How "Me" becomes "We": A Mathematical & Quantitative Approach to Ideology dynamics

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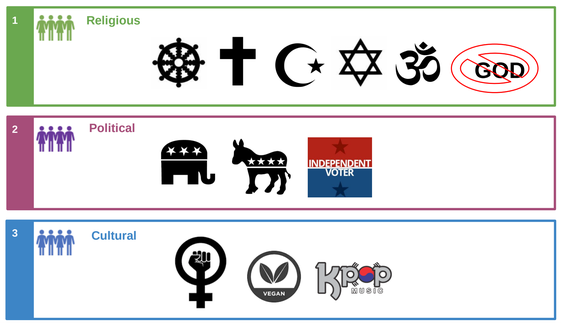
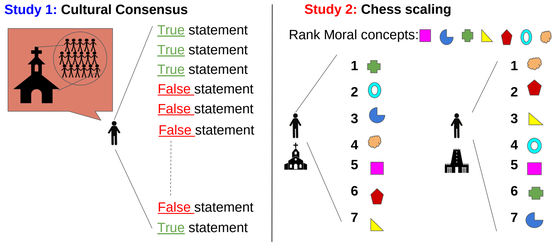
INTRODUCTION

Increasingly, ideology is an important topic of study as it influences our social judgment of important concepts like: right and wrong, fair and unjust, beautiful and ugly. Ideology has been a hotly debated topic for centuries. However, few agreements exist for what constitute an ideology, how it relates to culture and norms, and its emergence, role, and evolution. Hence this study attempts to resolve this age-long problem in a novel way by drawing from appropriate mathematical and quantitative methodologies in Anthropology Cultural Consensus Theory), Sociology (Networks), Evolutionary game theory (Dynamics), Mathematics (Kruskal Gamma), Statistics (Multidimensional Scaling, Principal Component Analysis), and Machine Learning (Unsupervised Clustering). To understand ideology, we use 2 studies to gather data from participants in 12 groups (religious, cultural, and political) and analyze important trends present in each. We attempt to answer questions such as: do Jews, Muslims, and Christians have similar level of expertise in their written doctrine? Do vegans and Republicans have similar spiritual beliefs? Our findings from this study will contribute to a more comprehensive theory of ideology and its evolution over time.

12 Ideology Groups

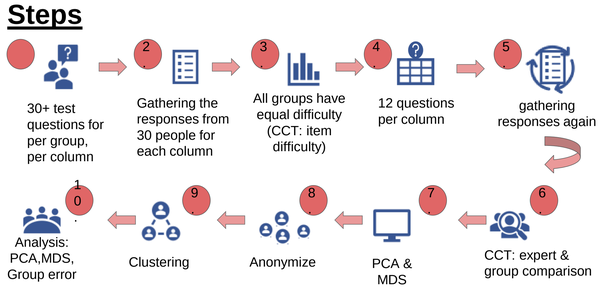


Ideology - 2 Studies



METHODOLOGY

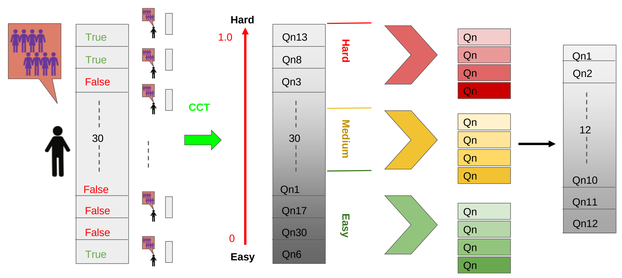
STUDY 1



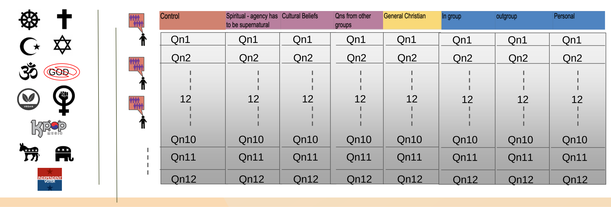
This study asks participants various **true** and **false** questions both about *their group* and *other general questions* based on their beliefs of their group. Seven hypotheses are tested.

Qns from other Groups | Cultural Beliefs | Spiritual | Specific for each group | In-group Benefits | Out-group Punishments | Personal Benefit

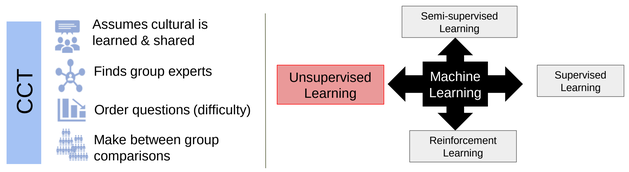
To ensure each hypothesis for each group has equal level of difficulty, 30+ items are refined to 12 (4 questions from each level of difficulty) using Cultural Consensus Theory (CCT)..



