

The Structure of Choice: Insights from 100K Decision Problems

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University of Warwick

SJDM 2024
New York City

OPTION 1

\$10
100%



OPTION 1

OPTION 2

\$20
60%

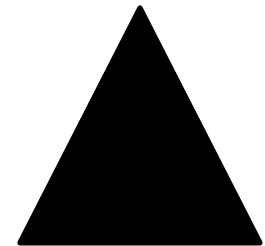


OPTION 2

	OPTION 1	OPTION 2
QUALITY	X	✓
PRICE	✓	X



OPTION 1



OPTION 2

Thinking about divorce

I'm 37M, wife is 36F, with 2 kids 10F and 8F. It feels like my wife gave up on our relationship and just wanted kids. She has no time for me anymore and has no interest in going on dates, seeing movies, and we haven't touched each other in almost 2 years. She says she just doesn't feel like being hugged, kissed, or touched at all anymore. I tell her she's beautiful (she is), try to be supportive as possible, I send her flowers, and tried to be the best husband I can be. I think I'm finally done with the marriage but my therapist said that a lot of couples experience this. No one I know admits to not doing anything with their wife for 2 years. More than that, she constantly corrects or has something to say whenever I spend time with our daughters. We can't do anything without her meddling and telling us we are doing it wrong, or to be careful, or to be quieter. This has been building-up for years and I think I've finally reached the end. I work so hard for my family and love my daughters but think I fell out of love with my wife.

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Should I leave my family or continue to suffer for the sake of the kids? Any advice on how to get through this is appreciated.



Data



r/Advice

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New ▾  ▾

 u/PatientMetal7228 • 1 min. ago

Should I try to find a better job?



I'm 30 years old and I currently work at Walmart as a cap 2 associate in Waterbury, CT. My current rate of pay is 16.50 an hour. I'm also paid bi-weekly. I also have a hard time saving money. I'm also the only person in the household who works. My mother and older brother are both disabled. I feel like 16.50 is a poverty wage. I'm responsible for mostly everything. The rent I pay is \$660. I also hope to get my own place at some point but I don't have enough money saved up. I feel like I can do so much better than what I'm doing. Should I try to find a better paying job? What hourly wage is considered to be a livable wage?

 1   0  Share

 u/Nervous-Affect-3491 • 1 min. ago

Driving my moms car

Hi I'm 16 about to get my learners in a month I'm taking my moms car to the store it's literally a 3 min drive I've never driven on the roads I've messed around in parking lots before that's about it if your wondering why I don't just walk it's because the side walk is closed and the walk takes around 10 mins because of the path you have to take with the roads being closed it's gonna take close to 30 mins and I got something I have to do in 30 mins that I can't miss my mom does not know about what's happening in 30mins

 1   0  Share

Advice

This is a place where you can ask for advice on many subjects. Everybody has issues that they run into, and everyone needs advice every now and again. This is Reddit's very own solution-hub.

924K
Members

1.4K
Online

COMMUNITY BOOKMARKS

[Wiki](#)

RULES

- 1 Be Nice. ▾
- 2 Posts must ask for advice. ▾
- 3 Forbidden Topics ▾
- 4 Follow the rules of Reddit. ▾
- 5 No discrimination. ▾

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1



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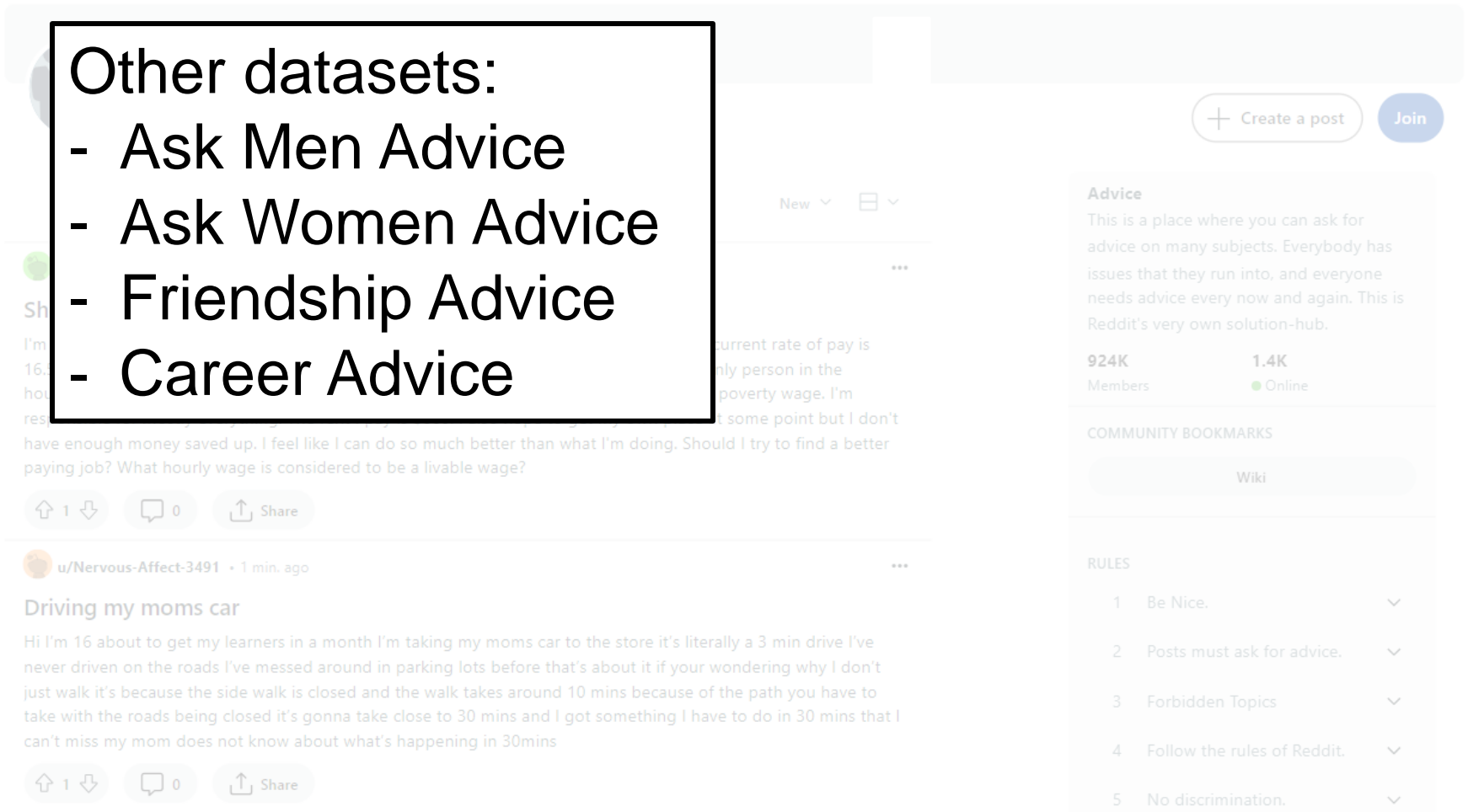
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Data

Other datasets:

- Ask Men Advice
- Ask Women Advice
- Friendship Advice
- Career Advice



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Study 1: N = 500
Representative US
participants describing
important life choices
(preregistered)

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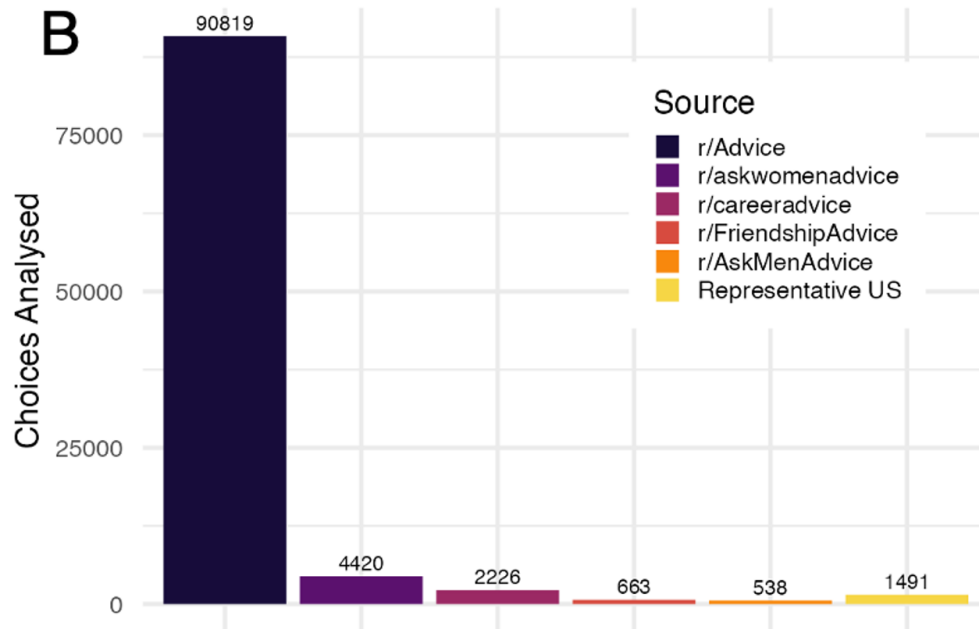
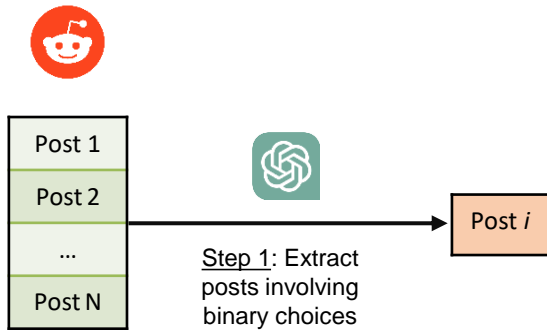


Pipeline



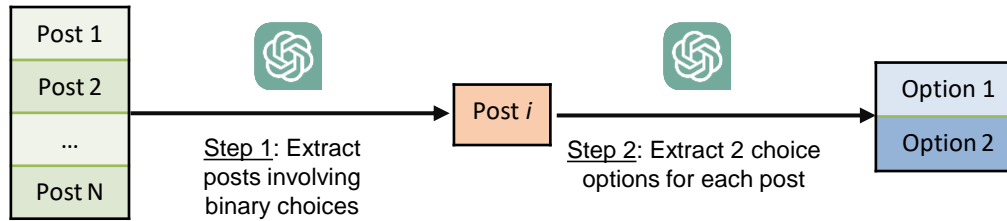
Post 1
Post 2
...
Post N

Pipeline

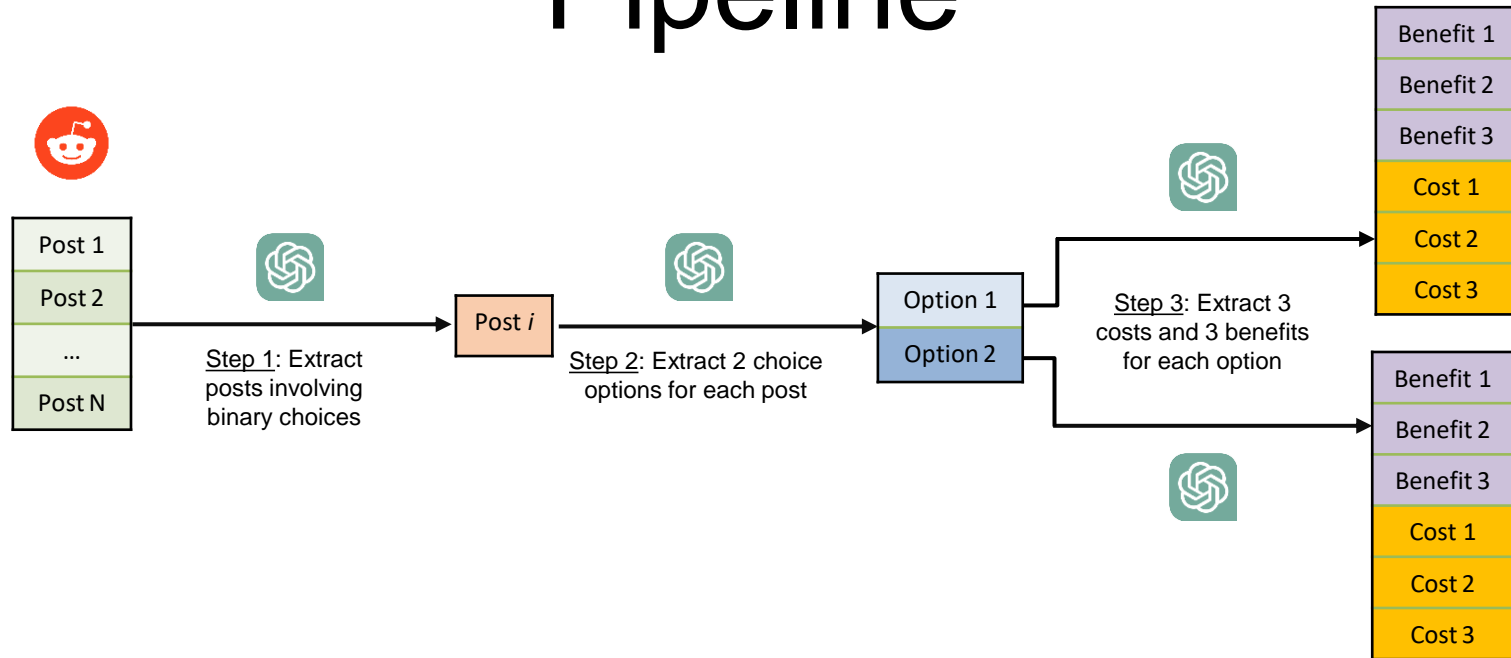


**~ 100K total
choice problems**

Pipeline



Pipeline



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Option 1: Leave the family

Benefits

1. Opportunity to pursue personal happiness and fulfillment
2. Ability to seek a healthier and more satisfying relationship
3. Freedom from a stagnant and unfulfilling marriage

