

How to avoid cognitive biases and conspiracy drifts in philosophy of mind and consciousness research ?

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Theoretical Background

1. Philosophy of Mind

The philosophy of mind is at the core of the epistemology in cognitive neuroscience. It includes several trends such as cartesian dualism and his legacy (parallelism, occasionalism, idealism and epiphenomenalism), behaviorism, identity theory, functionalism, the representational theory, the intentional stance, consciousness and non-reductive physicalism.

2. Cognitive Instances : Conspiracy Mentality and Cognitive Reflection

Conspiracy mentality is a biased judgment that demonstrates how human reasoning can drift away from rationality. Biased judgment and decision inclinations can reliably be predicted by the well-known cognitive reflection test which aims at eliciting an intuitive (system 1) reflection mode instead of a more rational and logical-based reasoning (system 2) (Kahneman & Frederick, 2002). Indeed, it represents a safeguard against cognitive biases. Epistemic Relativism can be seen as a relativistic view of knowledge intrinsically dependent upon several general frames such as time, society, culture or history (Balaguer et al., 2011). It can be taken as a general tendency against science.

3. World Views

A World view can be illustrated by a broad conceptualization of the world as regrouping instances of life, society and its embedded institutions (Koltko-Rivera, 2000). It includes for instance, Agency (free will) or Metaphysics.

4. New Age Beliefs

New-age beliefs or post-modernism encompass numerous aspects that contradict the current scientific rationalism such as pseudoscience, science denialism or alternative facts (Fasce, 2020).

Correlational Analyses :

Four correlational analyses were used in order to have a first glimpse into the possible relationships between the variables and the Conspiracy Mentality. The fourth table presents the main cognitive biases with regard to the factors from the principal component analysis on the philosophy of mind questionnaire. Here, you can see the two most interesting tables revealed by the study.

Step-wise Multiple Regression Analyses (MRA) :

On a statistical standpoint, parcimony can be crucial when considering MRA because irrelevant variables can biased the effect of relevant variables by the means of collinearity or multicollinearity. However, all important predictors must be included into the MRA to avoid a specification error (Hair, 2014). To follow those prerequisites, the use of step-wise multiple regression analyses were relevant for this study.

Structural Equation Modeling (SEM) :

SEM can be grasped as a compound of both factor analysis and multiple regression (Schreiber et al., 2006). In our study, two measurement models will be used to describe the latent constructs of philosophy of mind and their respective items. Furthermore, two structural models will be generated in order to : (1) decipher how the main predictors resulting from the step-wise regression analysis will predict the conspiracy mentality and (2) to understand how the possible cognitive biases involved in the study are linked to each kind of general views of the mind resulting from the principal component analysis.

