Judgement Aggregation and Democracy

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There Can Be Only One

vs
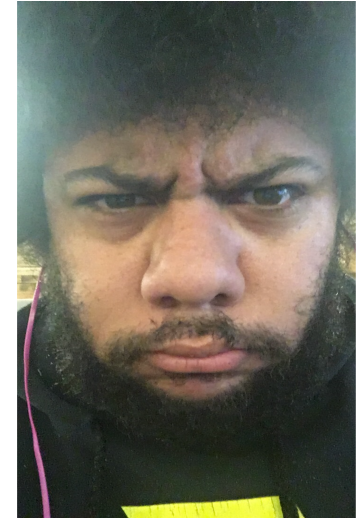
Acupuncture

November 1997, experts convene 'to provide health care providers, patients, and the general public with a responsible assessment of the use and effectiveness of acupuncture for a variety of conditions'

- What is the efficacy of acupuncture?

- What is the place of acupuncture in the treatment of various conditions?

- What are the directions for future research?

P = Acupuncture effectively relieves pain.

Q = Acupuncture can be integrated into existing treatment procedures.

R = We should fund more acupuncture research.

(P and Q) if and only if R

	p	q	$p \wedge q \leftrightarrow r$	r
Judge 1	true	false	true	false
Judge 2	false	true	true	false
Judge 3	true	true	true	true
Majority	true	true	true	false

What is Judgement Aggregation?

Judgement aggregation is the process of converting the beliefs of individuals about some logically related propositions into a shared belief.

Judgement aggregation is everywhere.

How can we do it well?

We can't.

The Discursive Dilemma

For at least 2 voters considering at least two propositions, there exists no judgement aggregation function which yields complete and consistent aggregate judgements and satisfies "anonymity", "systematicity", and "universal domain". (List & Pettit 2002)

Complete and Consistent (C&C)

The aggregation procedure yields judgments on all relevant propositions and these judgments are logically consistent.
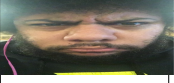
What C&C rules out.

	P	Q	P & Q
	YES	YES	YES
	NO	NO	NO
Group	NO	?	YES

Anonymity

If the judgments of two individuals are switched, the result of the judgment aggregation procedure does not change.

What Anonymity rules out.
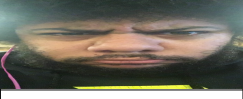
	P	Q	P & Q
	YES	YES	YES
	NO	NO	NO
Group	NO	NO	NO

	P	Q	P & Q
	YES	YES	YES
	NO	NO	NO
Group	NO	NO	YES

Systematicity

If the judgments of all individuals are the same on two propositions, then the aggregation procedure should lead the group to either accept both of them or deny both of them.

What Systematicity rules out.

	P	Q	P & Q
	YES	YES	YES
	YES	YES	NO
Group	NO	YES	YES

Universal Domain

The aggregation procedure can be applied to any combination of (complete and consistent) individual judgments on the relevant propositions.

The Discursive Dilemma

For at least 2 voters considering at least two propositions, there exists no judgement aggregation function which yields complete and consistent aggregate judgements and satisfies "anonymity", "systematicity", and "universal domain". (List & Pettit 2002)

It would be misleading to show you an example

Proof Step 1:

Anonymity and Systematicity together entail that if 2 propositions have the same number of votes they are either both rejected or both accepted.

Now what?

Proof Step 2:

	$\delta_i(P)$	$\delta_i(Q)$	$\delta_i((P \land Q))$	$\delta_i(\neg(P \land Q))$
$i = 1$	1	1	1	0
$i = 2$	1	0	0	1
$i = 3$	0	1	0	1
$i > 3$ and i is even	1	1	1	0
$i > 3$ and i is odd	0	0	0	1

Get rid of anonymity?

Maybe we should respect expertise?

Example

"*So we're in a pretty shitty mess, aren't we?*" he said. "*I cannot neglect the fact that people who are working on it have more weight than people who aren't. It's also clear that we cannot run science on a majority basis.*" (Tuabes 1986, pg. 218)

– Carlo Rubbia summarises the results of working group meeting.

Get rid of systematicity?

Maybe some propositions are more firmly entrenched than others?

Get rid of universal domain?

Maybe sometimes we should say something is inappropriate to decide upon?

The Absolute State Of Democracy

We have to make something like this work, but it is very difficult and compromises are essential.

References

- Gary Tuabes. *Nobel Dreams: Power, Deceit and the Ultimate Experiment*. Tempus Books. New York. 1986.
- Christian List and Philip Pettit. Aggregating Sets of Judgments. An Impossibility Result. *Economics and Philosophy* 18: 89 – 110. April 2002.
- Acupuncture conference website: http://consensus.nih.gov/1997/1997acupuncture107html.htm

Questions