Towards disentangling correspondence and emergence: The case of conscientiousness

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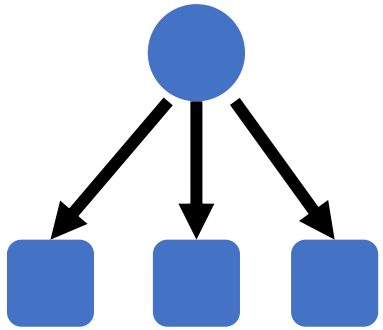
Correspondence

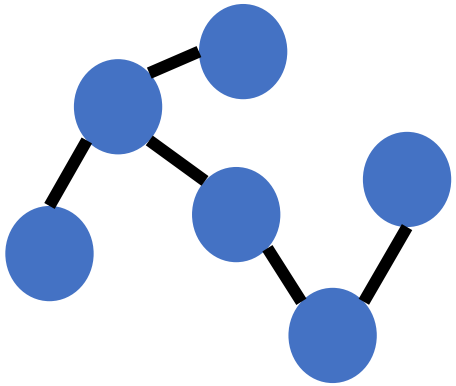


Realist interpretation of latent variables. Traits are unobservable individual dispositions, **independent of their manifestations**, biologically based and resistant to environmental influences.

John has many friends, loves people and goes to parties **because he is extraverted**.

(McCrae & Costa, 2008; McCrae & Sutin, 2018).

Emergence/network



Traits emerge from web of **causal** interactions among cognitions, emotions, motivations, behaviors, and situations.

John goes to parties because he likes people. By going to parties he makes new friends

(Baumert et al., 2017; Costantini & Perugini, 2018; Cramer et al., 2012).

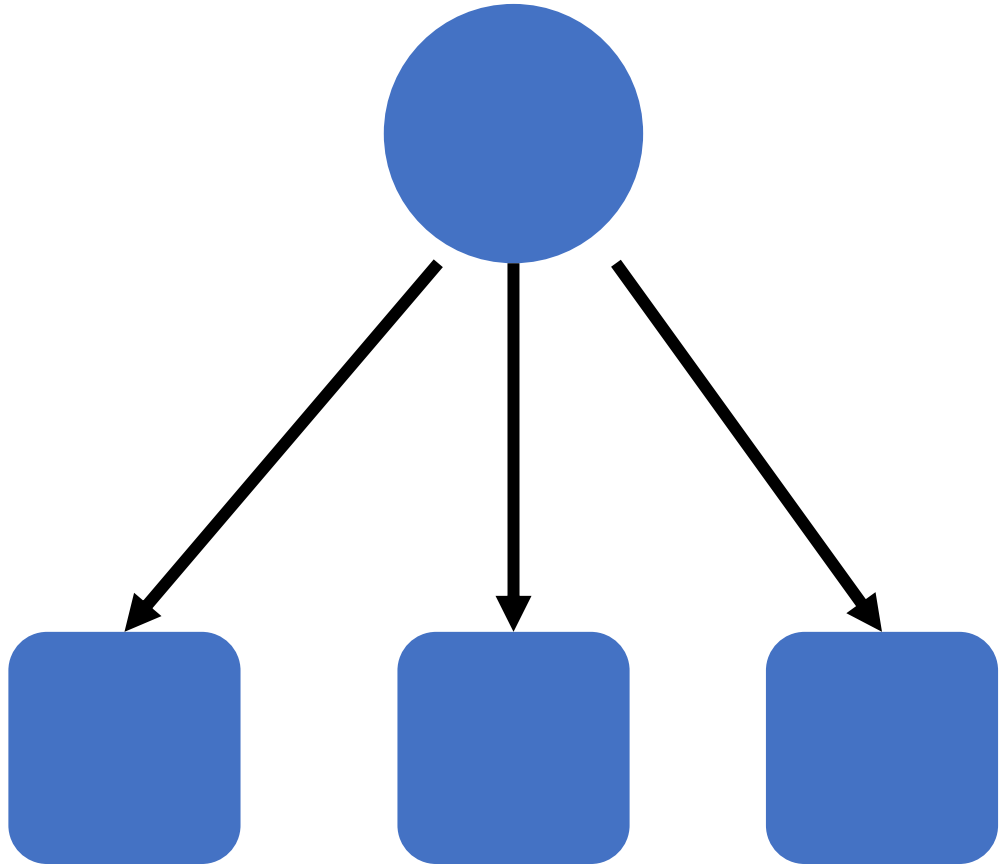
Correspondence

"Neither life experiences nor culture are supposed to affect traits "

(McCrae & Costa, 2008)

“Any psychological environment will lead, in the long run, to the same levels of personality traits.”

(McCrae & Sutin, 2018)

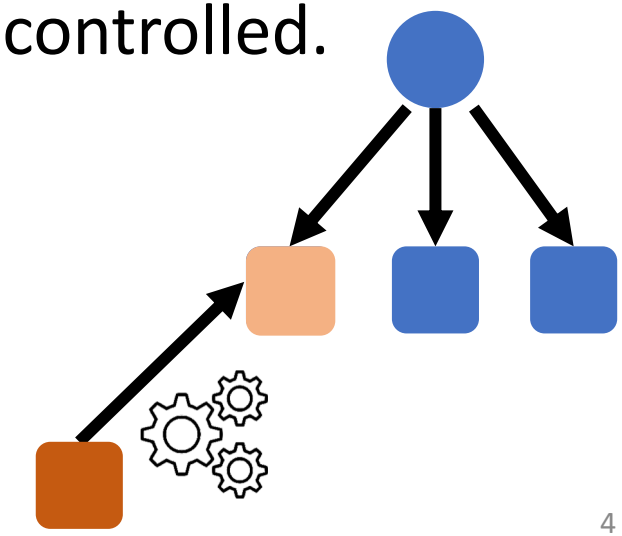


Correspondence, example

John is an unconscientious student.

