CONSƎNSUS: A Behavioral Social Choice Analyzer

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Three Main Concerns

- ❑ Empirical Evidence for Condorcet Paradox? (Majority Cycles)
- ❑ Empirical Consensus among Consensus Methods? (Generalization of Condorcet Efficiency)
- ❑ Consistent Estimators (Beyond Condorcet Efficiency)

Normative Theory → ← **Descriptive Theory & Data**

Behavioral Social Choice

Three Main Complications

- ❑ Data presented in a variety of formats
- ❑ Some data formats need additional assumptions
- ❑ Consensus methods are computationally intensive

Consensus Methods

- ❑ Condorcet
- ❑ Borda
- ❑ Plurality
- ❑ Anti Plurality
- ❑ STV
- ❑ Coombs
- ❑ Plurality Runoff
- ❑ Mean Generalized Rank
- ❑ Median Generalized Rank
- ❑ Mode Generalized Rank
- ❑ Mode Binary Relation
- ❑ Random Vote

Bootstrap Options

- ❑ Parametric Bootstrap
- ❑ Nonparametric Bootstrap
- ❑ Sample Size (Number of voters in the sample)
- ❑ Bootstrap Size (Number of bootstrap iterations)

Data formats

- ❑ Binary Relations
- ❑ Full Ranks
- ❑ Partial Ranks
- ❑ Full Numerical Ratings
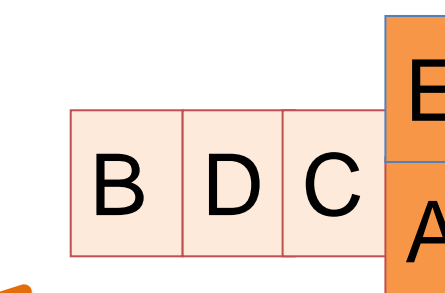- ❑ Partial Numerical Ratings
- ❑ Likert Scale

A Behavioral Social Choice Analyzer

CONSƎNSUS: A Behavioral Social Choice Analyzer — About

INPUT / **INPUT OPTIONS**

Data Source / Profile Selection
- ◉ Load Profile from .csv File
- ◯ Create Profiles from Theoretical Culture

.csv File
File Location: C:\Users\puffin\Dropbox\Voting Rules\GUI\APA_1980_Ranked.csv
Data Type: Ranked Data — <Select Type> Full Ranking / Partial Ranking / Other — <Select Model> Partial Order (PO) / Weak Order (WO) / Size Indep. Model (SIM)

Data Description
- Number of Voters: 15449
- Number of Candidates: 5

Theoretical Culture
- Culture Type: Choose Cult. Type

ANALYSIS / **OUTPUT OPTIONS & RESULTS**

Analysis Options / Apply Rule(s)
<Select Rules> Condorcet / Borda / Plurality

Outputs / Original Data Set Result(s)
Result 1

Describe — Save — Load — Rename

Bootstrap Options
- Number of Iterations: 10
- Voters in Bootstrap: 15449
- Random Seed: 0

Start Analysis

Agreement Among Rules
<Select Rule> First rank agreement / Last rank agreement / Agreement among social orders
Table...

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Agreement

- ❑ First Rank Agreement
- ❑ Last Rank Agreement
- ❑ First Rank is Last Rank Agreement
- ❑ Social Orders Agreement

Replicability

- ❑ First Rank Replicability
- ❑ Last Rank Replicability
- ❑ Social Orders Replicability

Partial Ranking Ballots

Complete Ranking

A	B	C	D	E
5	1	3	2	4

Partial Ranking

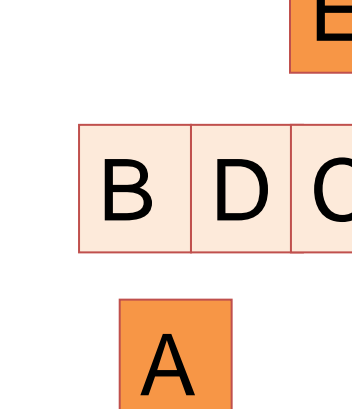| A	B	C	D	E
	1	3		2

Three Models of Partial Rankings

Weak order model
Unranked candidates are tied at the bottom of the preference

B D C E / A

Partial order model
No preferences b/w candidates when one or both are unranked

E
B D C
A

Size-Independent Linear Order model
Partial ranking is "beginning" of an unknown linear order
Linear order "profile" inferred statistically