Costs

1. Emotional impact on the children and potential strain on their well-being
2. Loss of support from family and friends who may view the poster negatively
3. Potential financial and logistical challenges related to divorce and co-parenting

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2. Loss of support from family and friends who may view the poster negatively
3. Potential financial and logistical challenges related to divorce and co-parenting

Option 2: Continue to suffer for the sake of kids

Benefits

1. Maintaining stability and familiar family dynamics for the children
2. Avoiding potential disruption and adverse effects on their emotional well-being
3. Potentially preserving relationships with extended family and mutual friends

Costs

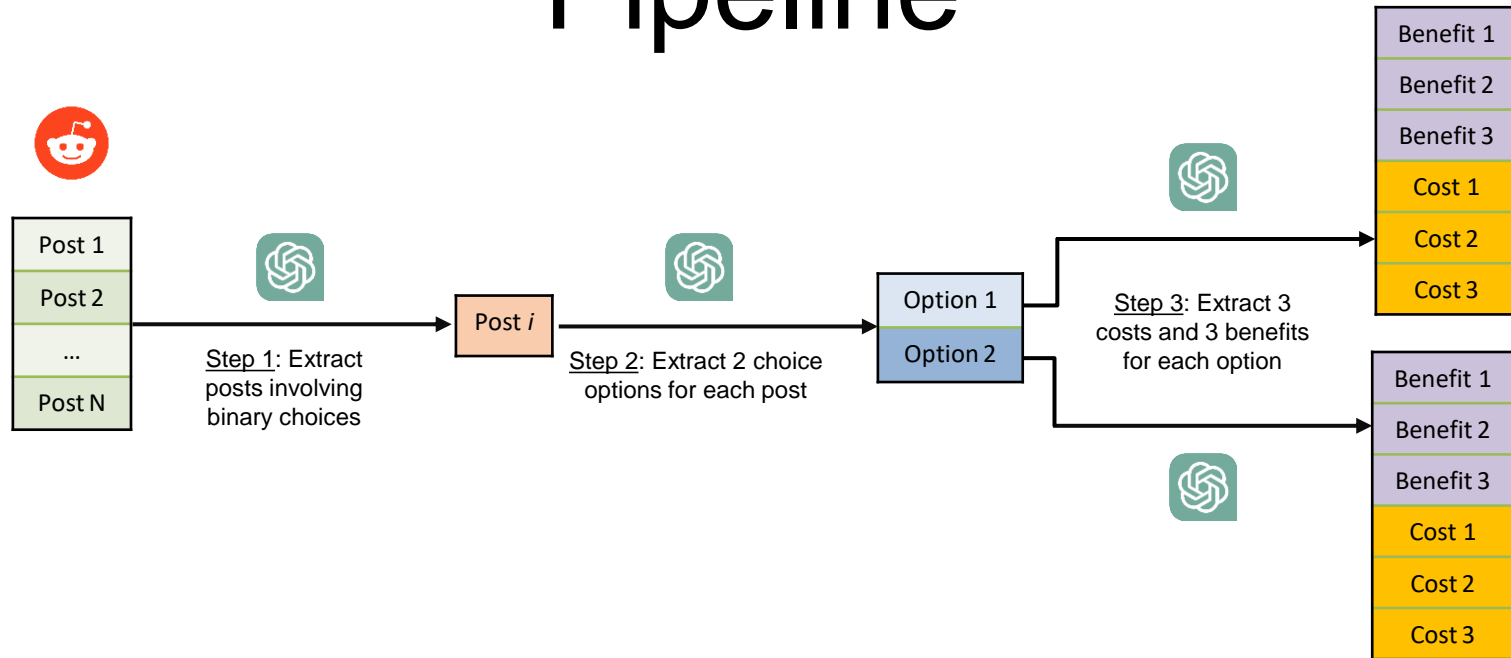
1. Personal unhappiness and dissatisfaction within the marriage
2. Mental and emotional toll of staying in an unfulfilling relationship
3. Limited opportunity for personal growth and self-fulfillment

Theory-based Attributes

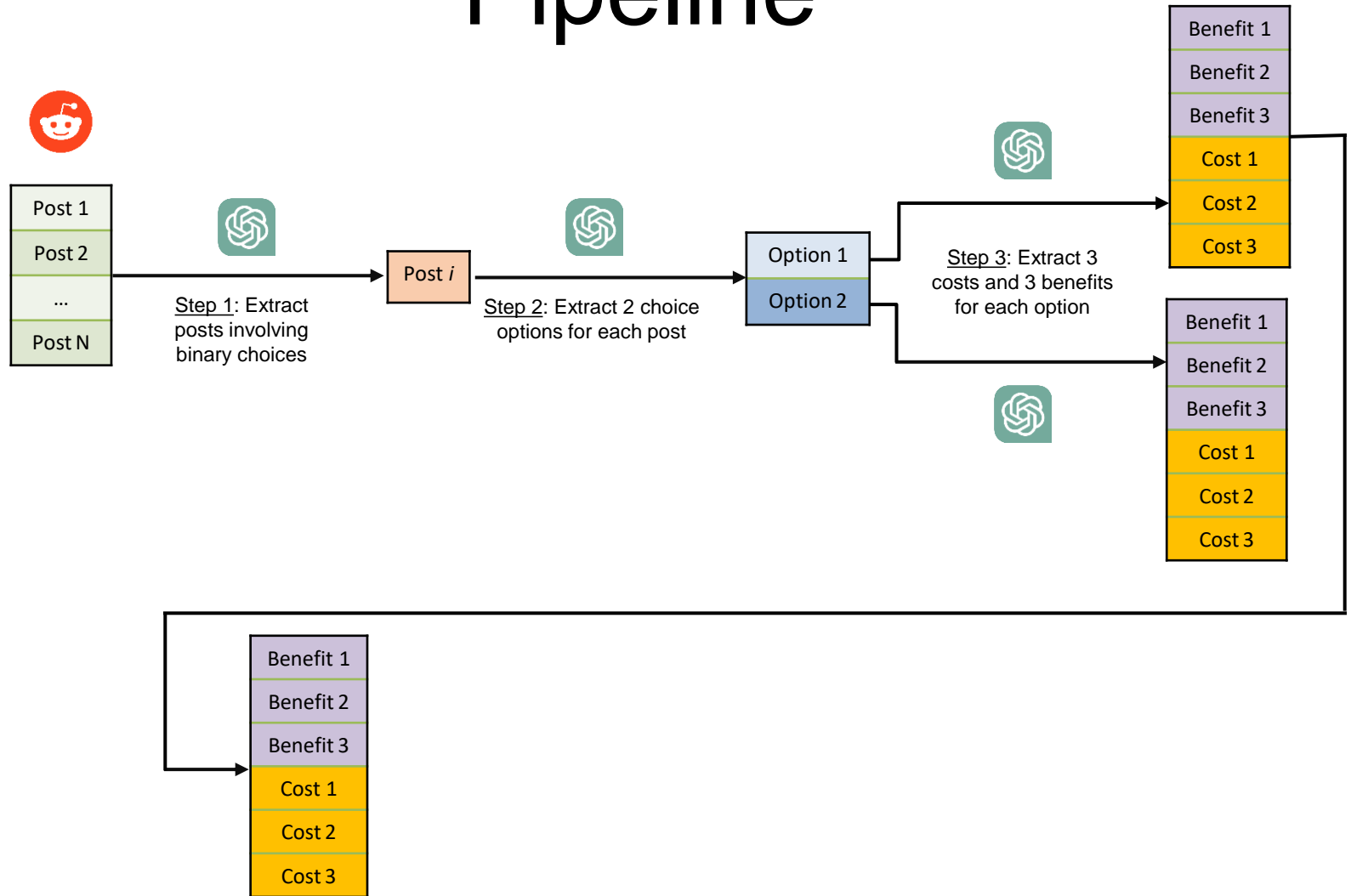
Attribute Type	#	Example Attribute
decision theory	5	safety vs. risk
decision outcomes	11	money
consumer behavior	6	experiential consumption
emotions	6	anger
self-determination	3	social relatedness
values	10	tradition
goals	135	sexual desirability
moral foundations	5	harm
person perception	10	competence
SVO	4	competitiveness
altruism	9	efficiency
fairness	3	procedural fairness