Results

Principal Component Analysis

Table 5. The Strict Neuroscience View of Mind

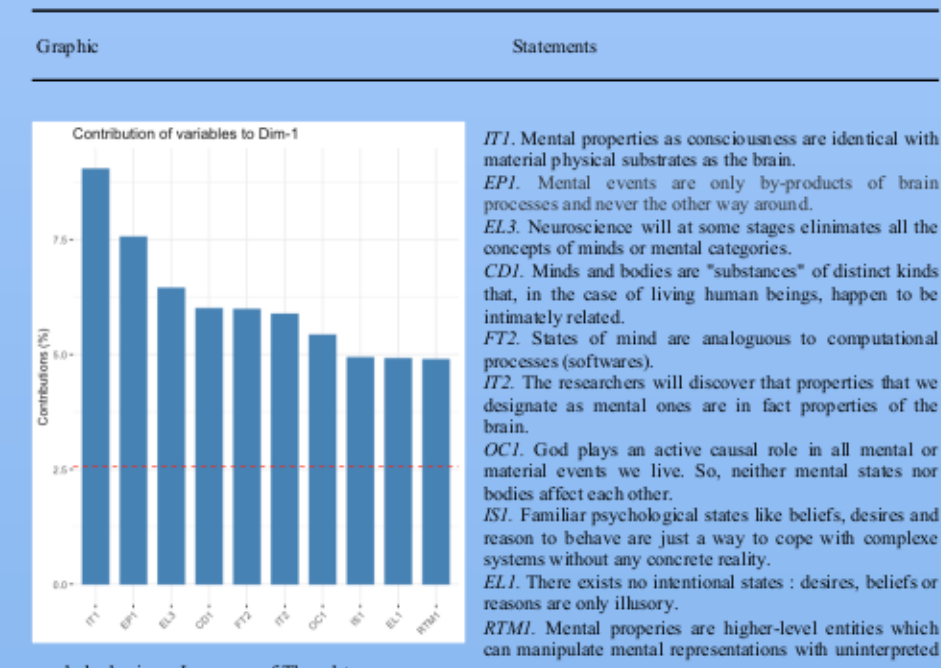


Figure 2. Items contribution to Dimension 1. First component (11.4% of explained variance) : The Strict Neuroscience View of Mind.

Table 6. The Survivalist View of Mind.

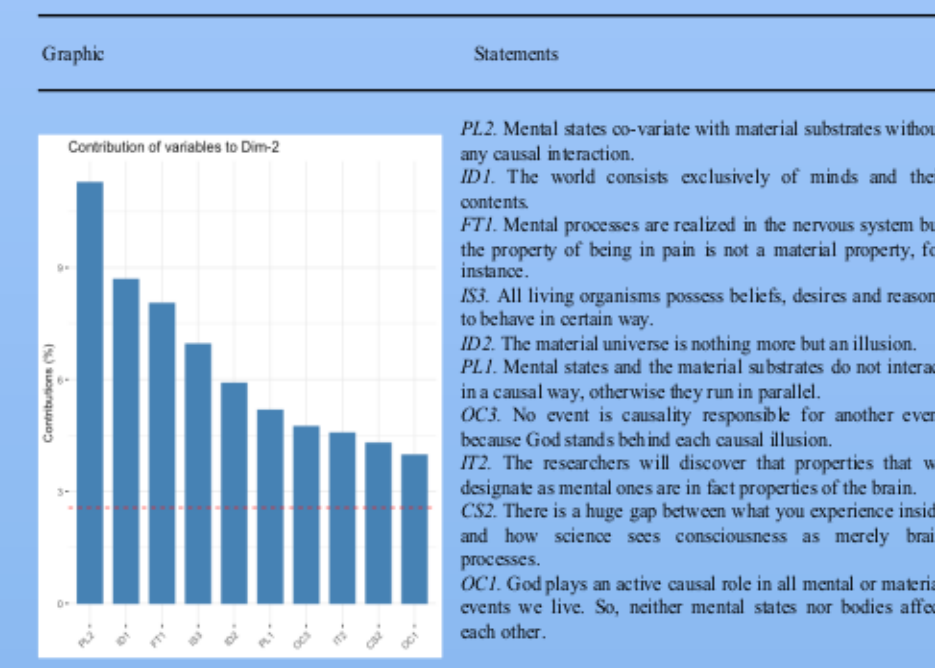


Figure 3. Items contribution to Dimension 2. Second component (9% of explained variance) : The Survivalist View of Mind.

Table 7. The Non-Reductible View of Mind.