Suppose an environmental condition X (a new teacher), through a mechanism M (the teacher is able to motivate John), is connected to relevant manifestations of the trait (John studies more).

This is not going to affect John's conscientiousness, besides that specific manifestation. In the long term, John does not become more organized, industrious, responsible, or controlled.



Emergence/network

“Personality dimensions emerge out of the connectivity structure that exists between their components"

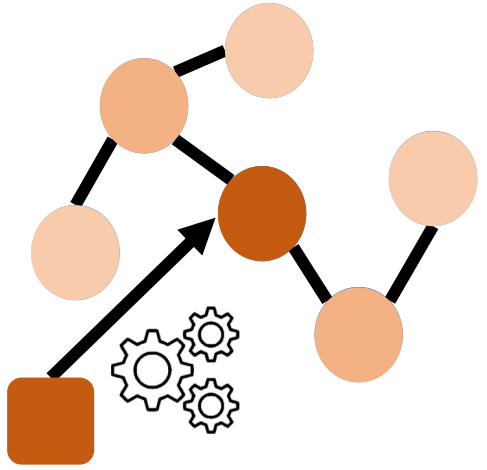
(Cramer et al., 2012)

“[traits] are seen as emergent from interactions among the elements of the personality network over time".

(Baumert et al., 2017)

Changes in relevant environments, over time, can have an effect, through a complex web of causal relationships, on the trait itself.

John’s conscientiousness is more likely to change.



It’s an empirical question… that can be tackled via experimental research

- **Experimental manipulations are controlled environments**. If, by relying on our knowledge of a trait’s network, we develop a reliable method for manipulating a trait in the long term, this would strongly corroborate the emergence idea.
- If we are systematically unable to do so, this would corroborate correspondence.

Experimental manipulations (whose aim was not changing traits) can have «collateral» but long-lasting effects on traits (Roberts et al., 2017)

Individuals willing to change their personality seem able to do so and seem to benefit from implementation intentions (Hudson & Fraley, 2015)

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A Framework for Testing Causality in Personality Research

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Abstract: Causal explanations in personality require conceptual clarity about alternative causal conditions that could, even in principle, affect personality. These causal conditions crucially depend on the theoretical model of personality, each model constraining the possibility of planning and performing causal research in different ways. We discuss how some prominent models of personality allow for specific types of causal research and impede others. We then discuss causality from a network perspective, which sees personality as a phenomenon that emerges from a network of behaviours and environments over time. From a methodological perspective, we propose a three-step strategy to investigate causality: (1) identify a candidate target for manipulation (e.g. using network analysis), (2) identify and test a manipulation (e.g. using laboratory research), and (3) deliver the manipulation repeatedly for a congruous amount of time (e.g. using ecological momentary interventions) and evaluate its ability to generate trait change. We discuss how a part of these steps was implemented for trait conscientiousness and present a detailed plan for implementing the remaining steps. Copyright © 2018 European Association of Personality Psychology

Key words: causality; networks; emergence; conscientiousness; goals

Step 1. Identify target

Step 2. In lab manipulation of target

Step 3. Ecological Momentary Intervention

A three-step framework, a long road.
Each step requires several studies.

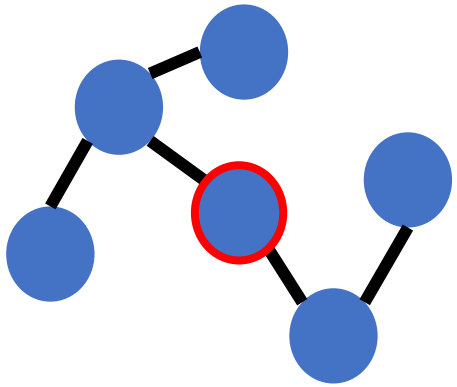
(We are now in the middle of Step 2)

Step 1. Identify a target

Identify **target constructs** for experimental intervention, using non-experimental research.

The ideal targets:

- Well connected with several aspects of the trait.
- Can be manipulated.
- Can be assessed not only with self-reports, but also via behavioral indicators.



Networks/GGM are a good way to identify candidates: Disconnected nodes are less likely to be directly causally related (Epskamp et al., 2018). But networks do not imply causality.

Development of Indirect Measures of Conscientiousness: Combining a Facets Approach and Network Analysis

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Abstract: Because indirect measures of personality self-concepts such as the Implici tapping into automatic processes, they can offer advantages over self-report measures have led to mixed results regarding the validity of indirect measures of conscientiousnes might be due to a failure to consider the different facets of conscientiousness. These fa because they are associated differentially with other psychobiological constructs and different mechanisms. Therefore, focusing on facets while developing indirect meas improve the validity of such measures. In Study 1, we conducted a psycholexical inv for each conscientiousness facet. In Study 2, we examined the convergent and discri IAT in relation to self-report measures, peer-report measures and self-report behaviou gated differential associations of the conscientiousness facets with working memory employed network analysis as a novel approach to elucidate differential relationshi The results corroborated the convergent and discriminant validity of the consc self-reports and showed that the conscientiousness facets were differentially associated and with self-control. Copyright © 2015 European Association of Personality Psycho

Key words: Implicit Association Test; conscientiousness facets; working memory; se

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The network of conscientiousness

