	Worried a lot.	Was complex, a deep thinker.

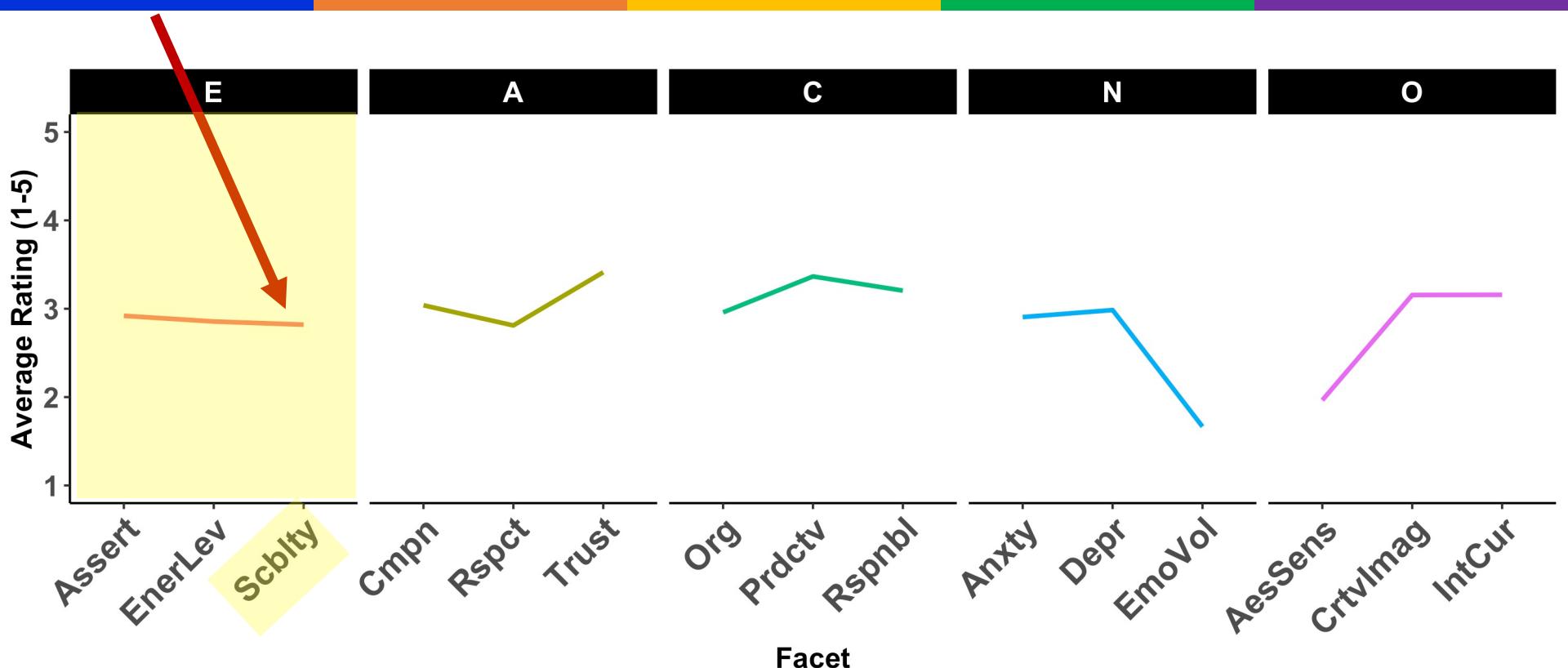
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Sociability	Compassion	Responsibility	Anxiety	Intellectual Curiosity



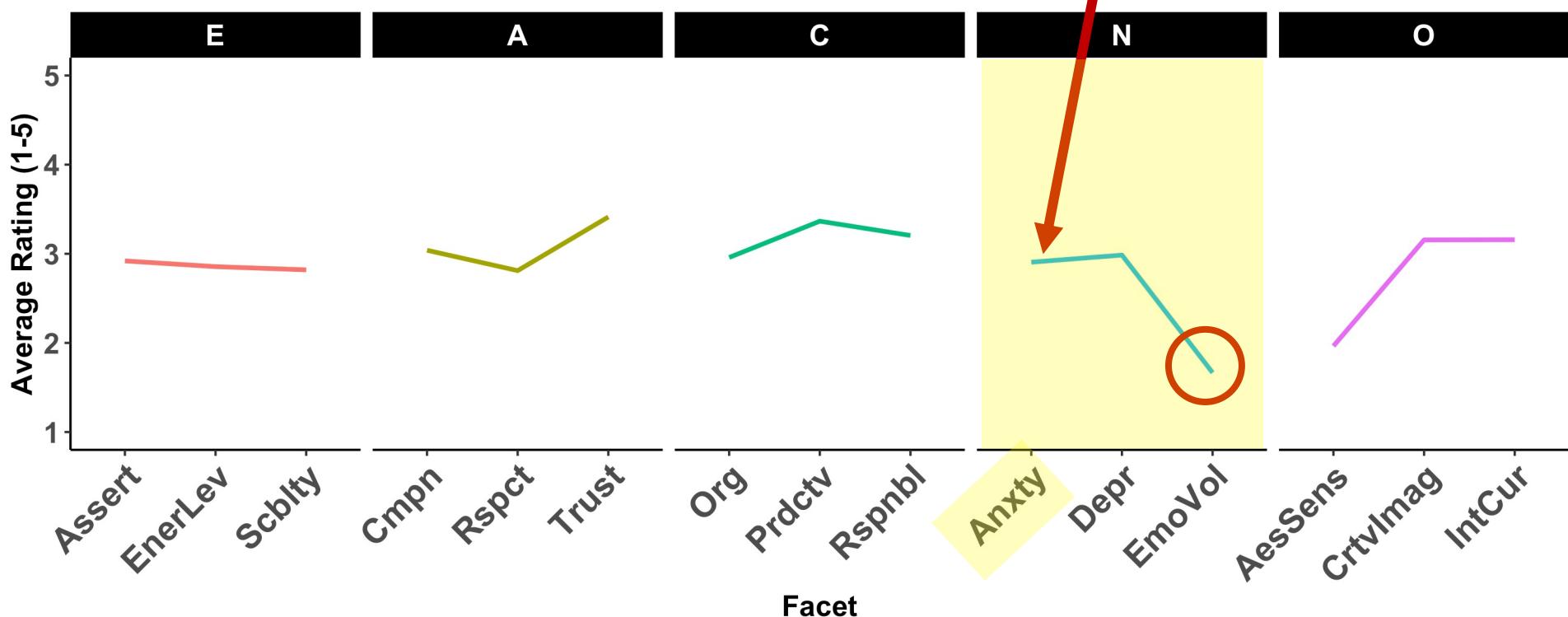
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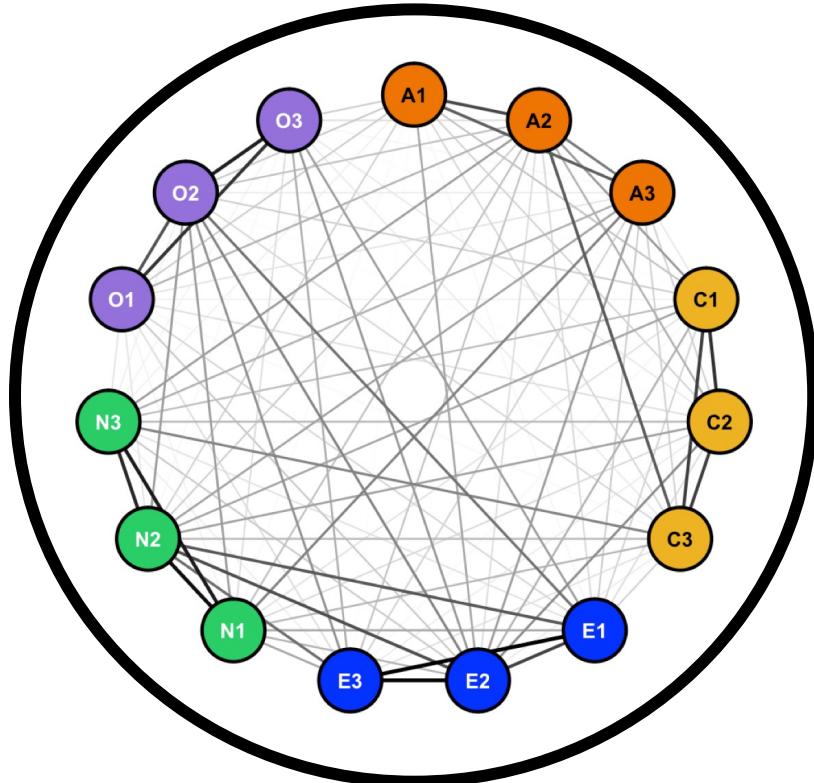
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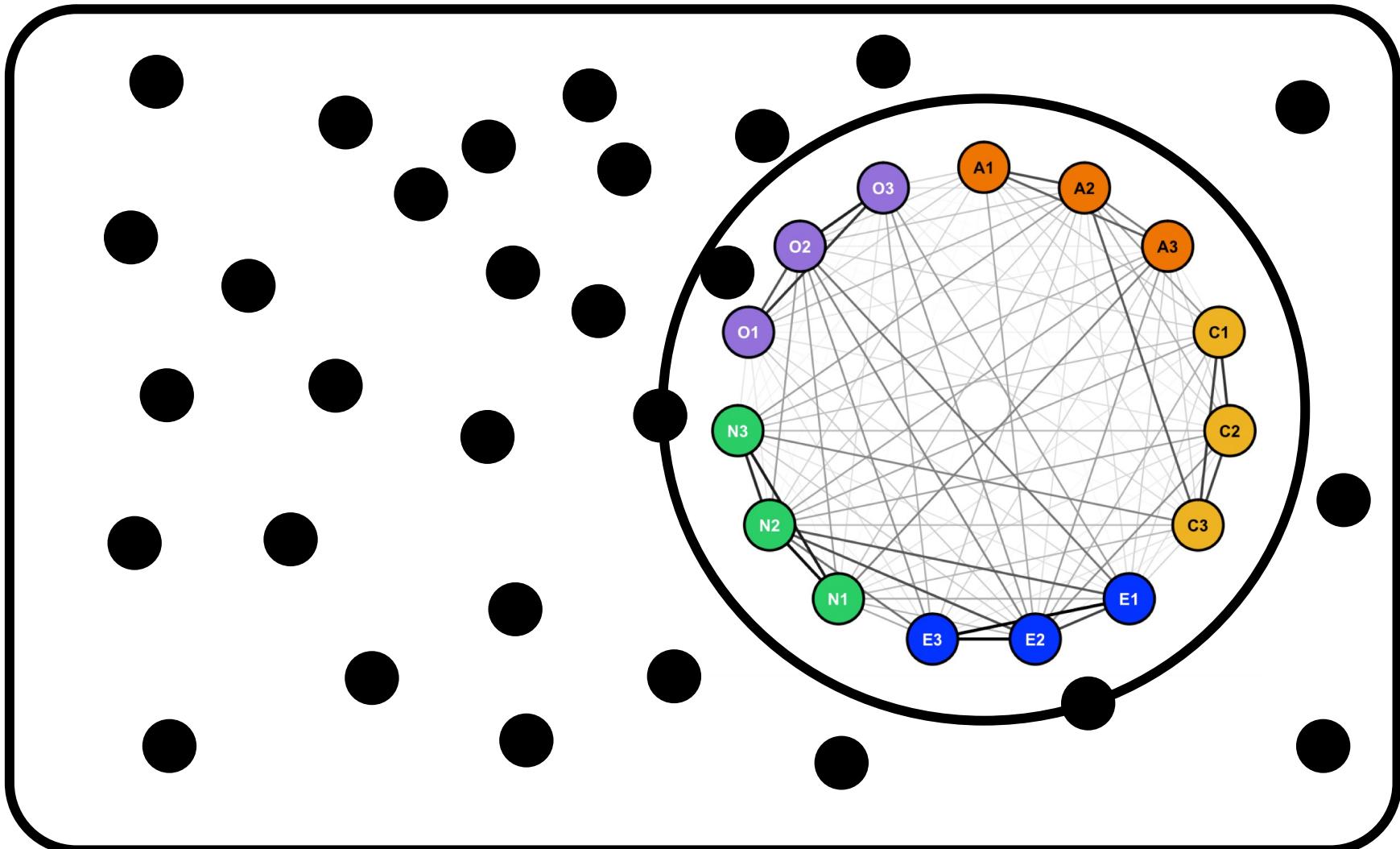