Total 207 distinct attributes

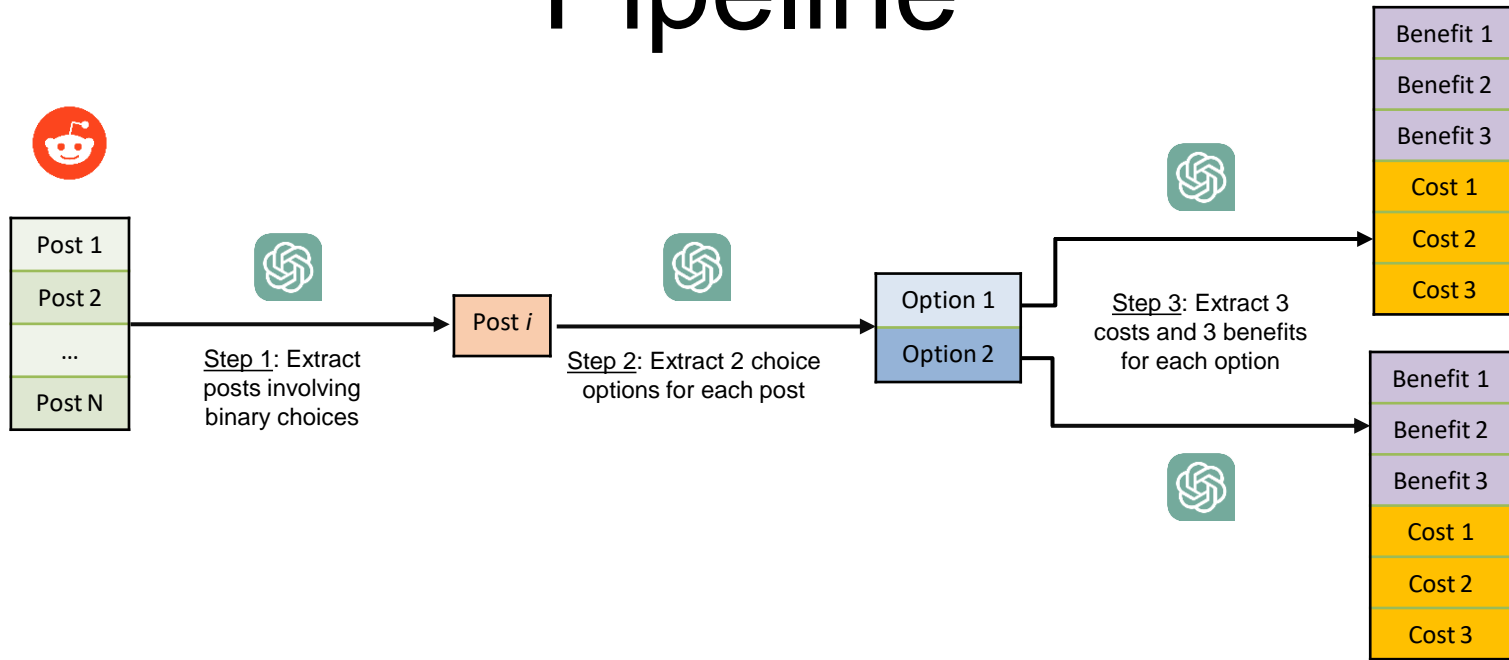
Pipeline



Pipeline

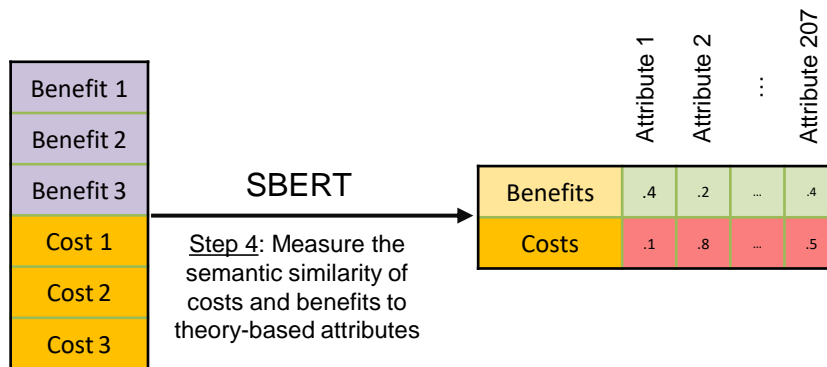
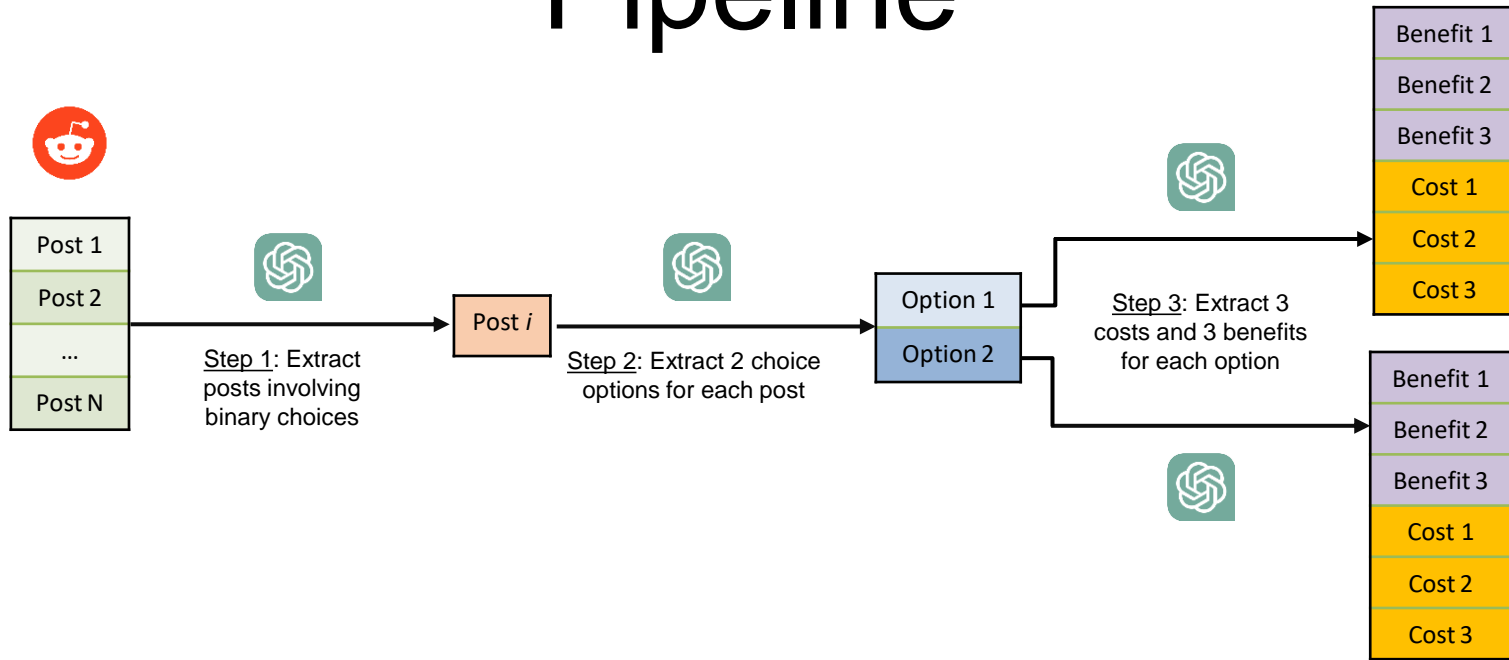


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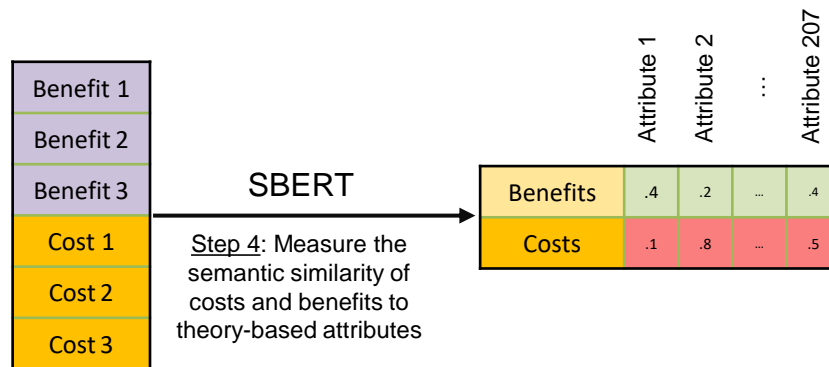
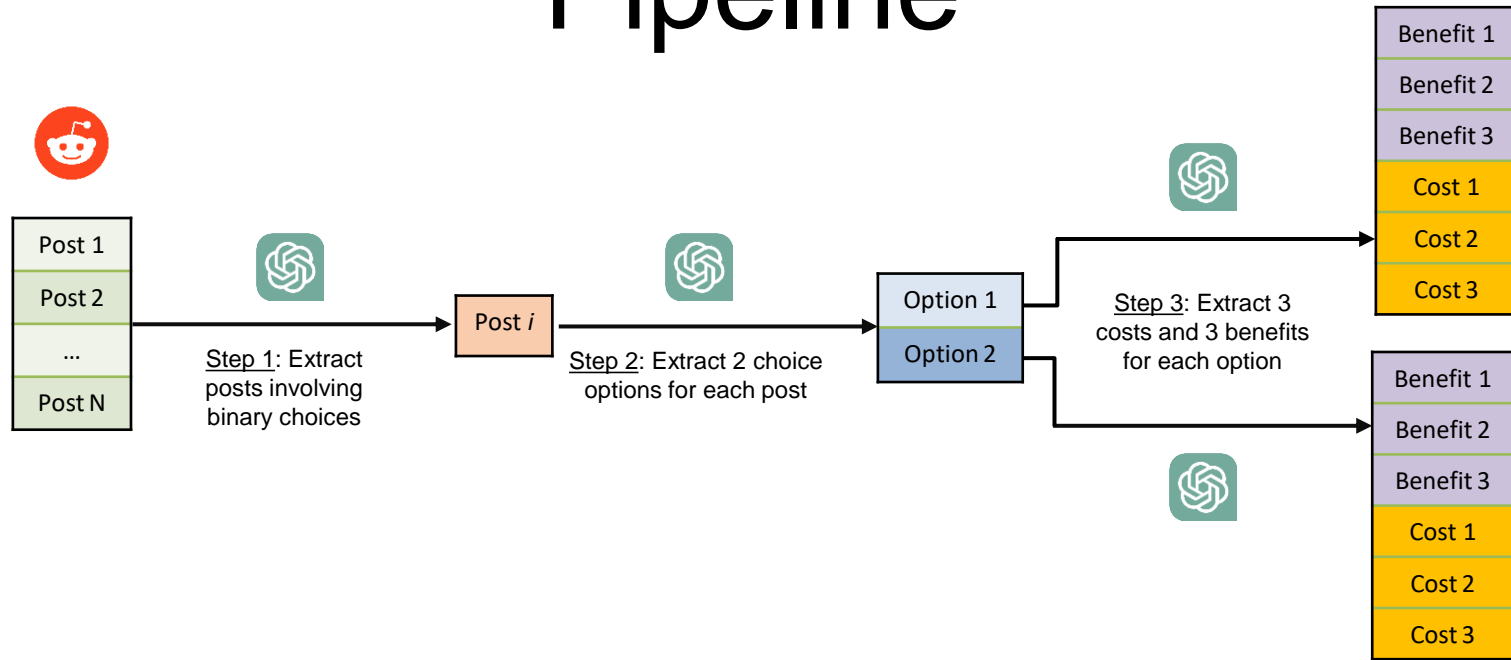


Benefit 1
Benefit 2
Benefit 3
Cost 1
Cost 2
Cost 3

Pipeline



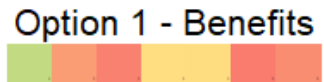
Pipeline



In recent work, we have shown that sentence embeddings can quantify self-reported reasons
Zhao et al., 2022; Psych. Review; Bhatia, 2024, JEP:General