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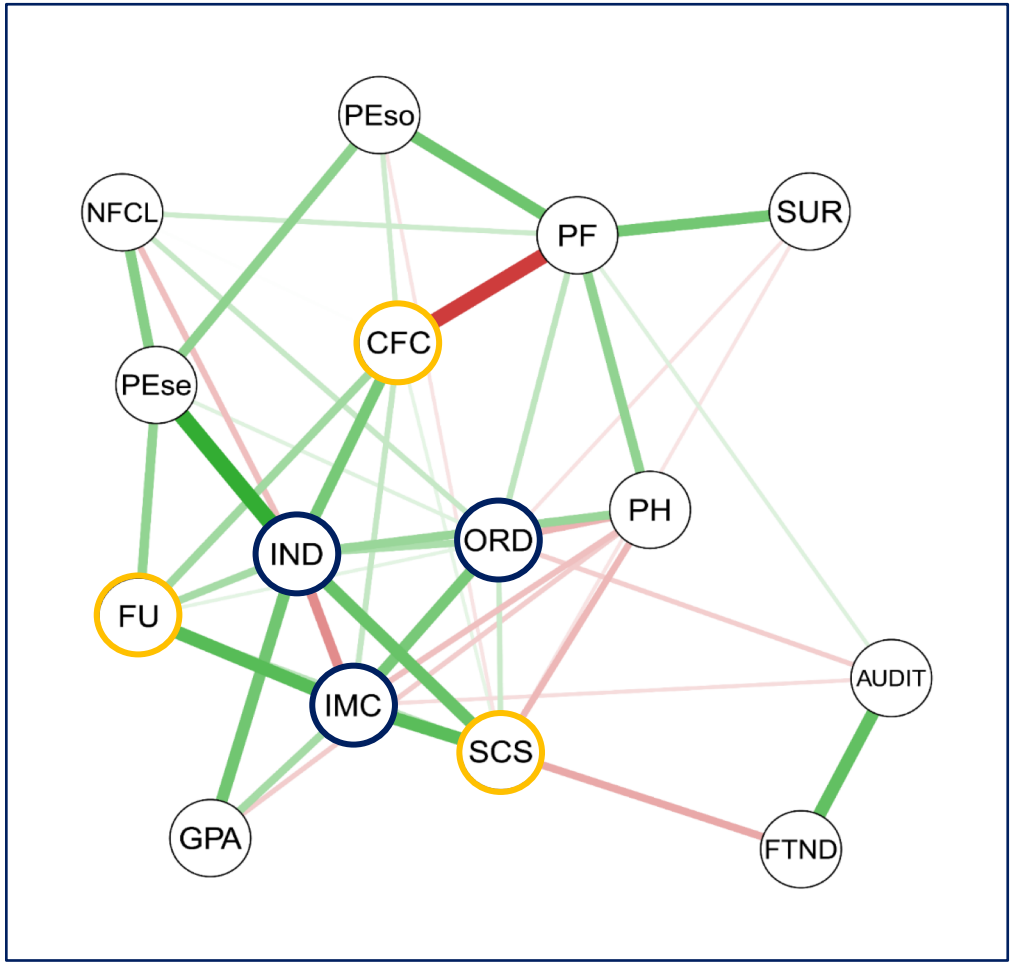
ABSTRACT

According to the network perspective, the coalescence of several personality characteristics into major personality dimensions results from a pattern of complex interactions that can be modeled as a network. We focused on one personality dimension, conscientiousness, and on its main facets. We administered a large battery of questionnaires to two samples (N = 210 and N = 230) and analyzed them by means of network analysis. The results showed that some elements of the network, such as general self-control and orientation toward the future, characterized all facets. These "shared" elements could be responsible for the facets to clump into one major dimension. Other elements of the network uniquely characterized different facets. These "unique" elements could underlie the main differences among conscientiousness facets.

Step 1. Self-control and future orientation

(Costantini & Perugini, 2016)

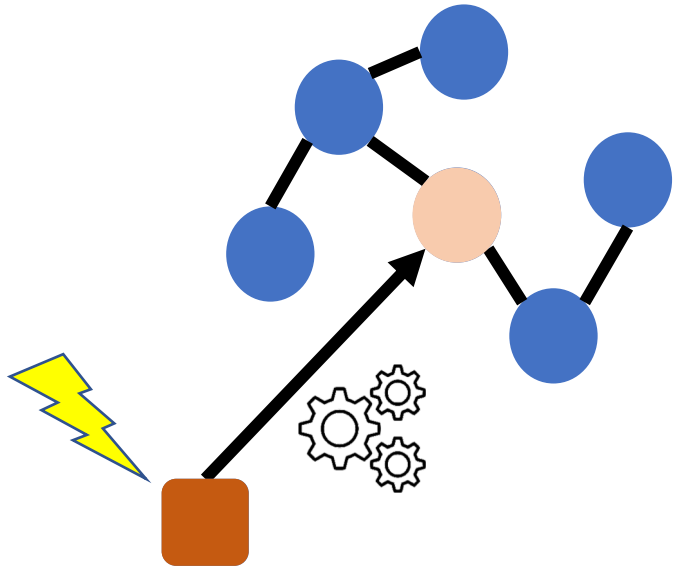
- **Self-control and Future orientation/Consideration of future consequences** are connected to all main conscientiousness facets. If partialled out, correlations among conscientiousness facets wane (see also Costantini et al., 2015).
- Good candidates for manipulation in experimental studies



Step 2. Development of a procedure to affect the target construct

A) Identify candidate experimental manipulations.

