

A MODEL OF DELIBERATIVE DEMOCRACY

- Juan Perote Peña
- Universidad de Zaragoza
- Ashley J. Piggins
- National University of Ireland, Galway

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Introduction

- There are **two main traditions** or approaches on the **theory of democracy**:
 - ***Social choice theory***: emphasis on preference aggregation and its problems (Borda, K. Arrow,...)
 - ***Deliberative democracy***: emphasis on seeking rational collective outcomes through deliberation (J. Habermas, J. Rawls,...)
- In fact, **deliberative democracy** stresses:
 - The creative process of knowledge generation: **epistemic democracy** (J. Cohen)
 - **Preference change** in the debate: **persuasion!!**
 - Deliberation must allow **different viewpoints** in an open, equal and free debate
 - Better decisions are taken after deliberation

“The truth is out there”(*)

- The creative process of knowledge generation: **epistemic democracy** (J. Cohen). Defined by three properties that must hold:
 - **An independent standard of correct decisions** (a common good)
 - **A cognitive account of voting**, in which “voting expresses beliefs about what the correct policies are,... not personal preferences for policies“
 - **An account of decision-making** as a process of the adjustment of beliefs.
- Therefore, in Cohen's notion of democracy, **rationality is equivalent to correctness or truth.**

(*): Fox Mulder, in “The X Files”

Introduction

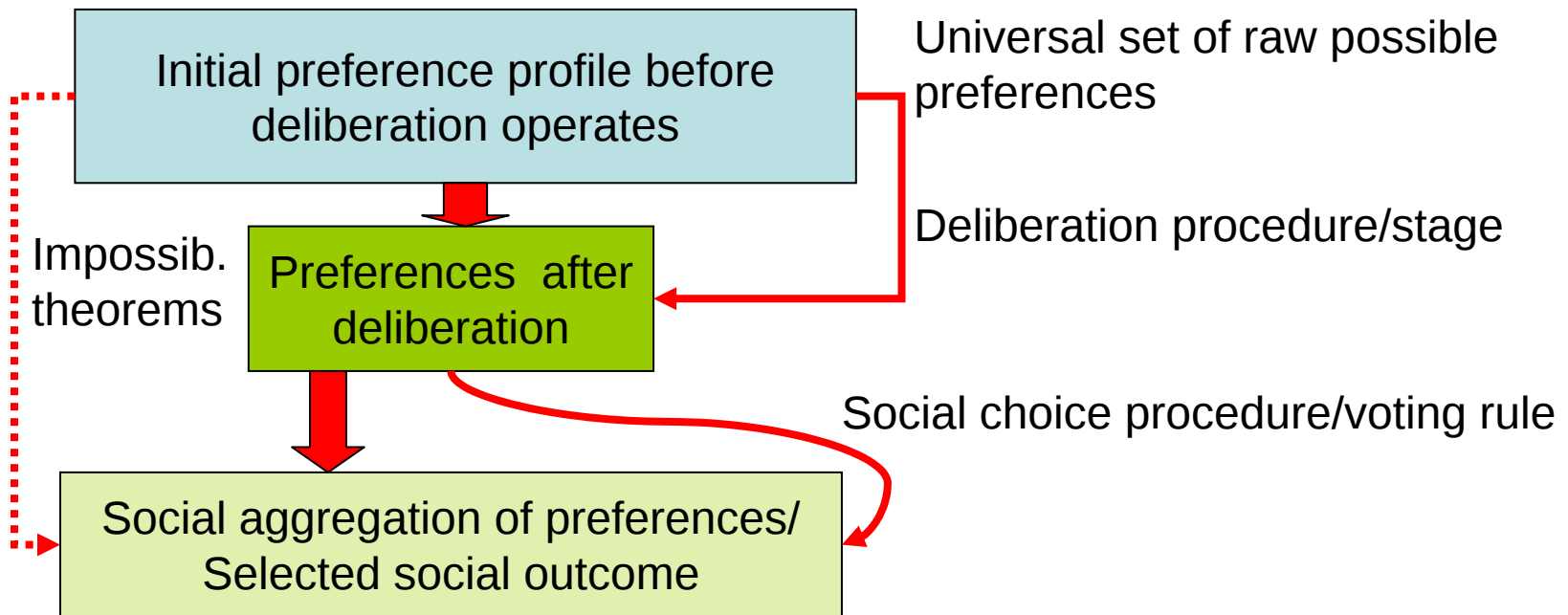
- Preference change in the debate... how is that possible? Aspects of deliberation (Dryzek & List):
 - Informational: confront people with new facts and perspectives on issues
 - Argumentative: draw people's attention to new arguments about the interdependence of issues, confirm or refute internal consistency
 - Reflective: Induce people to reflect on their preferences, that must be justified to others
 - Social: Create a situation of social interaction where people talk and listen to the other