Data

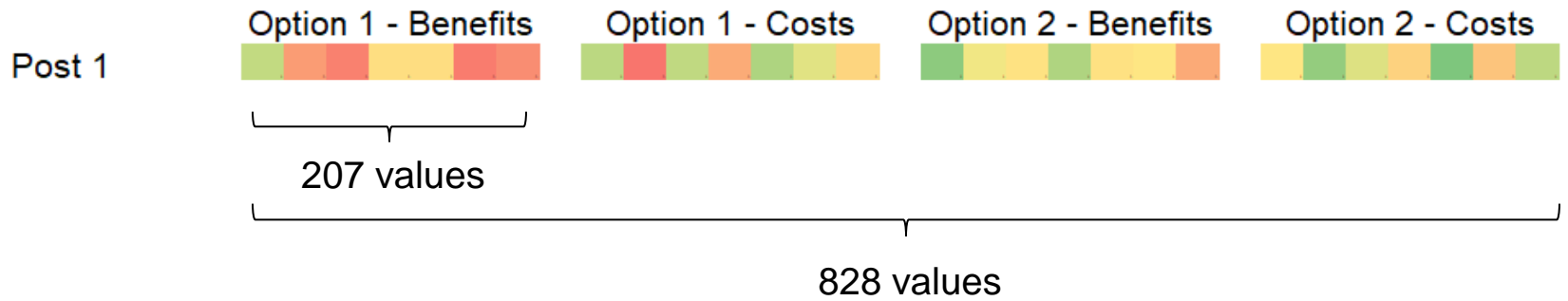
Post 1



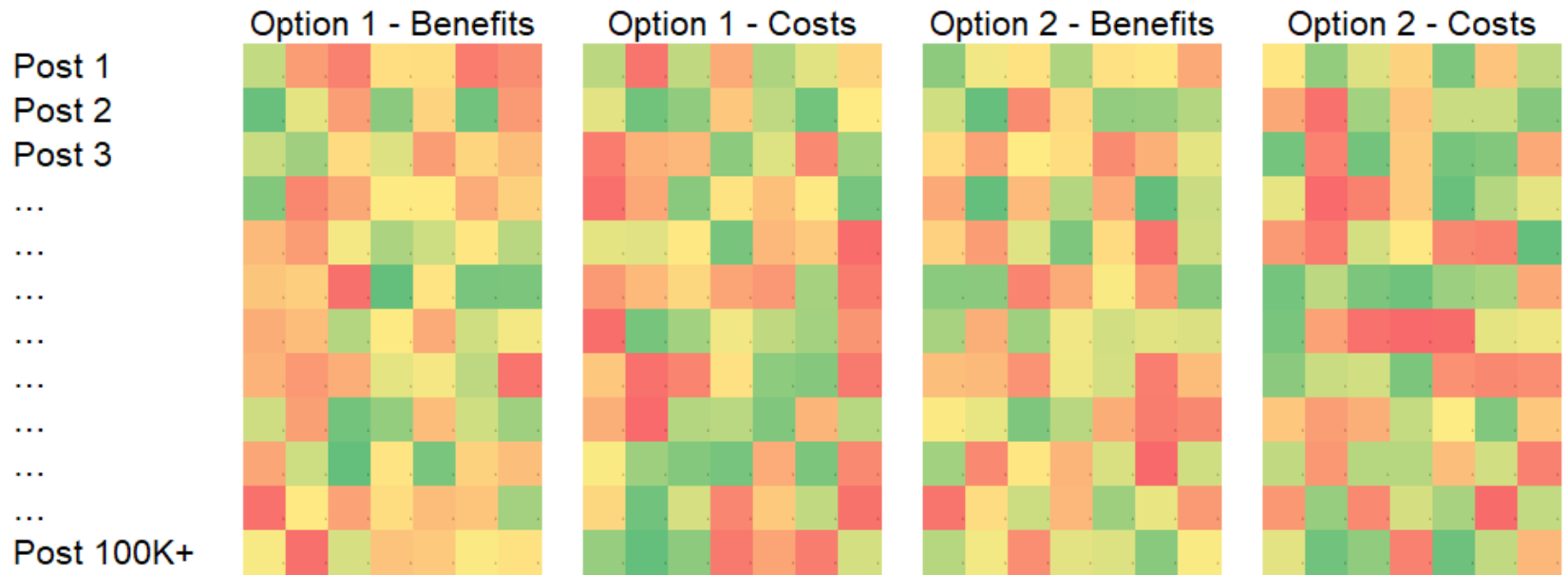
Data



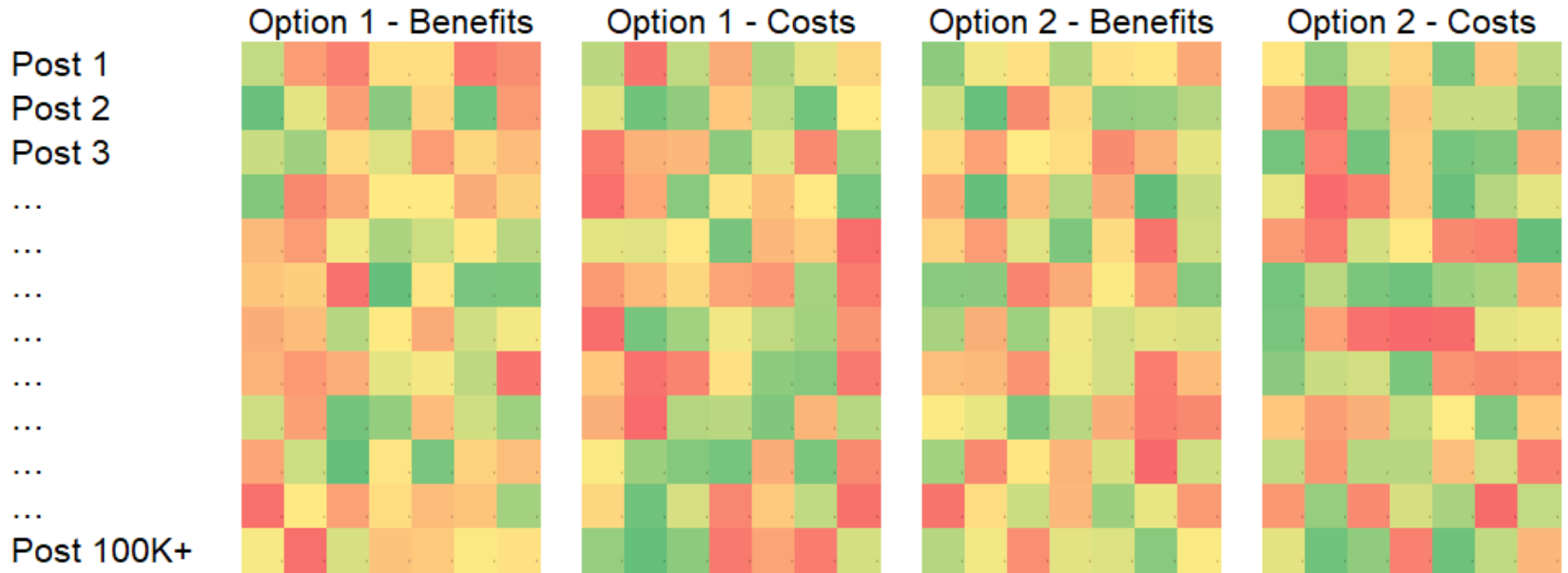
Data



Data



Data



~ 100M coded values

Validation

Study 1 → Attribute frequencies in r/Advice have correlation of $r = 0.90$ with decisions faced by representative US participants

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Study 2 → GPT summaries are judged by online participants to be accurate 91% of the time

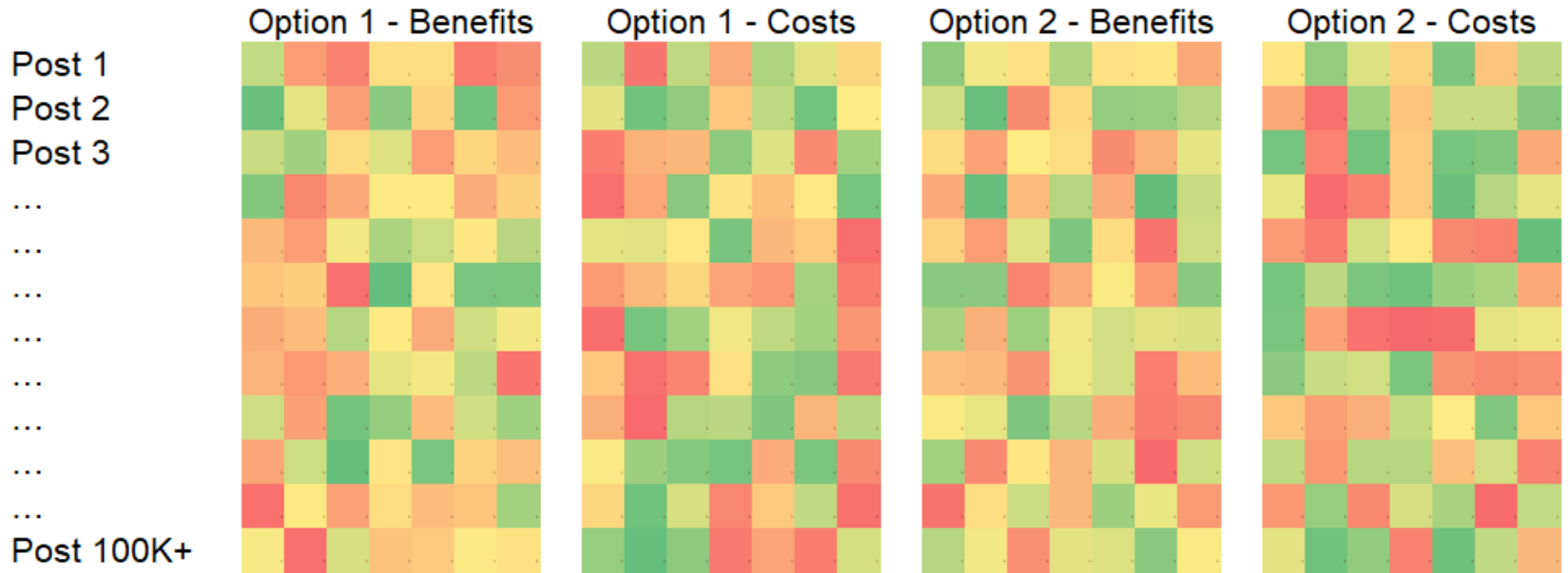
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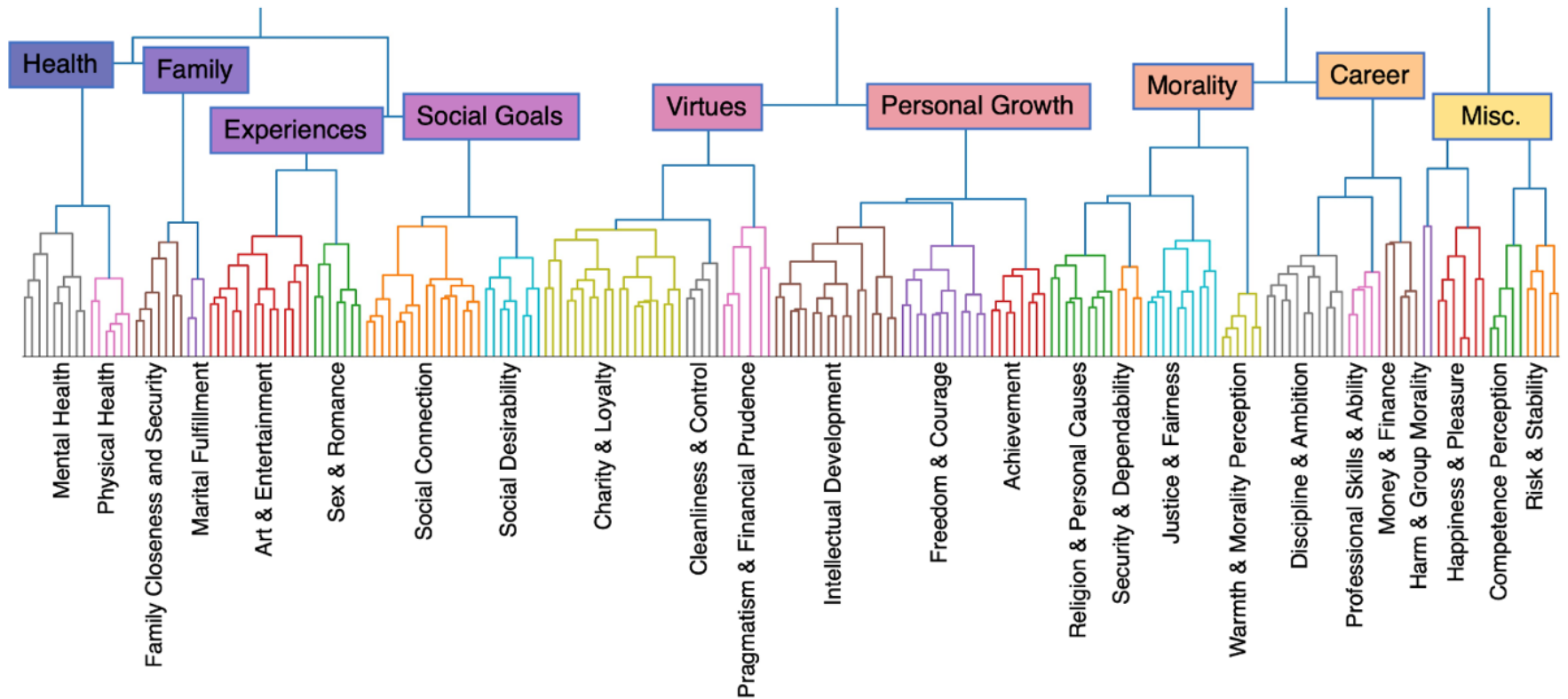
Study 3 → SBERT attribute quantification is judged by online participants to be accurate 98% of the time

Data



~ 100M coded values

Attribute Structure



Hierarchical clustering on choice option X attributes matrix

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Attribute Structure

**Option 1
(leave)**

**Option 2
(stay)**

Happiness and Pleasure
Sex and Romance
Achievement
Freedom and Courage
Physical Health
Mental Health
Art and Entertainment
Professional Skills and Ability
Money and Finance
Intellectual Development
Marital Fulfillment
Pragmatism and Financial Prudence
Competence Perception
Discipline and Ambition
Religion and Personal Causes
Harm and Group Morality
Social Desirability
Cleanliness and Control
Justice and Fairness
Charity and Loyalty
Risk and Stability
Security and Dependability
Warmth and Morality Perception
Social Connection
Family Closeness and Security

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs
2. Study social context

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs
2. Study social context
3. Study temporal context

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs
 2. Study social context
 3. Study temporal context
- } Ecological Structure

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs
2. Study social context
3. Study temporal context
4. Predict preference

Analysis

With the ability to quantify attribute structures in naturalistic choices we can:

1. Study attribute tradeoffs
2. Study social context
3. Study temporal context
4. Predict preference
5. Understand decision processes

Analysis

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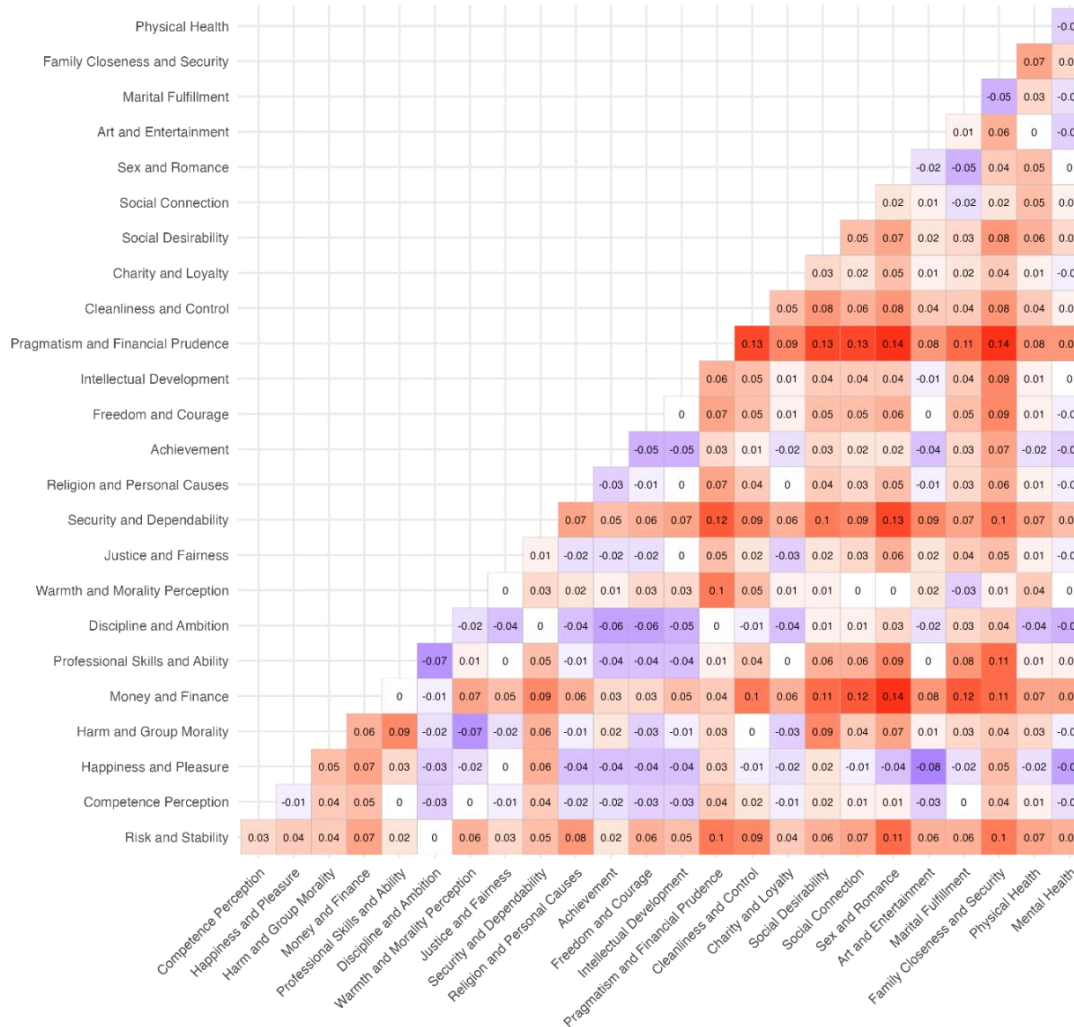
1. Study attribute tradeoffs
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- } Human Behavior