B) Evaluate their short-term effect on the target (e.g., self-control) considering also behavioral indices.



Recent studies suggest that repeated practice (e.g., 4-8 weeks) is more likely to produce stable change
(Robert et al, 2017; Lally et al., 2010; Wrzus & Roberts, 2017)

Step 2. Candidate manipulations (1)

Need to be quick and portable (see Step 3)

- Manipulations developed in ego-depletion framework (e.g., handgrip squeezing task) did not receive support recently.
  (Beames et al., 2018; Friese et al., 2016; Lee & Kemmelmeier, 2017).
- SC often happens effortlessly (e.g., fewer temptations and impulse inhibitions).
  (Hofmann et al., 2012; Imhoff et al., 2014; Milyavskaya & Inzlicht, 2017)
- Self-control/future orientation consist in advancing abstract and distal goals over concrete and proximal motives. Connected to **goals** (e.g., a stimulus becomes a temptation only if it conflicts with a goal).
  (e.g., Fujita, 2011; Milyavskaya et al., 2015)
- **Better integration of long-term goals within one's goals system**.

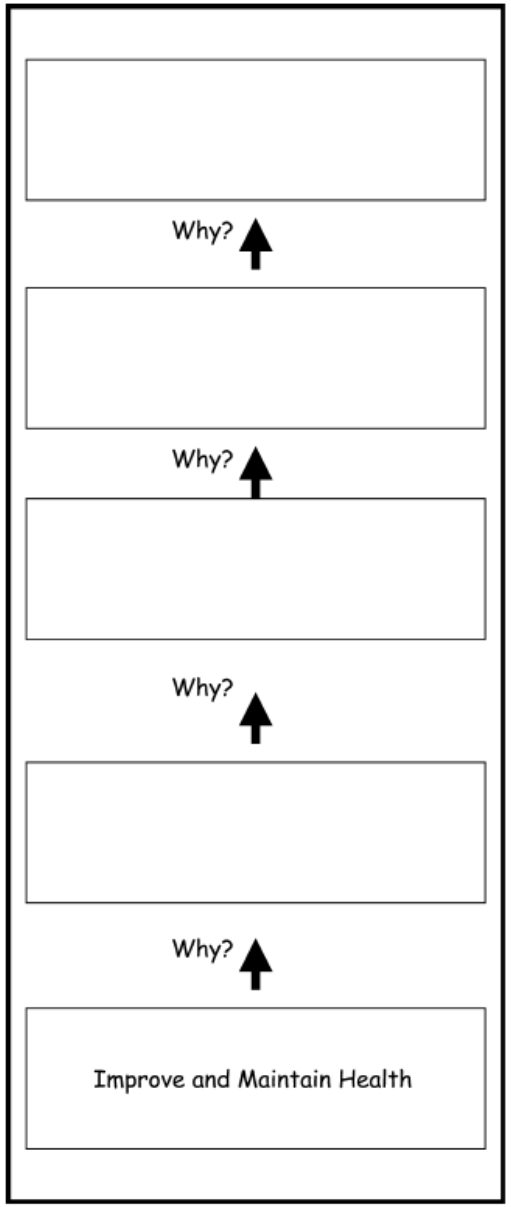
Step 2. Candidate manipulations (2)

Why manipulation / construal-level. Think of a goal and generate superordinate ends for that goal by answering why-questions. Promotes insight on goals and motives
(Freitas et al., 2004; Fujita, 2006, 2011).

Mental contrasting. Individuals reflect both on positive future outcomes connected to goal pursuit and on potential obstacles. Promotes insight also on obstacles
(Oettingen, 2012)

Implementation intentions: form if-then plans, thus linking goal-pursuit to specific situational triggers. Can promote formation of habits.
(Gollwitzer, 1999; Hudson & Fraley, 2015).

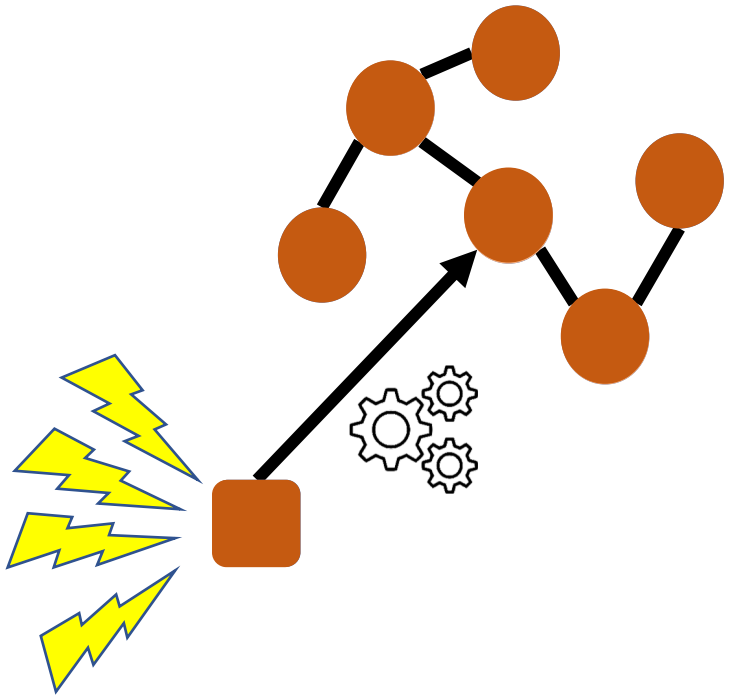
Control group: Same procedures on an irrelevant target.