2 Defining the Personality Space

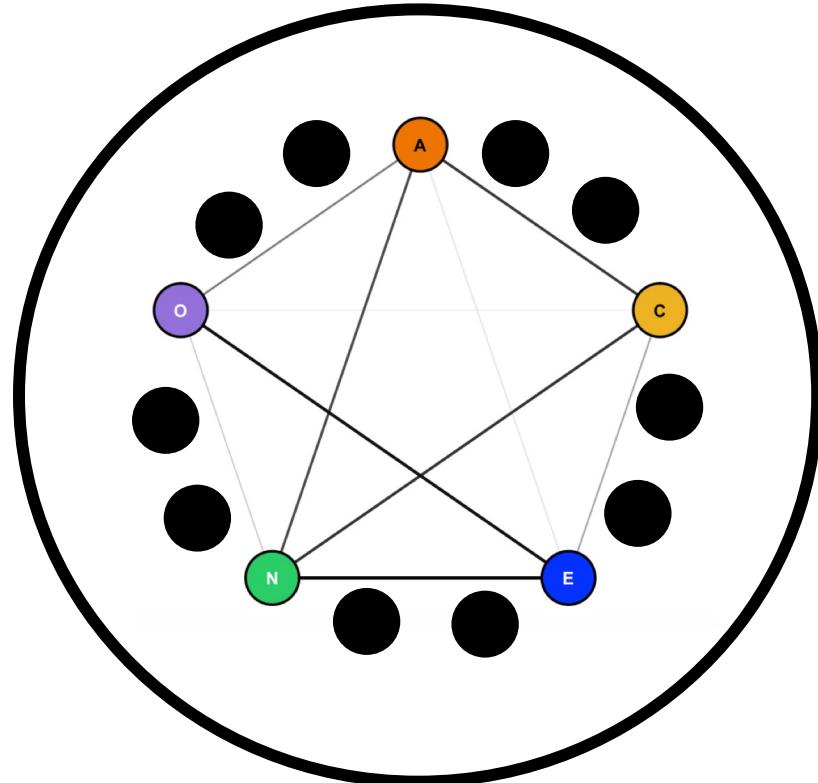
2 Defining the Personality Space



2 Defining the Personality Space



2 Defining the Personality Space



A Psychometric Dilemma

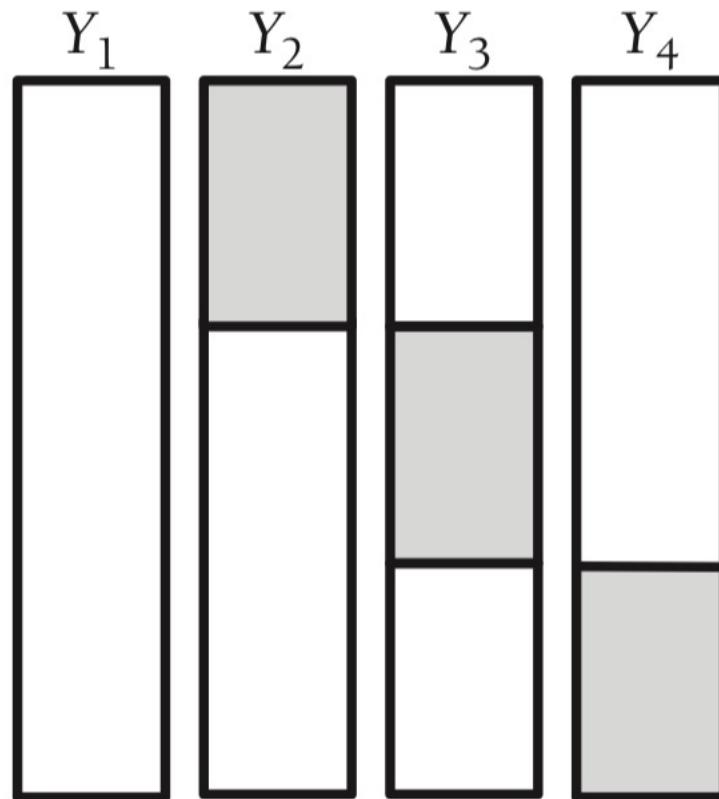
1 ESM Scale Use and Validation 2 Defining the Scale Content

So how do we measure more item content without increasing participant burden?

Scale	Frequency (Left Chart)	Frequency (Right Chart)
Adapted Goldberg	10	300
Big Five Adjectives	3	50
Adapted TIPI	4	44
Adapted CSE	2	20
12-item CSE	2	15
Mini Markers	1	10

A Planned Missing Alternative

(E) Planned Missing Pattern



The Current Study

Intentional Personality Change Study



The Current Study

Intentional Personality Change Study

BFI-2

BFI-2

BFI-2

BFI-2

BFI-2

Baseline Trait Assessments

ESM
4x/day x 15
days

30 Day Daily
Diary
Intervention

ESM
4x/day x 15
days

ESM
4x/day x 15
days

N = 133

104 F
29 M

59 F
35 So
25 J
19 Se

45% W
42% A
13% O

$M_{age} =$
20.45
(1.26)

The Current Study

BFI-2 Personality

12:29 ⓘ pmdbl.wustl.edu ⌂

Please respond to each question as characteristic of you during whatever you were just doing.

Was relaxed, handled stress well.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Was disorganized.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Felt happy

Strongly Disagree Disagree Neutral Agree Strongly Agree

Found fault with others.

Strongly Disagree Disagree Neutral Agree Strongly Agree

< > ⌂ ⌂ ⌂

This section displays four personality traits on Likert scales. Each trait has five options: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. The first two traits are preceded by descriptive text. The last two are preceded by their respective adjectives.

Contexts

12:29 ⓘ pmdbl.wustl.edu ⌂

Indicate which of the following are true about what you were just doing.

Felt tired

Was late for something

Was anxious about school work

Did poorly on an assignment or exam

Had an argument / disagreement with friend

Was watching TV

Was studying or doing school work.

Interacted with a friend

Interacted with family

Procrastinated

Lost something

Felt lonely

Was on the Internet

Was listening to music

< > ⌂ ⌂ ⌂

This section lists ten different contexts or activities, each with a checkbox next to it. Below the list are navigation icons: back, forward, and three other icons.

DIAMONDS Situations

12:29 ⓘ pmdbl.wustl.edu ⌂

Indicate which of the following are true about what you were just doing.

Social interactions were possible or required.

Not at all Totally

Somebody was being threatened, accused, or criticized.

Not at all Totally

Deep thinking was required.

Not at all Totally

Somebody was being deceived.

Not at all Totally

< > ⌂ ⌂ ⌂

This section lists four situations, each with a radio button for 'Not at all' and 'Totally'. Below the list are navigation icons: back, forward, and three other icons.

A Planned Missing Alternative

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A Planned Missing Alternative

Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Was outgoing, sociable.	Was compassionate, had a soft heart.	Was systematic, liked to keep things in order.	Was tense.	Was curious about many different things.
Was talkative.	Was helpful and unselfish with others.	Kept things neat and tidy.	Worried a lot.	Was complex, a deep thinker.
Tended to be quiet.	Felt little sympathy for others.	Tended to be disorganized.	Was relaxed, handled stress well.	Avoided intellectual, philosophical discussions.
Was sometimes shy, introverted.	Was cold and uncaring.	Left a mess, didn't clean up.	Rarely felt anxious or afraid.	Had little interest in abstract ideas.
Had an assertive personality.	Was respectful, treated others with respect.	Was efficient, got things done.	Often felt sad.	Was fascinated by art, music, or literature.
Was dominant, acted as a leader.	Was polite, courteous to others.	Was persistent, worked until the task was finished.	Tended to feel depressed, blue.	Valued art and beauty.
Found it hard to influence people.	Started arguments with others.	Tended to be lazy.	Stayed optimistic after experiencing a setback.	Had few artistic interests.
Preferred to have others take charge.	Was sometimes rude to others.	Had difficulty getting started on tasks.	Felt secure, comfortable with self.	Thought poetry and plays were boring.
Was full of energy.	Had a forgiving nature.	Was dependable, steady.	Was moody, had up and down mood swings.	Was inventive, found clever ways to do things.
Showed a lot of enthusiasm.	Assumed the best about people.	Was reliable, could always be counted on.	Was temperamental, got emotional easily.	Was original, came up with new ideas.
Rarely felt excited or eager.	Tended to find fault with others.	Was somewhat careless.	Was emotionally stable, not easily upset.	Had little creativity.
Was less active than other people.	Was suspicious of others' intentions.	Sometimes behaved irresponsibly.	Kept their emotions under control.	Had difficulty imagining things.

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A Planned Missing Alternative

1

Missing at random
data from full BFI-2

A Planned Missing Alternative

1

Missing at random
data from full BFI-2

2

Composite into facets

A Planned Missing Alternative

1

Missing at random
data from full BFI-2

2

Composite into facets

3

Individual-level
Multiple Imputation

1

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Individual-level Multiple Imputation

50 x 15,
0% missing

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Individual-level Multiple Imputation

50 x 15,
0% missing

But does
this work?

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A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