Introduction

- Is it possible to reconcile both approaches?:
 - **No**: (W. Riker): social choice theory has proved the fundamental impossibility of achieving rational social decisions: Arrow's theorem, Gibbard-Satterthwaite... Moreover, the presence of all viewpoints and information about other's preferences exacerbates the problems, so **deliberative democracy is meaningless**
 - **No**: (J. Elster): Rational discussion would tend to produce unanimous preferences, so **social choice theory is meaningless**
 - **Yes**: (C. List, J.S. Dryzek): **Deliberative democracy plays a role before social choice theory** applies aggregation procedures to social decisions: Deliberation tends to change individual preferences in line with the **domain restrictions** under which positive preference aggregation results exist in social choice theory!!
 - Empirical evidence: single-peaked preferences appear more often after deliberation takes place, penalties for lying and reputation loss

Introduction

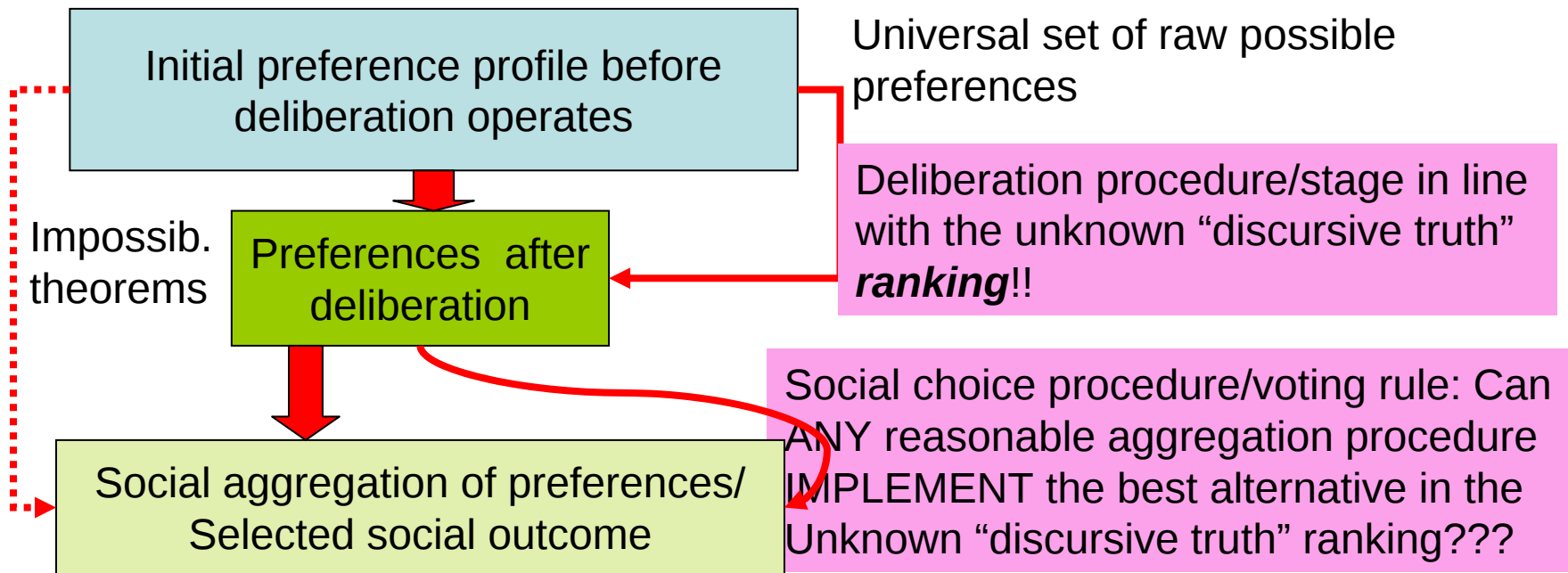
- The role of deliberative democracy (Dryzek and List):



- Criticism:** if it is overoptimistic that deliberation alone leads to unanimous preferences, it is also overoptimistic that deliberation works in the line of overcoming the problems of preference aggregation!

Introduction

- The aim of this work is to offer an alternative connection



- Deliberation produces partial unanimity following some logical patterns: "***persuasion pattern***", "***discursive truth***", similar but not necessarily an objective standard of truth or "correctness"

The patterns of persuasion

- *Persuasion*: making people change their minds/views/opinions about issues:
 - Rhetoric: Appealing to logic and reason
 - Eloquence: Appealing to feelings and passions
- Which are the **determinants of persuasion**?
 - Ability to create new alternatives not present before
 - Asymmetric distribution of information
 - Asymmetric distribution of the ability to process information and generate knowledge: skills
 - The intrinsic nature of the issues at debate
 - The persuasion costs:
 - May depend on the number of individuals in the committee
 - May depend on how diverse individuals are
 - May depend on the persuasion skills of some individuals...