Step 3. Ecological momentary interventions

(EMI, Heron & Smyth, 2010)

- Deliver manipulations repeatedly for a longer time (4-8 weeks).
- Inspect **long lasting** changes in the trait before/after the manipulation and at subsequent follow-ups (e.g., for 1 year), not during the manipulation, to avoid reactivity effects (French & Stutton, 2010)
- Only to individuals willing to change the trait (e.g., Robinson et al., 2015)



Manipulating conscientiousness requires knowledge of its motivational bases

All manipulations we considered rely on **goals**

- An idea further supported by results showing that WS variation in conscientiousness is explained by WS variation in goals (McCabe & Fleeson, 2016).
- Most studies investigating goals focused either on very broad goals (e.g., Lüdtke et al., 2009; Reisz et al., 2013; Roberts & Robins, 2000) and general motivational tendencies (McCabe, et al., 2013; Sorić, et al. 2017) or on a very specific subset of goals (McCabe & Fleeson, 2016).

In the following, we report a set of studies aimed at identifying the main goals associated to conscientious behavior, using a bottom-up approach

Conscientious goals

Costantini & Perugini (2018), Costantini, Saraulli & Perugini (*in prep*)

Study 1. Initial identification of goals

(Costantini & Perugini, 2018)

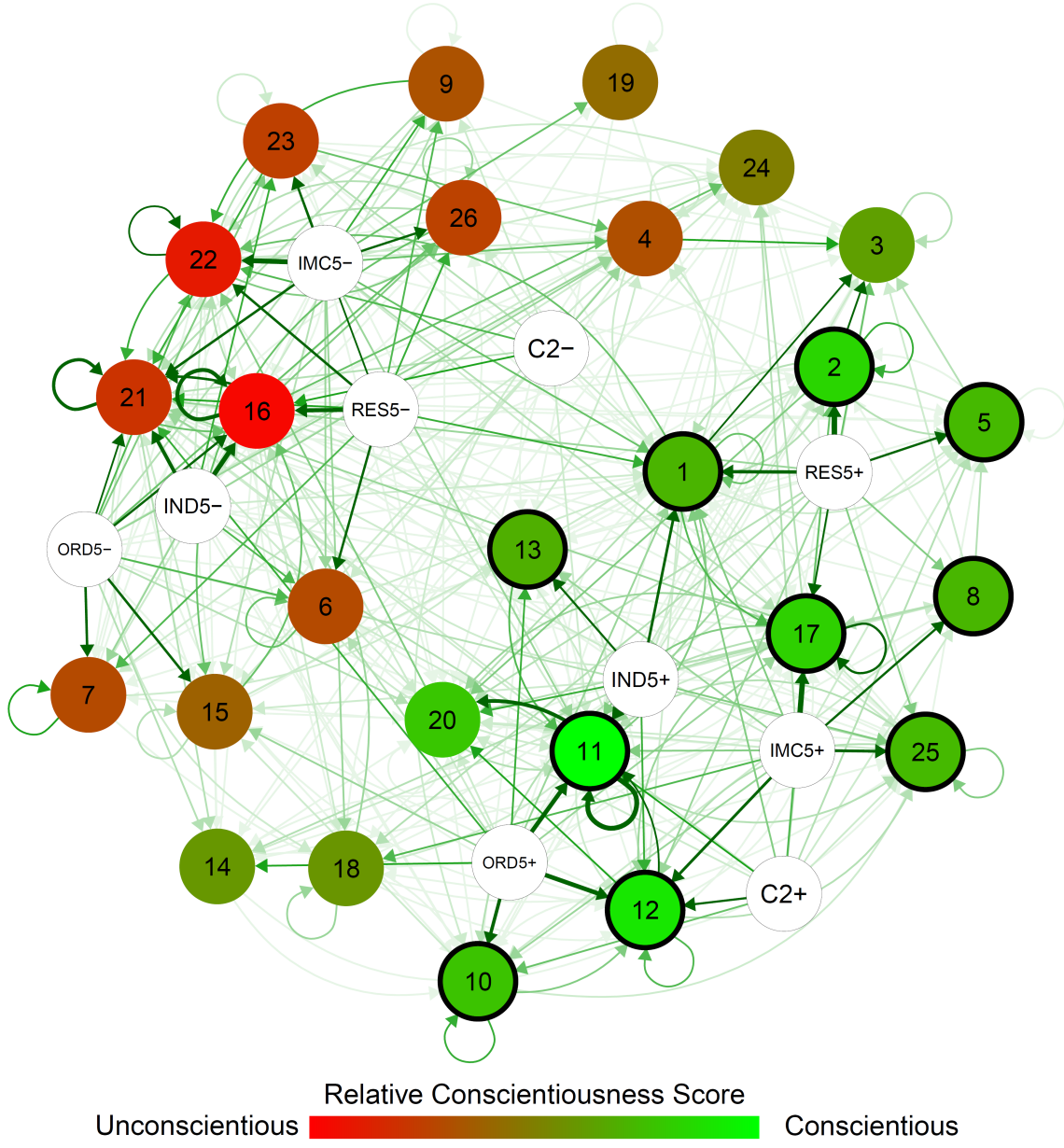
- N = 40 participants indicated goals for 44 conscientiousness adjectives, and superordinate goals for each goal, iteratively.

  Step 1. “Why do your or would you behave in an <industrious> way?” (lazy, organized….)
  (e.g., *Because I want to graduate)*
  Step 2. Why is this or could this be important for you?
  (e.g., *Because I want to be successful*)

- **Classification phase**: 3520 responses classified in goals/non-goals (K = .83) and in **26 classes** (K = .81).