**R-Factor Big 5 Recovery and
Factor Congruence**

A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

**R-Factor Big 5 Recovery and
Factor Congruence**

**Fidelity-Bandwidth in Behavior
Prediction**

A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

**R-Factor Big 5 Recovery and
Factor Congruence**

**Fidelity-Bandwidth in Behavior
Prediction**

A Planned Missing Alternative

Validation

State-Trait (Mean-Level) Convergence

$$State_{ijk} = \beta_{0jk} + \beta_{1jk} * Trait_{jk}$$

$$\beta_{0jk} = \gamma_{00k} + u_{0jk}$$

$$\beta_{1jk} = \gamma_{10k}$$

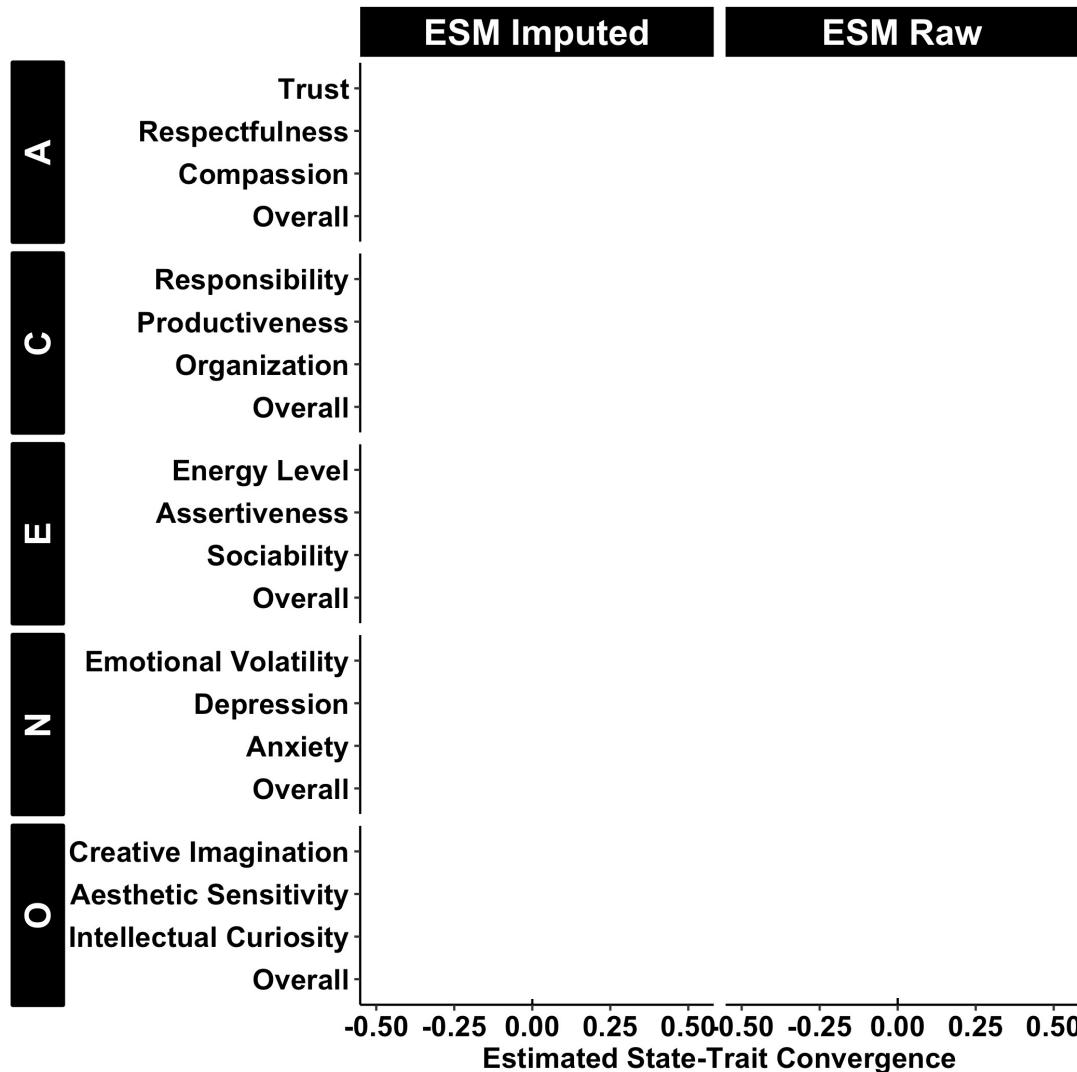
convergence

i = person, j = observation, k = indicator

A Planned Missing Alternative

Validation

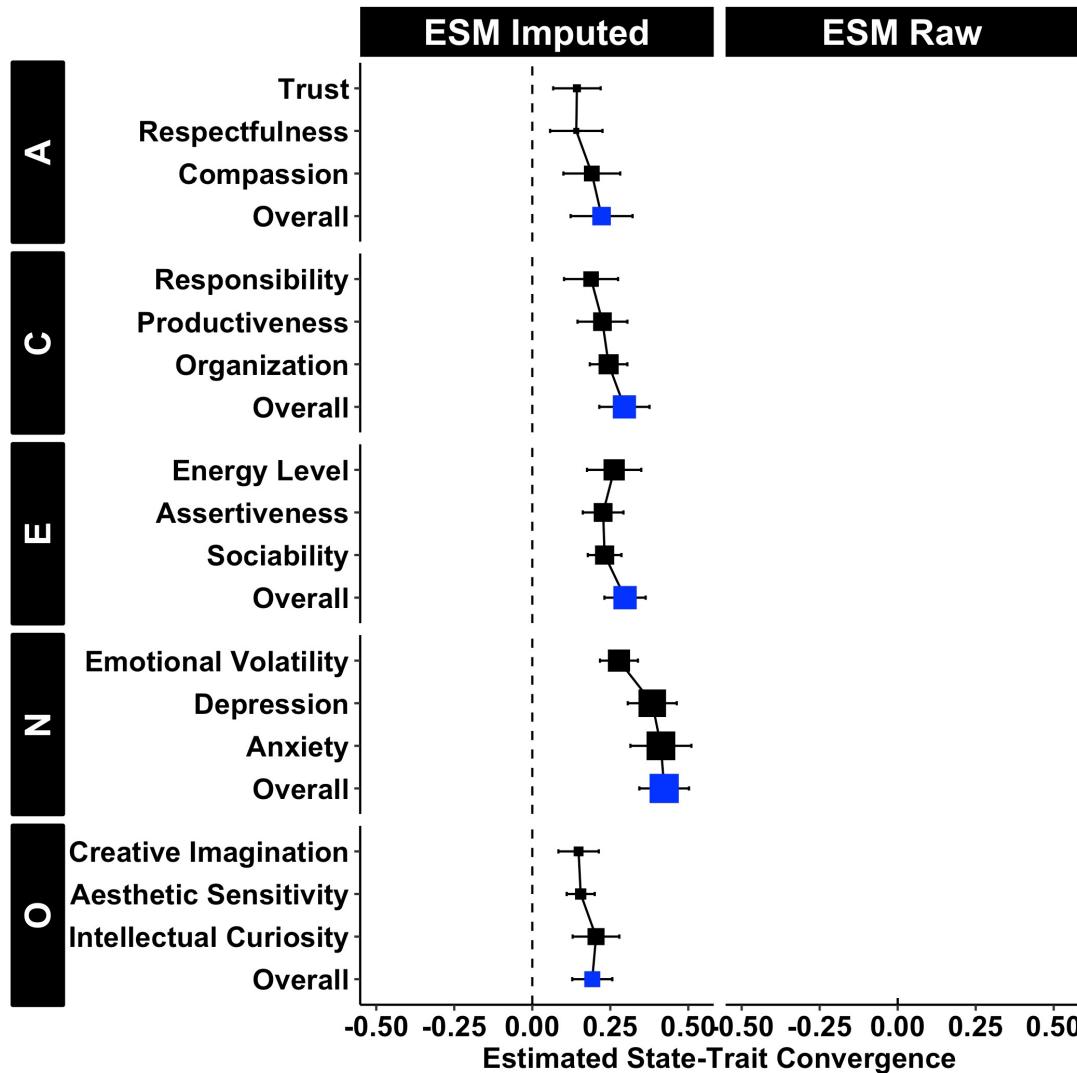
State-Trait (Mean-Level) Convergence



A Planned Missing Alternative

Validation

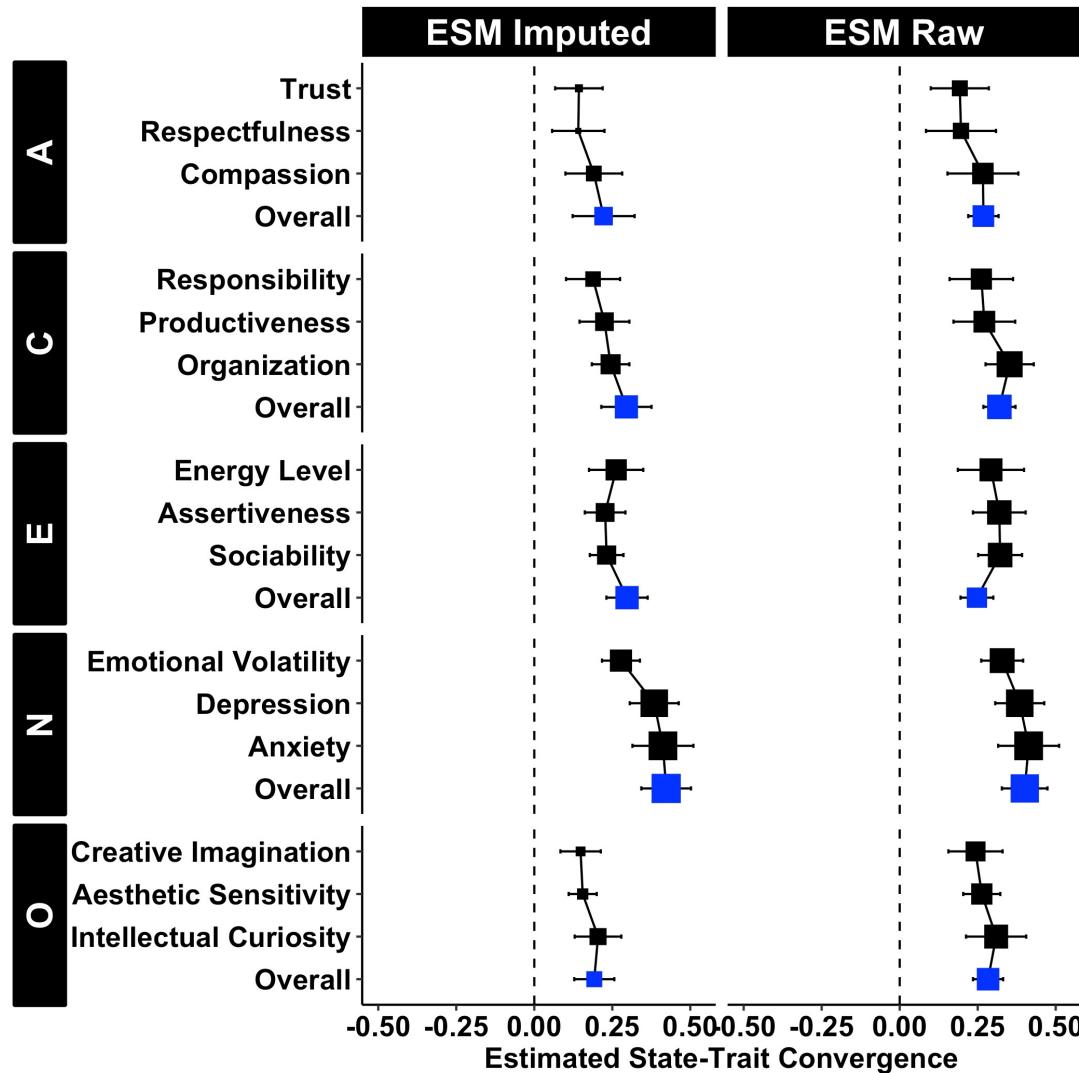
State-Trait (Mean-Level) Convergence



A Planned Missing Alternative

Validation

State-Trait (Mean-Level) Convergence



A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

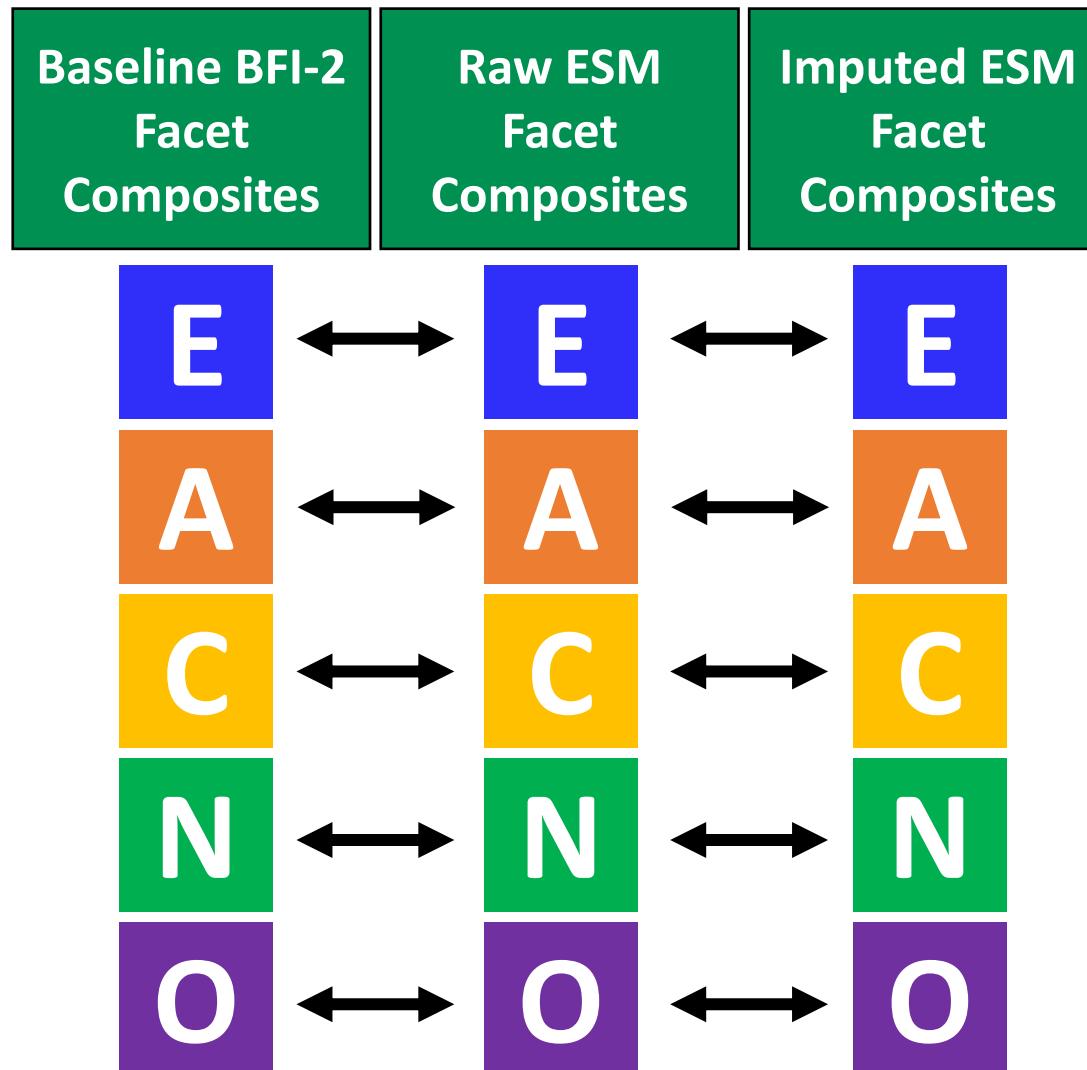
**R-Factor Big 5 Recovery and
Factor Congruence**