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The model

- Let $A = \{X, Y, Z, \dots\}$ be the finite set of alternatives
- Let $\mathcal{R}$ be the set of all logically possible orderings over the set of alternatives. Let $i \in \{1, \dots, \#\mathcal{R}\} \in \mathbb{N}$ be an index of a possible preference and R_i the i th preference in set $\mathcal{R}$.
- A preference profile $\mathbf{R}$ is a function: $\mathbf{R}: \mathcal{R} \rightarrow \mathbb{N},^{\#\mathcal{R}}$ such that $\mathbf{R}_i (R_i) = N_i$
- Let $\delta: \mathcal{R} \times \mathcal{R} \rightarrow \mathbb{N}$, be an admissible measure of distance between preference orderings, like the Kemeny distance:

$$\delta (R_i, R_j) = (1/2)(R_i - R_j) \cup (R_j - R_i).$$

A **persuasion group** is a set of preferences that are at a smaller distance than a given admissible threshold δ .

We assume that a persuasion group can always solve their internal differences through deliberation, in line with the commonly unknown discursive truth ranking $T \in \mathcal{R}$

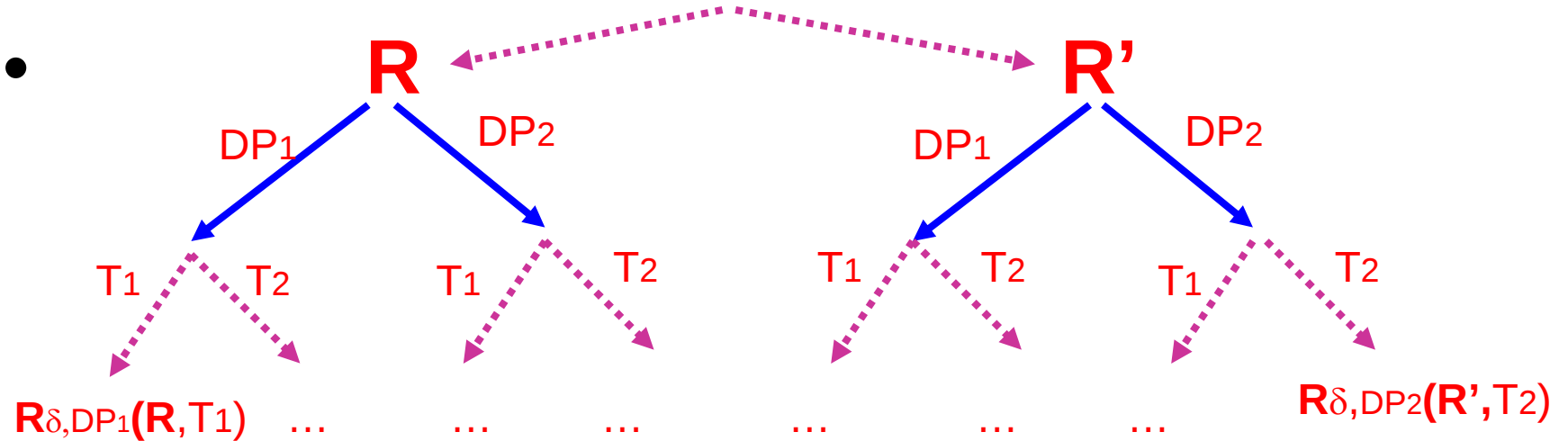
The model

- Let $\mathbf{R}$ be a preference profile and $T \in \mathfrak{R}$ be truth and let
- $S(\mathbf{R}) \in \{R_i, R_j \text{ t.q. } \delta(R_i, R_j) \leq \delta\}$ be a persuasion group,
- Let $R_k \in \mathfrak{R}$ be such that $\forall X, Y \in A$ with $(X, Y) \in R_i \forall i \in S(\mathbf{R})$, $(X, Y) \in R'$ and otherwise $(X, Y) \in T$.
- Then, the preference profile after deliberation with $S(\mathbf{R})$ is $\mathbf{R}'(S)$, where $\mathbf{R}'_i(S) = 0 \forall i \in S(\mathbf{R})$ and $\mathbf{R}'_k(S) = \sum N_i$, $\forall i \in S(\mathbf{R})$.
- Given a persuasion threshold δ , a **deliberation procedure DP** establish a specific set $S(\mathbf{R})$ for all preference profiles $\mathbf{R}$ if there exists at least one non-empty set $S(\mathbf{R})$.
- **Remark 1:** It can be the case of $S(\mathbf{R}) = \emptyset$ for some $\mathbf{R} \dots$
- **Remark 2:** Since $T \in \mathfrak{R}$ is transitive, for any **DP** and $\mathbf{R}$, after a finite sequence of iterative $S(\mathbf{R}')$, we get $S(\mathbf{R}'') = \emptyset$

