LeMonde Meetings

November 13, 2018

FLASHPOINTS: MINING EXCEPTIONAL PAIRWISE BEHAVIOR IN VOTE DATASETS

An exceptional model mining technique to factcheck behavioral claims

AUTHORS.

Adnene BELFODIL Philippe LAMARRE

Marc PLANTEVIT Sylvie CAZALENS

LIRIS INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON UCBL Lyon 1 cnrs

SUMMARY

1. Fact Checking
2. Problem statement
3. DSC Framework (solution)
4. Using DSC to enlighten BCCs
5. Conclusions and discussions

FACT CHECKING

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* Several Claims can be transformed into BCCs thus allowing them to be contextualized.

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- Contextualize the claim:
  - Considering that the two deputies are from two different parties, are the two respective parties similar in their voting behavior ?
  - Is it valid for every context (time period, topic of ballots) ?

FACT CHECKING, EXAMPLES OF BCCs

Claim 1 In the European parliament, French deputies vote following the votes recommendation given by their respective national parties

Claim 2 There is no national position when it comes to votes in European political group.

Claim 3 Deputy D1 votes practically the same as a deputy D2 (Several possibilities by considering different dimensions of grouping ...)

Claim 4 The Topic X is a hotter than the Topic Y (w.r.t. all the parliament, some countries or some political groups ...)

Claim 5 Deputy D1 changed his behavior after 2013 compared to its national party (the two political line diverge at some point after 2013 or for particular contexts)

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Voting datasets

European parliament voting

Opinion Polls

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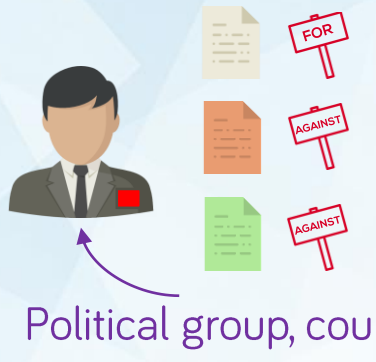
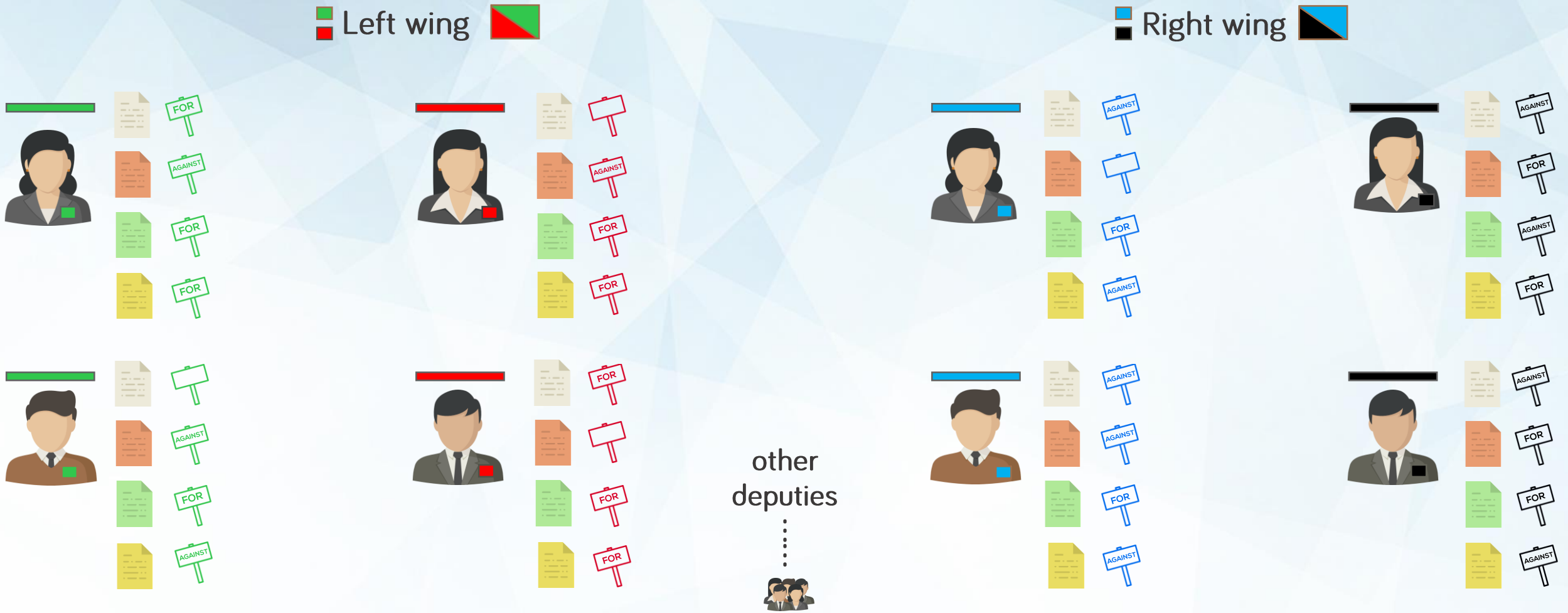


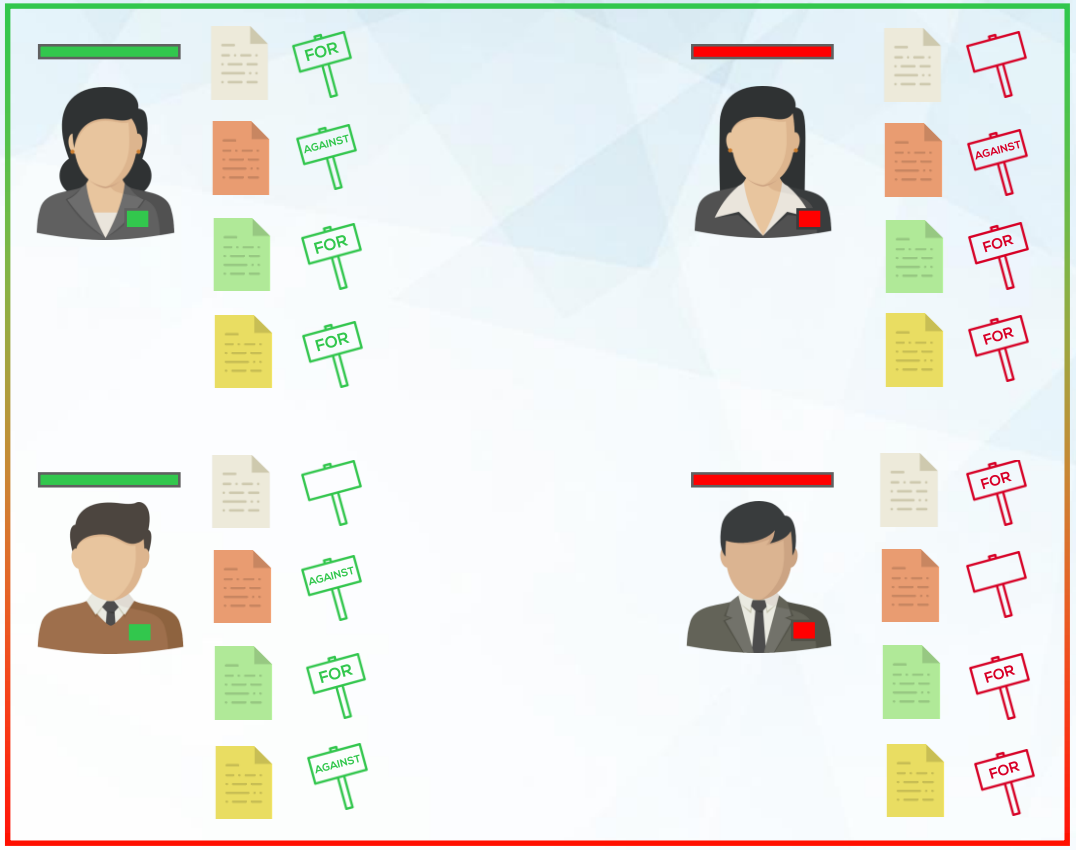
other deputies

INTRODUCTION



INTRODUCTION

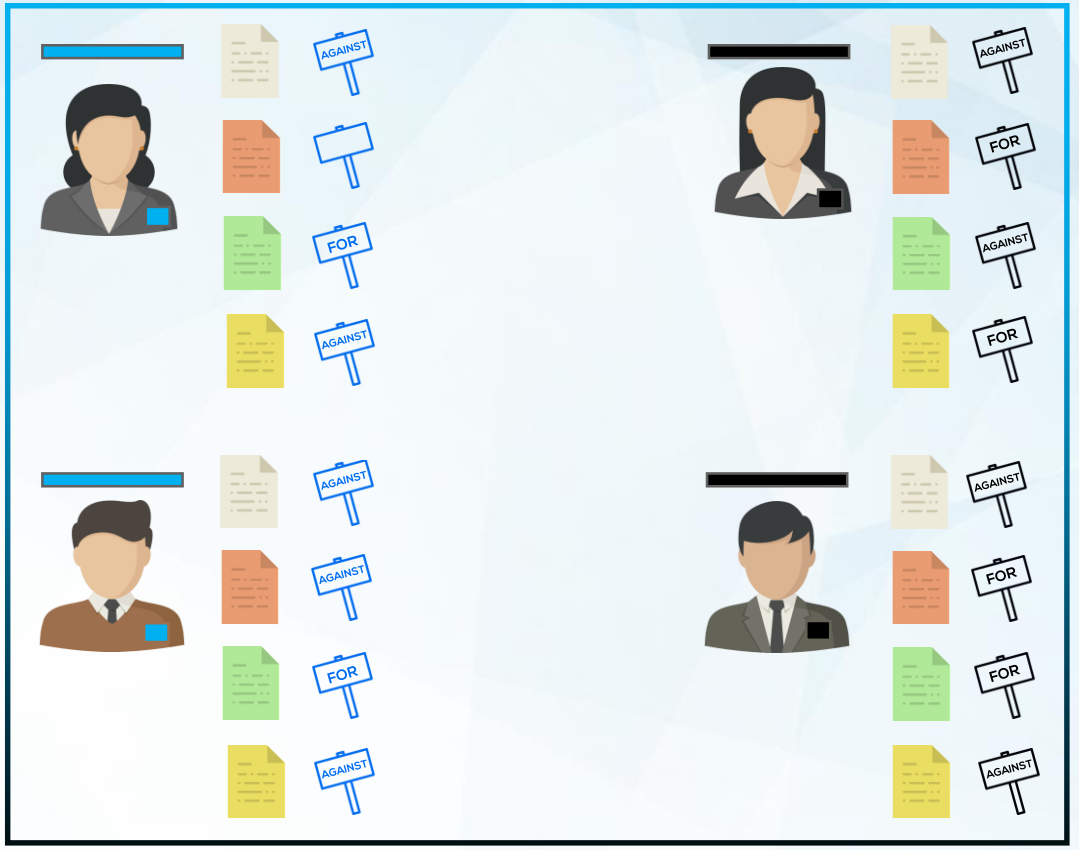
Left wing



Pairwise agreement:
25%

other deputies

Right wing



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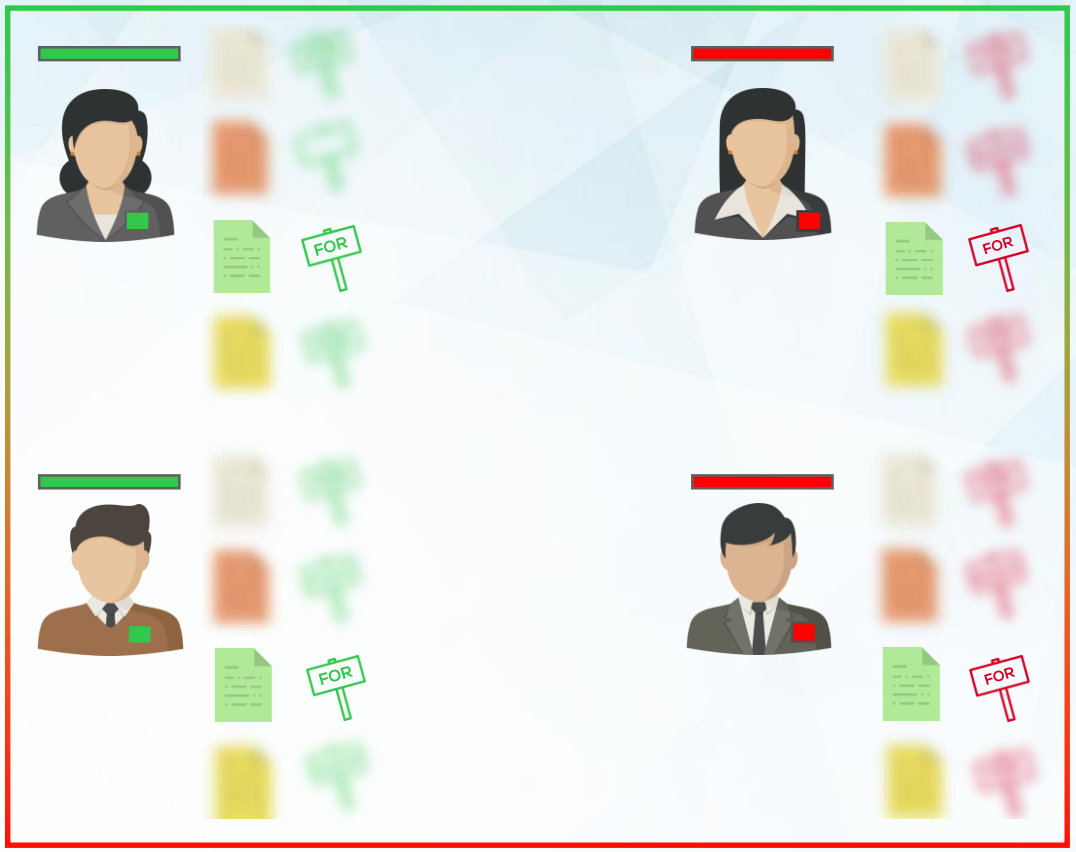