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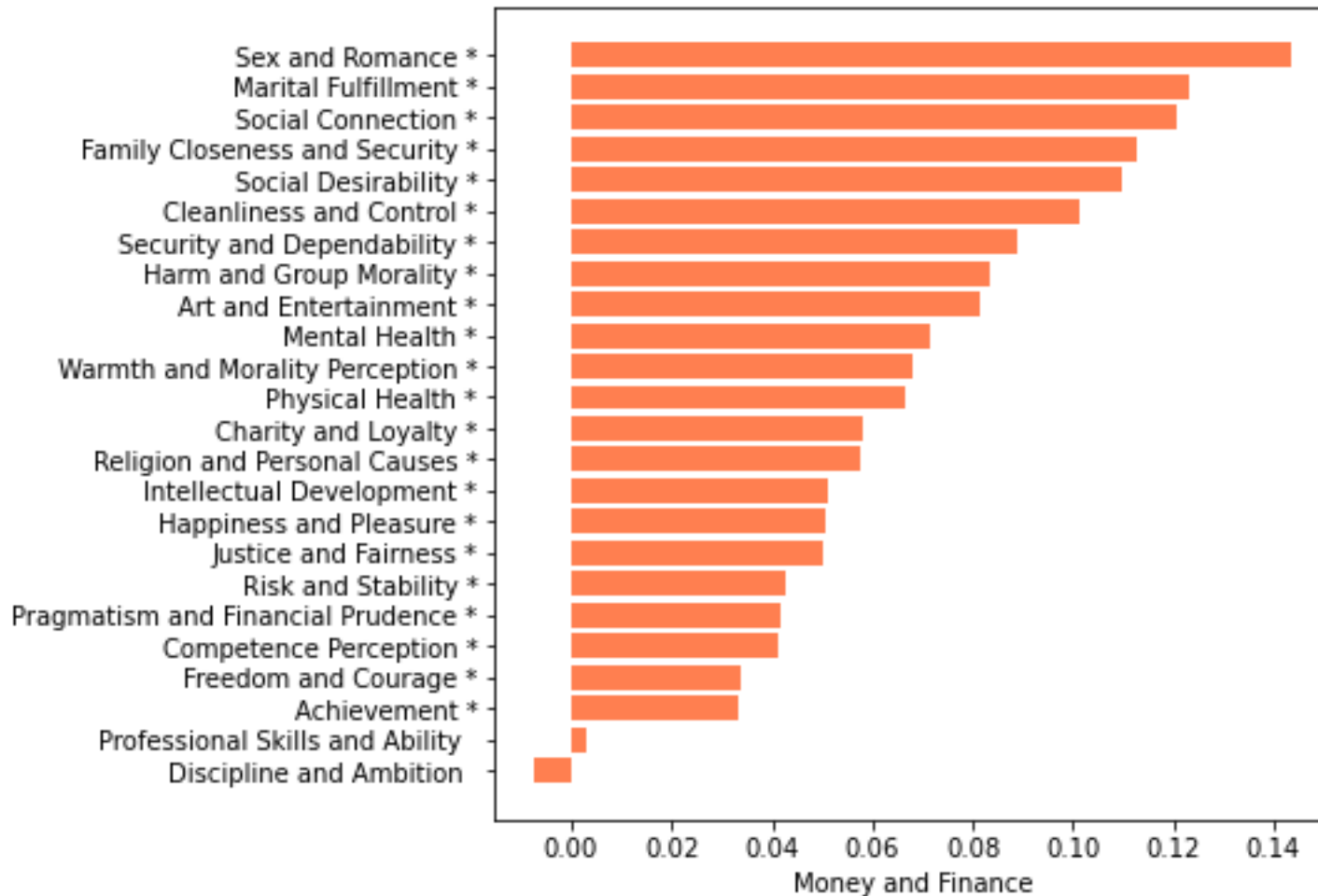
Tradeoffs



Pairwise correlation of attribute frequencies across options in the same dilemma

$|r| > 0.02$ is significant at $p < 0.05$ Bonferroni corrected

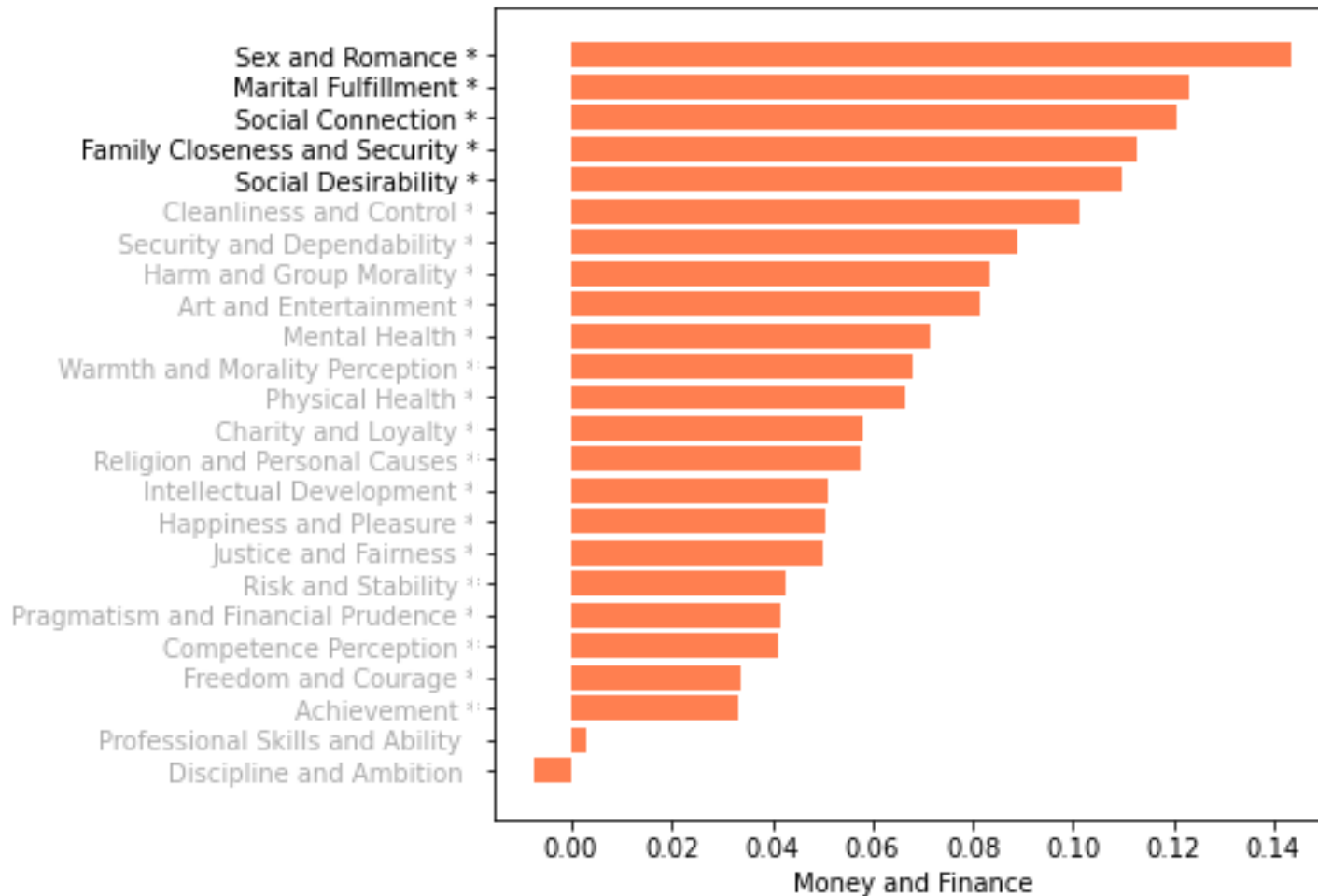
Tradeoffs



Sorted by pairwise correlation of attribute frequencies across options

* indicates $p < 0.05$ Bonferroni corrected

Tradeoffs



Sorted by pairwise correlation of attribute frequencies across options

* indicates $p < 0.05$ Bonferroni corrected



r/Advice • 3 yr. ago
Putrid_Marketing_144



Should I apply for the job?!

I (28F) am engaged to (24M) and we have a 1 year old daughter together. We currently both have jobs with schedule of M-F 8-5pm with weekends off. However, I have the opportunity to apply for a much higher paying position however, it is shift work. I would be working 4 days out of the week with 3 days off. Meaning one more day with my daughter. The schedule changes every 3 months. I have really been thinking of the pros and cons. Some close friends tell me to go for it and other close friends tell me I shouldn't since I have a little one. They say my daughter needs her mom more than dad, but if the roles were reversed I know they wouldn't tell HIM the same as me. My fiancée tells me to go for it but I know he rather I didn't. Should I just do it? No rude comments please.



Archived post. New comments cannot be posted and votes cannot be cast.