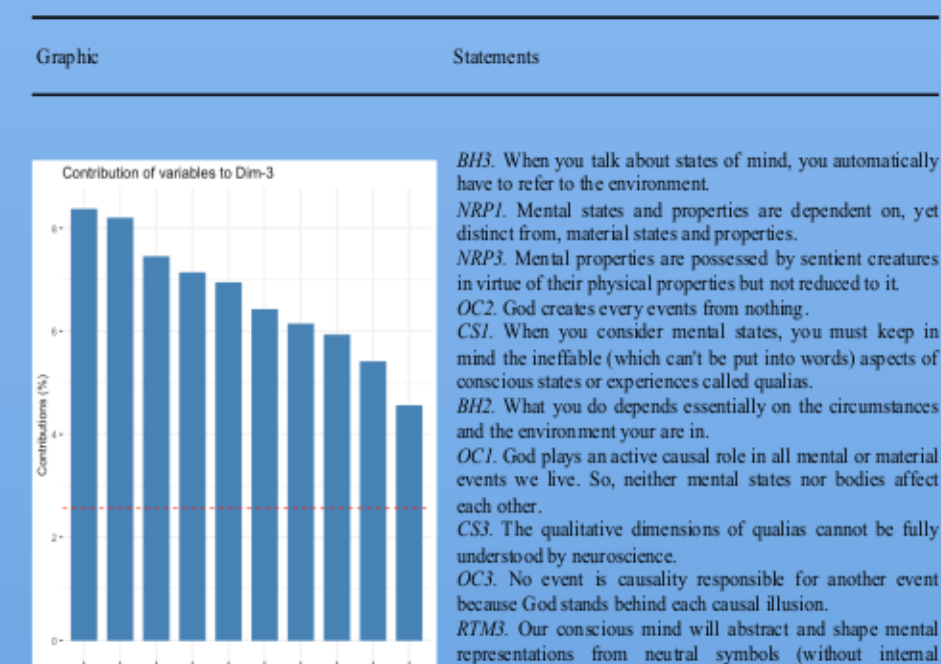


Figure 4. Items contribution to Dimension 3. Third component (6.6% of explained variance) : The Non-reducible View of Mind.

Table 8. The Illusory View of Mind.

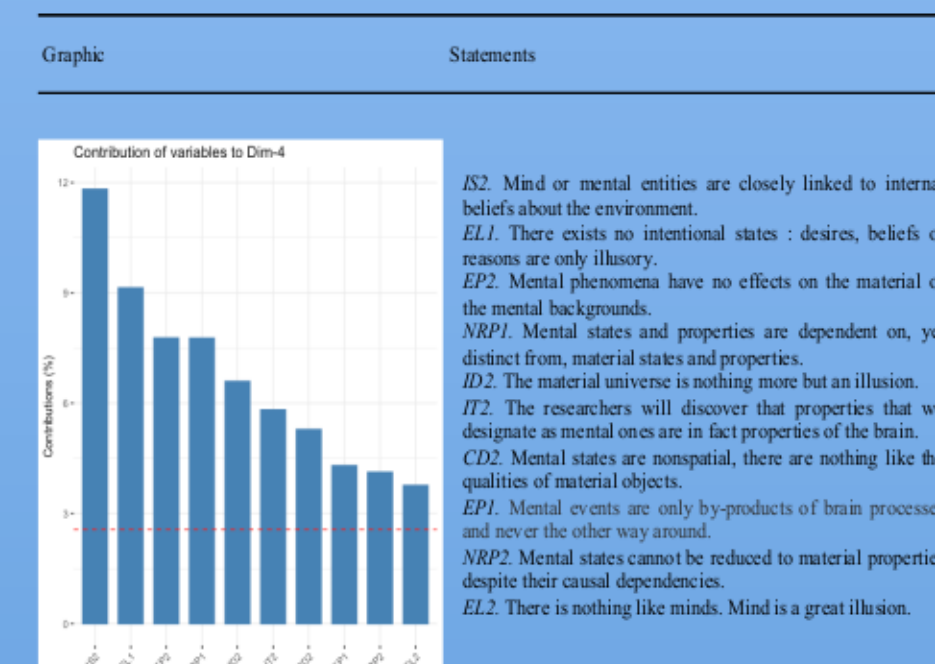


Figure 5. Items contribution to Dimension 4. Fourth component (5.5% of explained variance) : The Illusory View of Mind.