**Complexity and Behavioral
Predictions**

A Planned Missing Alternative

Validation

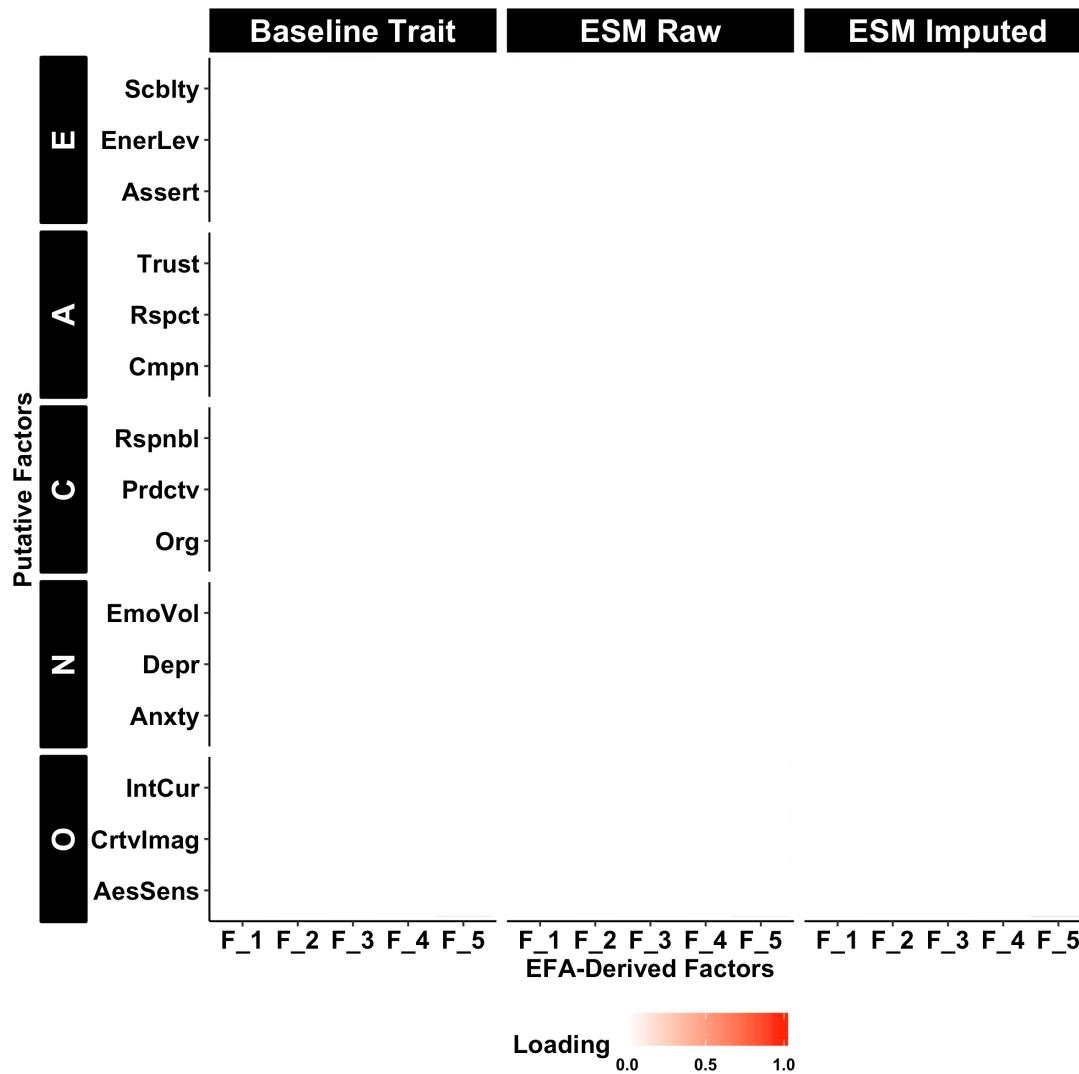
R-Factor Big 5 Recovery and Factor Congruence



A Planned Missing Alternative

Validation

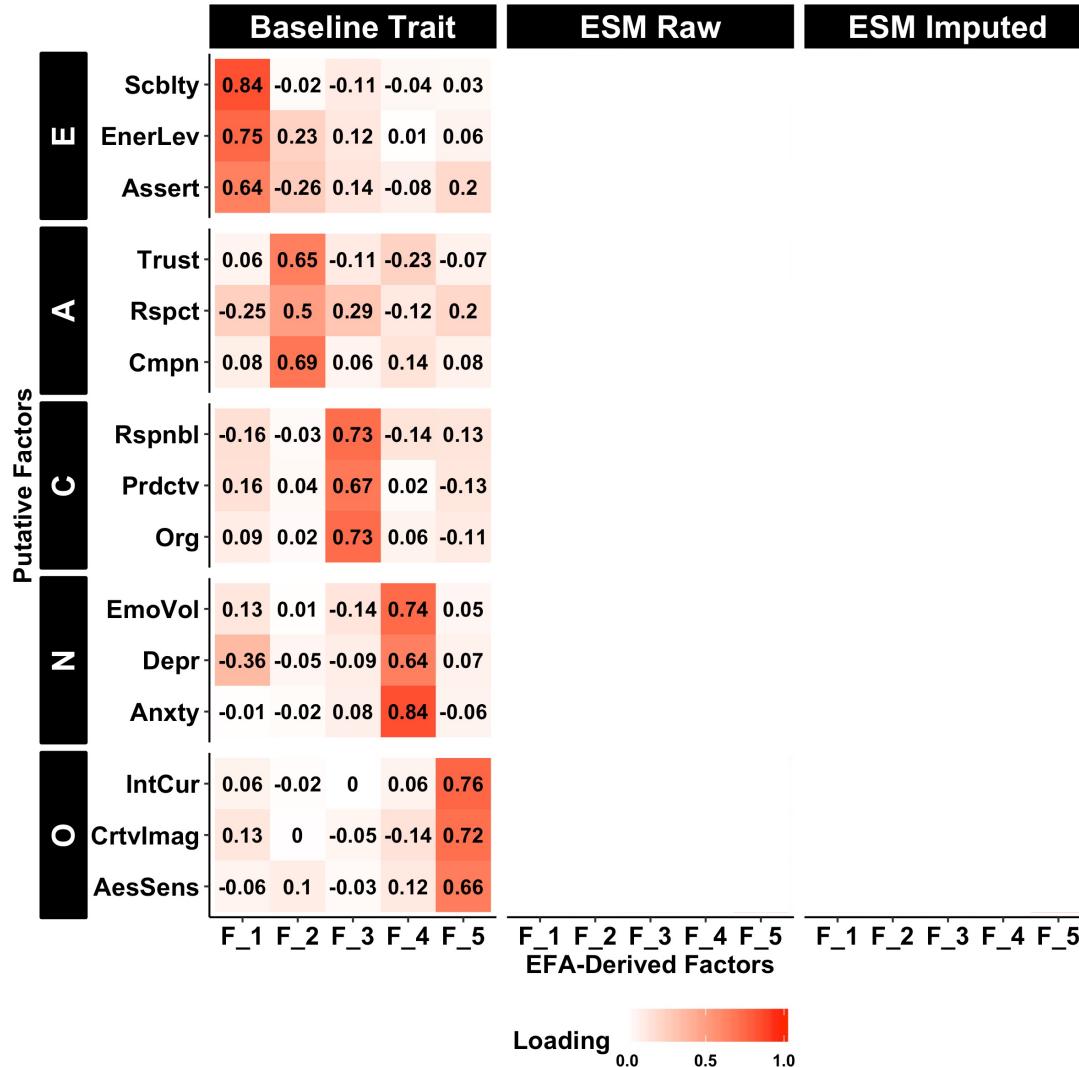
R-Factor Big 5 Recovery and Factor Congruence



A Planned Missing Alternative

Validation

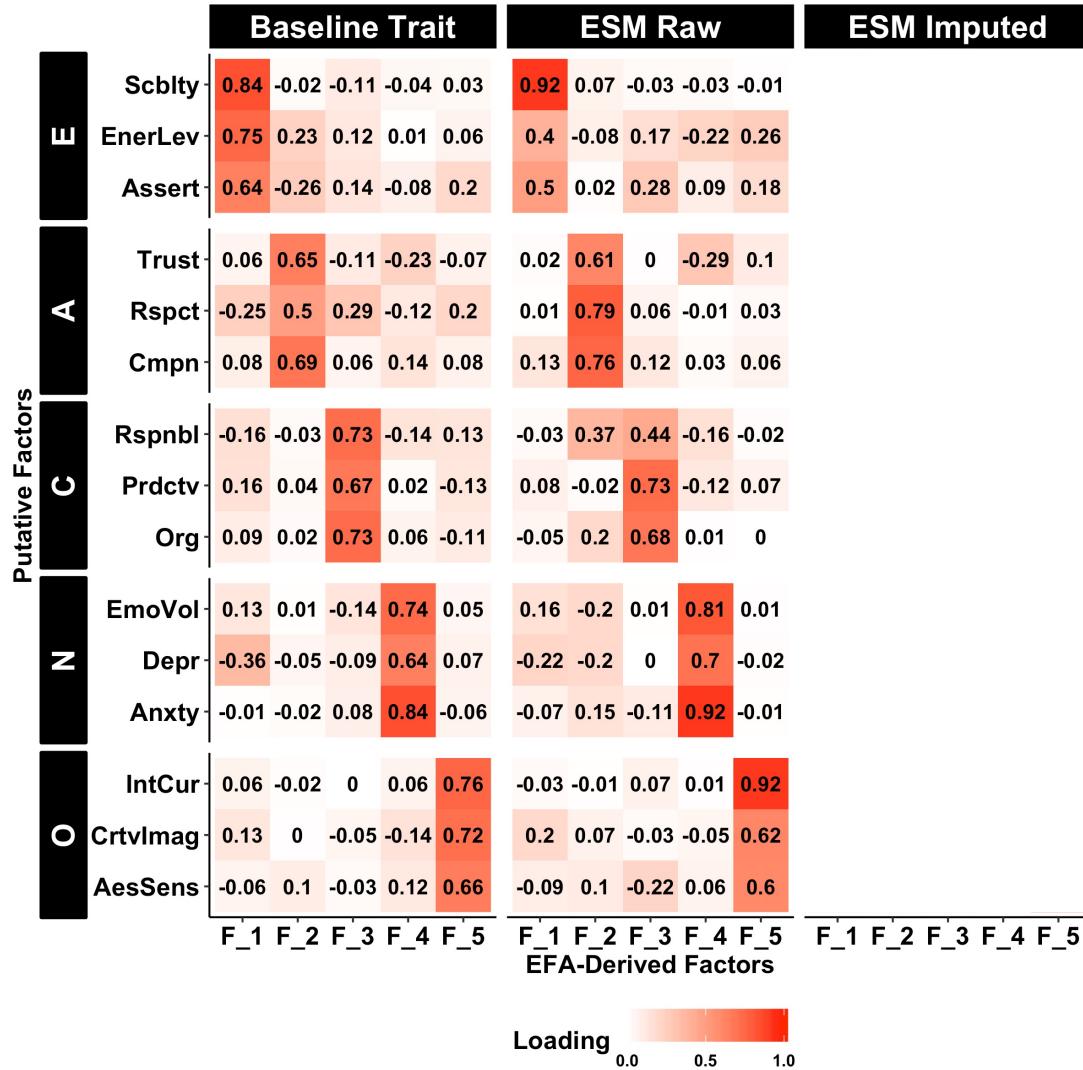
R-Factor Big 5 Recovery and Factor Congruence