1

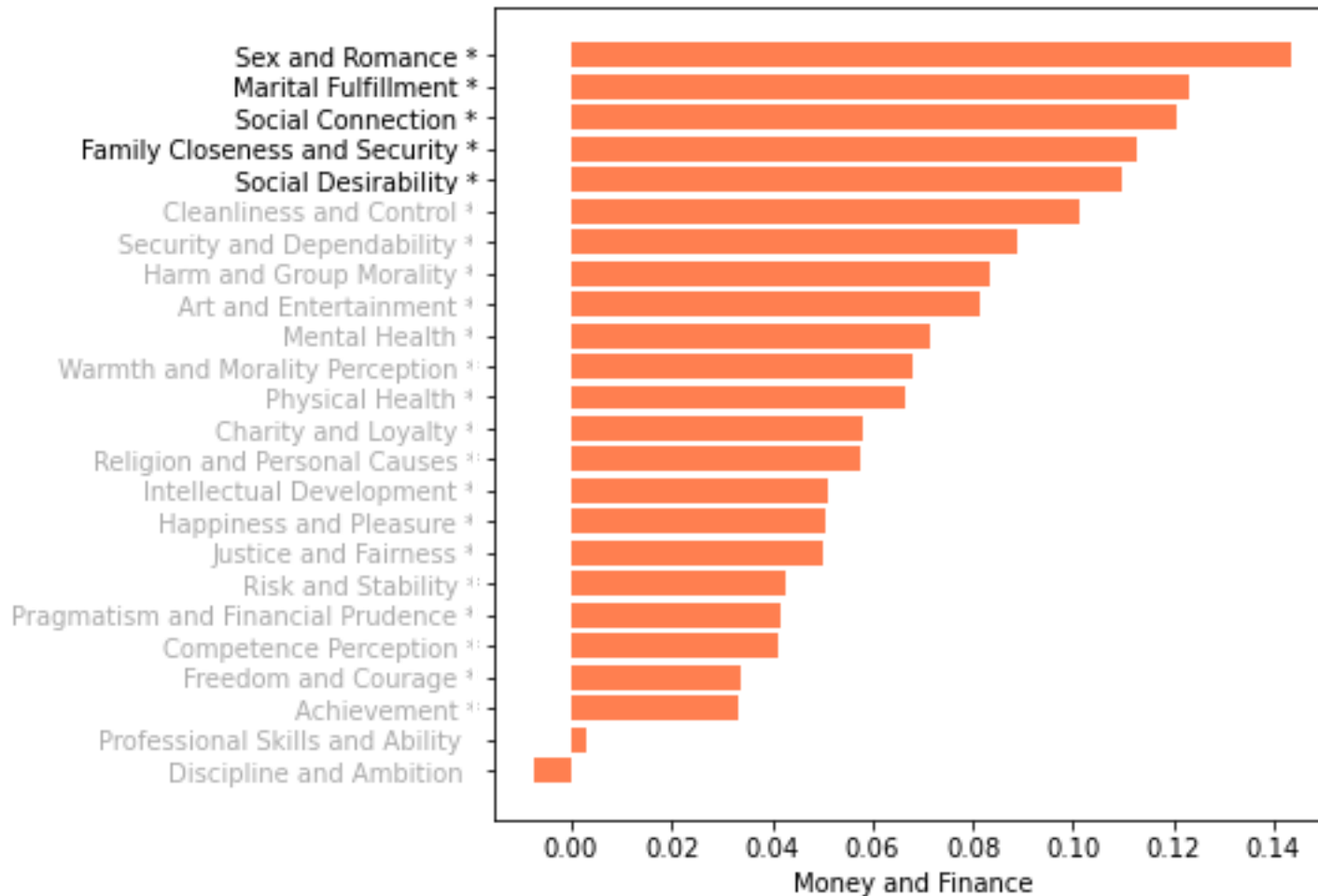


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Share

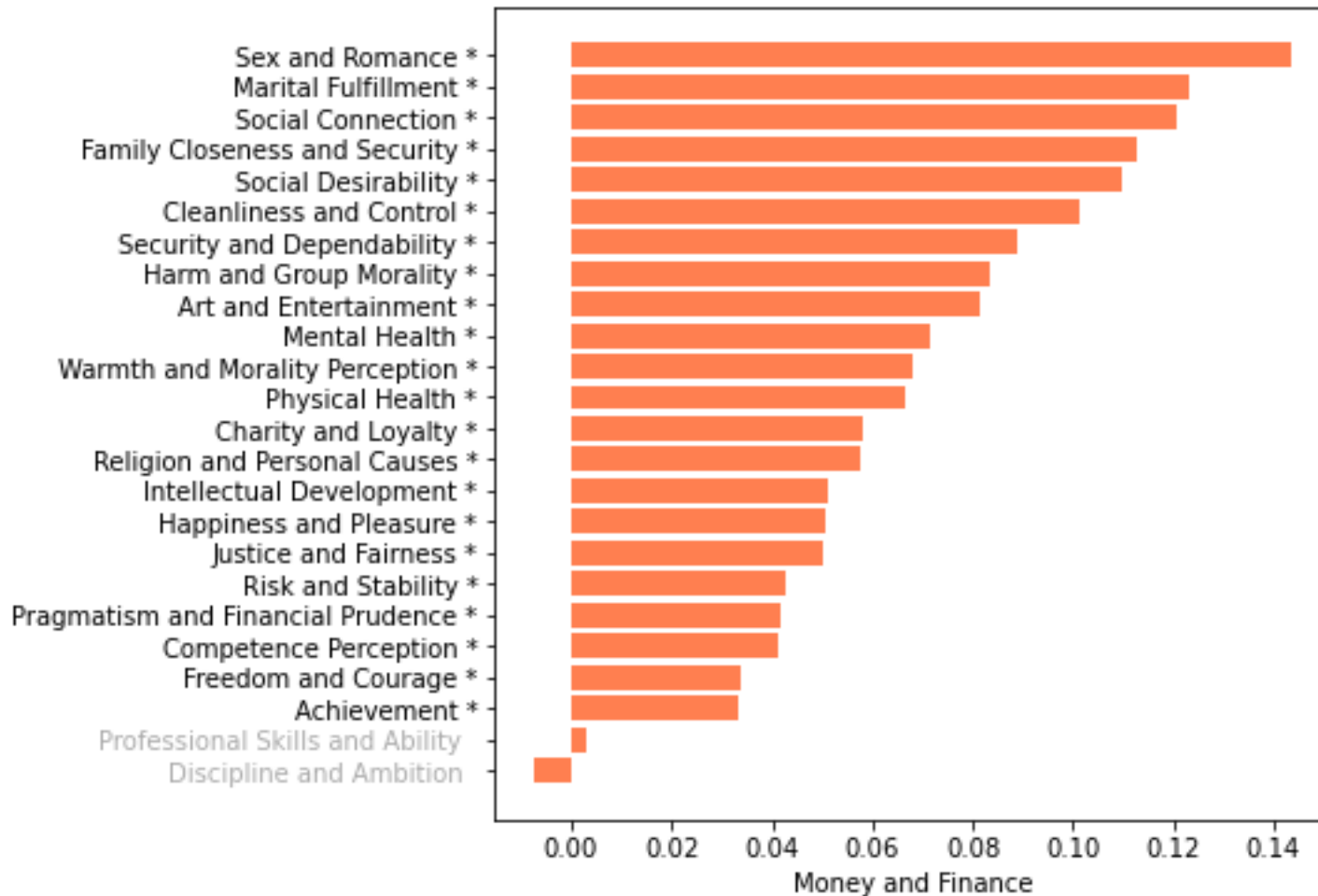
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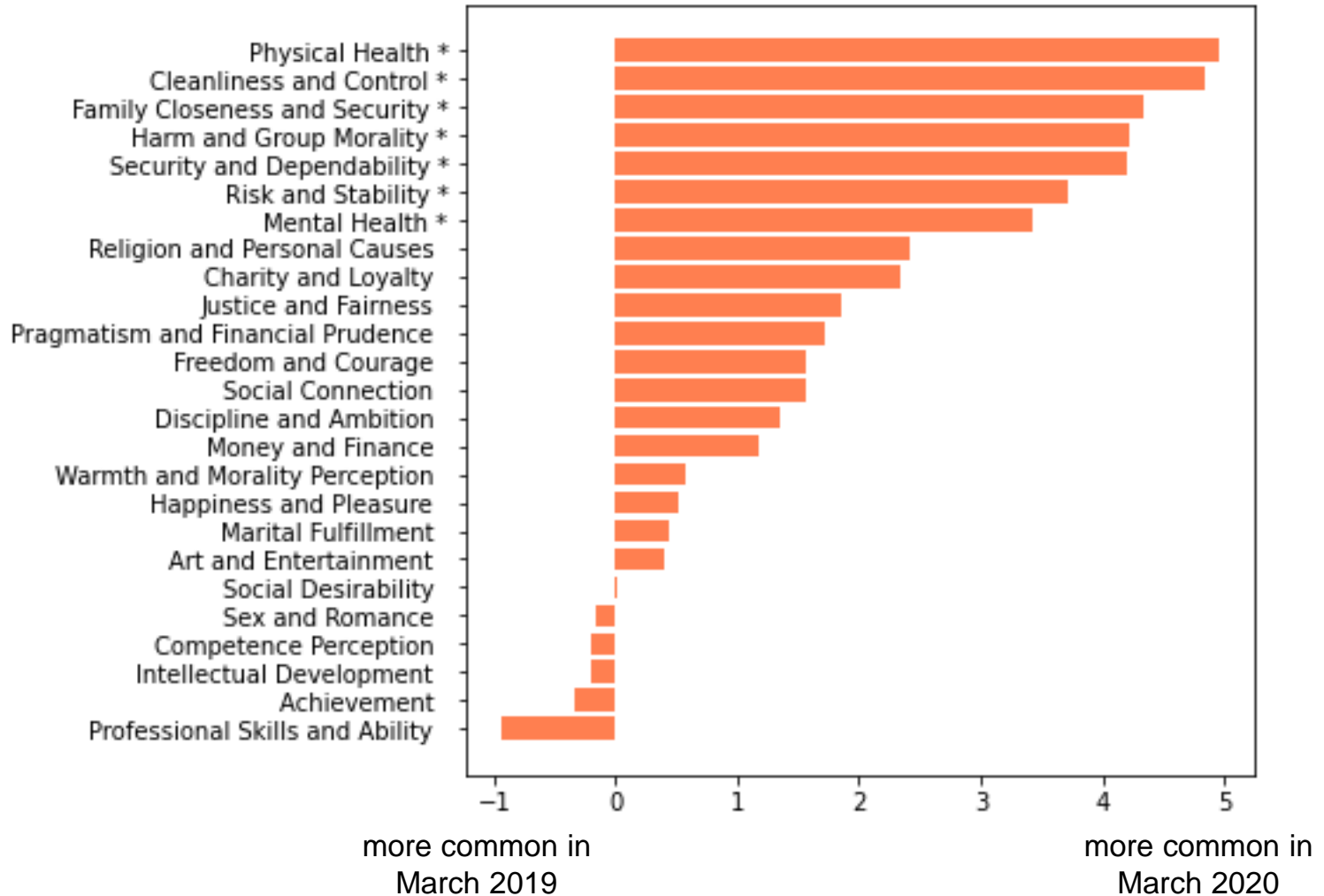
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2. Study social context
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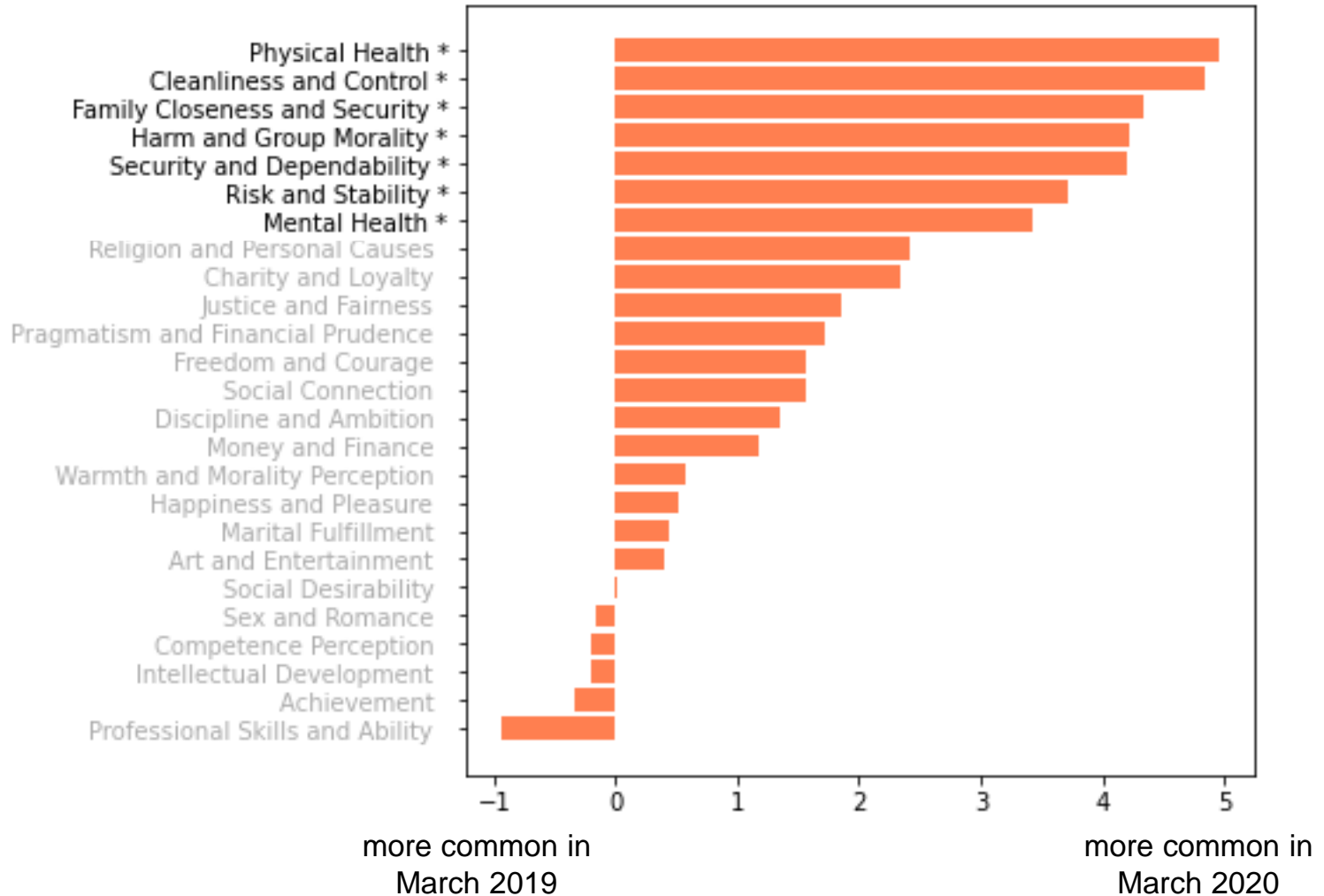
Temporal Context



