Graphical Representation Enhances Compliance with Normative Argumentation Principles

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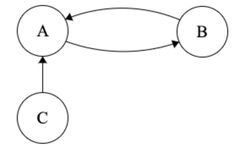
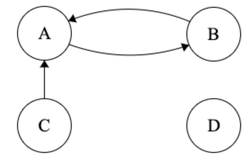
Introduction

Reasoning semantics in formal argumentation follow normative argumentation principles.

Do argumentation principles proposed by the AI researchers realistically model human reasoning?

Methods

- Participants were randomly assigned to one of two groups: Graph (n = 57) and No Graph (n = 41).
- They answered 16 questions where they needed to estimate the strength of each argument by using the scale from 1 (very weak) to 4 (very strong).
- Participants also completed three Cognitive Reflection Test tasks and short, five item versions of Need for cognition and Faith in intuition scales.

A: John thinks that each tennis game should end after one player wins three sets. B: Pierre thinks that each tennis game should end after one player wins two sets. C: Gerhard claims that the players will be too tired at the end of the season if all the tournaments are played on three sets.	
A: John thinks a tennis game should end after one player wins three sets. B: Pierre thinks a tennis game should end after one player wins two sets. C: Gerhard claims that the players will be too tired at the end of the season if all the tournaments are played on three sets. D: Ichiro says that the Association of Tennis Professionals (ATP) should provide more money for young players since the sponsors have too much impact.	

Scale	No graph (n=57)		Graph (n=41)		Test of difference			
	M	SD	M	SD	t (96)	p	r	d
Independence	72.7	23.1	89.1	16.5	4.11	< .001	.39	0.84
Anonymity between tasks	18.1	19.4	50.5	30.5	6.00	< .001	.52	1.23
Anonymity within tasks	70.2	20.3	85.6	13.0	4.58	< .001	.42	0.94
Void precedence	47.3	24.7	73.0	32.0	4.29	< .001	.40	0.88
Maximality	38.8	25.0	57.2	27.2	4.42	.001	.33	0.70

Conclusions

The graphical representation of argument significantly enhances:

- performance on group level
- reliability of individual differences

	1	2	3	4	5	6	7	8	9
1. Independence		.43**	.45**	.56**	.40**	.27*	.31*	.10	.29*
2. Anonymity between tasks	-.07		.62**	.70**	.44**	.28*	.25	-.04	.04
3. Anonymity within tasks	.42**	.52**		.62**	.40**	.19	.26	.16	.09
4. Void precedence	.54**	.04	.28		.65**	.47**	.37**	.14	.13
5. Maximality	.45**	-.37**	.10	.51**		.32*	.18	.19	.13
6. Control tasks	.44**	.24	.47**	.47**	-.08		.20	.27*	.11
7. Cognitive reflection	.22	-.03	.17	.21	.05	.20		.05	.02
8. Need for cognition	-.22	-.16	-.12	.02	.02	-.04	-.11		.34*
9. Faith in intuition	-.07	.05	-.08	-.23	-.21	.04	.05	-.03	