Results

- Some classes elicited by conscientious adjectives (e.g., Personal realization), some by unconscientious adjectives (e.g., Avoid managing things), some by both (e.g., Avoid remorse).
- We defined a network linking Cons. facets (white) to goals (Bagozzi et al., 2003).
- **Relative Conscientiousness Score (RCS)**. Standardized residuals in a chi-square test for independence between goals and conscientiousness poles.
- **11 conscientious goal classes** and **10 unconscientious goal classes** according to RCS.



Limitations

- Small sample size (N = 40).
- Subjective judgment in scoring open-ended responses.
- How valid is our RCS?
- Equifinality: Some goals could be also connected to traits other than Conscientiousness (Kruglanski, 2002).

Study 2.

TARGET PERSONALITY – 1

Is genuine in interpersonal relations, is unwilling to manipulate others
Avoids fraud and corruption, is unwilling to exploit or take advantage of others
Has little interest in lavish wealth, luxury goods, or high social status
Is modest and unassuming, makes no claim to special treatment

Versus

Uses flattery and pretends to like others as a way to get ahead
Is willing to gain by cheating or stealing
Wants to enjoy and display great wealth and status
Considers self superior and entitled to privileges that others do not have

Method:

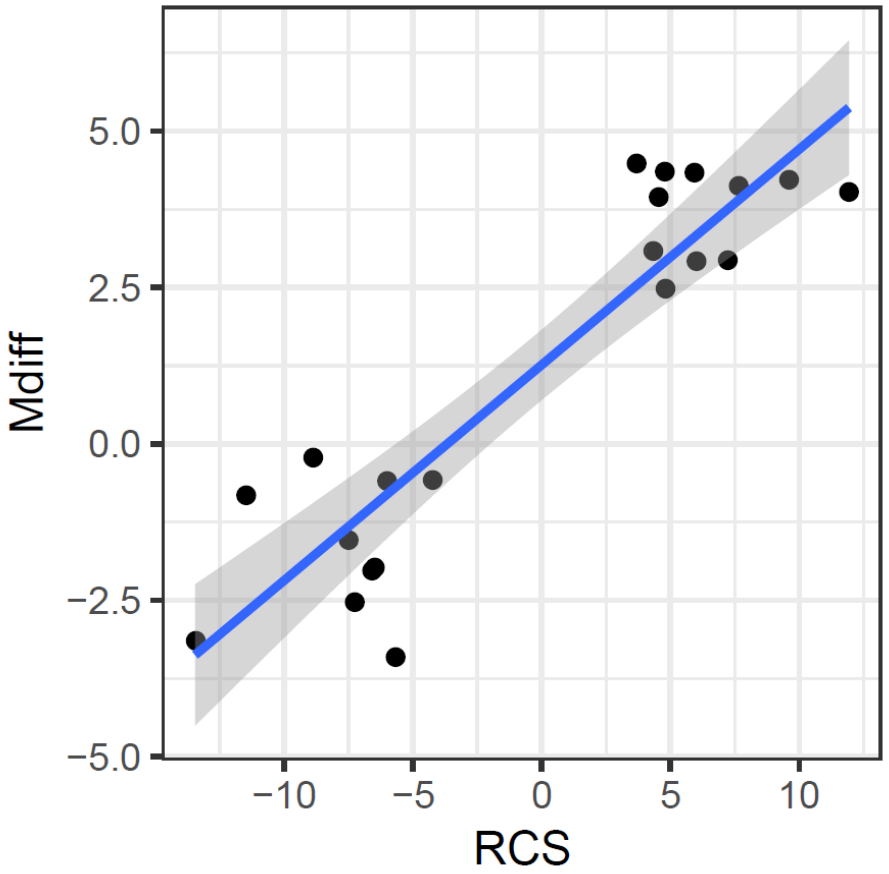
- Students were given descriptions of the positive/negative poles of Conscientiousness + other HEXACO traits (Lee & Ashton, 2008).
- They indicated how much individuals matching the description may pursue each of 21 goal classes (from 1 = *not at all to* 7 = *very much*)
- N = 299 with planned missing data design (Graham et al., 2006; Little & Rhemtulla, 2013), power ~ .99 for *d* = .5.

Results – conscientiousness poles / RCS

Are goals associated to the Consc. pole predicted by RCS?

21 one-tailed t-test confirmed our hypotheses for all goals (p*s* < .001) but one, «feel good», *t*(298) = 1.54, p = .062.

Correlation between RCS and the Mean difference **r = .91**



Results 2 - equifinality

We performed 10 partially-overlapping-samples one-tailed t-tests (Derrick, Russ, Toher, & White, 2017) comparing Conscientiousness score vs. other traits.

7 out of 11 conscientious goal classes were significantly more associated to conscientiousness than to any of the 10 poles of other traits.

- **Personal realization**
- **Do something well, avoid mistakes**
- **Safety**
- **Have control**
- **Think, reflect**
- **Comply with rules**
- **Accomplish something**

Worst-case result for each goal class

Conscientious goals	M	SD		M	SD	t	df	p
Personal realization	6.30	1.06	O+	5.98	0.97	2.28	79.46	.012
Do something well, avoid mistakes	6.21	0.96	A-	3.58	1.57	12.45	63.95	<.001
Be trustworthy	6.05	1.04	H+	6.00	1.06	0.35	69.57	.360
Safety	5.61	1.19	E+	5.05	1.93	2.2	68.63	.016
Personal satisfaction	5.75	1.34	E-	5.75	1.19	0	85.57	.500
Have control	6.23	1.09	A-	3.68	2.05	9.34	62.48	<.001
Do good to someone, avoid hurting	5.39	1.30	X+	5.33	1.41	0.34	74.71	.368
Think, reflect	6.27	1.06	A-	3.37	1.73	12.39	63.89	<.001
Comply with rules	6.11	1.08	H+	5.79	1.26	1.84	65.79	.035
Demonstrate something to others	5.44	1.43	H-	5.57	1.78	0.5	64.53	.308
Accomplish something	6.57	0.83	A-	3.97	1.29	15.34	64.67	<.001

Study 3

N = 330 participants self-rated the importance of each goal class + HEXACO personality traits (Ashton & Lee, 2009).