Table 9. The Computational View of Mind

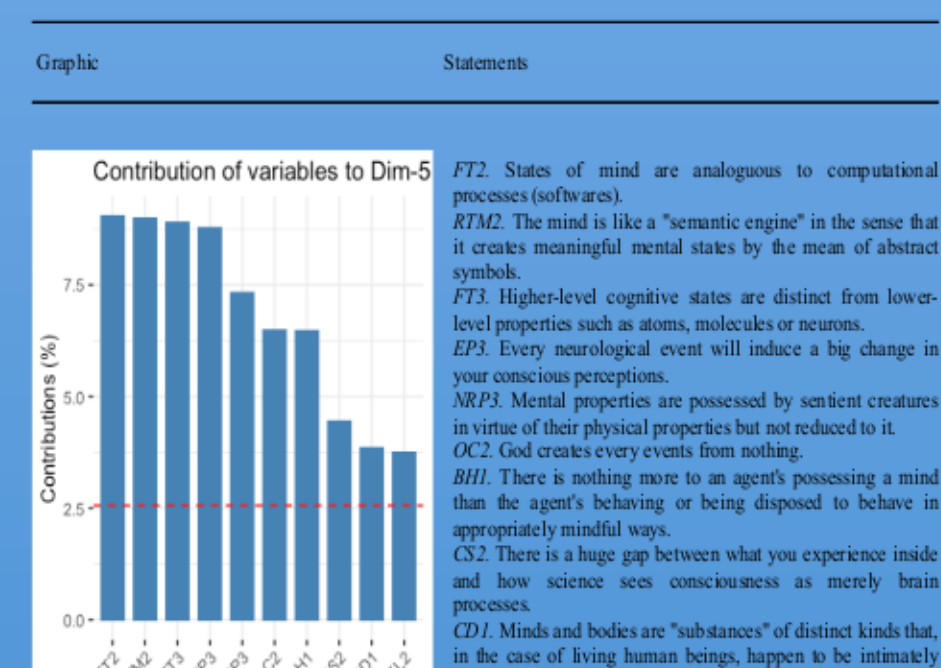


Figure 6. Items contribution to Dimension 5. Fifth component (3.2% of explained variance) : The Computational View of Mind.

Table 10. Decision making : how many factors to keep?

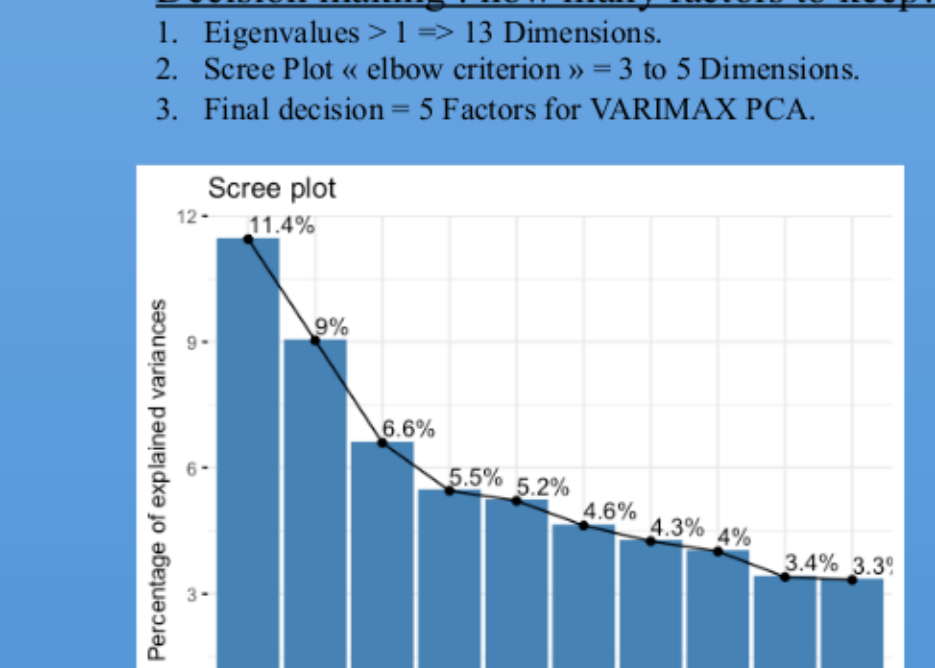


Figure 7. Scree plot showing the percentage of explained variance for 13 dimensions.