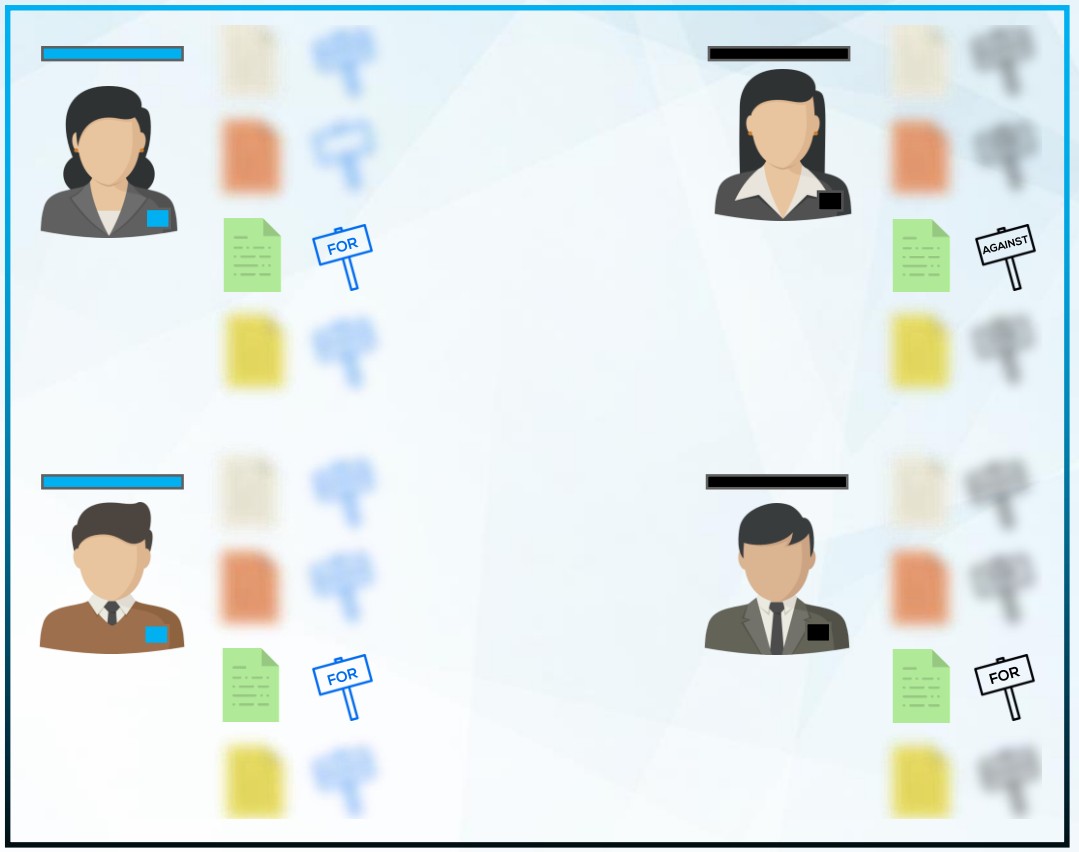
Fisheries ballots

Pairwise agreement:

100%

other deputies

Right wing



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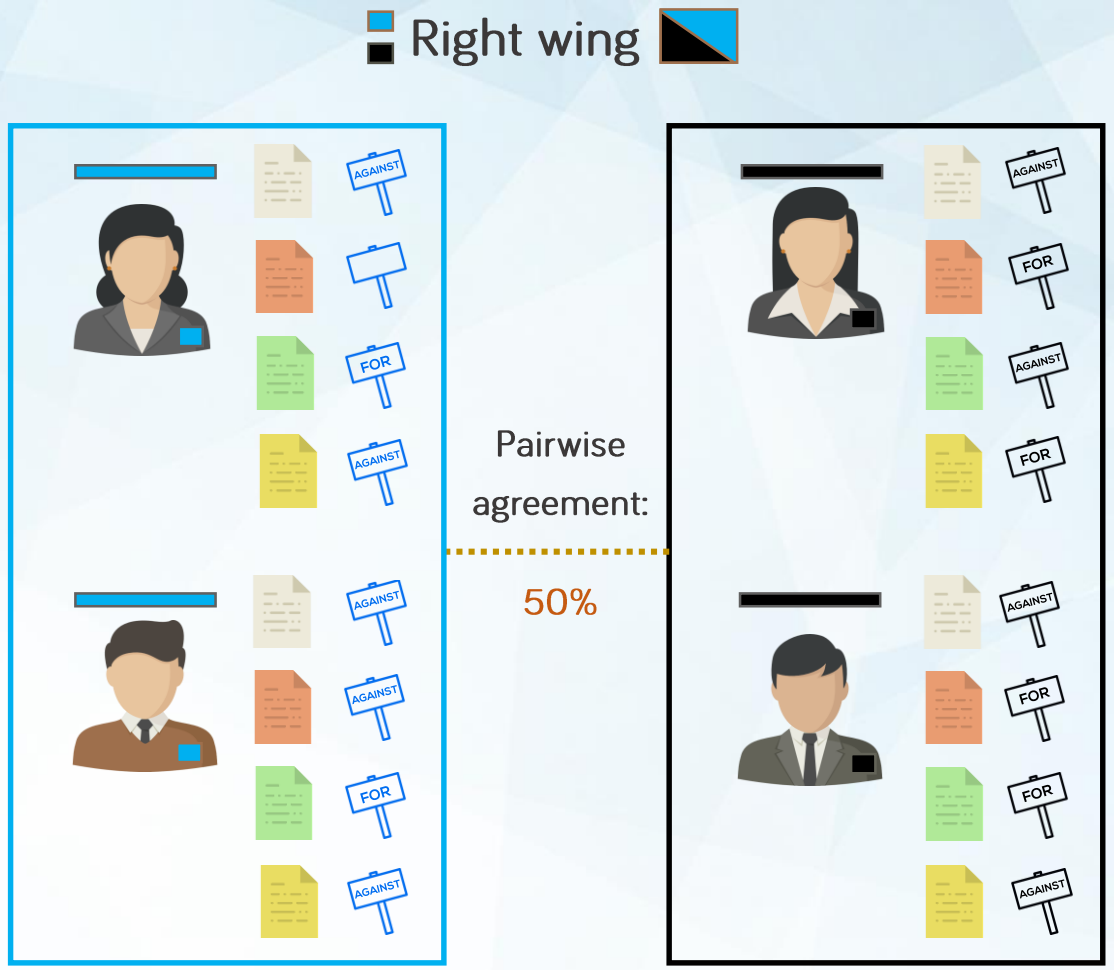

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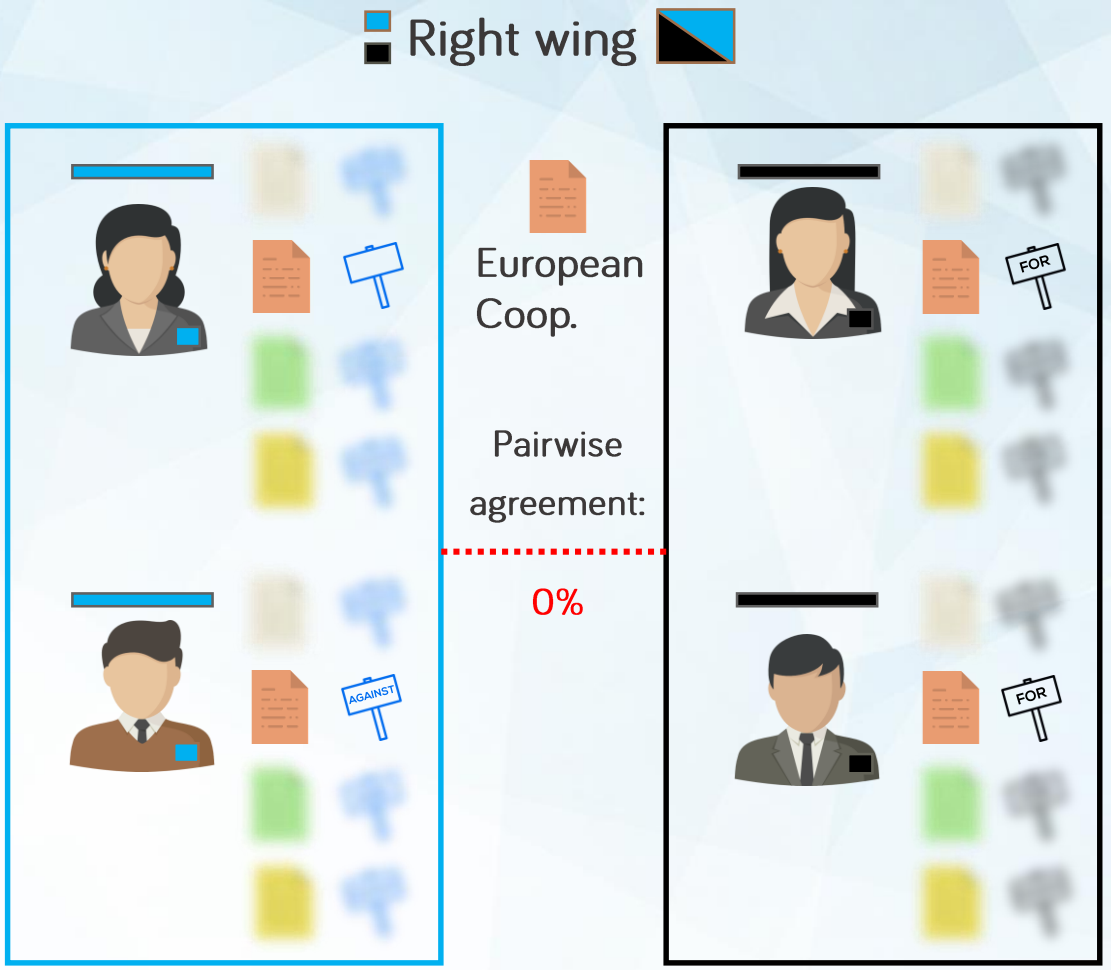

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definition by intent of a
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definition by intent of a subset of items

g' & g"

definition by intent of a subset of individuals

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Example:

(Consumer Protection in General Ballots voted in between 2015 and 2016 , German Deputies, Italian Deputies)

We observe a significant decrease of pairwise agreement

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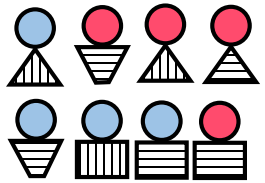
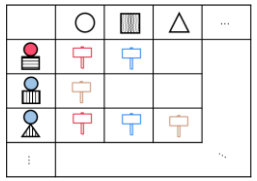


Reviewers
(eg. Users, Deputies)



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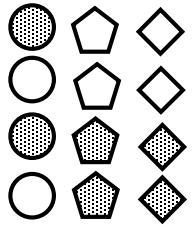

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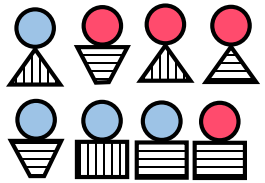

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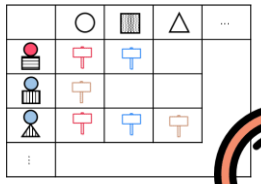

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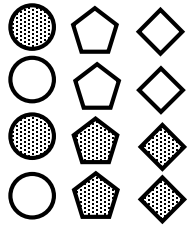

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Dataset example: Parliament voting dataset

Items (Ballots) - E			*Individuals (Deputies) - U*			*Outcome*
Idsession	*Date*	*Theme*	*Full name*	*National Party*	*Political Group*	*Vote*
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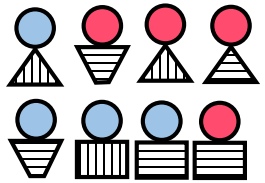

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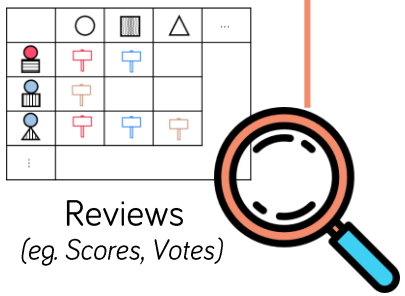

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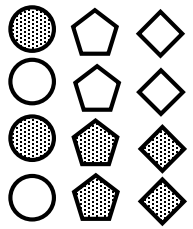

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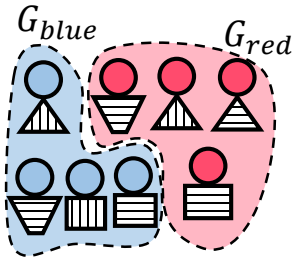
Descriptions attributes* over items (context)

Descriptions attributes* over individuals

*numeric, nominal, hierarchical multi-tag attributes

DISCOVERING SIMILARITIES CHANGE (DSC) FRAMEWORK

1 *Constitute groups*
(eg. By head color)



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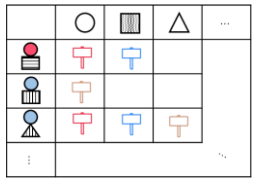

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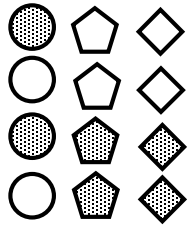

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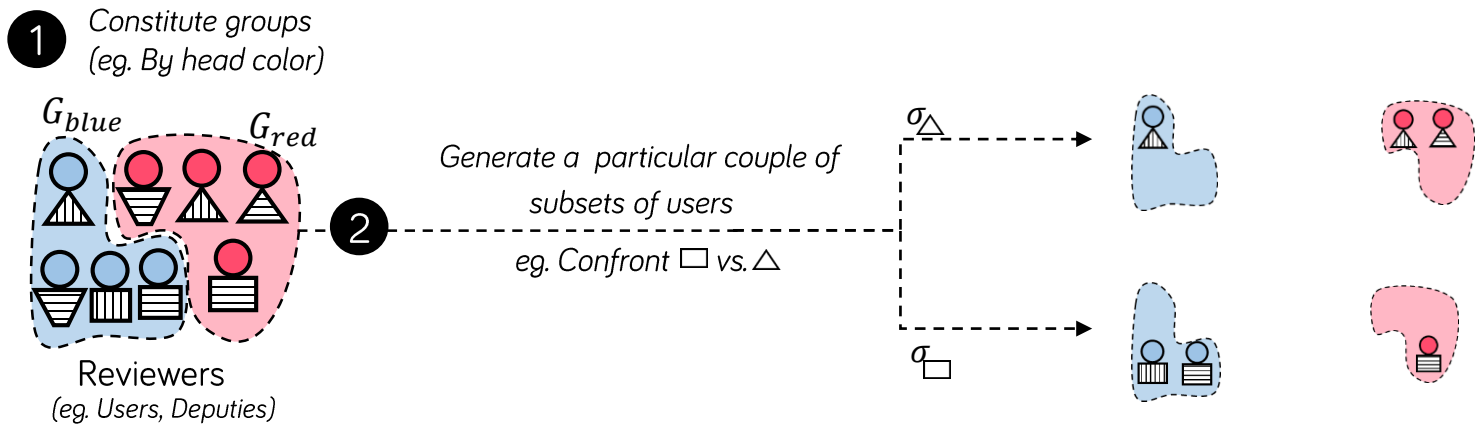

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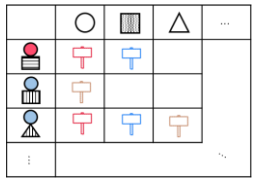

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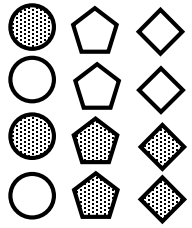