Sorted by t-statistic for difference in attribute frequency

* indicates $p < 0.05$ Bonferroni corrected

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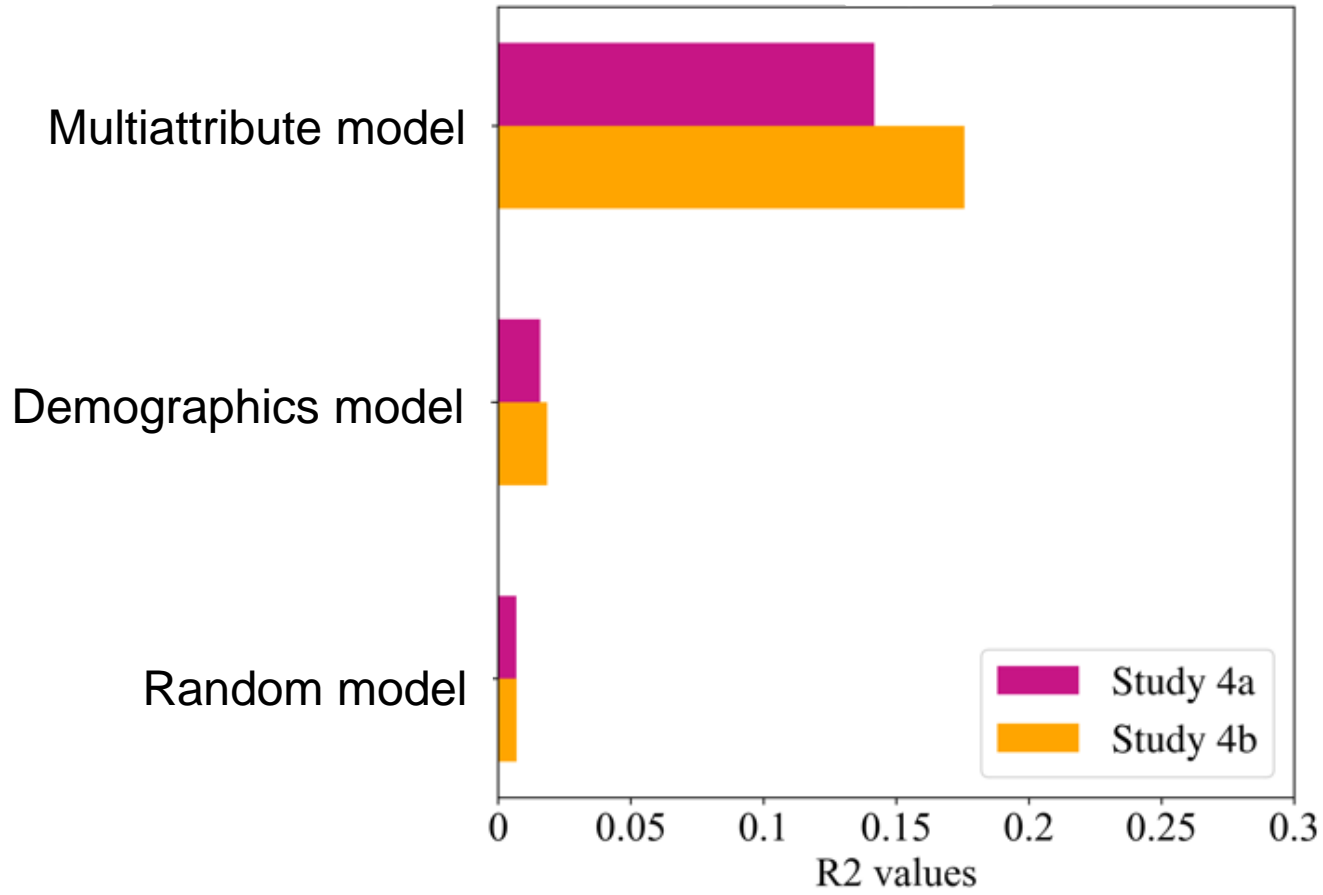
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5. Understand decision processes

In Study 4a (N = 300) and Study 4b (N = 300) online participants evaluated r/Advice dilemmas (preregistered)

Choice Prediction



All models have equal number of parameters

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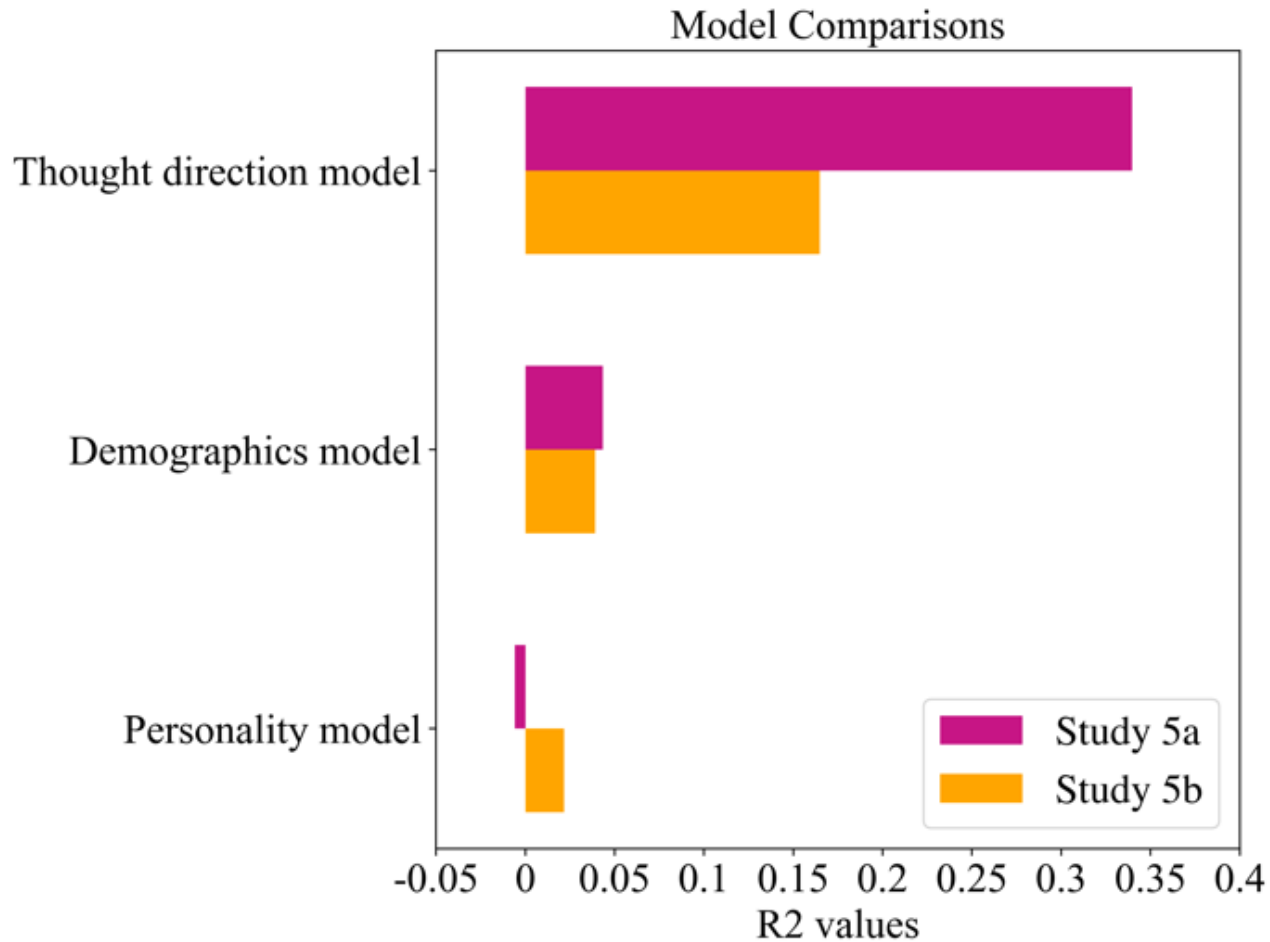
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- 5. Understand decision processes**

In Study 5a (N = 300) and Study 5b (N = 300) online participants evaluated these dilemmas while thinking out loud

Decision Process



Data



r/Advice

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New



u/PatientMetal7226 · 1 min ago

Should I try to find a better job?

I'm 30 years old and I currently work at Walmart as a cap 2 associate in Waterbury, CT. My current rate of pay is 16.50 an hour. I'm also paid bi-weekly. I also have a hard time saving money. I'm also the only person in the household who works. My mother and older brother are both disabled. I feel like 16.50 is a poverty wage. I'm responsible for mostly everything. The rent I pay is \$660. I also hope to get my own place at some point but I don't have enough money saved up. I feel like I can do so much better than what I'm doing. Should I try to find a better paying job? What hourly wage is considered to be a livable wage?

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u/Nervous-Affect3491 · 1 min ago

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This is a place where you can ask for advice on many subjects. Everybody has issues that they run into, and everyone needs advice every now and again. This is Reddit's very own solution-hub.

924K Members

1.4K Online

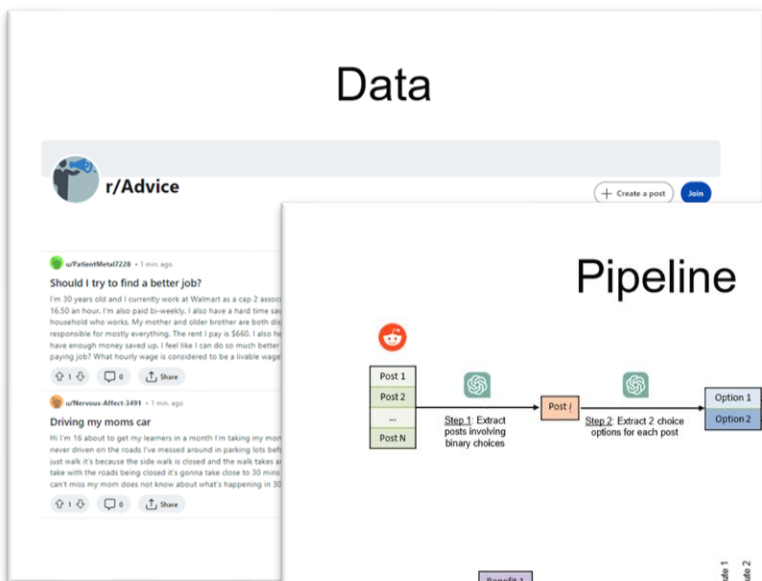
COMMUNITY BOOKMARKS

WU

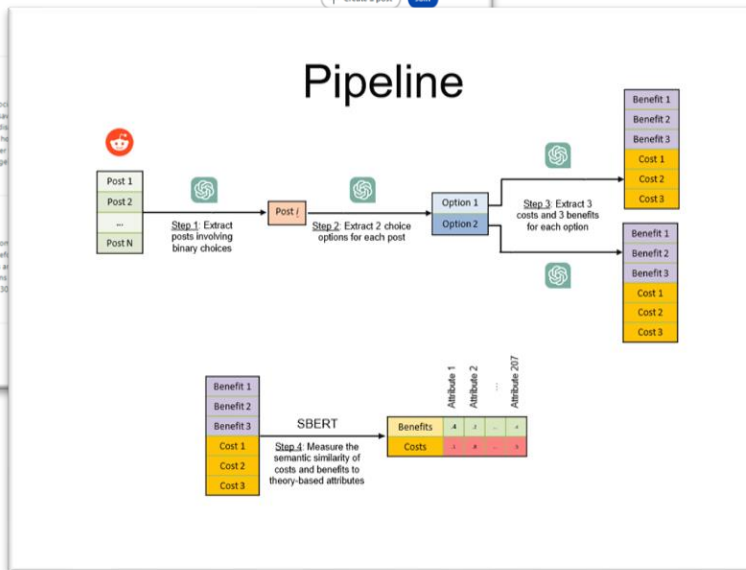
RULES

- 1 Be Nice. ▾
- 2 Posts must ask for advice. ▾
- 3 Forbidden Topics ▾
- 4 Follow the rules of Reddit. ▾
- 5 No discrimination. ▾

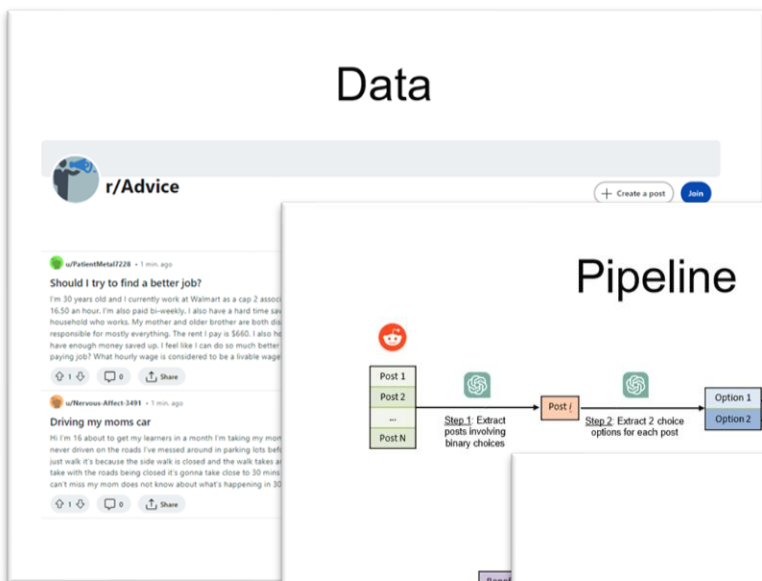
Data



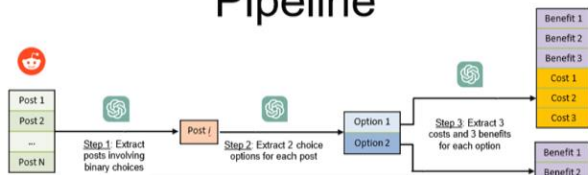
Pipeline



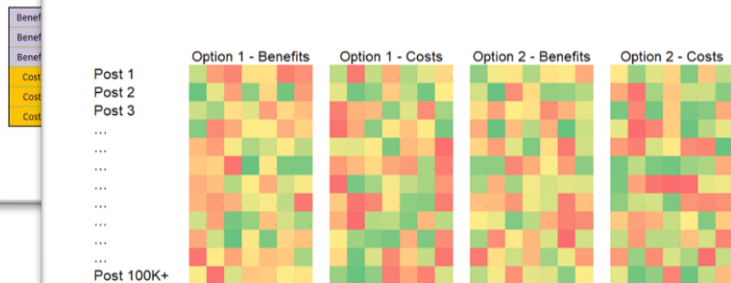
Data



Pipeline



Data



~ 100M coded values

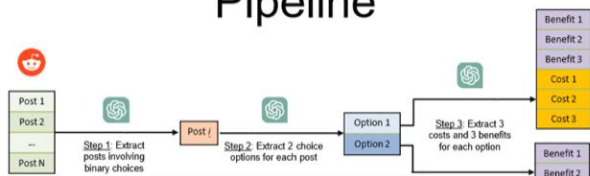
Data

r/Advice

Should I try to find a better job?
I'm 30 years old and I currently work at Walmart as a cap 2 assoc 16.50 an hour. I'm also paid bi-weekly. I also have a hard time as a household who works. My mother and older brother are both disabled responsible for mostly everything. The rent I pay is \$660. I also have enough money saved up. I feel like I can do so much better playing job? What hourly wage is considered to be a livable wage?