Correlational Analyses

Table 10. Means, standard deviations, and correlations with confidence intervals

Variable	M	SD	1	2	3	4	5	6	7
1. Epistemic Relativism	-0.33	1.05							
2. Cognitive Reflection	0.57	0.33	-.16						
3. Conspiracy Mentality	0.60	1.04	.29**	-.13					
4. Strict Neuroscience View of Mind	-0.00	1.00	-.33**	.13	-.10				
5. Survivalist View of Mind	-0.00	1.00	.34**	-.29**	.34**	-.00			
6. Illusory View of Mind	0.00	1.00	-.01	-.18	.12	.00			
7. Computational View of Mind	0.00	1.00	-.06	-.08	.40**	-.00	-.00		
8. Non-Reductible View of Mind	-0.00	1.00	-.15	.04	-.22*	-.00	.00	-.00	

Note: M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates p < .05. ** indicates p < .01.

Variable	M	SD	1	2	3	4
1. Moral Relativism	0.21	1.16				
2. Epistemic Relativism	-0.33	1.05	-.03			
3. Anthropomorphism	0.23	0.60	-.01	.23**		
4. Cognitive Reflection Test	0.57	0.33	-.05	-.16	-.12	
5. Conspiracy Mentality	0.60	1.04	-.05	.29**	.39**	-.13

Note: M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates p < .05. ** indicates p < .01.

Step-wise Multiple Regression Analyses

Table 12

Step-wise regression model using Conspiracy Mentality as the criterion

Predictor	b	95% CI	beta	95% CI	r ²	95% CI	r	Fit
(Intercept)	0.18	[0.07, 0.43]						
Natural Remedies	0.30**	[0.12, 0.48]	0.28	[0.11, 0.45]	.06	[-.01, .12]	.45**	
Computational View of Mind	0.29**	[0.13, 0.44]	0.29	[0.13, 0.44]	.07	[-.00, .15]	.40**	
Survivalist View of Mind	0.26**	[0.10, 0.41]	0.25	[0.10, 0.40]	.06	[-.01, .12]	.33**	
Non-Reductible View of Mind	-0.22**	[-0.37, -0.08]	-0.23	[-0.37, -0.08]	.05	[-.01, .11]	-.22*	
Holism	0.17	[-0.03, 0.36]	0.15	[-0.03, 0.32]	.01	[-.02, .05]	.43**	

Note: A significant b-weight indicates the beta-weight and semi-partial correlation are also significant. b represents unstandardized regression weights. beta indicates the standardized regression weights. r² represents the semi-partial correlation squared. r represents the zero-order correlation. LL and UL indicate the lower and upper limits of a confidence interval, respectively. * indicates p < .05. ** indicates p < .01.

Table 13

Step-wise regression model using the Strict Neuroscience View of Mind as the criterion

Predictor	b	95% CI	beta	95% CI	r ²	95% CI	r	Fit
(Intercept)	0.51**	[0.20, 0.82]						
Metaphysics	-0.34**	[-0.49, -0.18]	-0.41	[-0.60, -0.23]	.12	[.02, .22]	-.47**	
Locus	-0.42**	[-0.65, -0.18]	-0.29	[-0.46, -0.13]	.08	[-.01, .16]	-.12	
Responsibility	-0.24*	[-0.45, -0.04]	-0.20	[-0.37, -0.03]	.04	[.02, .09]	-.23*	
Agency	-0.17*	[-0.34, -0.00]	-0.18	[-0.36, -0.00]	.03	[-.02, .07]	-.33**	

Note: A significant b-weight indicates the beta-weight and semi-partial correlation are also significant. b represents unstandardized regression weights. beta indicates the standardized regression weights. r² represents the semi-partial correlation squared. r represents the zero-order correlation. LL and UL indicate the lower and upper limits of a confidence interval, respectively. * indicates p < .05. ** indicates p < .01.