A Planned Missing Alternative

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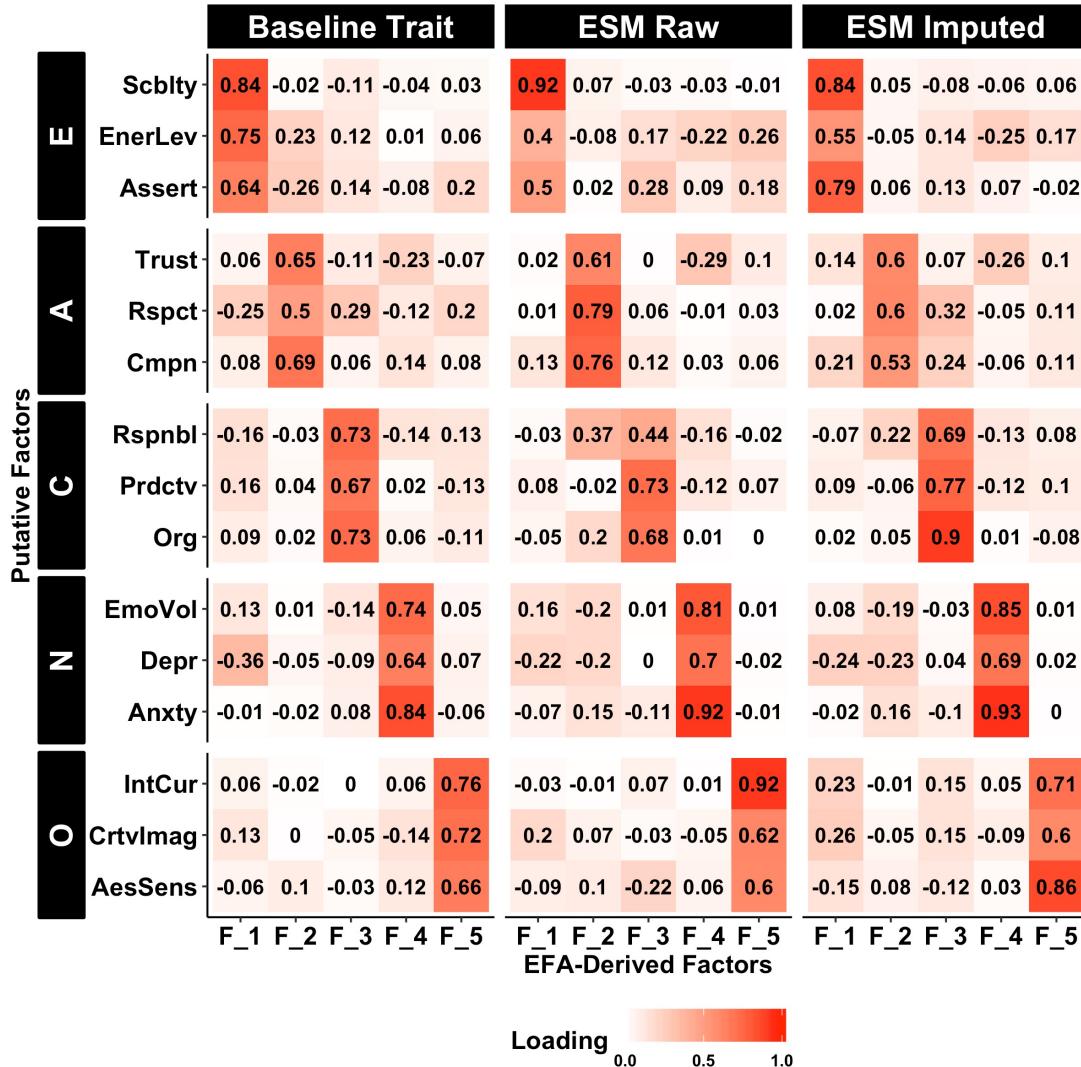
R-Factor Big 5 Recovery and Factor Congruence



A Planned Missing Alternative

Validation

R-Factor Big 5 Recovery and Factor Congruence



A Planned Missing Alternative

Validation

R-Factor Big 5 Recovery and Factor Congruence



Baseline Trait ESM Imputed

Baseline Trait ESM Raw

ESM Imputed ESM Raw

A Planned Missing Alternative

Validation

R-Factor Big 5 Recovery and Factor Congruence



Baseline Trait	ESM Imputed	0.94	0.84	0.94	0.96	0.94
Baseline Trait	ESM Raw					
ESM Imputed	ESM Raw					

A Planned Missing Alternative

Validation

R-Factor Big 5 Recovery and Factor Congruence

E A C N O

Baseline Trait	ESM Imputed	0.94	0.84	0.94	0.96	0.94
<hr/>						
Baseline Trait	ESM Raw					
ESM Imputed	ESM Raw	0.94	0.97	0.95	1.00	0.94

A Planned Missing Alternative

Validation

R-Factor Big 5 Recovery and Factor Congruence

E A C N O

Baseline Trait	ESM Imputed	0.94	0.84	0.94	0.96	0.94
Baseline Trait	ESM Raw	0.92	0.83	0.91	0.96	0.93
ESM Imputed	ESM Raw	0.94	0.97	0.95	1.00	0.94

A Planned Missing Alternative

Validation

**State-Trait (Mean-Level)
Convergence**

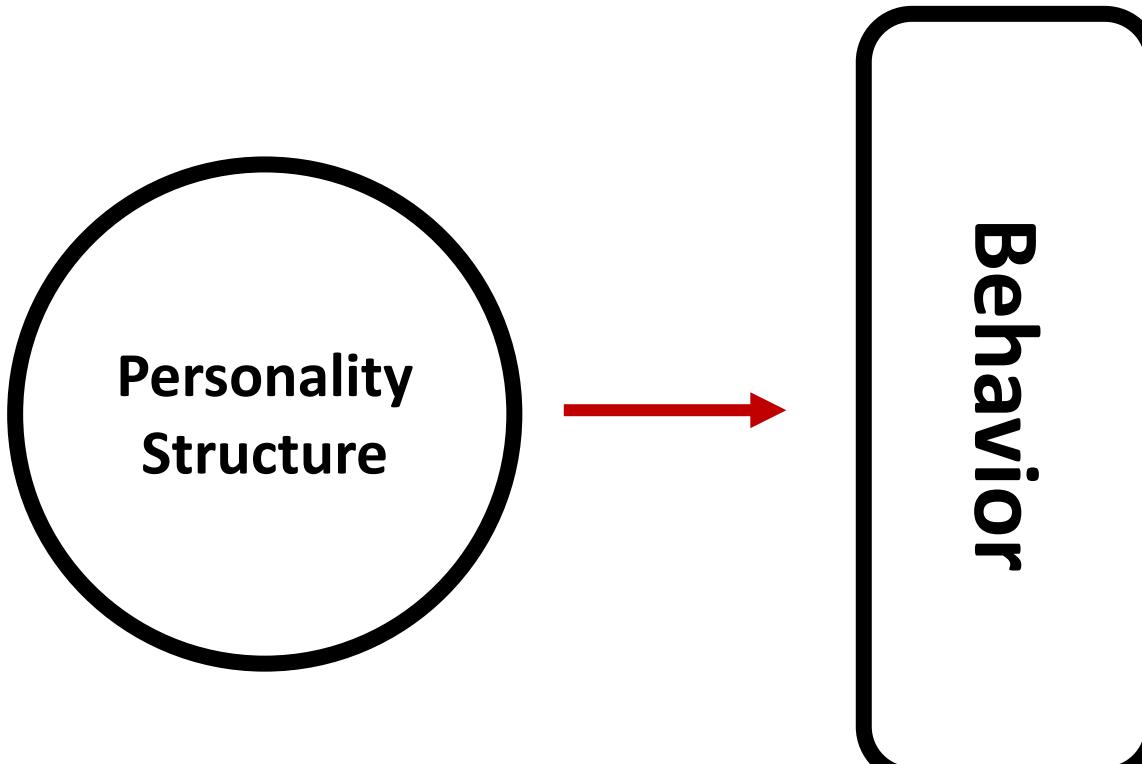
**R-Factor Big 5 Recovery and
Factor Congruence**