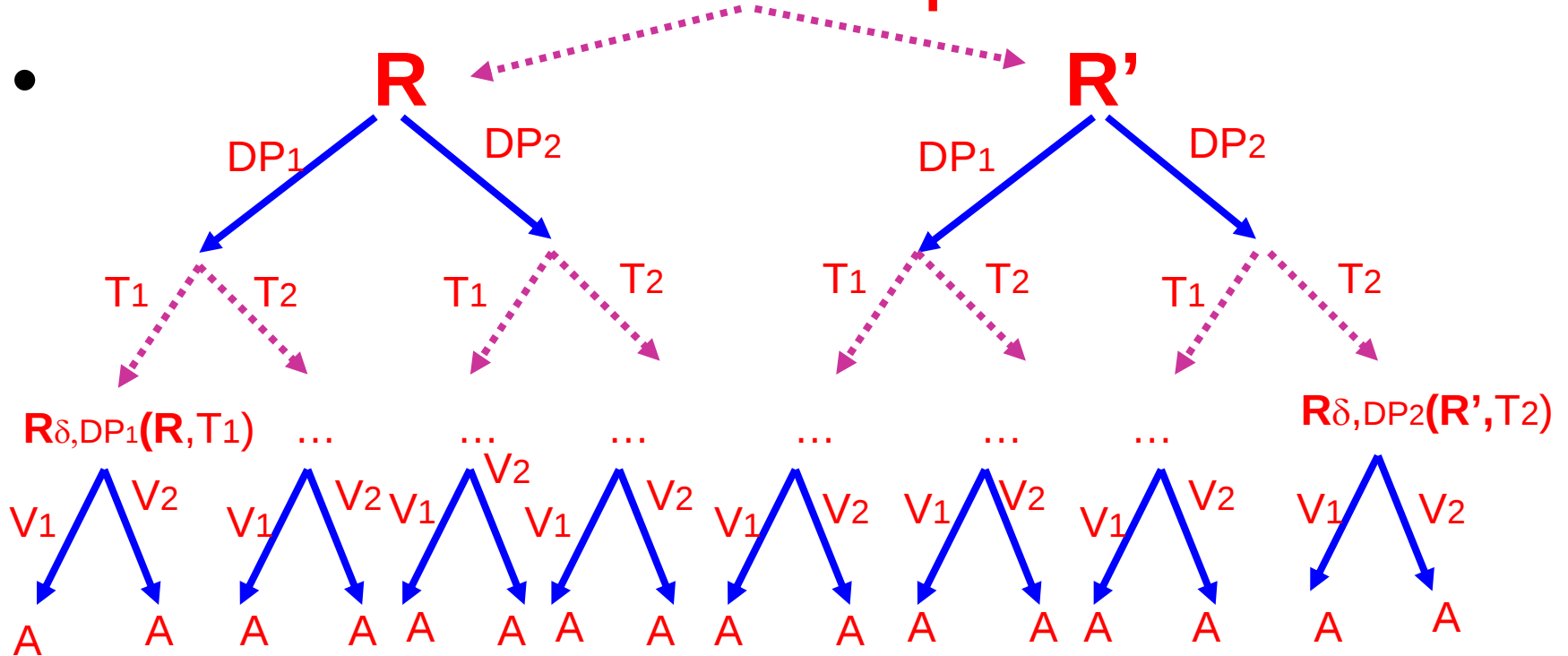
The model

- Given a persuasion threshold δ and a DP, for all profiles $\mathbf{R}$, and given any discursive truth $T \in \mathcal{R}$, applying recursively the DP until we always achieve a preference profile in which no further persuasion groups exist: let $\mathbf{R}'_{\delta, DP}(\mathbf{R}, T)$ be that profile.
- An admissible voting rule (anonymous scf) V is a function $V: \mathbf{R} \rightarrow A$ belonging to some family C .
- Given a persuasion threshold δ , a democracy is a pair (DP, V) .
- Given δ , a democracy (DP, V) is truth-revealing or implements the truth if $\forall \mathbf{R}, \forall T \in \mathcal{R}$,
- $V(\mathbf{R}'_{\delta, DP}(\mathbf{R}, T)) = \operatorname{argmax} T$

An illustrative picture

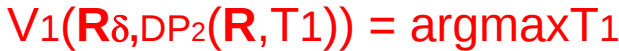


An illustrative picture



By correctly choosing DP and V , we aim at selecting the “best” alternative in the true ranking T , whatever the true ranking T is and regardless of the Initial “raw” preference profile R .