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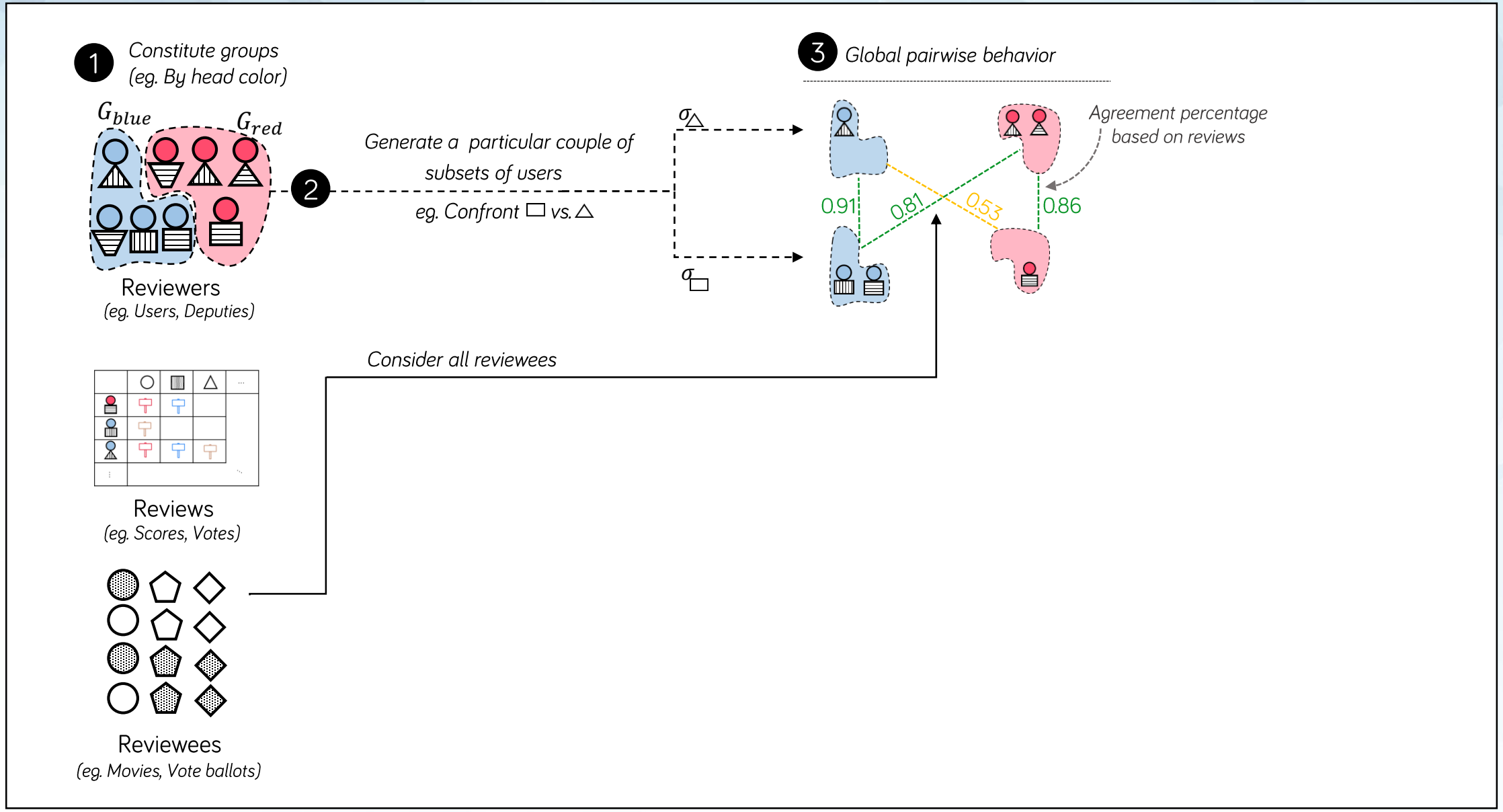

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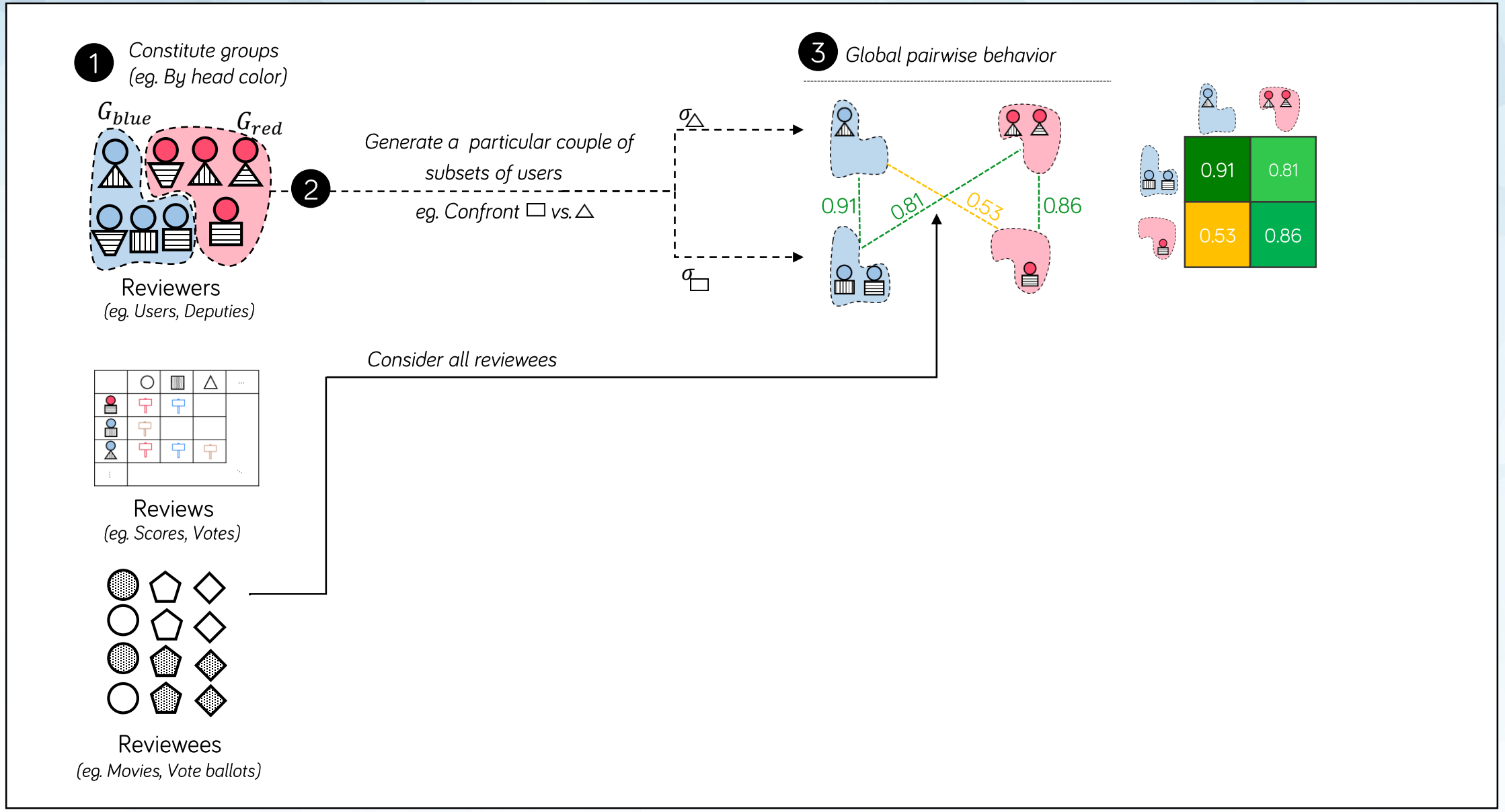

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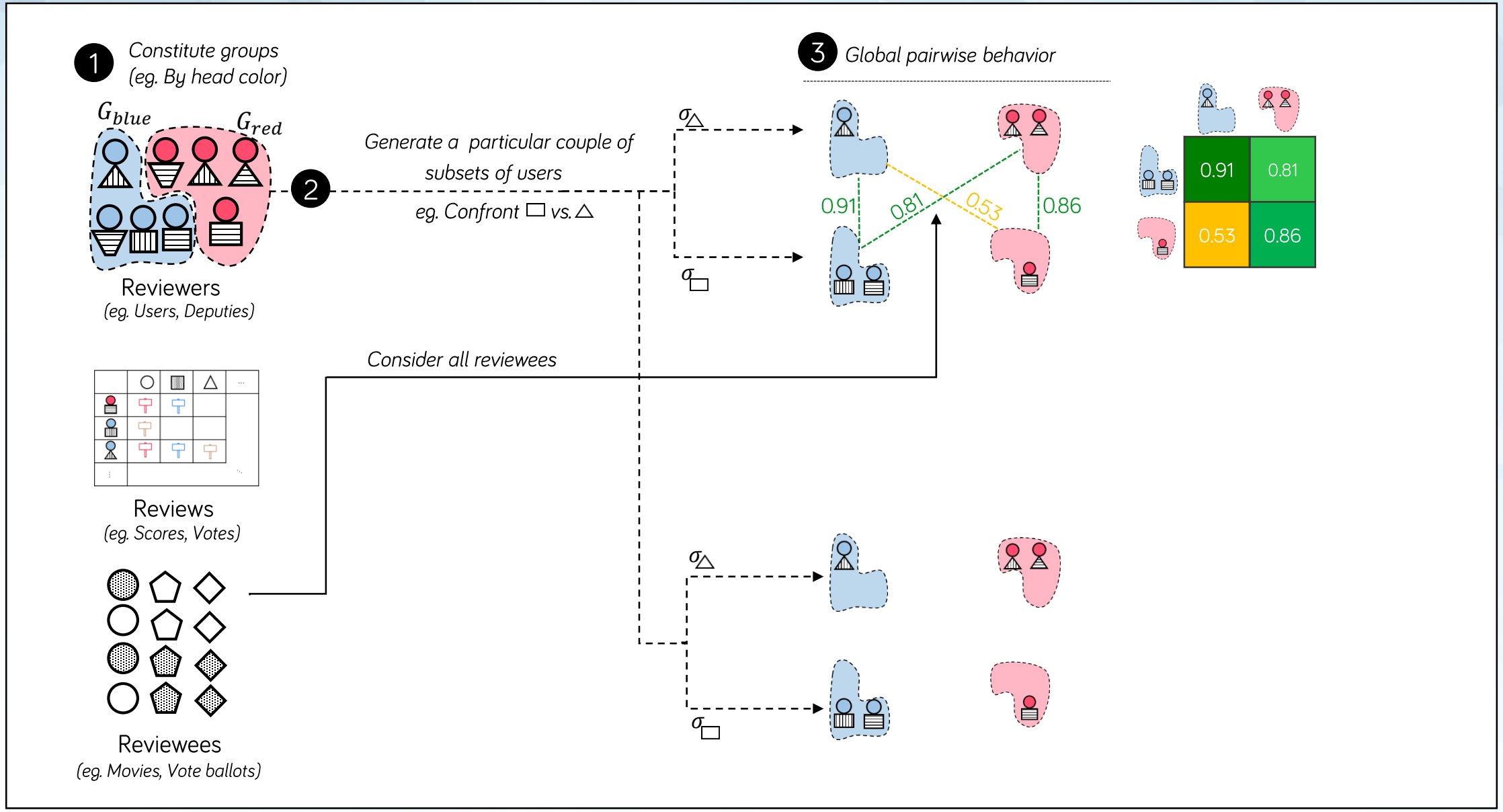

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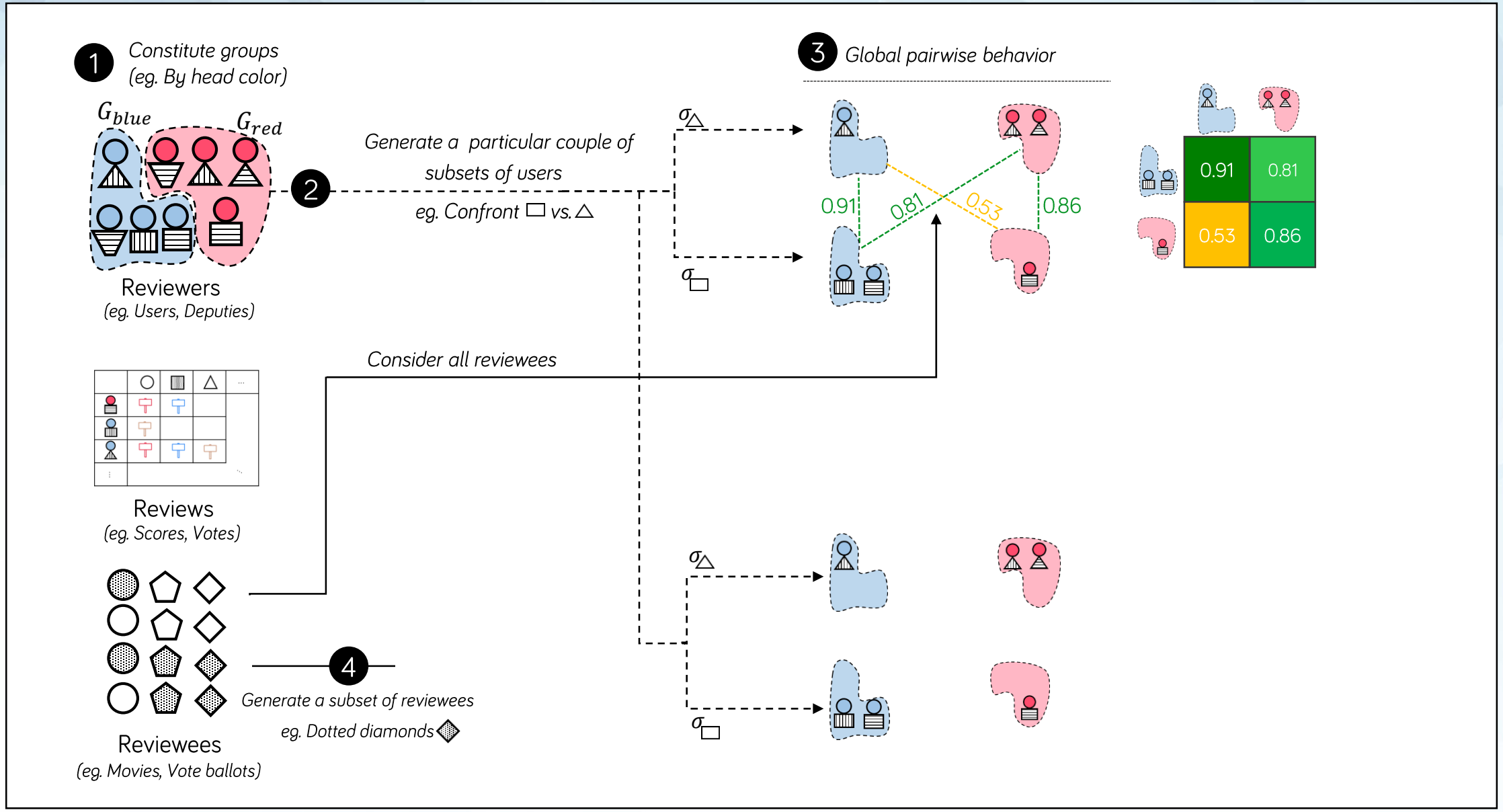