**Complexity and Behavioral
Predictions**

A Planned Missing Alternative

Validation

The Fidelity-Bandwidth Problem

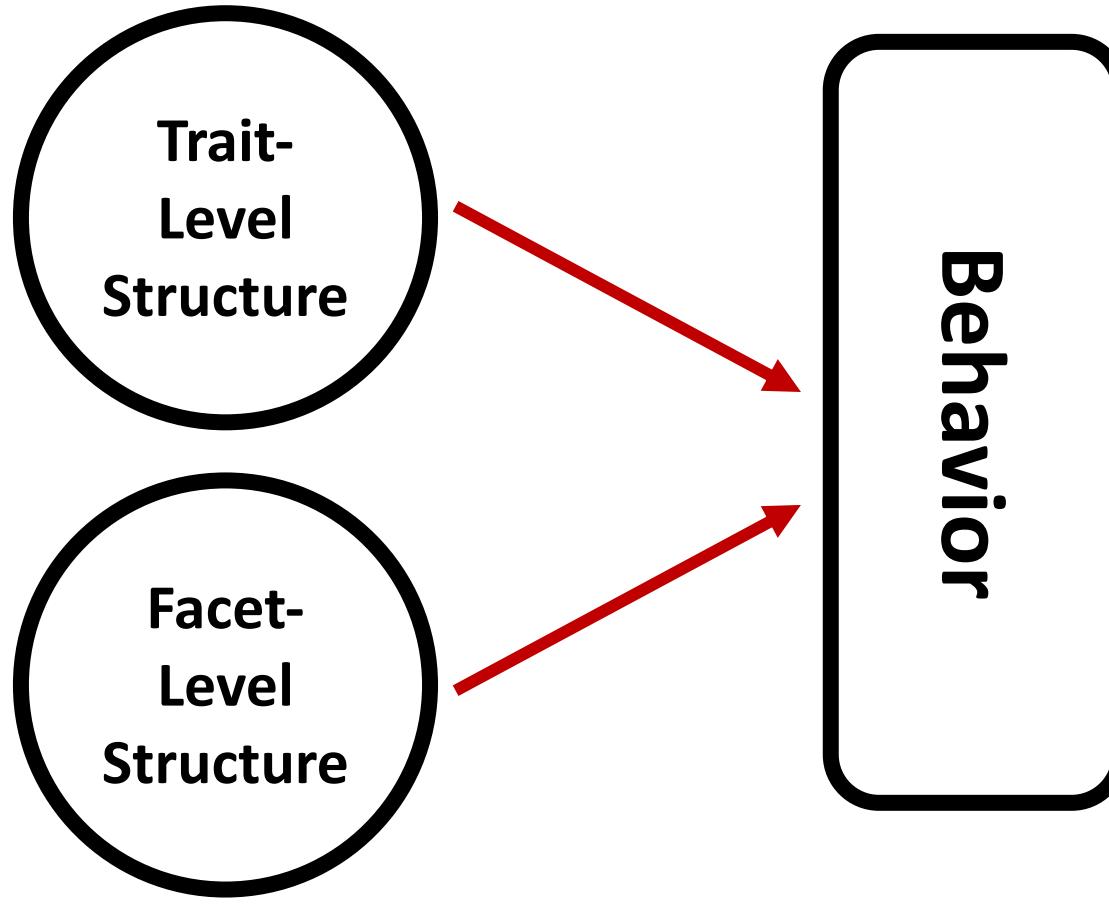


Idiographic

A Planned Missing Alternative

Validation

The Fidelity-Bandwidth Problem

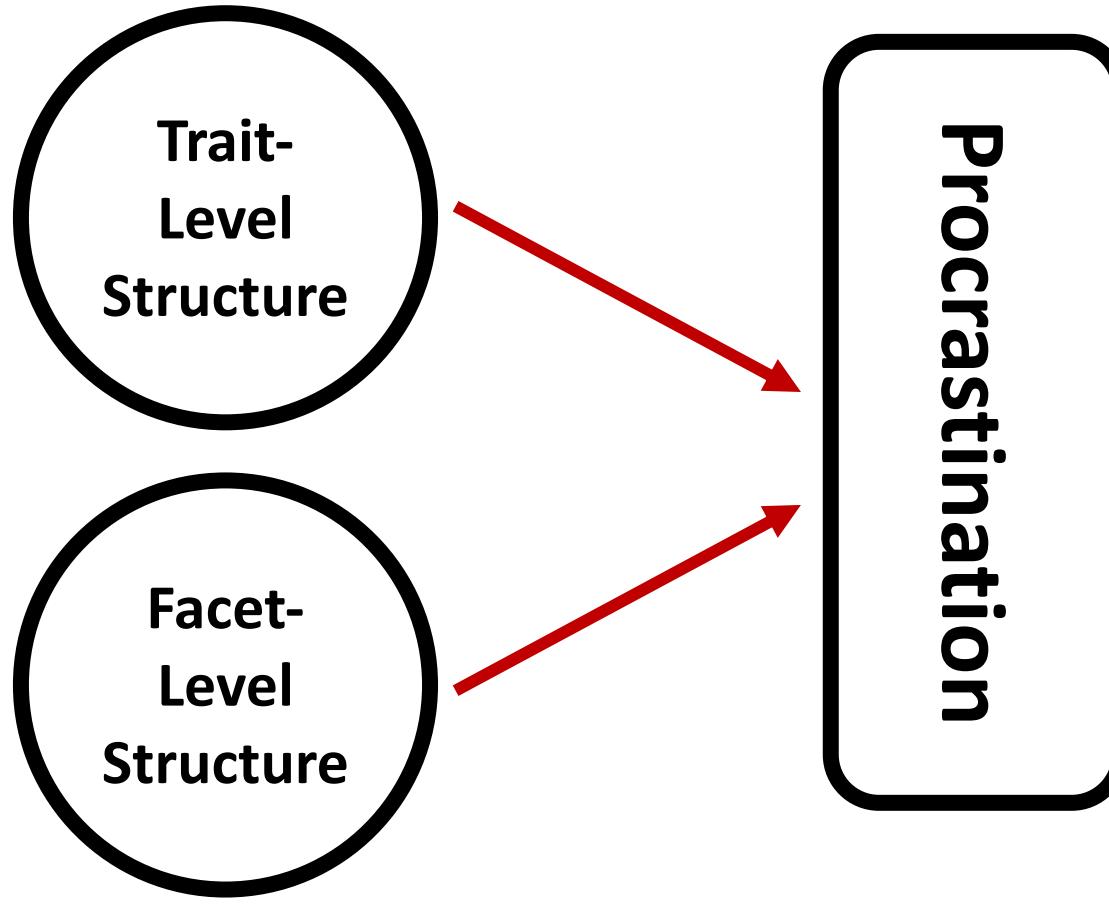


Idiographic

A Planned Missing Alternative

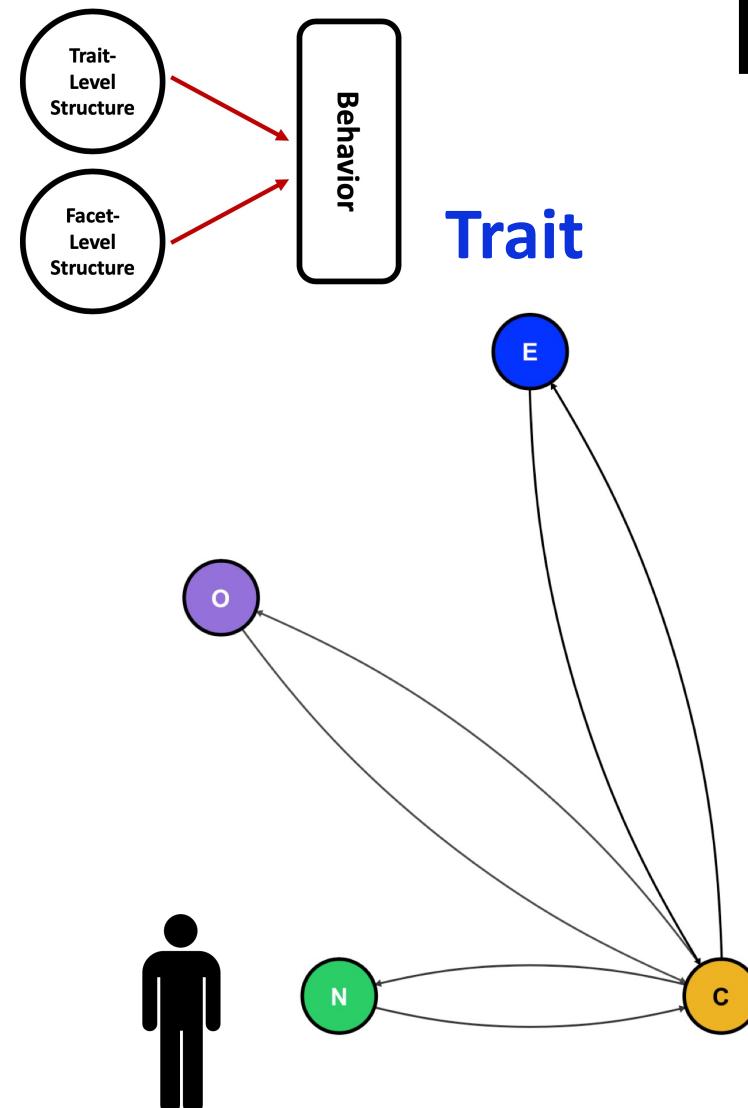
Validation

The Fidelity-Bandwidth Problem



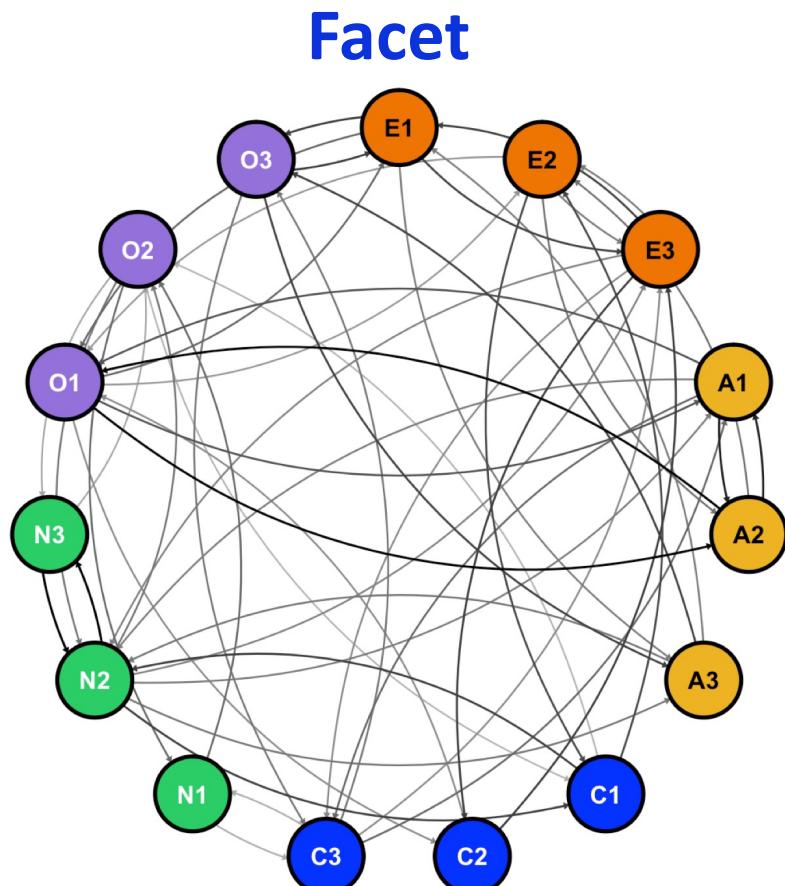
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A Planned Missing Alternative



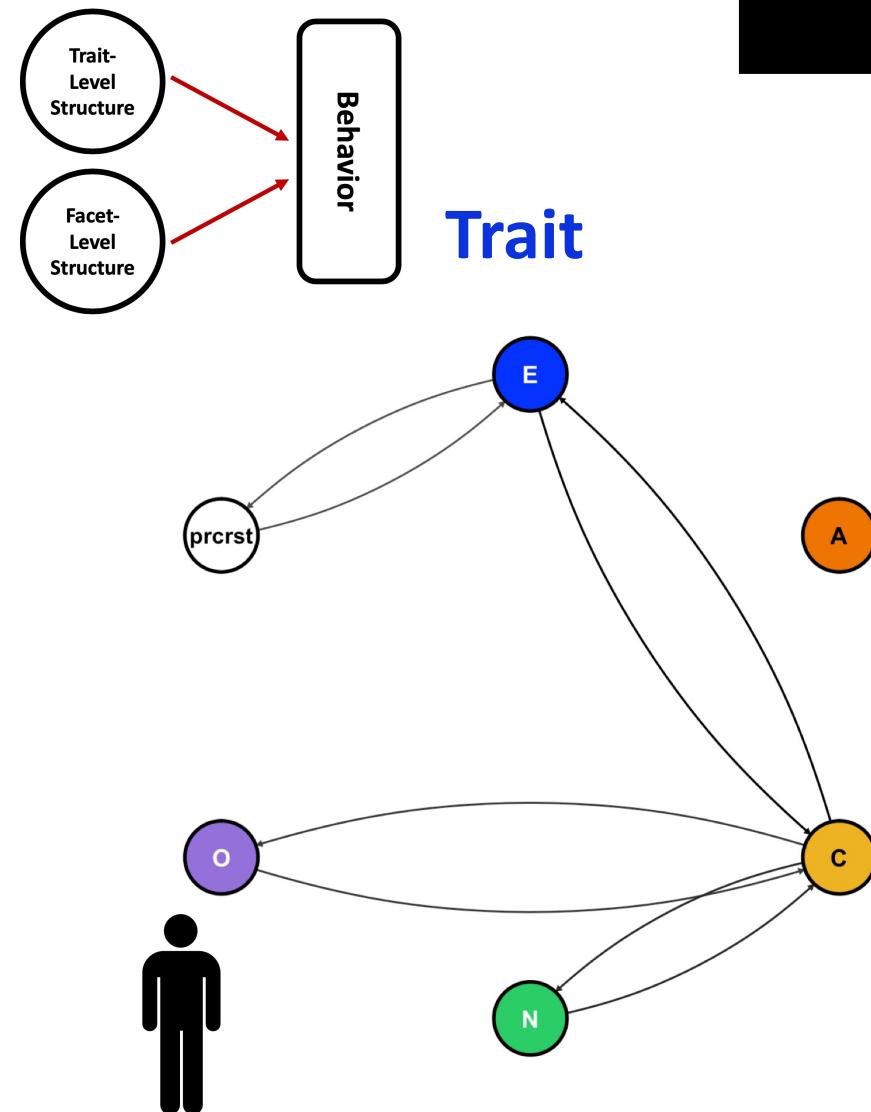
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The Fidelity-Bandwidth Problem