●


$$V_1(\mathbf{R}_{\delta, DP_2}(\mathbf{R}', T_1)) = \operatorname{argmax} T_1$$
$$V_1(\mathbf{R}_{\delta, DP_2}(\mathbf{R}', T_2)) = \operatorname{argmax}_{T_2}$$

For instance, **DP₂** and **T₁** in the figure above...

Preliminary result

- Let $\#A = 3$ ($A = \{X, Y, Z\}$), $\mathfrak{R}$ = strict orderings, $\mathcal{C}$ the family of all reasonable scoring rules (with normalized weights $1, k, 0$) and persuasion threshold δ = Kemeny distance:
- If $\delta = 3$, There exist truth-revealing democracies (DP, V) : such that $S(\mathbf{R}) = N$ and V any scoring rule (unimportant)
- If $\delta = 2$, There exist truth-revealing democracies (DP, V) : working with any scoring rule V (unimportant)
- If $\delta = 1$, There exists only truth-revealing democracies (DP, V) such that DP proceeds in **two stages**: firsts groups agents that **agree in the top**, for every top, and then groups agents that **agree in the bottom**. The scoring rule must also be always **$V = \text{double voting}$** ($k=1$)
- **CONCLUSION:** Selection of V (social choice theory) depends on the deliberatory process used, so if we don't understand deliberation, social choice is meaningless...

The preliminary result

- Let us focus on strict orderings and $\#A=3$
- $A=\{x, y, z\}$, and δ is the Kemeny distance:
- Admissible persuasion groups thresholds:
- If $\delta \leq 0$: No persuasion possible! Preference aggregation do all the job: No guaranteed mechanism
- If $\delta \leq 1$: $\forall \mathbf{R} \in \mathfrak{R}^n$: Both persuasion and preference aggregation play a role: ???
- If $\delta \leq 2$: $\forall \mathbf{R} \in \mathfrak{R}^n$: Persuasion only do all the job!
Implementation committee sequence: $\{S_{xz}, S_{zx}, N\}$
- If $\delta \leq 3$: $\forall \mathbf{R} \in \mathfrak{R}^n$: Persuasion do all the job! Preference aggregation has no role: trivial plenary sequence: $\{N\}$

The $\delta \leq 2$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$

X	X	Y	Y	Z	Z
Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

Remarks:

- We always assume anonymity, so the order of individuals does not matter
- We assume provisionally that there are at least one individual supporting each position: $N_1, N_2, N_3, N_4, N_5, N_6$ cannot be zero.

The $\delta \leq 2$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$

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Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

$\longleftrightarrow$
 S_{xz}

$\longleftrightarrow$
 S_{zx}

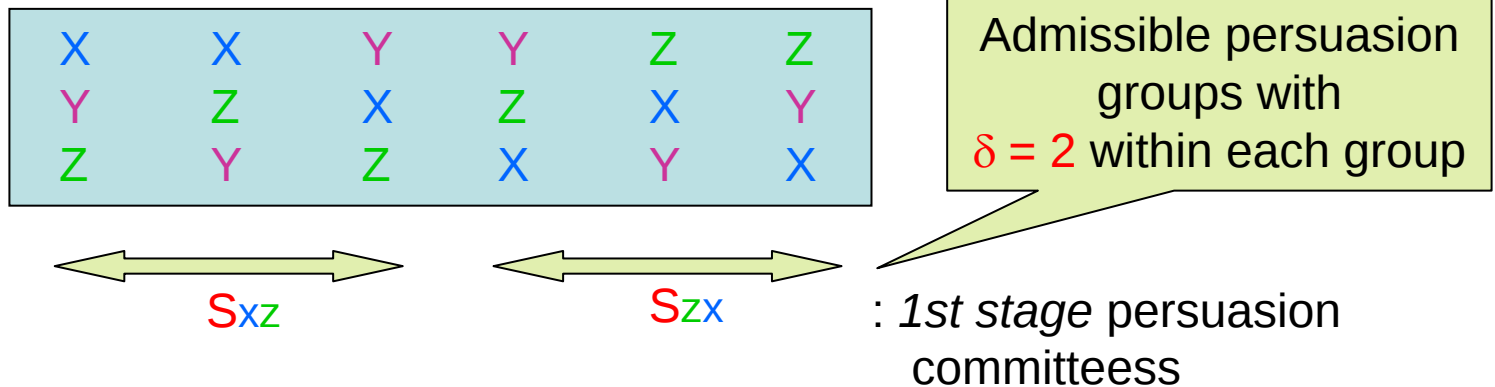
Admissible persuasion
groups with
 $\delta = 2$ within each group

: 1st stage persuasion
committees

Now, whatever “truth” is, the unordered pairs xy , yz within each committee S_{xz} and S_{zx} must be consistent with the true profile, so the common final preference in each group is at a Kemeny distance of $\delta = 1$ to the true one!