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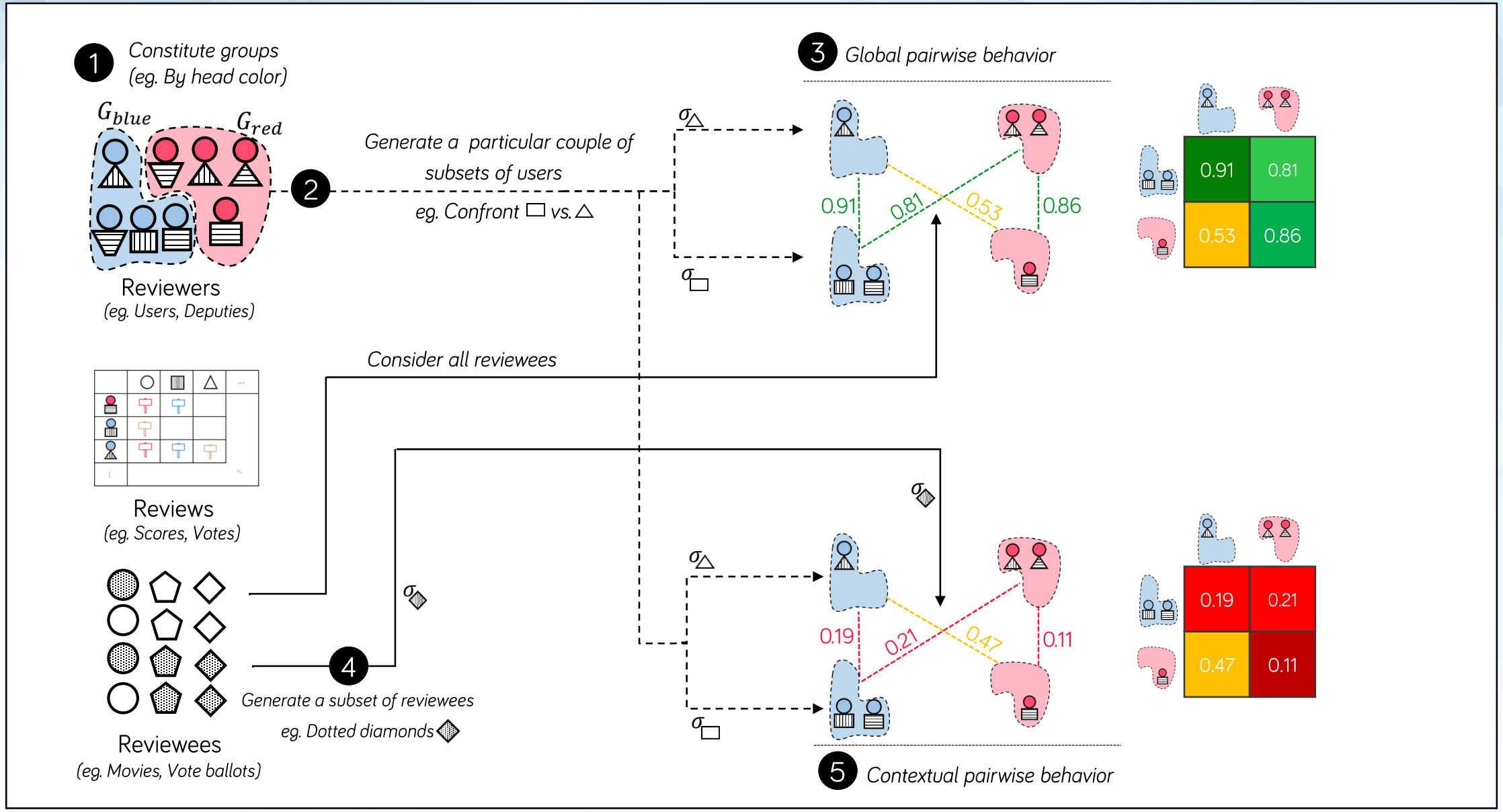

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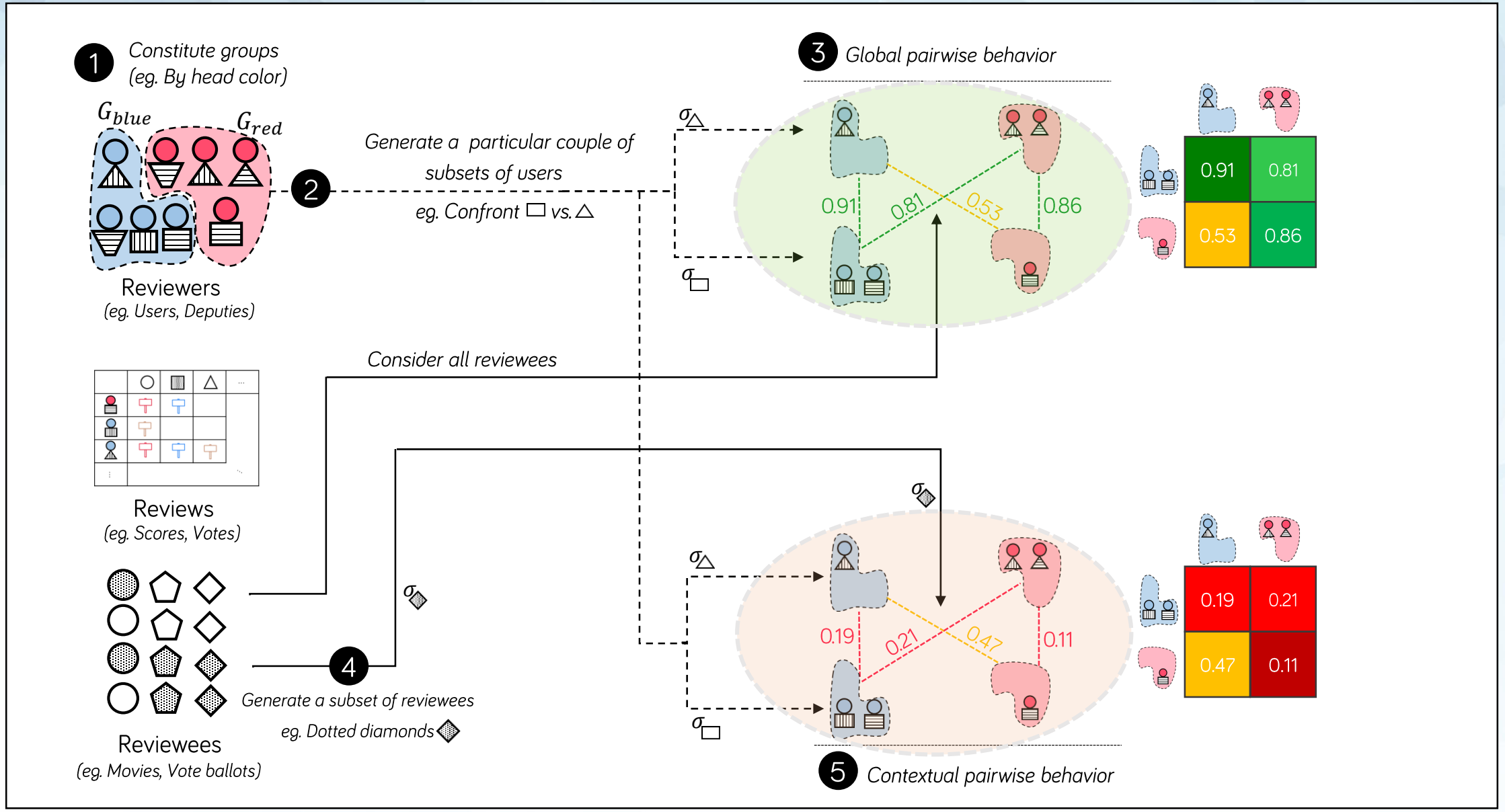

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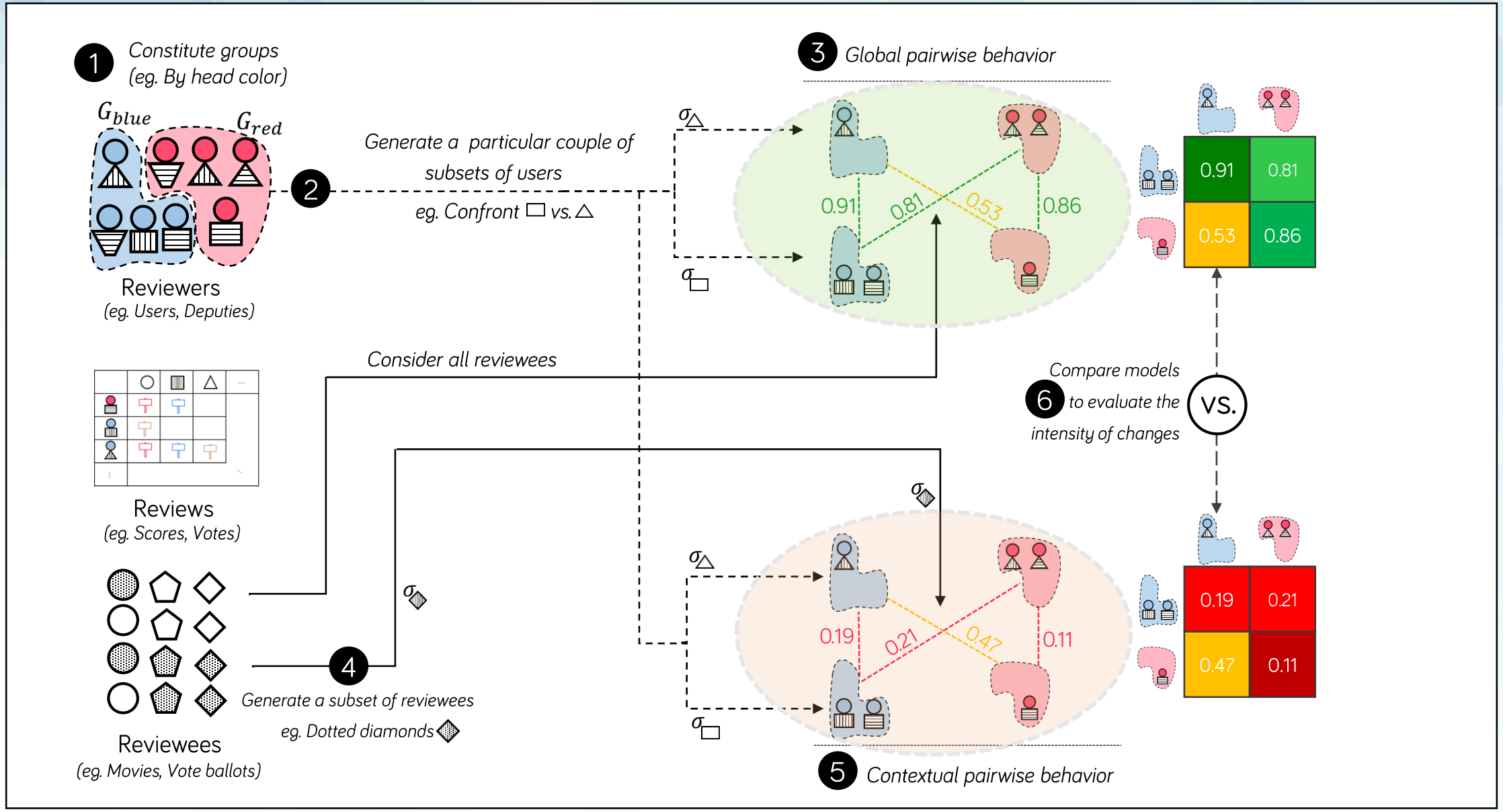

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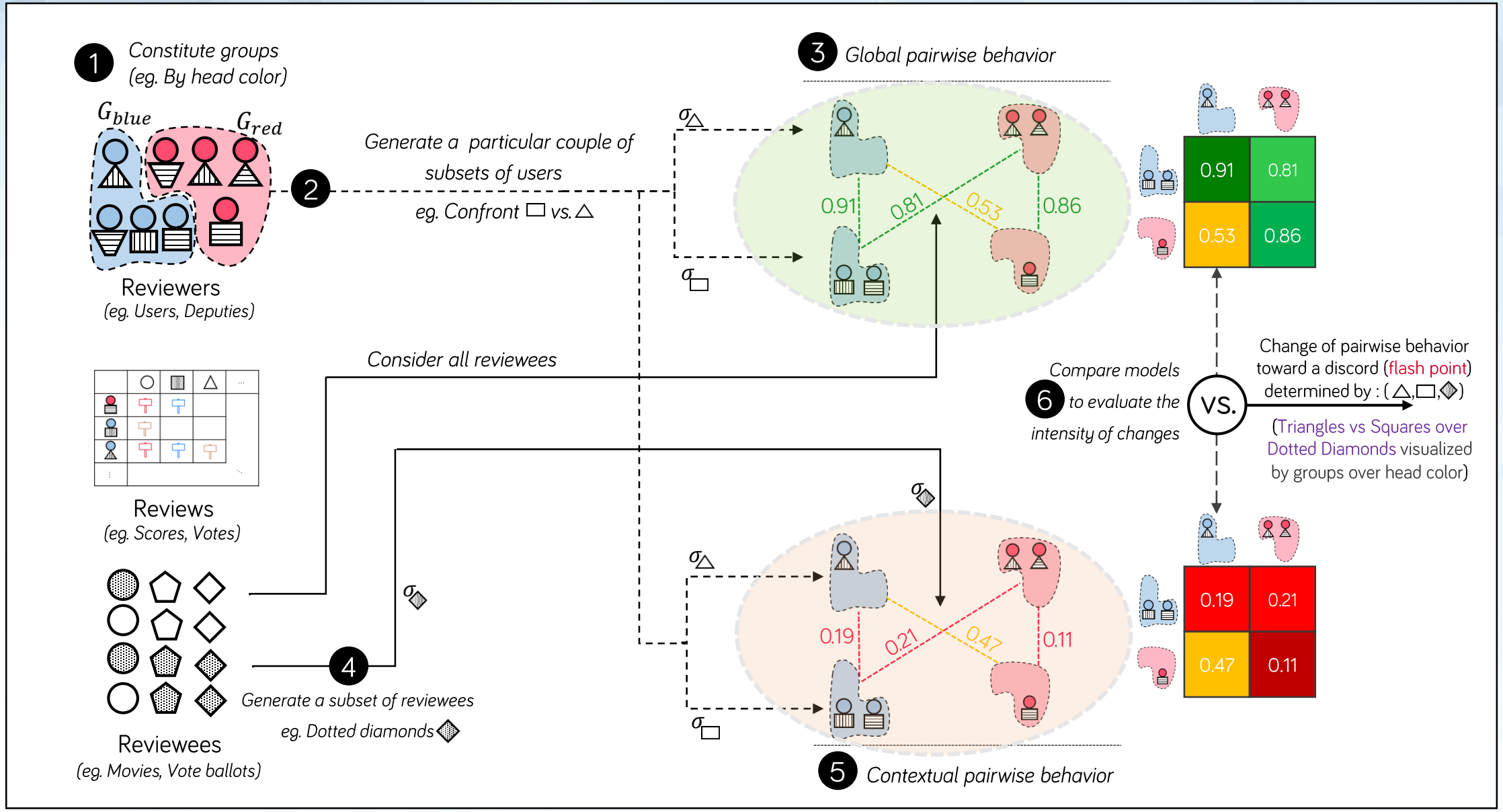