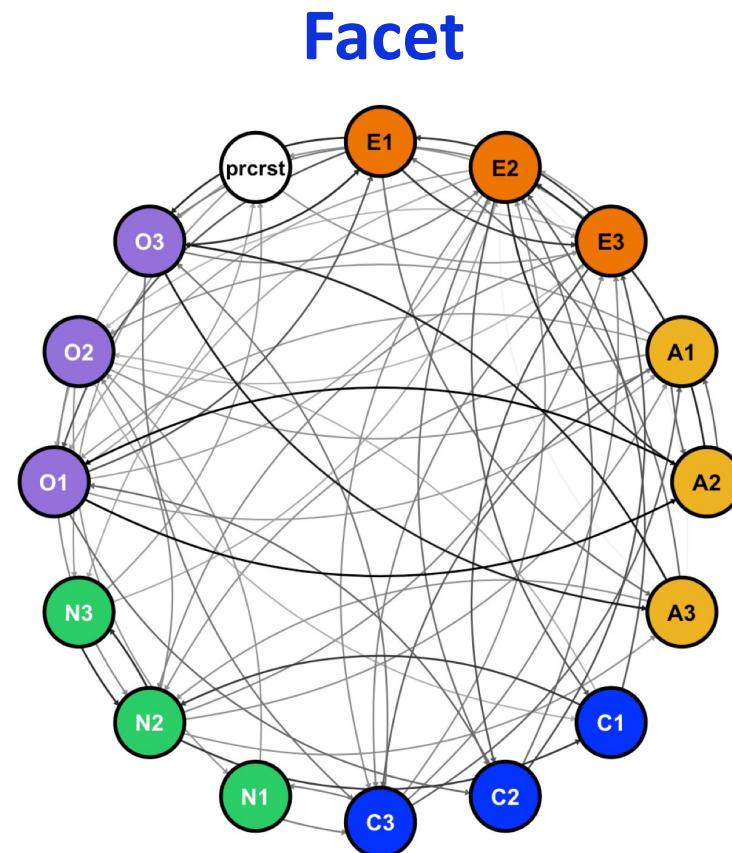
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A Planned Missing Alternative



Validation

The Fidelity-Bandwidth Problem



Idiographic

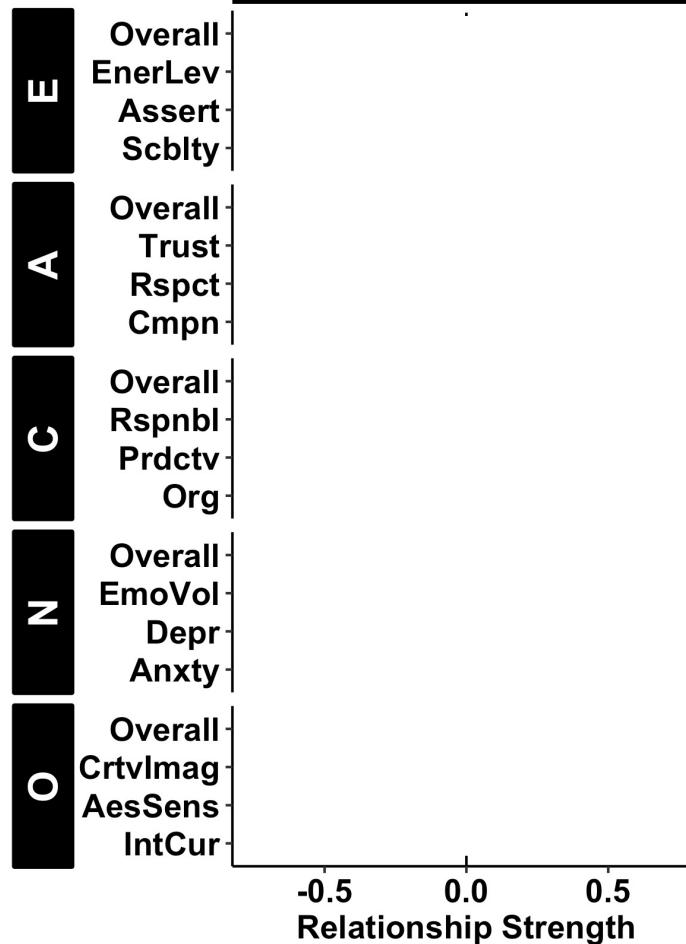
A Planned Missing Alternative

Validation

The Fidelity-Bandwidth Problem

Participant 110101

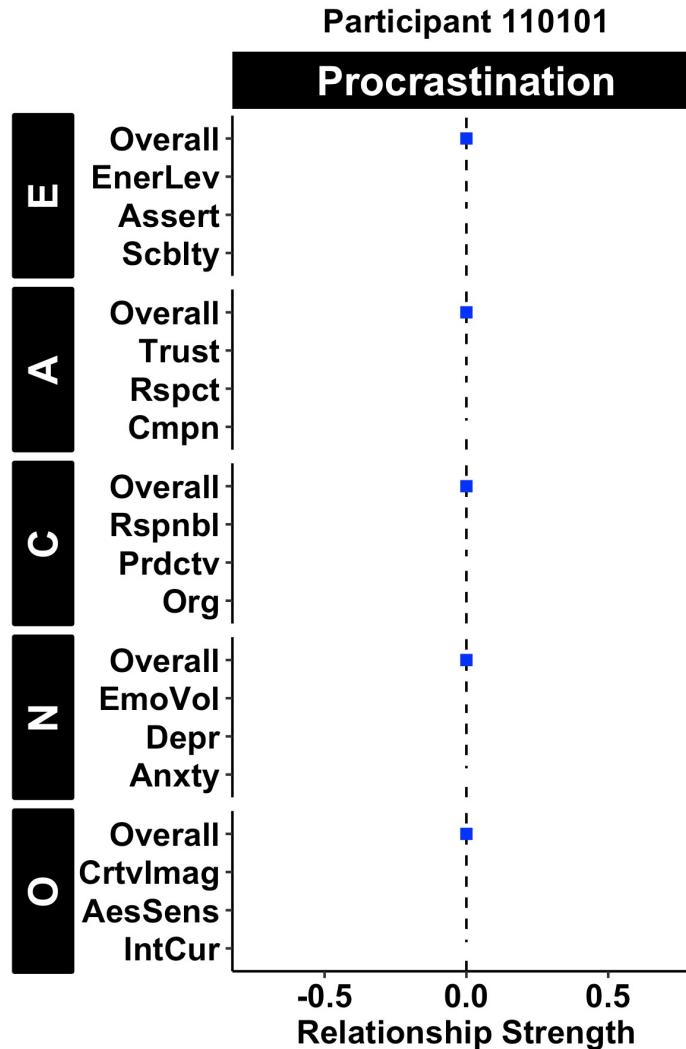
Procrastination



A Planned Missing Alternative

Validation

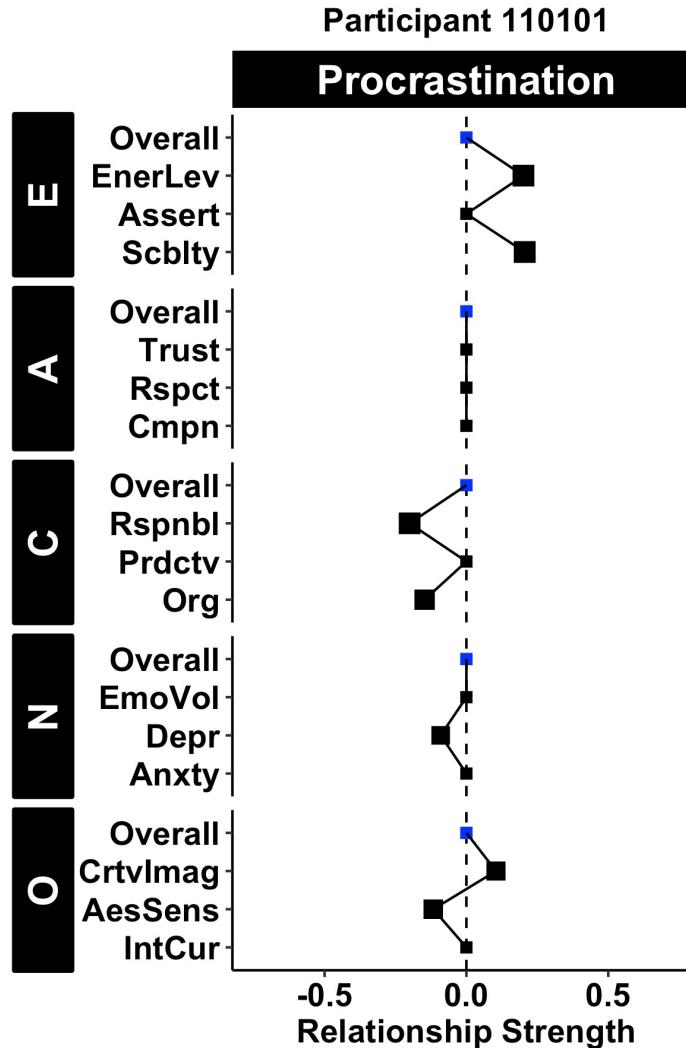
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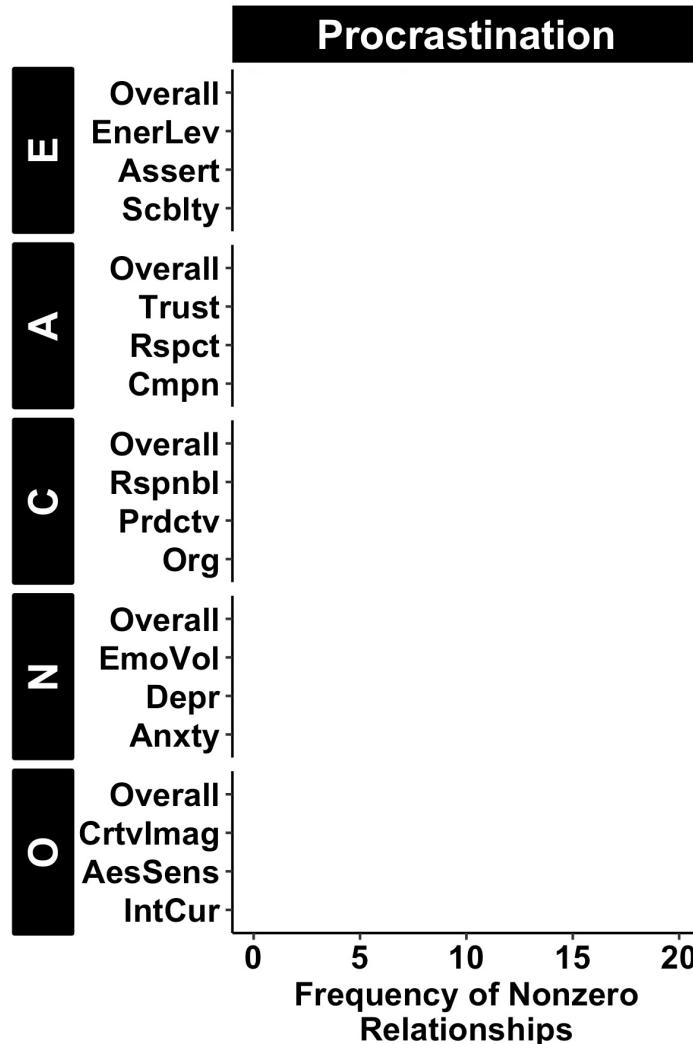
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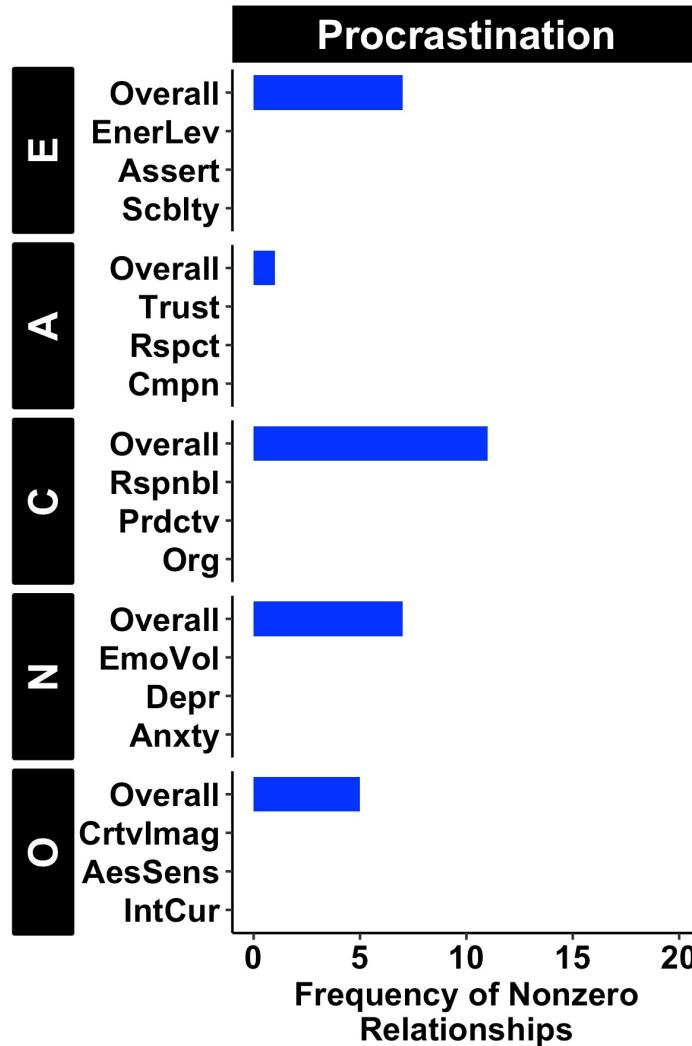
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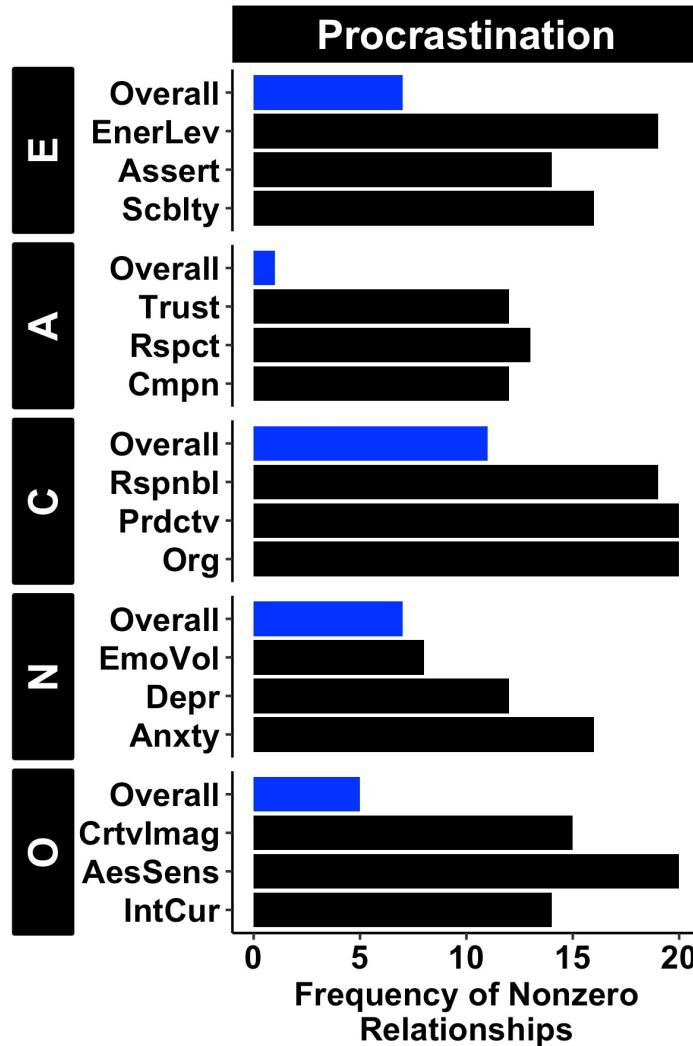
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Conclusions