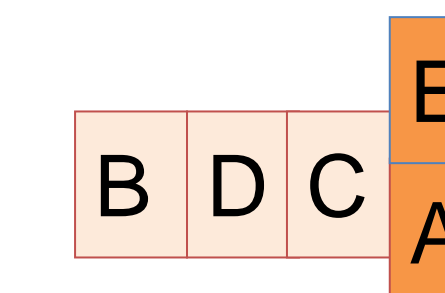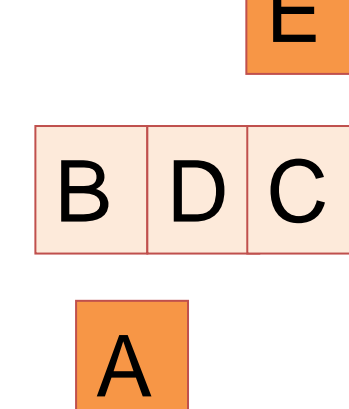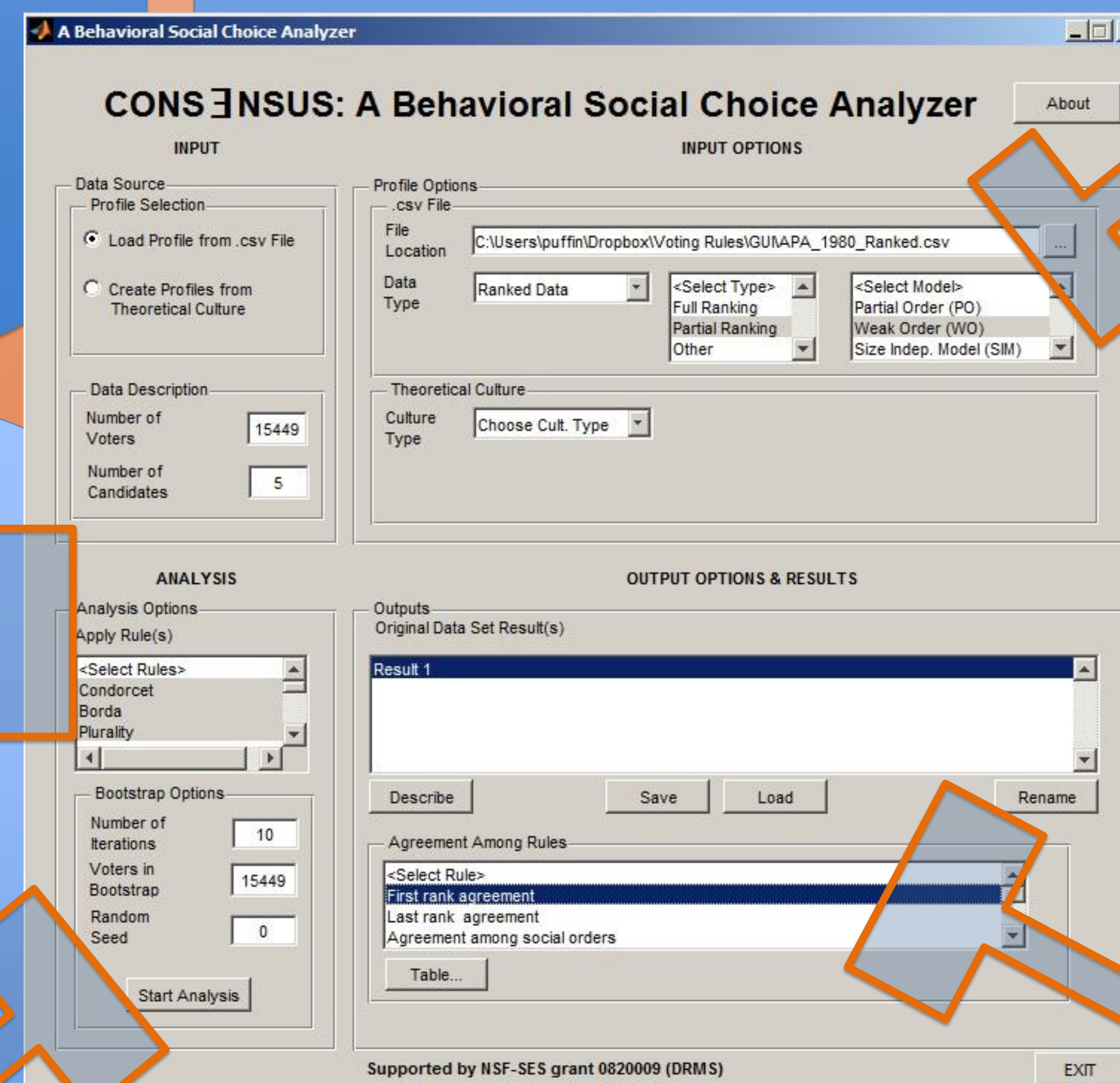B D C A E   B D C E A

Partial Rating Ballots

Complete Rating

A	B	C	D	E
3	10	5	8	1

Partial Rating

A	B	C	D	E
	10	5		8

Three Models of Partial Ratings

Weak order model
Unrated candidates are tied at the bottom of the preference

B D C E / A

Partial order model
No preferences b/w candidates when one or both are unrated

E
B D C
A

Model with replaced missing values
Assign any numerical value to unrated candidates

A	B	C	D	E
4	10	5	8	4

B D C E / A

A	B	C	D	E
9	10	5	8	9

E
B A D C