Results converged with Study 2, in indicating **the same 7 goals** were uniquely related to conscientiousness after controlling for other goal classes.

Conscientious Goals ~ HEXACO

Results are close to those of Study 2

Conscientious goals	C	H	E	X	A	O	R^2
Personal realization	**0.16*** **	-0.17***	0.01	-0.04	-0.10	0.08	0.07***
Do something well, avoid mistakes	**0.39*** **	-0.09	0.03	0.00	0.03	0.07	0.15***
Be trustworthy	0.11	-0.04	0.06	0.09	0.02	0.07	0.03
Safety	**0.18*** **	-0.02	0.32***	-0.03	0.16***	-0.07	0.16***
Personal satisfaction	0.06	-0.10	0.01	0.16*	0.02	0.12*	0.05**
Have control	**0.30*** **	-0.12*	0.05	-0.10	0.00	-0.09	0.12***
Do good to someone, avoid hurting	0.04	0.27***	0.23***	0.08	0.17***	0.14***	0.24***
Think, reflect	**0.19*** **	0.01	-0.04	-0.08	0.02	0.03	0.04*
Comply with rules	**0.26*** **	0.10	0.09	-0.09	0.20***	-0.08	0.15***
Demonstrate something to others	0.08	-0.15*	0.12*	-0.06	0.11	0.01	0.04*
Accomplish something	**0.22*** **	0.02	0.10	0.03	0.02	0.09	0.07***

Study 4

We generated **56 goals**, 8 by class and administered them to N = 221 participants, who rated each goal's importance for them.

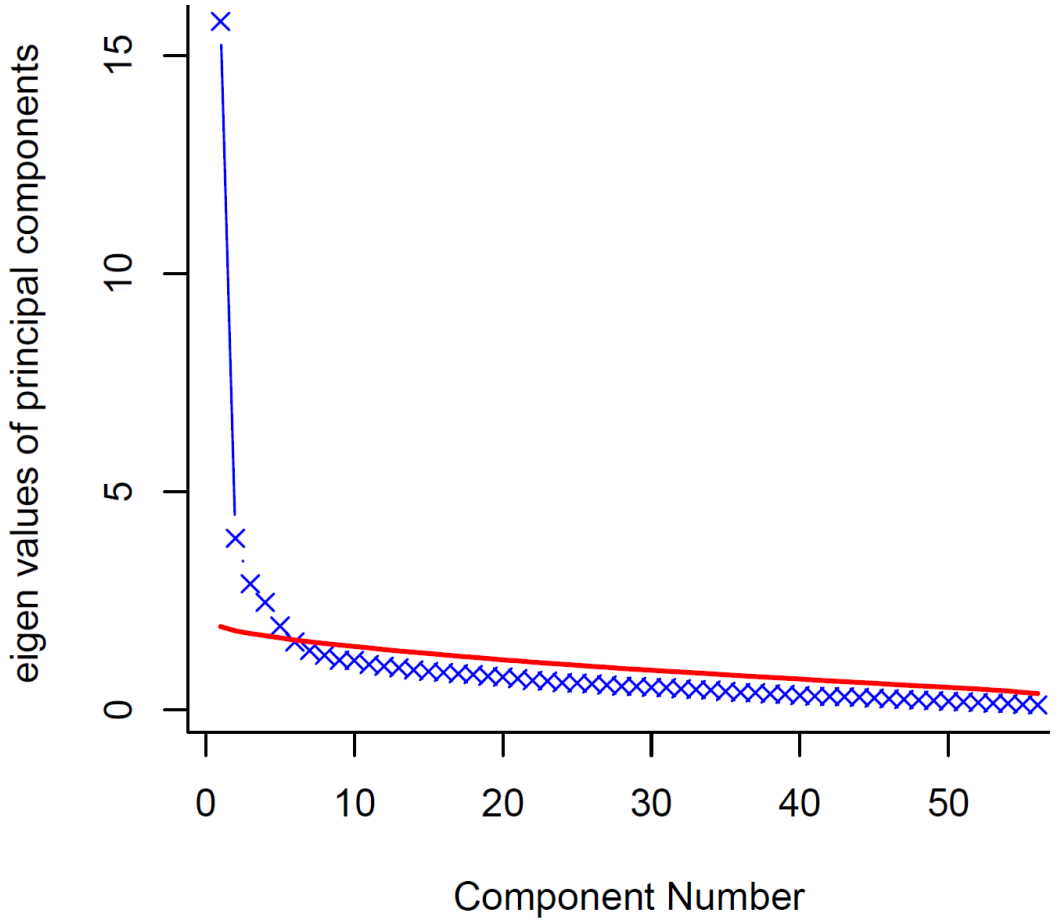
We inspected:

- Structure of goal scale
- Correlation with HEXACO traits (Ashton & Lee, 2009).
- Correlation with Consc. facets (mirroring Costantini & Perugini, 2016).

Results

Five-factor structure.