1

You *can* implement within-person
planned missing in ESM

Conclusions

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2

Between person, planned missing
captures the Big Five

Conclusions

1

You *can* implement within-person planned missing in ESM

2

Between person, planned missing captures the Big Five

3

Planned missing let's us answer questions, like whether Big 5 states show a between-person Big 5 structure

Future Directions & Challenges

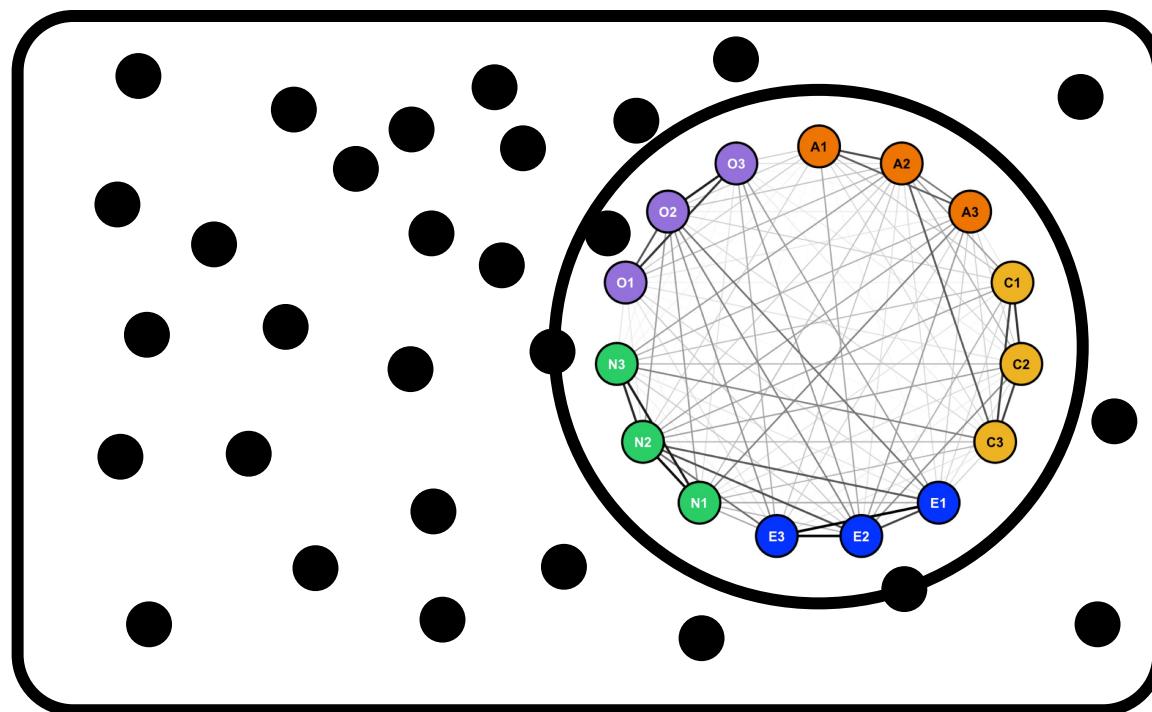
Idiographic Personality Structure

“A trait... May be viewed either in light of the personality which contains it, or in the light of its distribution in the population at large”
(Allport, 1968, p. 44)

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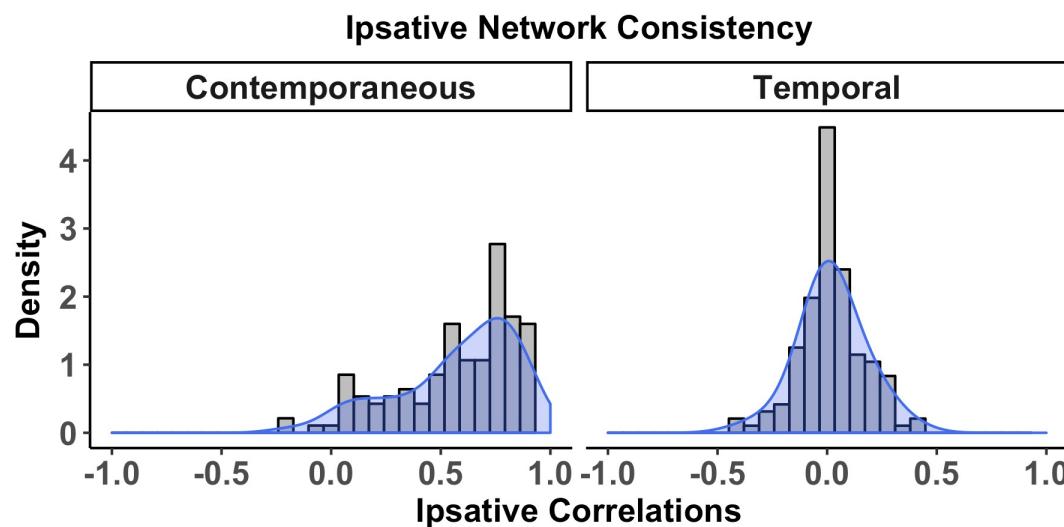
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Personality Change

Within-person structural change in personality



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Person-Situation Transactions

“We are now challenged to untangle the complex web of tendencies that constitute a person, however contradictory they may seem to be when activated differentially in various situations.” (Allport, 1968, p.47)

Future Directions & Challenges

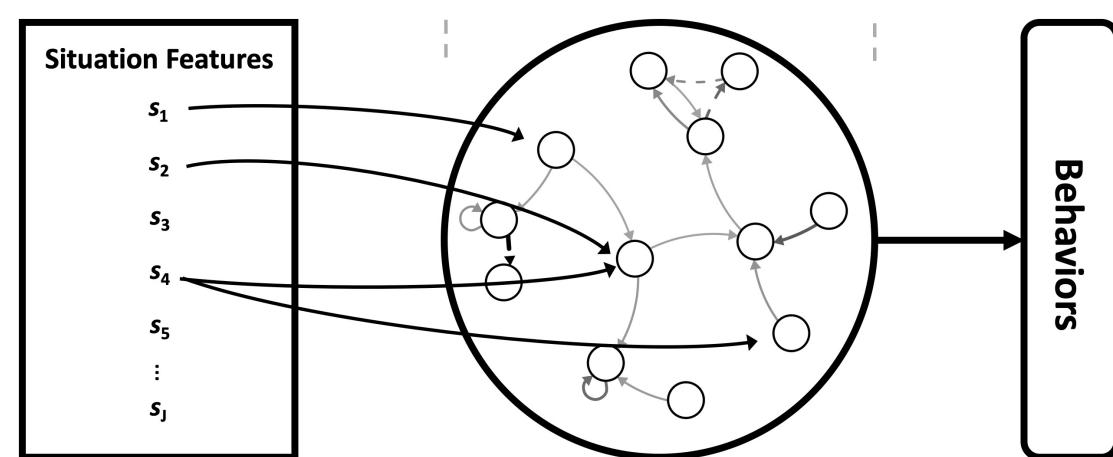
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Understanding the role of time

Encoding the time dimension in multivariate time series data with missing responses

Future Directions & Challenges

Idiographic Personality Structure

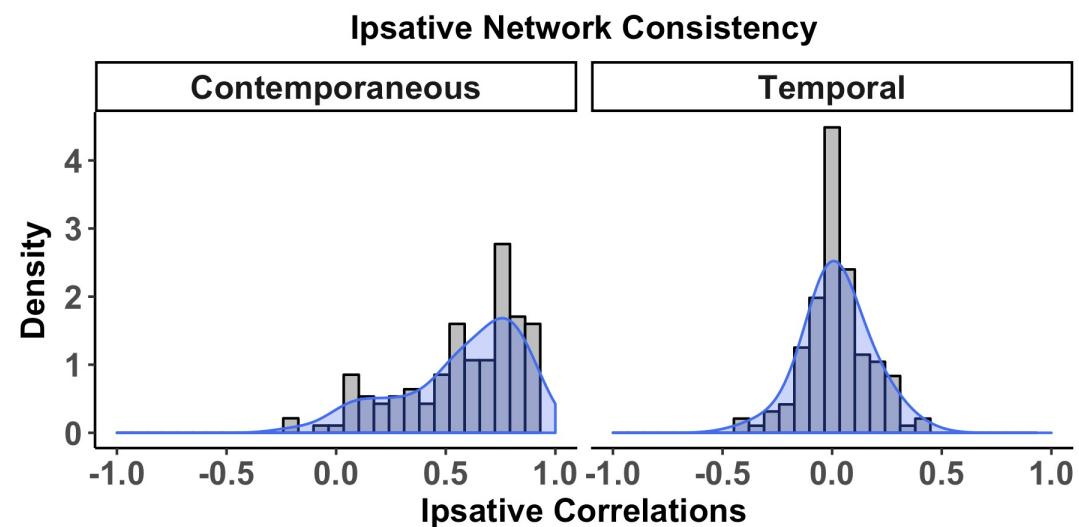
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Thank you!



Slides: pmdlab.wustl.edu/Beck_ARP_2019