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So, in the final stage we set the whole society group N , which is admissible:
 A plenary session where all individuals can be persuaded, so we get the True profile, whatever is it, without the help of any specific preference
 Aggregation method: A SPECIFIC METHOD OF DELIBERATIVE
 DEMOCRACY DO THE JOB!!!: SOCIAL CHOICE THEORY NOT NEEDED!

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.

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X	X	Y	Y	Z	Z
Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

$\longleftrightarrow$
 T_x

$\longleftrightarrow$
 T_y

$\longleftrightarrow$
 T_z

Admissible persuasion
groups with
 $\delta = 1$ within each group

: 1st stage persuasion
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$\longleftrightarrow$
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: 1st stage persuasion committees

Admissible persuasion groups with $\delta = 1$ within each group

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Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

Admissible persuasion groups with $\delta = 1$ within each group

$\longleftrightarrow$
 T_x

$\longleftrightarrow$
 T_y

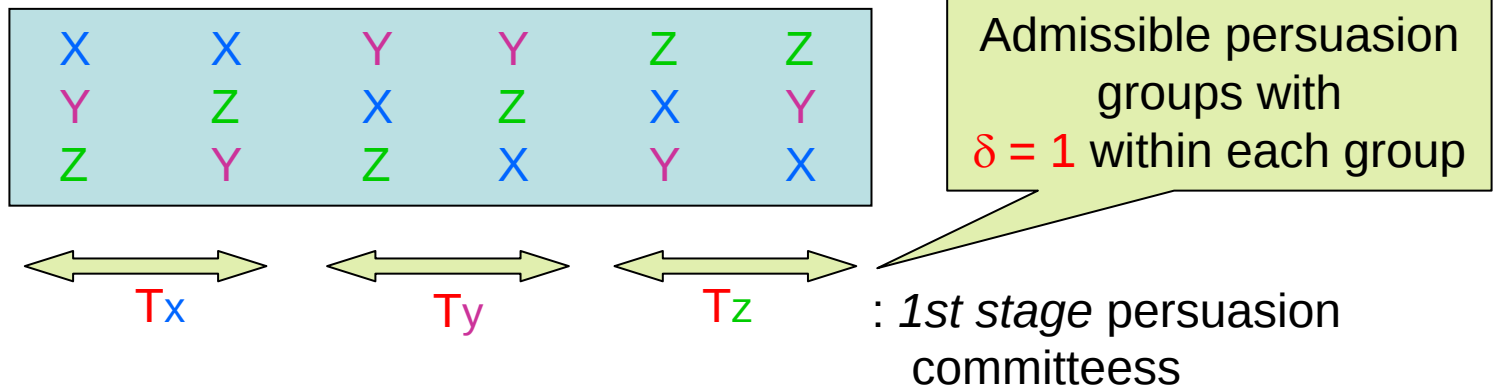
$\longleftrightarrow$
 T_z

: 1st stage persuasion committees

Imagine that the “true” preference is 1: $X Y Z$: we obtain the following resulting Intermediate profile:

The $\delta \leq 1$ result

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Imagine that the “true” preference is 1: $X Y Z$: we obtain the following resulting Intermediate profile:

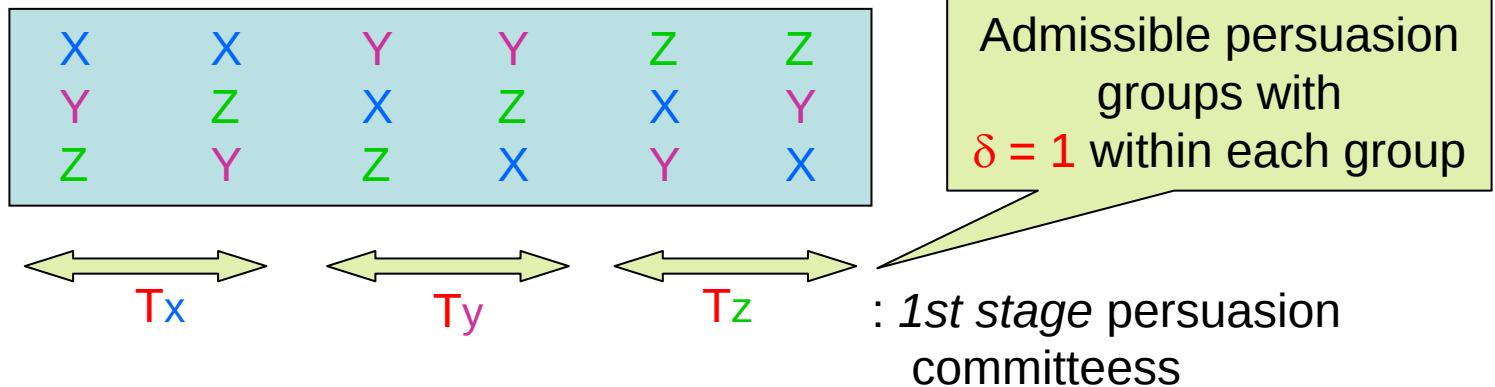
X	X
Y	Y
Z	Z

Y	Y
X	X
Z	Z

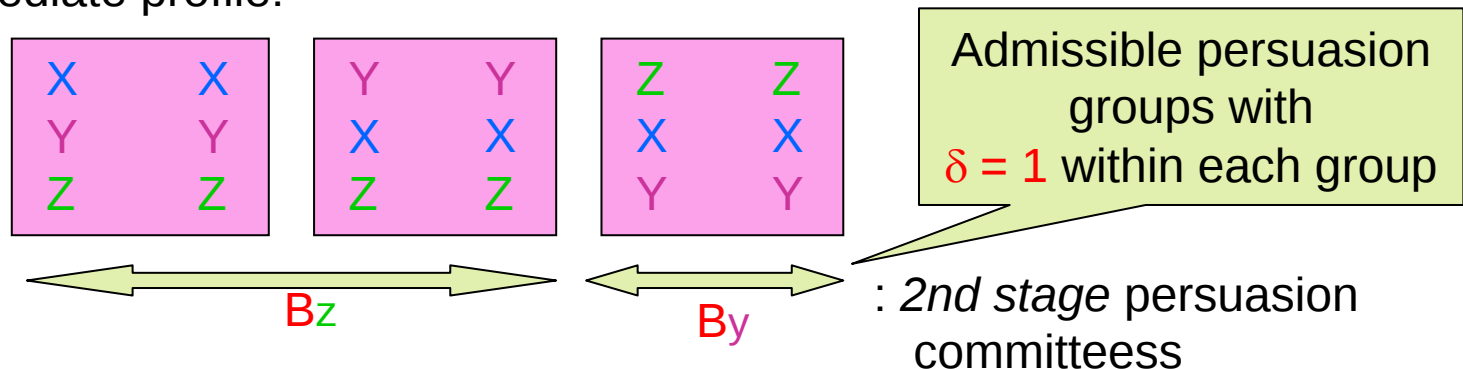
Z	Z
X	X
Y	Y

The $\delta \leq 1$ result

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- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$



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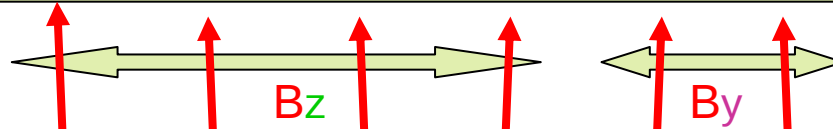


The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- And we obtain the following FINAL profile:

X	X	X	X	Z	Z
Y	Y	Y	Y	X	X
Z	Z	Z	Z	Y	Y

And there is no further
Possibilities of persuasion
.....

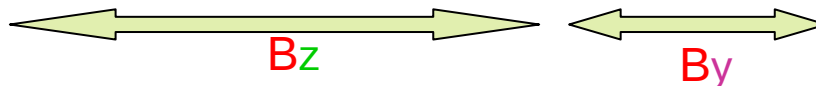


: 2nd stage persuasion
committees

Imagine that the “true” preference is 1: $X Y Z$: we obtain the following resulting Intermediate profile:

X	X	Y	Y	Z	Z
Y	Y	X	X	X	X
Z	Z	Z	Z	Y	Y

Admissible persuasion
groups with
 $\delta = 1$ within each group



: 2nd stage persuasion
committees

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- And we obtain the following FINAL profile:

X	X	X	X	Z	Z
Y	Y	Y	Y	X	X
Z	Z	Z	Z	Y	Y

And there is no further
Possibilities of persuasion

.....

The “true” preference is 1: X Y Z, and we move to the specific anonymous Aggregation method to elicit the truth “X”:

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- And we obtain the following FINAL profile:

X	X	X	X	Z	Z
Y	Y	Y	Y	X	X
Z	Z	Z	Z	Y	Y

And there is no further possibilities of persuasion

.....