Table 13

Step-wise regression model using the Survivalist View of Mind as the criterion

Predictor	b	95% CI	beta	95% CI	r ²	95% CI	r	Fit
(Intercept)	0.60**	[0.19, 1.00]						
Metaphysics	0.14	[-0.02, 0.29]	0.17	[-0.02, 0.36]	.02	[-.02, .06]	.42**	
Mutability	-0.23**	[-0.40, -0.07]	-0.23	[-0.40, -0.07]	.05	[-.02, .11]	-.29**	
Epistemic Relativism	0.24**	[0.07, 0.41]	0.25	[0.08, 0.43]	.05	[-.02, .12]	.34**	
Locus	-0.29*	[-0.53, -0.05]	-0.20	[-0.37, -0.03]	.03	[-.02, .09]	-.34**	
Cognitive Reflection	-0.58*	[-1.10, -0.06]	-0.19	[-0.35, -0.02]	.03	[-.02, .08]	-.29**	

Note: A significant b-weight indicates the beta-weight and semi-partial correlation are also significant. b represents unstandardized regression weights. beta indicates the standardized regression weights. r² represents the semi-partial correlation squared. r represents the zero-order correlation. LL and UL indicate the lower and upper limits of a confidence interval, respectively. * indicates p < .05. ** indicates p < .01.