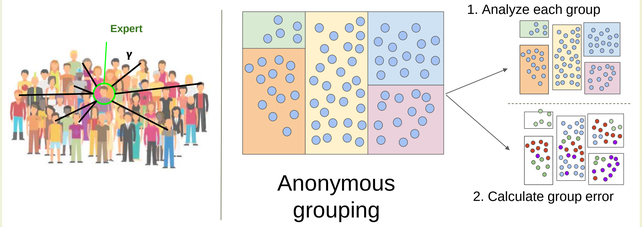
Each group answers 12 refined questions for each hypothesis.



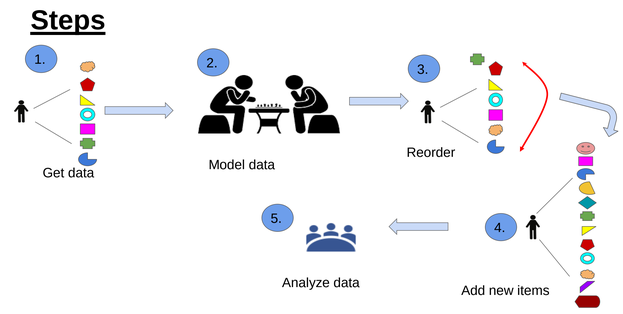
Using group responses, CCT and Gamma gives experts in each group. Then group affiliation labels are removed and individuals based on similarity.



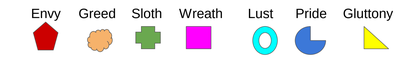
Experts are most central to groups. Once the grouping algorithm is complete, each group is analyzed and also compared to original groups.



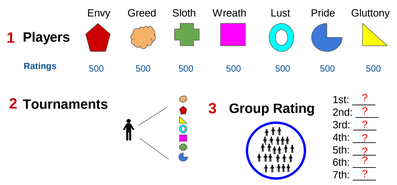
STUDY 2



Each group will ranked moral concepts, from worst to least worst.

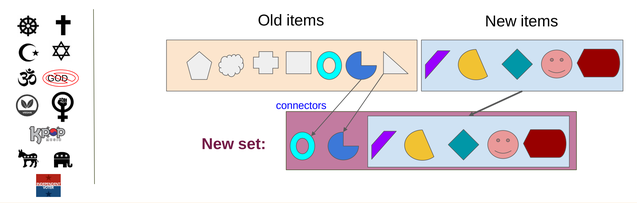


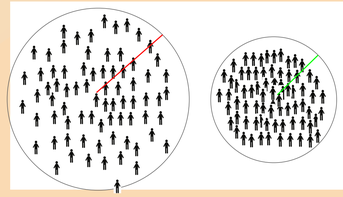
Chess set up



Players: sins
Tournaments: participant ranking
Group Rating: chess scaling algorithm

New moral concepts are added by including a few old items to the new set.



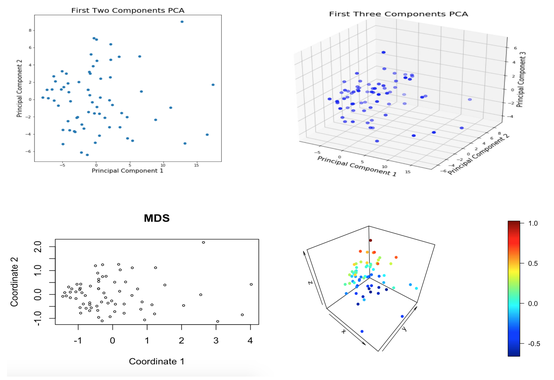


Participants cannot order more than 7 or so items at a given time and the connective mechanism allows for a deeper population wide exploration of large sets of morals.

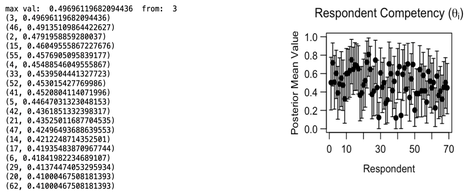
RESULTS

STUDY 1

Early results indicate that using Kruskal Gamma and CCT will give the same expert. Additionally, for Cultural concepts, participants do not cluster closely.



Clustering using both PCA and MDS shows scattered clusters. .



Experts using Gammas and CCT.

STUDY 2

Results from 32 Christian participants.

1st: Wrath
2nd: Greed
3rd: Envy
4th: Pride
5th: Gluttony
6th: Sloth
7th: Lust

DISCUSSION

Future applications of our research can be used in the creation of dynamic models. Specifically, these will be population dynamic models, which will predict and analyze how specific types of population evolve over time. We can apply our research to two specific types of these models, replicator dynamic models and cultural transmission models.

Replicator dynamics is a way to model how ideologies are transmitted in between groups. It models evolutionary dynamics by having a given replicator that can create copies of itself. The reason that we want an entity that creates copies is because a replicator can attract more people to be a part of the group. For example, in the context of our research, a replicator could be a cultural institution. If a cultural institution creates more headquarters (for example, a church creating more churches that follow the same practice), then it will be accessible to more people and therefore more people will join the group.

REFERENCES:
Carvalho (2015) "Identity-Based Organizations"
Batchelder, W. H., & Anders, R. (2012). Cultural consensus theory: Comparing different concepts of cultural truth. *Journal of Mathematical Psychology*, *56*(5), 316-332.