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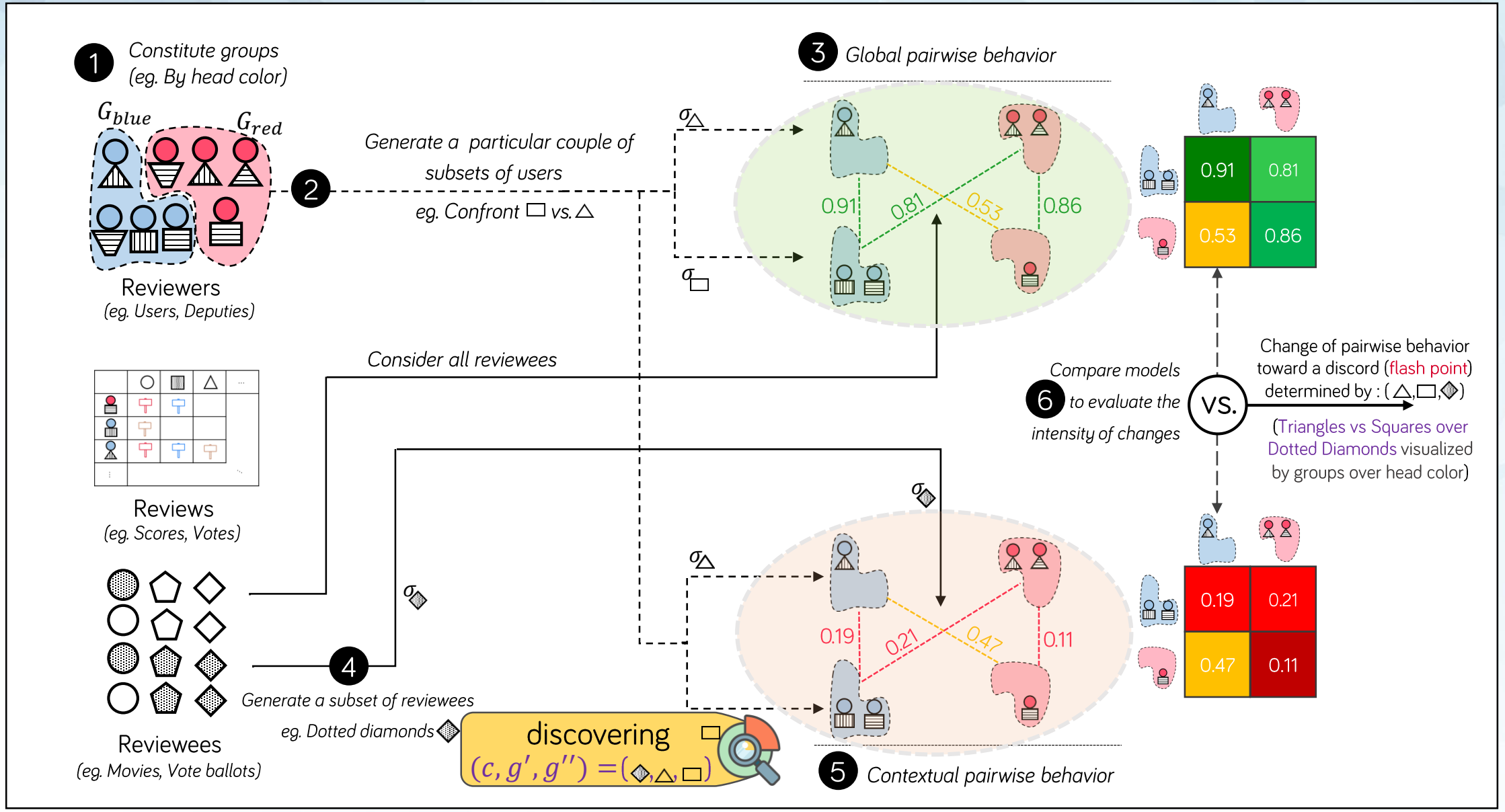
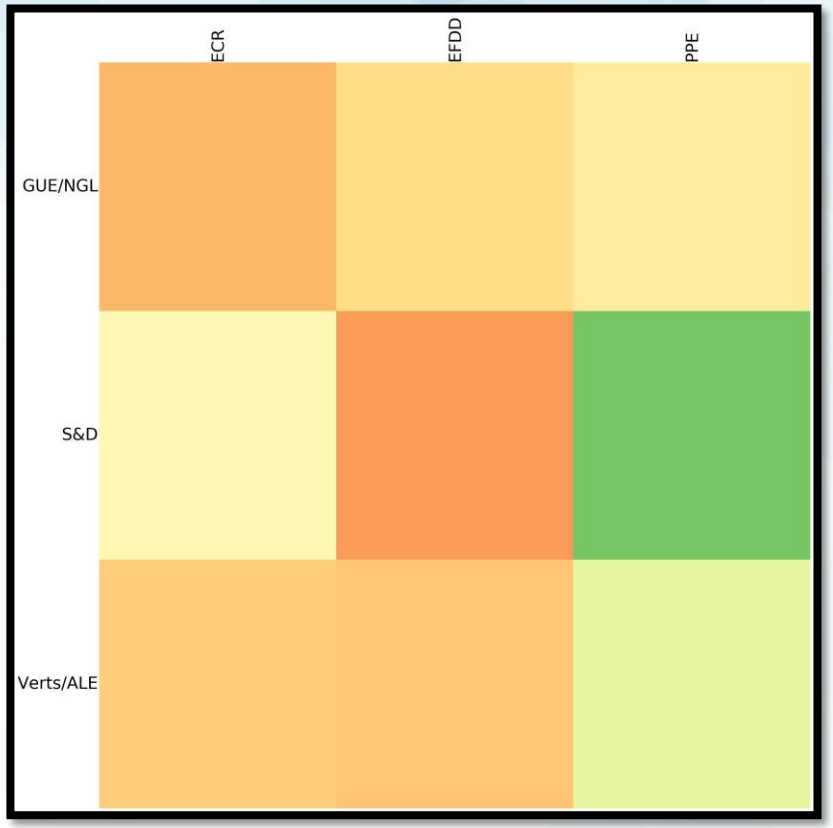


EXAMPLE: EUROPEAN PARLIAMENT DATASET

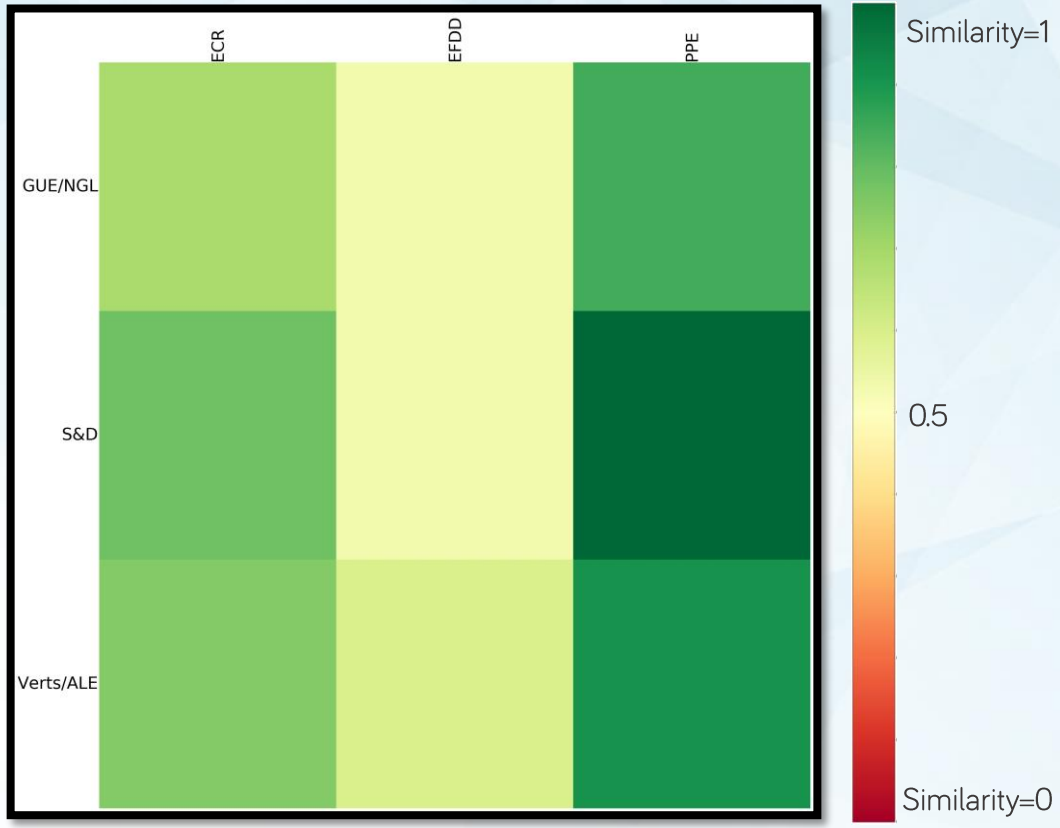
Usual pairwise behavior



Toward consent between European political groups
The pattern:

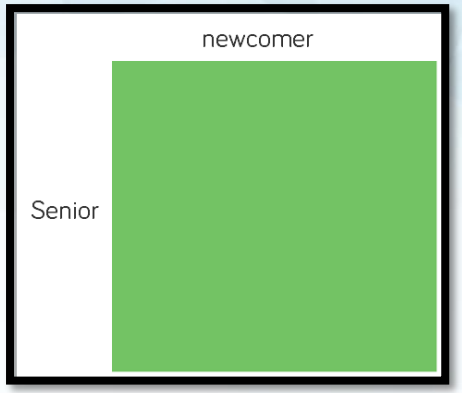
[7.40 European judicial conventions during Feb. – Nov. 2015 ,left wing ,right wing]

Contextual pairwise behavior



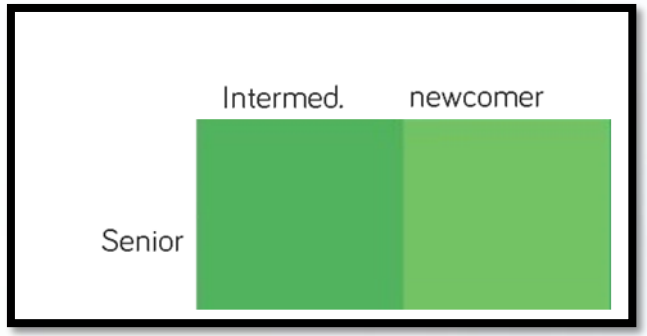
EXAMPLE: YELP DATASET

Usual pairwise behavior



Toward Dissent between Yelp Users for the context:

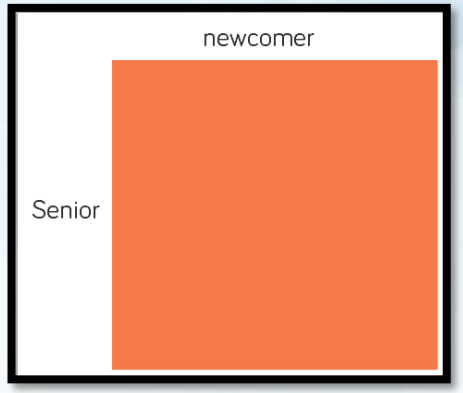
[Professional Services, Shopping, In Oklahoma, Senior, Newcomer]

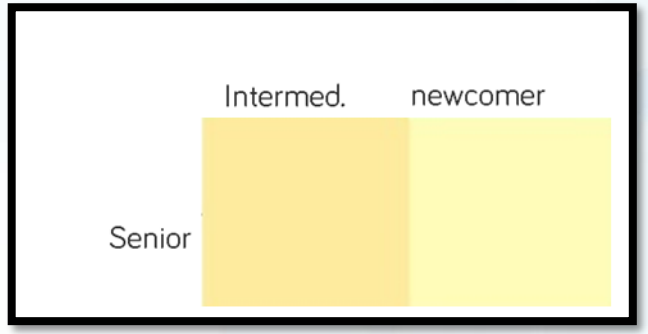


Toward Dissent between Yelp Users for the context:

[Medical Center, Doctors, In Wisconsin, {Senior}, {Interm., Newcomer},]

Contextual pairwise behavior





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Example: In the European Parliament, The deputy X votes practically the same as the deputy Y.

To evaluate at what extent this claim is valid, several questions pop in mind implying different ways to enlighten such claims:

- Is this claim valid in the general case (when considering all votes) ? *(do the math)*
- Contextualize the claim:
  - Considering that the two deputies are from two different parties, are the two respective parties similar in their voting behavior ?
  - Is it valid for every context (time period, topic of ballots) ?

FACT CHECKING, EXAMPLES OF BCCs

Claim 1 In the European parliament, French deputies vote following the votes recommendation given by their respective national parties

Claim 2 There is no national position when it comes to votes in European political group.

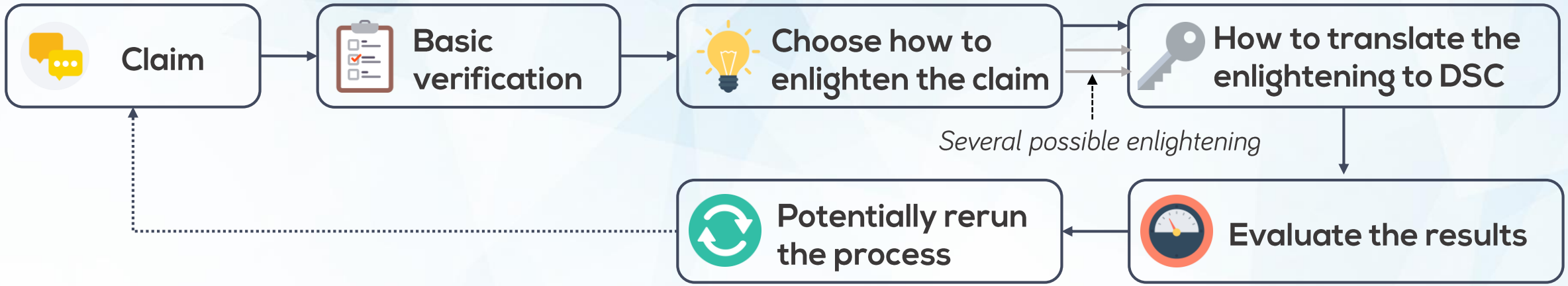
Claim 3 Deputy D1 votes practically the same as a deputy D2 (Several possibilities by considering different dimensions of grouping ...)

Claim 4 The Topic X is a hotter than the Topic Y (w.r.t. all the parliament, some countries or some political groups ...)