- Personal realization
- Have control/avoid mistakes
- Comply with rules
- Safety
- Accomplish something



Multiple regressions predicting each goals form HEXACO traits

Conscientious goals	C	H	E	X	A	O	R^2
Personal Realization	.34***	-.19*	.12	.09	-.05	.09	.18***
Have control / Avoid mistakes	.30***	-.21***	.15*	.05	-.02	.06	.15***
Comply with rules	.30***	.16*	.24***	.02	.21***	-.21***	.30***
Safety	.04	.02	.34***	.12	-.04	-.09	.14***
Accomplish something	.23***	.05	.23***	.13	.02	-.03	.16***

All goal classes are uniquely connected to conscientiousness, except Safety, which was mainly connected to Emotionality.

All goal classes are also connected to other traits. Personality as a well connected system?

Facet level

Each goal class is also uniquely related to a conscientiousness facet.

Goal	ORD	IND	IMC	H	E	X	A	O	R2
Personal Realization	-.10	.65***	-.11	-.14*	.17*	-.04	-.01	.01	.33***
Have control / Avoid mistakes	.31***	.13	-.07	-.19***	.15*	.01	.02	.07	.20***
Comply with rules	.07	.07	.28***	.16*	.21***	.03	.17*	-.21***	.33***
Safety	-.01	.03	-.02	.02	.35***	.12	-.03	-.09	.14***
Accomplish something	-.02	.33***	-.06	.08	.26***	.07	.05	-.07	.18***

Conclusions / Future directions (1)

Correspondence and emergence differ on a **crucial prediction**, the effect of environments on traits.

A three-step framework for testing this prediction.

- **Step 1 (done)**. Candidate targets for manipulation, self-control and future orientation.
- **Step 2 (ongoing).**
  - Candidate manipulations require knowledge of goals.
  - We identified goals connected to all aspects of conscientiousness.
  - Onging in-lab experimental studies.
- **Step 3 (planned).** Ecological Momentary Interventions.

Conclusions / Future directions (2)

- A reilable and successful manipultion of a trait is going to support an emergence view against the correspondence assumption. However, correspondence and emergence can co-exist within the same trait (Mottus & Allerhand, 2018)
- We are now in the middle of Step 2: Feedback on our results and on our plans are more than welcome!

Thank you for your attention!

Goal Classes

Conscientious goals

Personal realization (RCS = 11.94)

Do something well, avoid mistakes (RCS = 9.62)

Be trustworthy (RCS = 7.66)

Safety (RCS = 7.24)

Personal satisfaction (RCS = 6.02)

Have control (RCS = 5.94)

Do good to someone, avoid hurting (RCS = 4.82)

Think, reflect (RCS = 4.79)

Comply with rules (RCS = 4.56)

Demonstrate something to others (RCS = 4.35)

Accomplish something (RCS = 3.70)

Unconscientious goals

Avoid managing things you don't care (RCS = -13.46)

Try new sensations (RCS = -11.47)

Feel good (RCS = -8.86)

Manifest or vent a negative emotion (RCS = -7.49)

Avoid thinking (RCS = -7.25)

Hide something from someone (RCS = -6.58)

Hurt someone (RCS = -6.47)

Rebel, transgress rules (RCS = -5.67)

Manipulate other's behavior (RCS = -5.99)

Save time (RCS = -4.22)

	Personal Realization	Have control / Avoid mistakes	Comply with rules	Safety	Accomplish something
Achieve good results	.79				
Be successful	.69				-.21
Get the most	.67	.24			
Achieve results at school, academia or work	.63				
Do what I do at best	.63				
Overcome myself	.58				
Do an excellent job	.57				
Realize myself	.51			.36	
Do everything in the best possible way	.42				.3
Keep everything under control		.77			
Have full control		.77			
Have everything in control		.71			
Do not make mistakes	.22	.56	.22		
Control a situation		.55			
Don't miss any detail		.49			
Avoid making mistakes		.49			
Don't mess up		.47			.27
Avoid chaos	-.22	.44	.31		
Avoid oversights		.43	.20		
Evaluate all options before making a decision		.41			.30
Not leaving anything to chance		.36	.24		
Follow the rules			.74		
Follow the law			.70		
Act according to the rules			.66		
Avoid breaking rules			.64	.26	
Respect an authority			.56		.28
Do everything within the time planned	.26		.55	-.27	.24
Do not break the mold	-.34	.40	.44		
Avoid Risks		.32	.43	.29	

	Personal Realization	Have control / Avoid mistakes	Comply with rules	Safety	Accomplish something
Protect myself				.74	
Avoid hurting myself				.68	
Safeguard myself				.62	
Be healthy	.23			.60	
Stay safe				.55	
Don't put myself in danger		.20	.42	.53	
Don't get in trouble		.20	.36	.53	
Have financial security	.22			.51	
Have a future	.36	-.22		.51	
Fulfill a committment		-.20	.20		.69
Find my stuff		.20		.25	.53
Order my thoughts		.32	-.20		.51
Respect the context I am in			.28		.50
Find things when I need them					.50
Finish a job in time	.27		.32		.50
Keep committments					.47
Finish something	.41				.47
Accomplish a project	.33		.20		.44
Analyze situations well		.37		.24	.42
Avoid abandoning things unaccomplished			.28		.39
Foresee the consequences of my actions		.31			.39
Do things well	.33		.28		.22
Take good decisions	.29	.22		.27	
Avoid interrupting work			.33		.30
Behave according to my values	.22		-.30	.25	.24
Take the right decision	.24			.31	.24
Find the best solution when I have a problem	.31		-.24	.3	.31