Structural Equation Modeling

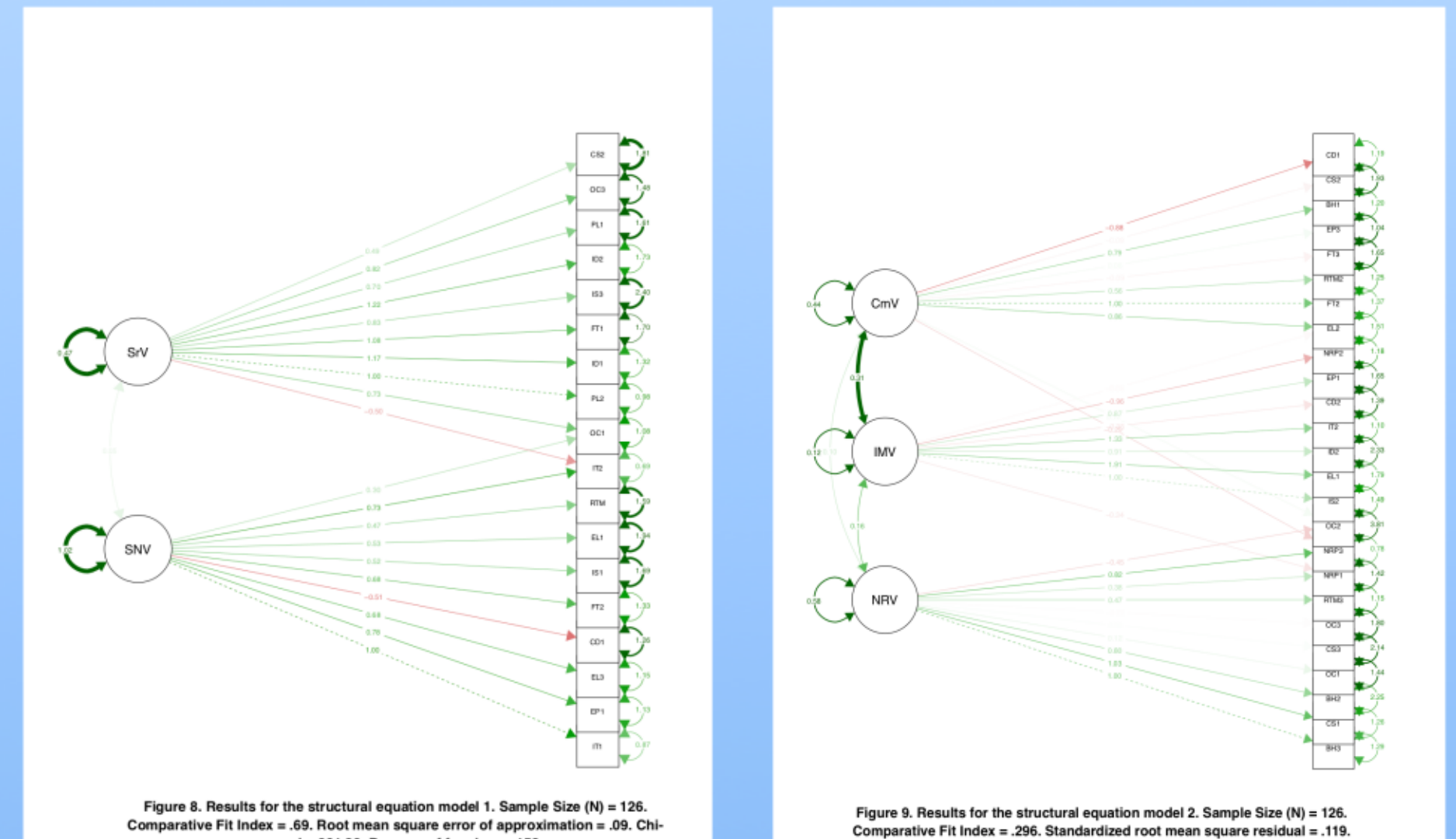


Figure 8. Results for the structural equation model 1. Sample size (N) = 126. Comparative Fit Index = .89. Root mean square error of approximation = .28. CFI = .91. Degrees of freedom = 153.

Figure 9. Results for the structural equation model 2. Sample size (N) = 126. Comparative Fit Index = .88. Root mean square error of approximation = .28. CFI = .90. Degrees of freedom = 154.

Measurement Models : Latent Variables : SRV = Survivalist View ; SNV = Strict Neuroscience View ; CMI = Computational View ; IMV = Illusory Mind View ; NRV = Non-reducible View ; Manifest Variables : Higher loading Items from the PCA on philosophy of mind.