The “true” preference is 1: X Y Z, and we move to the specific anonymous Aggregation method to elicit the truth “X”:

The scoring rule such that $k = 1$: **double voting**!!: it adds up the scores of the first-ranked and second-ranked alternatives across all voters:

$$\text{X: } N_1 + N_2 + N_3 + N_4 + N_5 + N_6 = N$$

$$\text{Y: } N_1 + N_2 + N_3 + N_4$$

$$\text{Z: } N_5 + N_6$$

So for any profile and $N_1, N_2, N_3, N_4, N_5, N_6$, the winner will always be “X”

This is the only admissible anonymous procedure that discovers the truth in this context, when $\delta \leq 1$, whatever the “true” preferences are...

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.
- And we obtain the following FINAL profile:

X	X	X	X	Z	Z
Y	Y	Y	Y	X	X
Z	Z	Z	Z	Y	Y

And there is no further possibilities of persuasion
.....

The “true” preference is 1: X Y Z, and we move to the specific anonymous Aggregation method to elicit the truth “X”:

Suppose any scoring rule such that $k < 1$:

X: $N1 + N2 + N3 + N4 + k(N5 + N6)$

Y: $N1 + N2 + N3 + N4$

Z: $N5 + N6$

So take any profile and $N1, N2, N3, N4, N5, N6$ such that :

$$1-k > \frac{N1 + N2 + N3 + N4}{N5 + N6}$$

And for that profile, Z will win, and the truth “X” will not be implemented!

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.

- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$

X	X	Y	Y	Z	Z
Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

BX

Admissible persuasion groups with $\delta = 1$ within each group

. 1st stage persuasion committees

Let us suppose that the deliberation process starts with any BX, followed by Ty, for example: if truth is Y Z X, then, we obtain the next profile and use:

X	X	Y	Y	Z	Y
Y	Z	X	Z	X	Z
Z	Y	Z	X	Y	X

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.

- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$

X	X	Y	Y	Z	Z
Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

Admissible persuasion groups with $\delta = 1$ within each group

: 1st stage persuasion committees

BX

Ty

2nd stage persuasion committees

X	X	Y	Y	Z	Y
Y	Z	X	Z	X	Z
Z	Y	Z	X	Y	X

Truth: Y Z X

The $\delta \leq 1$ result

- Let us take any preference profile $\mathbf{R} \in \mathfrak{R}^n$.

- $\mathbf{R} = \{N_1, N_2, N_3, N_4, N_5, N_6\}$

X	X	Y	Y	Z	Z
Y	Z	X	Z	X	Y
Z	Y	Z	X	Y	X

Admissible persuasion groups with $\delta = 1$ within each group

: 1st stage persuasion committees

BX

Ty

2nd stage persuasion committees

X	X	Y	Y	Z	Y
Y	Z	X	Z	X	Z
Z	Y	Z	X	Y	X

Truth: Y Z X

X	X	Y	Y	Z	Y
Y	Z	Z	Z	X	Z
Z	Y	X	X	Y	X

Now, there are only two possibilities left:

By and Tx:

The $\delta \leq 1$ result

Truth: $Y Z X$

- Let us take any preference profile $R \in \mathcal{R}^n$.

For all $k \leq 1$, if:
 $N2 + N5 > (1-k)(N3 + N4 + N6) + kN1$,
 Then, Z will come out, and the “true”
 Outcome is Y

For all $k \leq 1$, if:
 $N3 + N4 + N6 < (1-k)(N1 + N2) + kN5$,
 Then, X will come out, and the “true”
 Outcome is Y

X	Z	Y	Y	Z	Y
Y	X	Z	Z	X	Z
Z	Y	X	X	Y	X

X	X	Y	Y	Z	Y
Y	Y	Z	Z	X	Z
Z	Z	X	X	Y	X



X	X	Y	Y	Z	Y
Y	Z	Z	Z	X	Z
Z	Y	X	X	Y	X

:3rd stage persuasion
committees

Now, there are only two
possibilities left:

By and Tx :

Conclusions

- The aggregative (social choice theory) and deliberative approaches to democracy cannot be reconciled: they involve **completely different paradigms**: **a procedural approach to social choice theory**.. But:
- It is possible to integrate the deliberation process into social choice theory with not-too-difficult models of preference change with persuasion
- It is necessary to take the deliberation process into account explicitly in social choice theory, because the choice of the “best” deliberation procedure depends on the choice of the “best” final preference aggregation method and the other way round: they are inter-related and cannot be separated without losing the good property of “truth” emerging...
- For the take-over to occur, it needs social choice theory to go **one step further** beyond preference aggregation to **accommodate the concept of “*persuasion pattern*” or the “*discursive truth*”** that could emerge from discussion alone and logic persuasion.