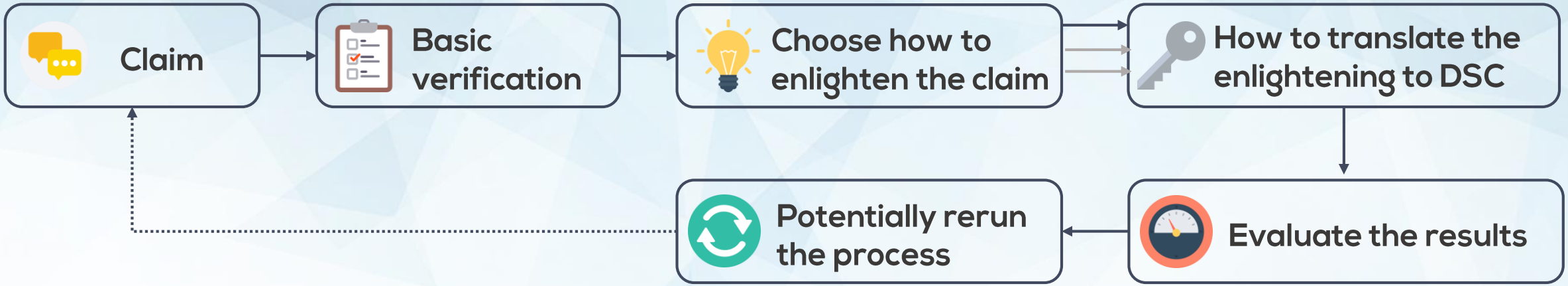
Claim 5 Deputy D1 changed his behavior after 2013 compared to its national party (the two political line diverge at some point after 2013 or for particular contexts)

FACT CHECKING, PROCESS

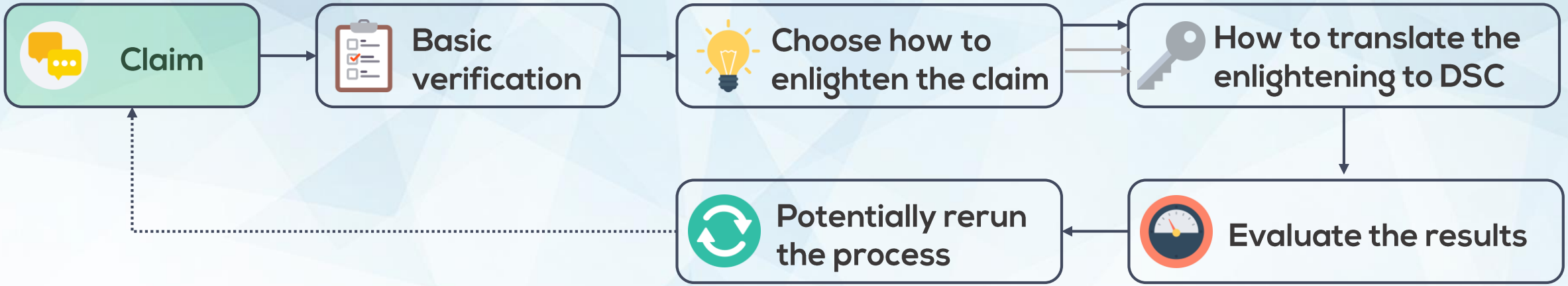
What is the process of evaluating Behavioral Comparison Claims?



FACT CHECKING, PLAYING THE PROCESS

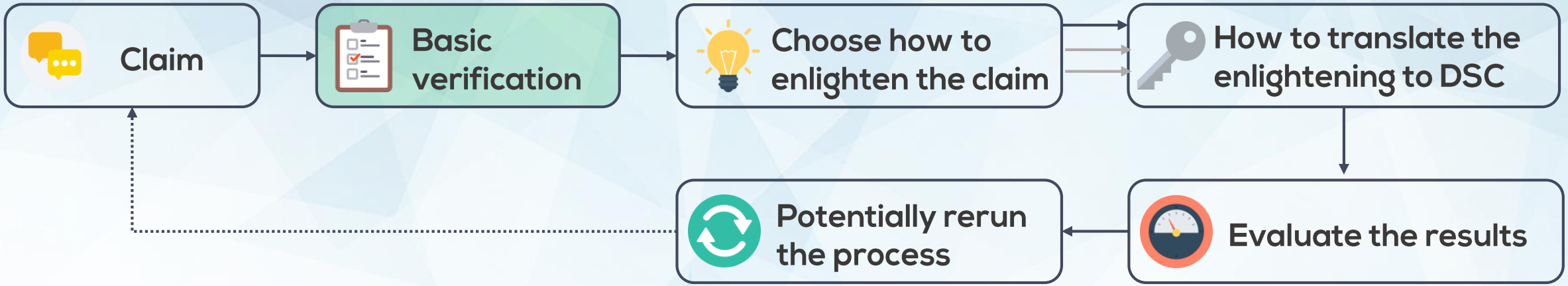


FACT CHECKING, PLAYING THE PROCESS



Claim 1 In the European parliament, French deputies vote following the votes recommendation given by their respective national parties

FACT CHECKING, PLAYING THE PROCESS



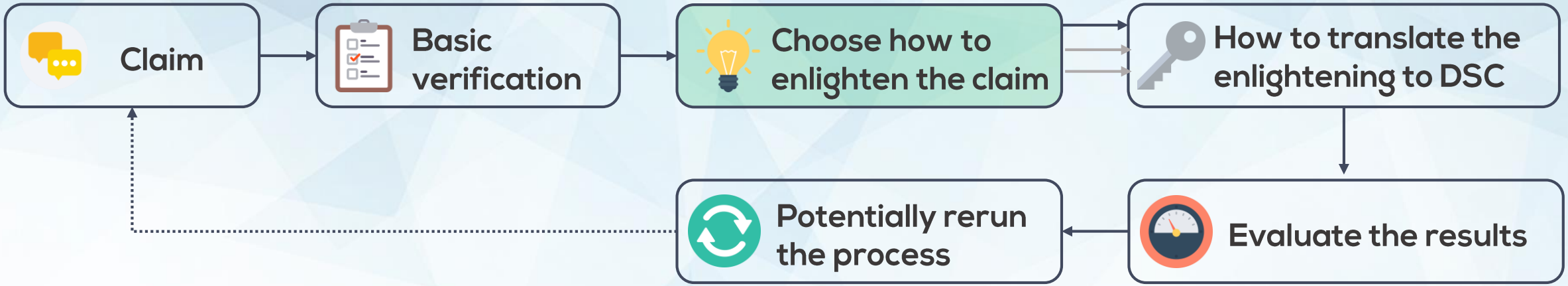
Basic Verification

For each **French National Party** and using **all the roll call votes**: evaluate the **usual intra-cohesion**

**To measure intra cohesion, the Agreement Index[1] can be used*

[1] Hix, S., Noury, A., & Roland, G. (2005). Power to the parties: cohesion and competition in the European Parliament, 1979–2001. British Journal of Political Science, 35(2), 209-234.

FACT CHECKING, PLAYING THE PROCESS

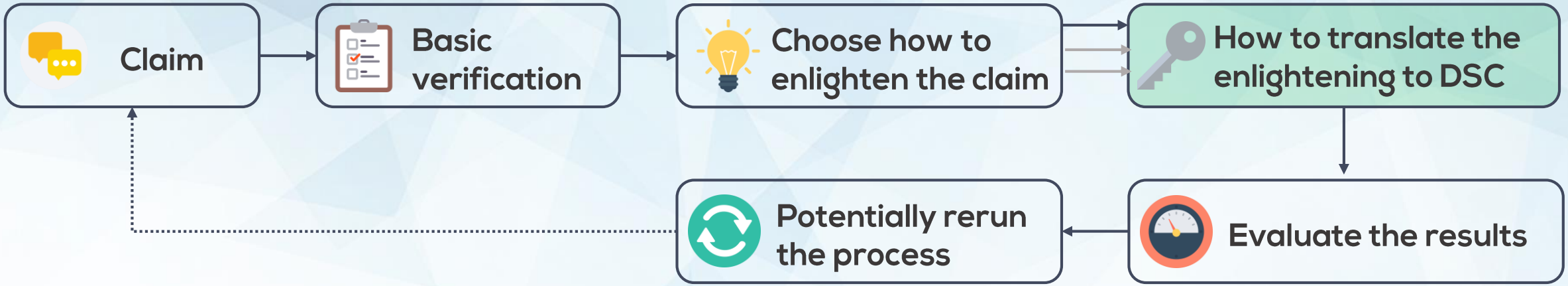


1

Enlightening the claim

Finding counter arguments: is there any particular context (identifying a subset of ballots) where a national party intra-cohesion decreases significantly?

FACT CHECKING, PLAYING THE PROCESS



1

Translating (Using DSC)

Discovering Intra-cohesion changes: We are then interested in finding contexts (subsets of items) where the intra-cohesion measure for a national party reduces w.r.t. its usual intra-cohesion.

Part 1	Part 2	Part 3	Part 4
Filtering the underlying dataset	Identifying the enlightening dimensions	Selecting the measures	Setting the constraints

FACT CHECKING, PLAYING THE PROCESS

ANR MEETUP
Belfodil, Lamarre, Cazalens & Plantevit

1

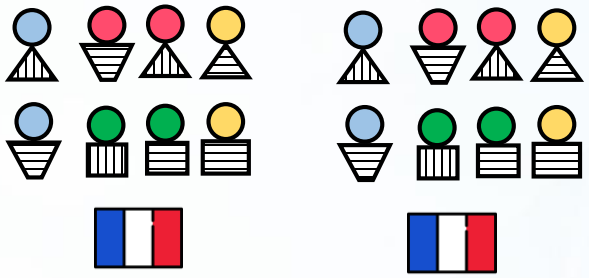
Translating (Using DSC)

Discovering Intra-cohesion changes: We are then interested in finding contexts (subsets of items) where the intra-cohesion measure for a national party reduces w.r.t. its usual intra-cohesion.

Part 1 Filtering the underlying dataset

1 *What are the two subsets of individuals that I am going to confront in this study?*

French Deputies against French deputies



2 *On what subset of items am I going to build the referential behavior ?*

The usual behavior: then All ballots

3 *Do I have a prior knowledge on what contexts domains I want to explore?*

No: consider then All ballots

FACT CHECKING, PLAYING THE PROCESS

1

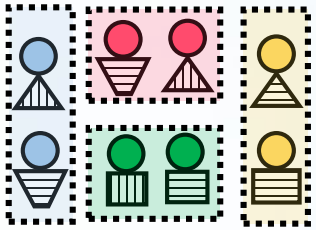
Translating (Using DSC)

Discovering Intra-cohesion changes: We are then interested in finding contexts (subsets of items) where the intra-cohesion measure for a national party reduces w.r.t. its usual intra-cohesion.

Part 2 Identifying the enlightening dimensions

4 *What dimensions to consider when building groups of individuals?*

National Parties



5 *How a context is defined (by which ballots description attributes)?*

The ballots themes

Items (Ballots) - E			Individuals (Deputies) - U			Outcome
Idsession	Date	Theme	Full name	National Party	Political Group	Vote
001	2017/03/17	1.10 Justice 2.10 Europe coop	Lavrilleux	LR	PPE	For
001	2017/03/17	1.10 Justice 2.10 Europe coop	Philippot	FN	ENF	Against
002	2017/04/11	3.10 Agriculture	Lavrilleux	LR	PPE	For
002	2017/04/11	3.10 Agriculture	Philippot	FN	ENF	For
002	2017/04/11	3.10 Agriculture	Arnatu	FN	ENF	For
003	2017/04/11	1.20 Security	Le Grip	LR	PPE	Abstain

6 *How a subset of individuals is defined (by which deputies description attributes)?*

National Parties: + Confront only the same subsets (Intra groups behavior)

Items (Ballots) - E			Individuals (Deputies) - U			Outcome
Idsession	Date	Theme	Full name	National Party	Political Group	Vote
001	2017/03/17	1.10 Justice 2.10 Europe coop	Lavrilleux	LR	PPE	For
001	2017/03/17	1.10 Justice 2.10 Europe coop	Philippot	FN	ENF	Against
002	2017/04/11	3.10 Agriculture	Lavrilleux	LR	PPE	For
002	2017/04/11	3.10 Agriculture	Philippot	FN	ENF	For
002	2017/04/11	3.10 Agriculture	Arnatu	FN	ENF	For
003	2017/04/11	1.20 Security	Le Grip	LR	PPE	Abstain

FACT CHECKING, PLAYING THE PROCESS

1

Translating (Using DSC)

Discovering Intra-cohesion changes: We are then interested in finding contexts (subsets of items) where the intra-cohesion measure for a national party reduces w.r.t. its usual intra-cohesion.

Part 3 Selecting the measures

7 *What similarity measures between confronted subsets of individuals do you want to use?*

Agreement index

8 *Are you interested in strengthening similarities or weakening similarities?*

Weakening of similarities: Decreases of intra cohesion

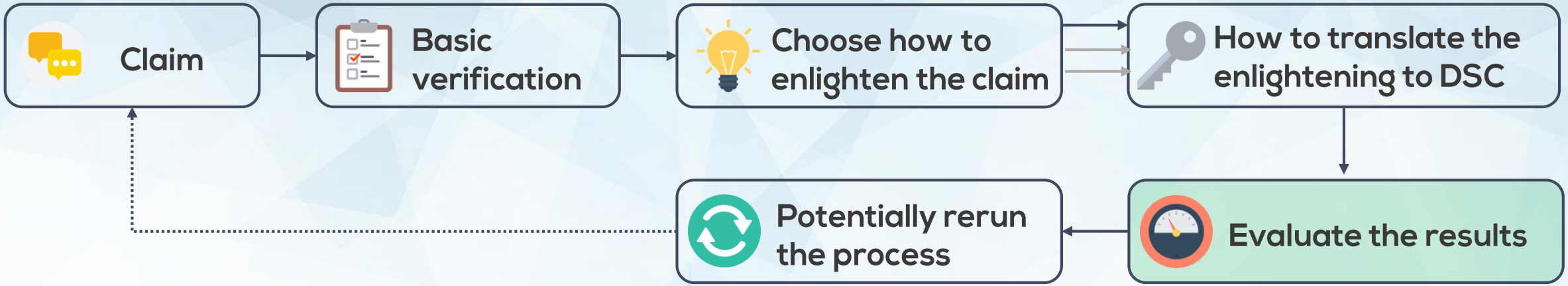
Part 4 Setting the constraints

9 *Advanced constraints and other info:*

- *What are the minimum number of ballots over which a resulting pattern is viewed as significant? (#thres. Items= 10)*
- *What is the minimum number of deputies composing a group? (#thres. Items= 5)*
- *How much results do you want to display? (Top-K) (K= 25)*

...