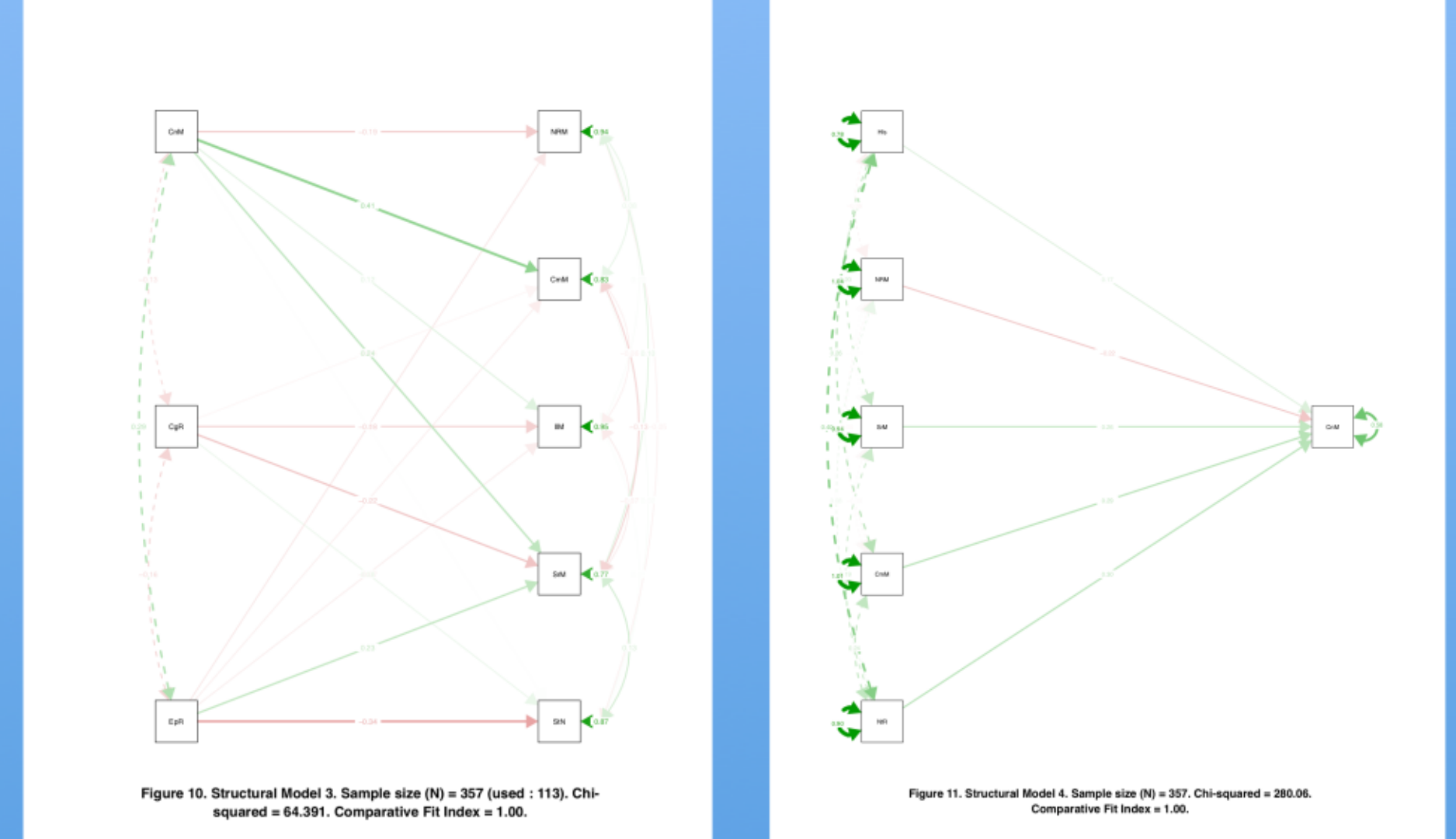


Figure 10. Structural Model 3. Sample size (N) = 327 (used = 119). CFI = .90. Comparative Fit Index = 1.00.

Figure 11. Structural Model 4. Sample size (N) = 327. CFI = .90. Comparative Fit Index = 1.00.

Structural models : Manifest Variables : CmM = conspiracy mentality ; CgR = CRT ; EpR = Epistemic Relativism ; NRM = Non-reducible Mind View ; CniM = Computational View of Mind ; IIM = Illusory View of Mind ; SiM = Survivalist Mind View ; SiN = Strict Neuroscience View of Mind ; Hns = Holism, NNR = Natural Remedies.

Discussion

- Conspiracy Mentality correlates positively with Anthropomorphism, Epistemic Relativism, the Survivalist and Computational View of Mind.
- Conspiracy Mentality is negatively correlated with the Non-reducible view of Mind.
- SW regression analysis 2 suggests an inverse relationship between Metaphysics, External Locus of Responsibility, Agency, Epistemic Relativism and The Strict Neuroscience View of Mind. Moreover, SNV loads negatively on cartesian dualism 1.
- With regard to SEM 4, we find out that holism, the Survivalist and Computational Views of mind and Natural Remedies load positively on Conspiracy Mentality. However, the Non-reducible View of Mind loads negatively on CM (Conspiracy Mentality).
- SEM 3 shows us that CM loads positively on the Computational and the Survivalist Views of mind and negatively on the Non-reducible View of mind. CRT loads negatively on the Illusory and the Survivalist Views of mind. Epistemic Relativism loads negatively on the Strict Neuroscience View and it loads positively on the Survivalist View of Mind.

Main References

- Fenster, M. (2008). *conspiracy theories: Secrecy and power in american culture*.
- Hair, J. F. (Ed.). (2014). *Multivariate data analysis* (7. ed., Pearson new internat. ed). Pearson.
- Heil, J. (2013). *Philosophy of Mind: A contemporary introduction*.