FACT CHECKING, PLAYING THE PROCESS



Evaluating the results

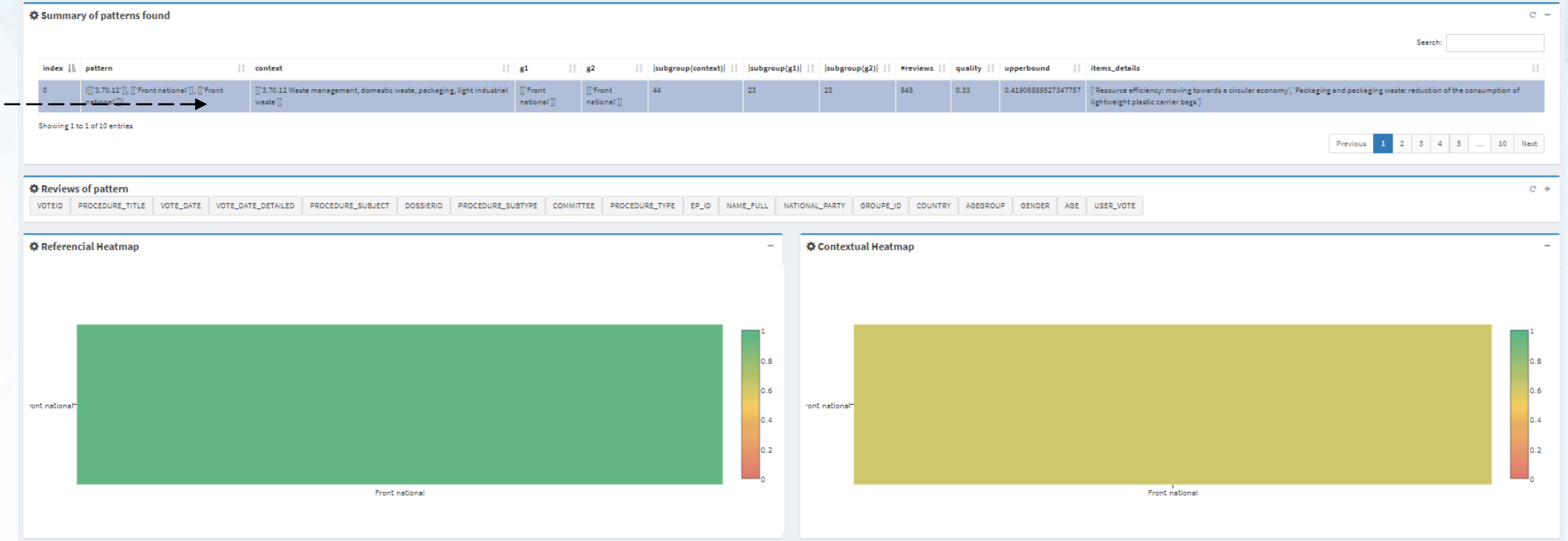
Results: DSC gives the set of the most significant patterns w.r.t. the Intensity of change of pairwise behavior.

FACT CHECKING, PLAYING THE PROCESS

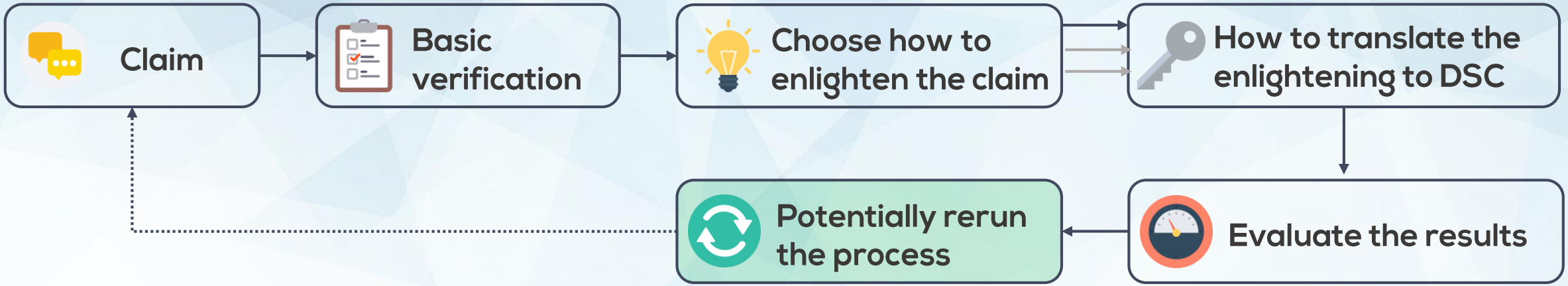
Evaluating the results

Results: DSC gives the set of the most significant patterns w.r.t. the Intensity of change of pairwise behavior.

For the context -Waste management- , The intra-cohesion of the French national party FN tends to decrease by 30%



FACT CHECKING, PLAYING THE PROCESS



Rerun the process

Depending on the claim, it may be interesting to **enlighten it from another angle of view.**

**We will give an example of this for the next claim.*

FACT CHECKING, EXAMPLES OF BCCs

Claim 1 In the European parliament, French deputies vote following the votes recommendation given by their respective national parties → *Valid in general case, but there is some particular contexts where deputies of certain national parties are divided*

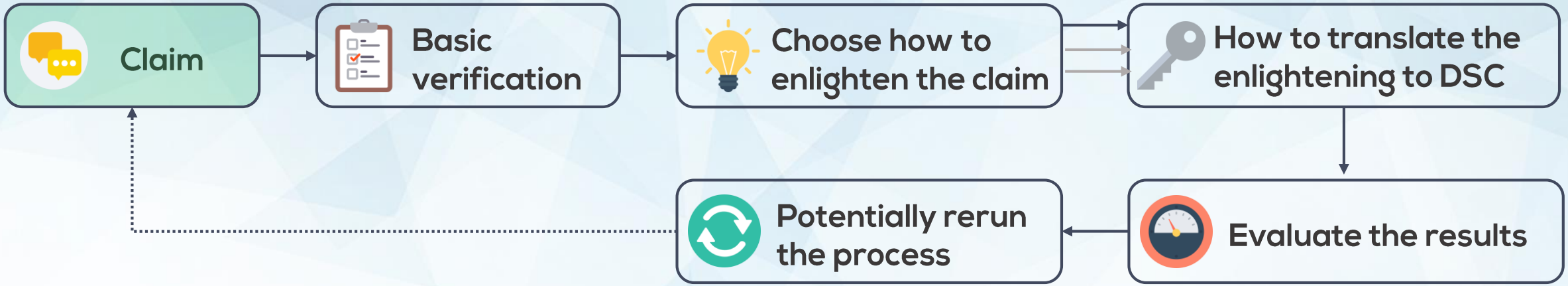
Claim 2 There is no national position when it comes to votes in European political group.

Claim 3 Deputy D1 votes practically the same as a deputy D2 (Several possibilities by considering different dimensions of grouping …)

Claim 4 The Topic X is a hotter than the Topic Y (w.r.t. all the parliament, some countries or some political groups …)

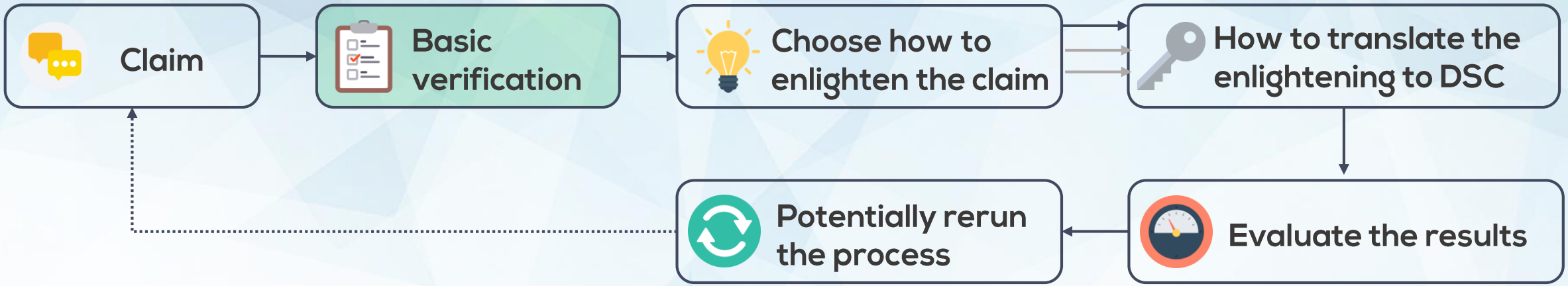
Claim 5 Deputy D1 changed his behavior after 2013 compared to its national party (the two political line diverge at some point after 2013 or for particular contexts)

FACT CHECKING, PLAYING THE PROCESS



Claim 2 There is no national position when it comes to votes in European political group (Select S&D for example).

FACT CHECKING, PLAYING THE PROCESS



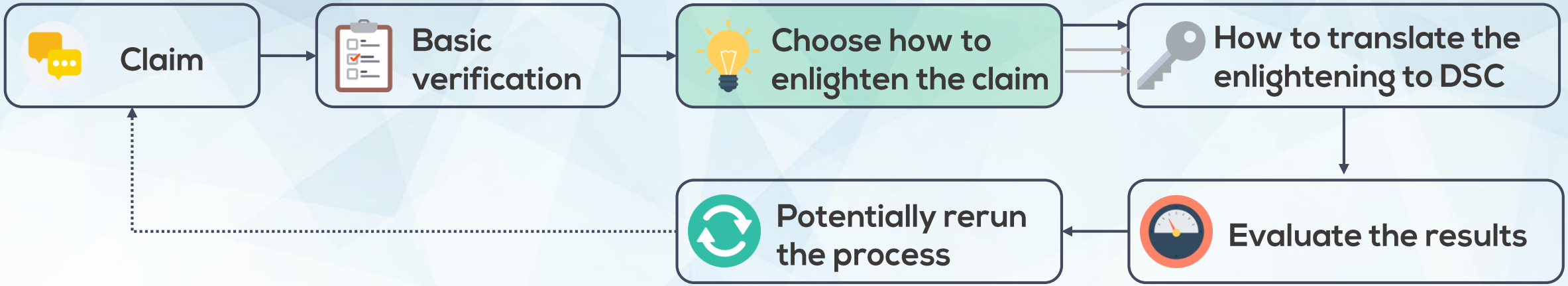
1 *Basic Verification*

For each **European Political Group** and using **all the roll call votes**: evaluate the **usual intra-cohesion** for a given political group (There are 7)

2

For a given **European Political Group**, confront deputies of each peer of countries and using **all the roll call votes**: evaluate the **usual pairwise behavior.**

FACT CHECKING, PLAYING THE PROCESS



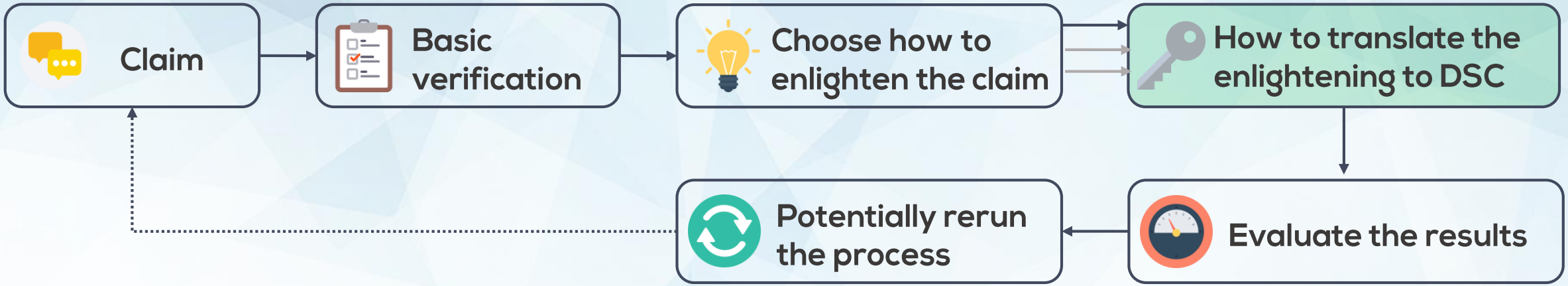
2

Enlightening the claim

Finding counter arguments/or strengthening arguments: is there any particular context (identifying a subset of ballots) where for a given European group we have an important Weakening/Strengthening of the usual observed pairwise behavior*

**similarity between the two confronted majorities of countries*

FACT CHECKING, PLAYING THE PROCESS



2 *Translating (Using DSC)*

Discovering change of pairwise agreement: We are then interested in finding contexts (subsets of items) where the pairwise behavior between two confronted countries of the same political group changes drastically (e.g.: toward discord) w.r.t. its usual maintained pairwise behavior.

Part 1	Part 2	Part 3	Part 4
Filtering the underlying dataset	Identifying the enlightening dimensions	Selecting the measures	Setting the constraints

FACT CHECKING, PLAYING THE PROCESS

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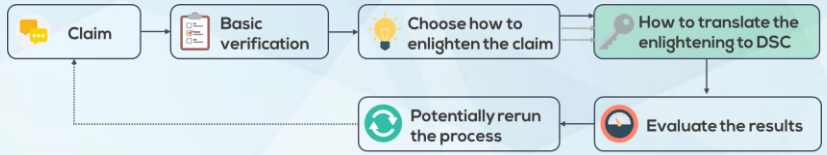
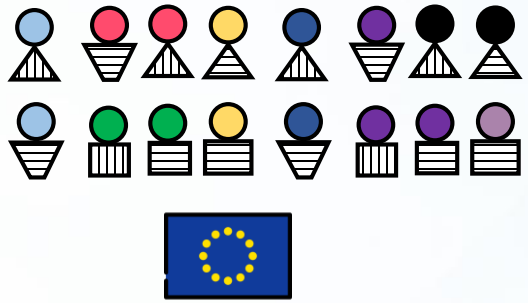


Part 1 Filtering the underlying dataset

1 *What are the two subsets of individuals that I am going to confront in this study?*

All Deputies against All Deputies



2 *On what subset of items am I going to build the referential behavior ?*

The usual behavior: then All ballots

3 *Do I have a prior knowledge on what contexts domains I want to explore?*

No: consider then All ballots

FACT CHECKING, PLAYING THE PROCESS

ANR MEETUP
Belfodil, Lamarre, Cazalens & Plantevit

2

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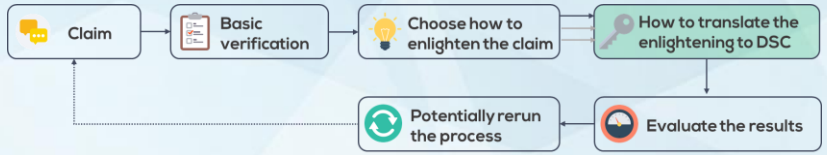
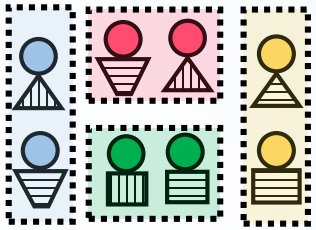


Part 2 Identifying the enlightening dimensions

4 *What dimensions to consider when building groups of individuals?*

Countries



5 *How a context is defined (by which ballots description attributes)?*

The ballots themes & period of voting

Items (Ballots) - E			Individuals (Deputies) - U			Outcome
Idsession	Date	Theme	Full name	National Party	Political Group	Vote
001	2017/03/17	1.10 Justice 2.10 Europe coop	Lavrilleux	LR	PPE	For
001	2017/03/17	1.10 Justice 2.10 Europe coop	Philippot	FN	ENF	Against
002	2017/04/11	3.10 Agriculture	Lavrilleux	LR	PPE	For
002	2017/04/11	3.10 Agriculture	Philippot	FN	ENF	For
002	2017/04/11	3.10 Agriculture	Arnatu	FN	ENF	For
003	2017/04/11	1.20 Security	Le Grip	LR	PPE	Abstain

6 *How a subset of individuals is defined (by which deputies description attributes)?*

Countries:

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001	2017/03/17	1.10 Justice 2.10 Europe coop	Philippot	FN	ENF	Against
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002	2017/04/11	3.10 Agriculture	Arnatu	FN	ENF	For
003	2017/04/11	1.20 Security	Le Grip	LR	PPE	Abstain

FACT CHECKING, PLAYING THE PROCESS

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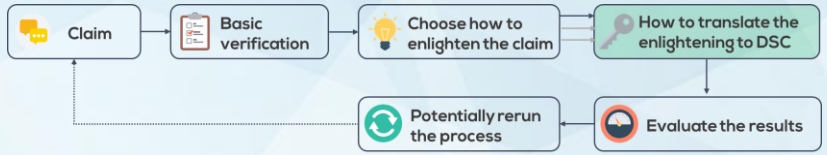


Part 3 Selecting the measures

7 *What similarity measures between confronted subsets of individuals do you want to use?*

Similarity between majority vote

8 *Are you interested in strengthening similarities or weakening similarities?*

Weakening of similarities: Decreases of pairwise behavior

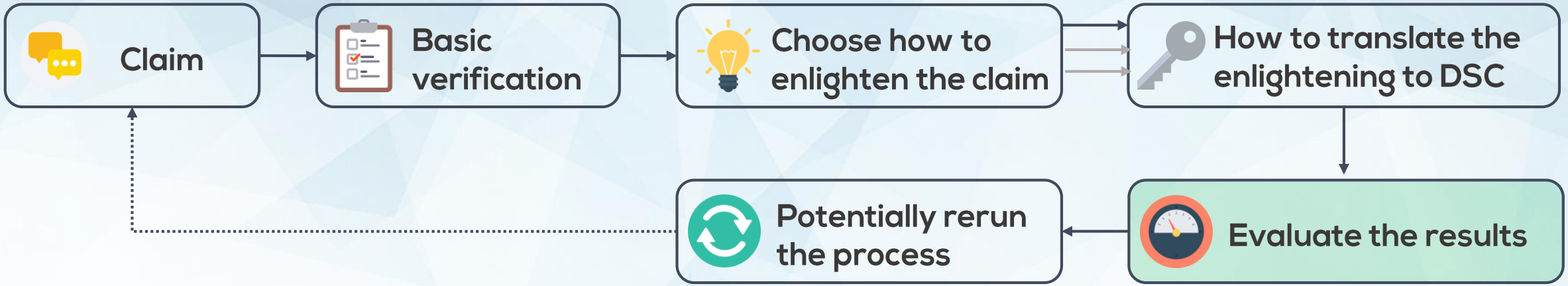
Part 4 Setting the constraints

9 *Advanced constraints and other info:*

- *What are the minimum number of ballots over which a resulting pattern is viewed as significant? (#thres. Items= 15)*
- *What is the minimum number of deputies composing a group? (#thres. Items= 20)*
- *How much results do you want to display? (Top-K) (K= 25)*

...

FACT CHECKING, PLAYING THE PROCESS



Evaluating the results

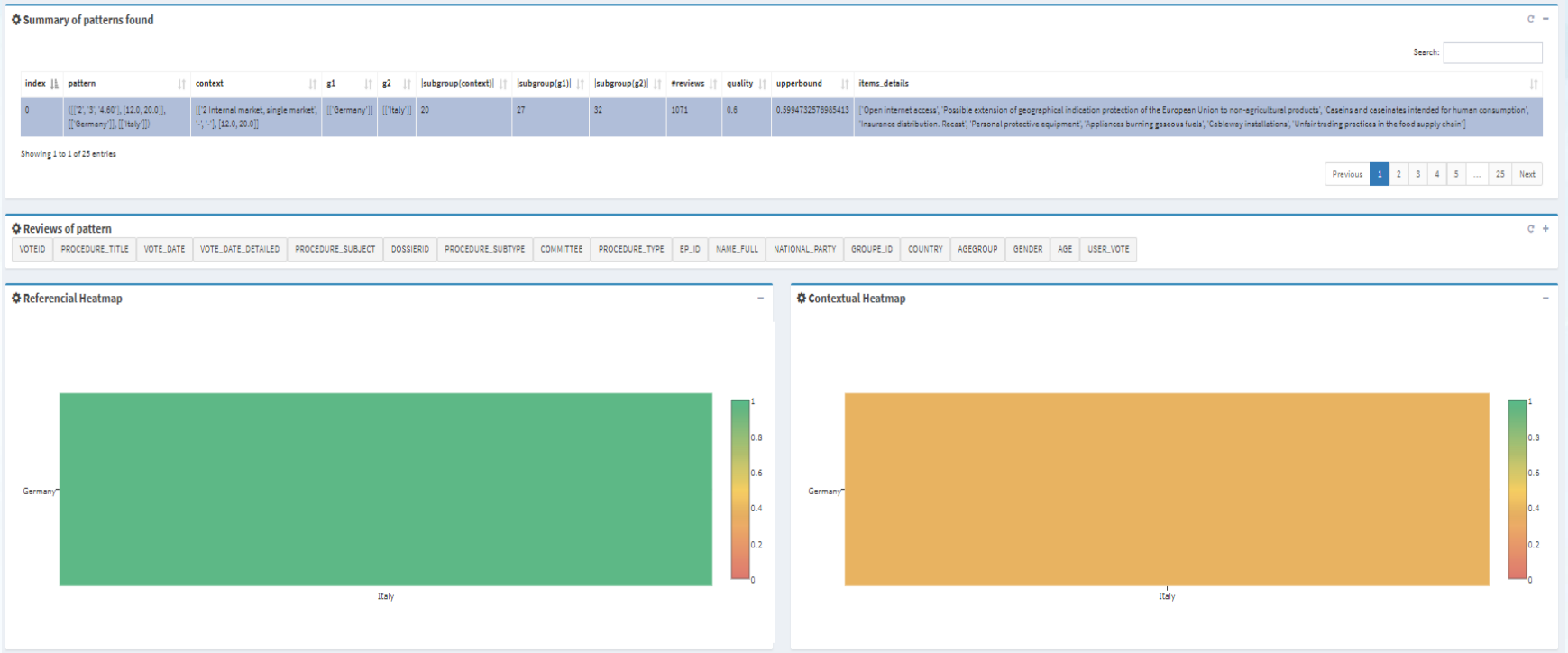
Results: DSC gives the set of the most significant patterns w.r.t. the Intensity of change of pairwise behavior.

FACT CHECKING, PLAYING THE PROCESS

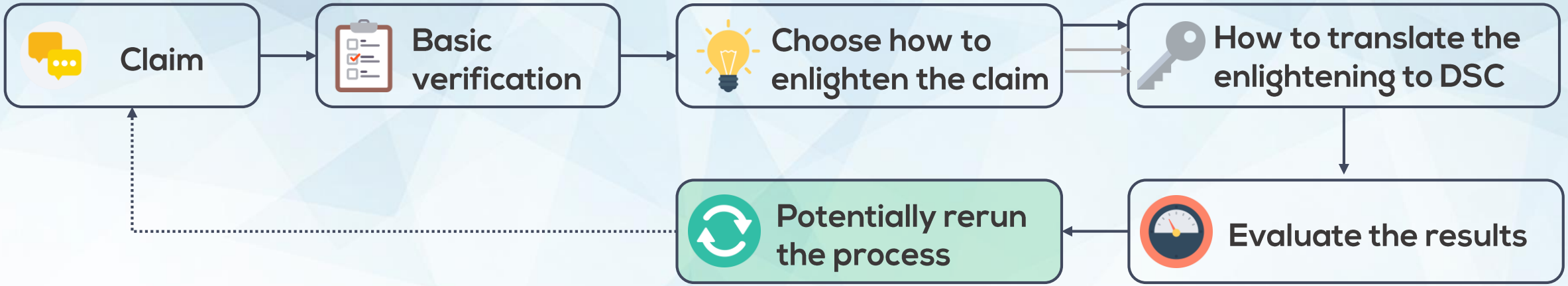
Evaluating the results

Results: DSC gives the set of the most significant patterns w.r.t. the Intensity of change of pairwise behavior.

For the context
- (2 Internal Market, 3, 4.60 Consumers protection in general Between) [Oct 2015, June 2016]- , The pairwise behavior between the German and the Italian S&D deputies tends to decrease by 60%



FACT CHECKING, PLAYING THE PROCESS



Rerun the process

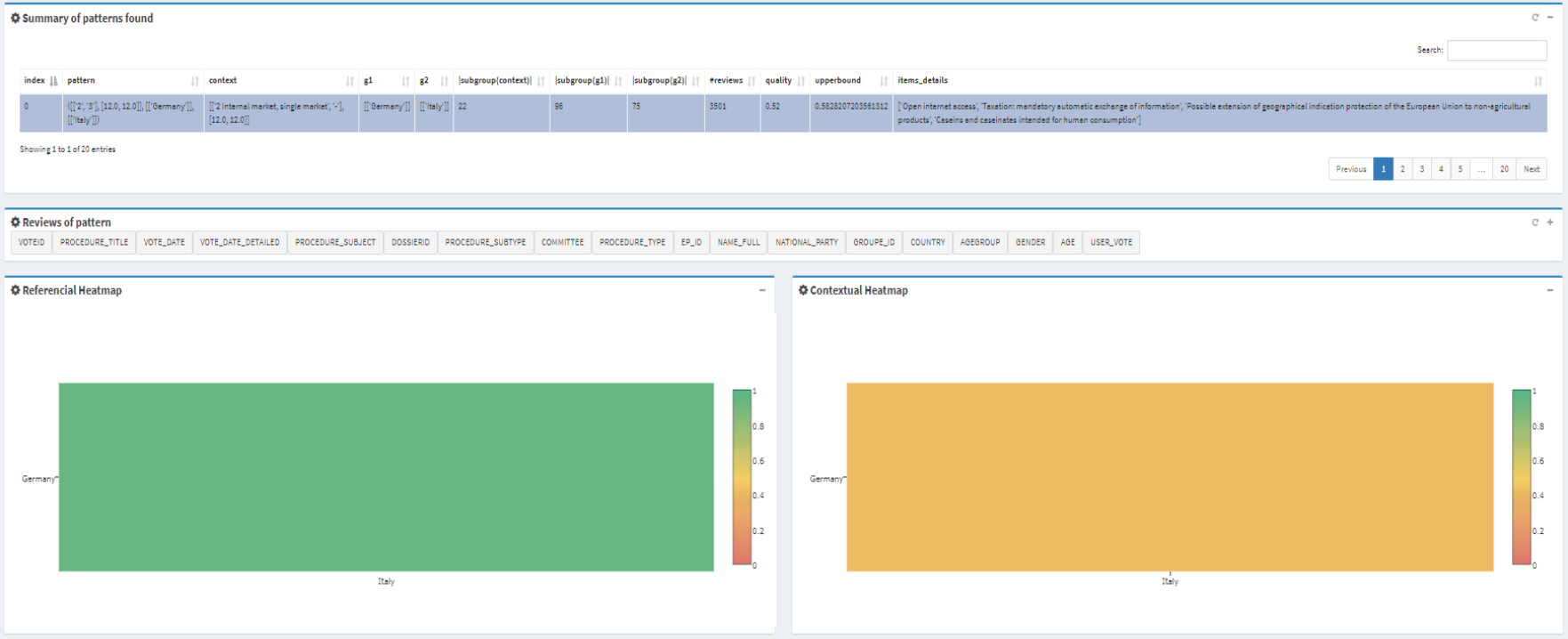
We seen that German and Italian S&D deputies are in disagreement considering the context shown before. Is it the a context that divide the two countries in general?

FACT CHECKING, PLAYING THE PROCESS

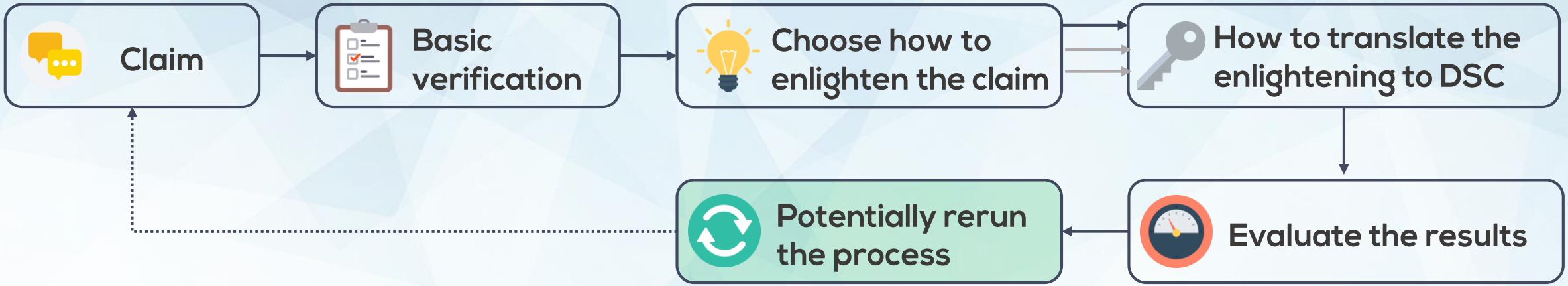
Evaluating the results

Results: DSC gives the set of the most significant patterns w.r.t. the Intensity of change of pairwise behavior.

For the context
- (2 Internal Market, 3) [Oct 2015, June 2016]- , The pairwise behavior between the German and the Italian **ALL** deputies tends to decrease by 51%



FACT CHECKING, PLAYING THE PROCESS



Rerun the process

And we can rerun crossing the national parties and so on …

FACT CHECKING, EXAMPLES OF BCCs

Claim 1 In the European parliament, French deputies vote following the votes recommendation given by their respective national parties → *Valid in general case, but there is some particular contexts where deputies of certain national parties are divided*

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Claim 5 Deputy D1 changed his behavior after 2013 compared to its national party (the two political line diverge at some point after 2013 or for particular contexts)

SUMMARY

1. Fact Checking
2. Problem statement
3. DSC Framework (solution)
4. Using DSC to enlighten BCCs
5. Conclusions and discussions

Conclusion

- Definition of a novel problem :
  discovering exceptional pairwise behavior

- A little primer on evaluating/enlighening
  BCCs (Behaviors Comparison Claims)
  using DSC

CONCLUSION AND PERSPECTIVES

Conclusion

- Definition of a novel problem : discovering exceptional pairwise behavior
- A little primer on evaluating/enlighening BCCs (Behaviors Comparison Claims) using DSC

Perspective

- Providing adapted instant mining and interactive mining algorithms.
- Studying the behavior of groups of individuals (deputies) through time.
- ContentCheck: Design a set of tools for fact checking/lead finding

THANKS
FOR YOUR TIME

QUESTIONS

Contact : adnene.belfodil@insa-lyon.fr

Materials: https://github.com/Adnene93/DiscoveringSimilarityChanges

Feel free to ask any question you have :-)

BIBLIOGRAPHY

THANKS FOR YOUR TIME ? QUESTIONS

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