Driving my moms car
Hi I'm 16 about to get my learners in a month I'm taking my mom never driven on the roads I've messed around in parking lots but just walk it's because the side walk is closed and the walk takes a take with the roads being closed it's gonna take close to 30 mins can't miss my mom does not know about what's happening in 30

Pipeline



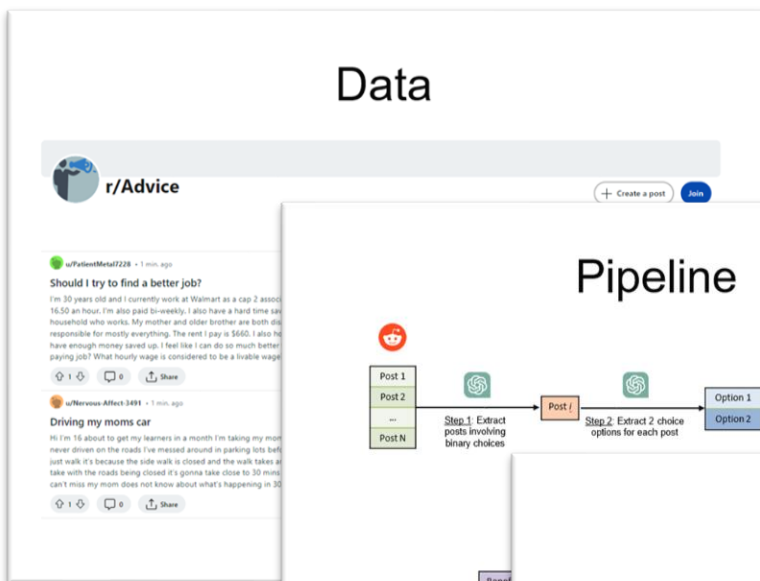
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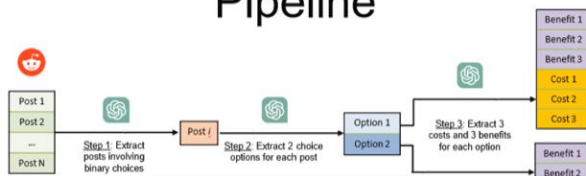
Analysis

- With the ability to quantify attribute structures in naturalistic choices we can:
- 1. Study attribute tradeoffs
 - 2. Study social context
 - 3. Study temporal context
 - 4. Predict preference
 - 5. Understand decision processes
- Ecological Structure (1-3)
Human Behavior (4-5)

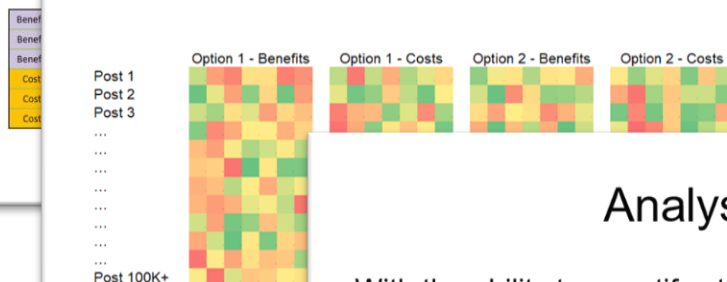
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Pipeline



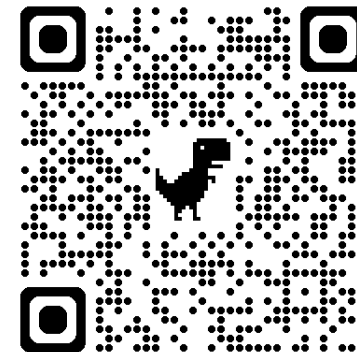
Data



Analysis

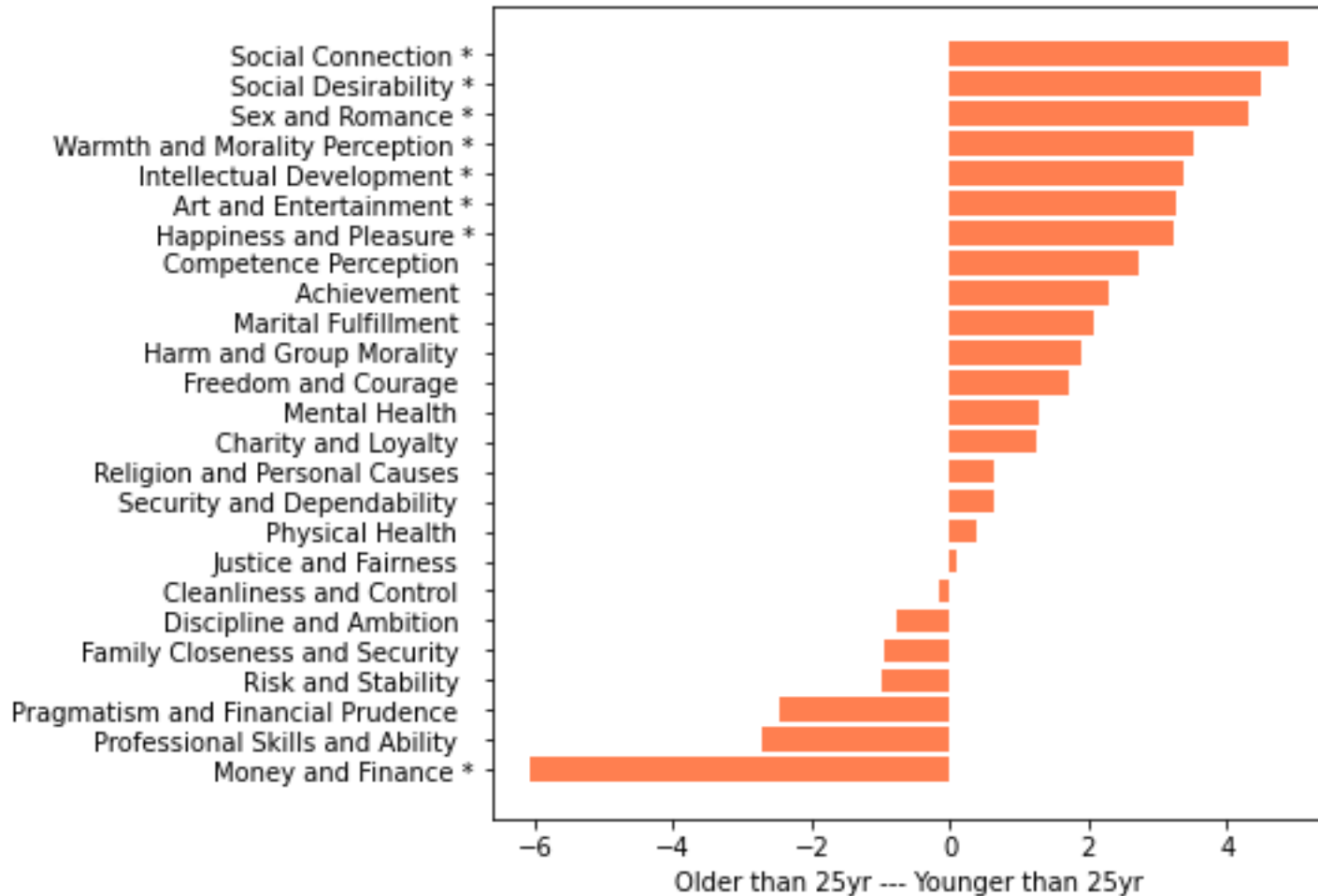
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 - 4. Predict preference
 - 5. Understand decision processes
- } Ecological Structure
- } Human Behavior



Contact: Sudeep Bhatia
bhatiasu@sas.upenn.edu

Social Context



Sorted by t-statistic for difference in attribute frequency
 * indicates $p < 0.05$ Bonferroni corrected

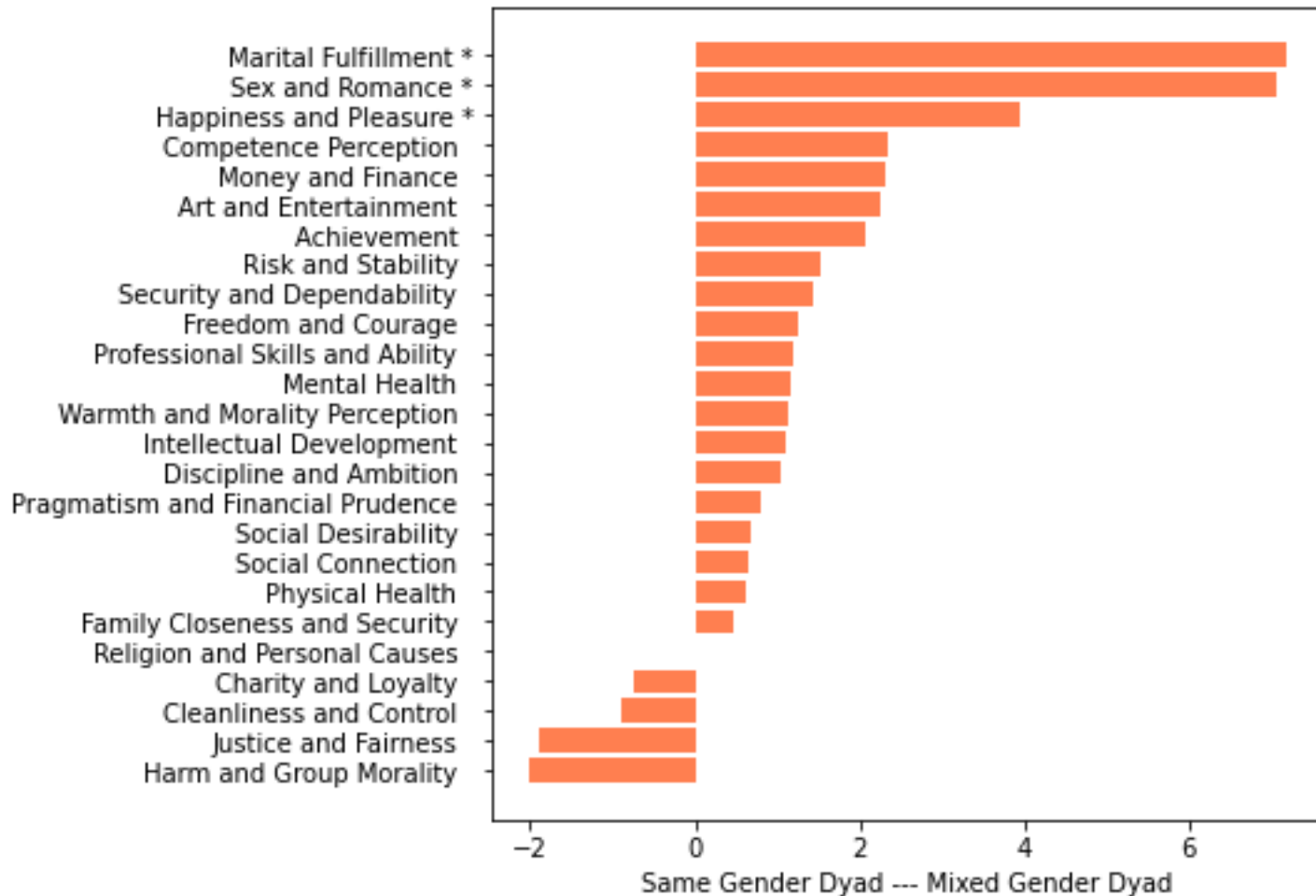
Social Context



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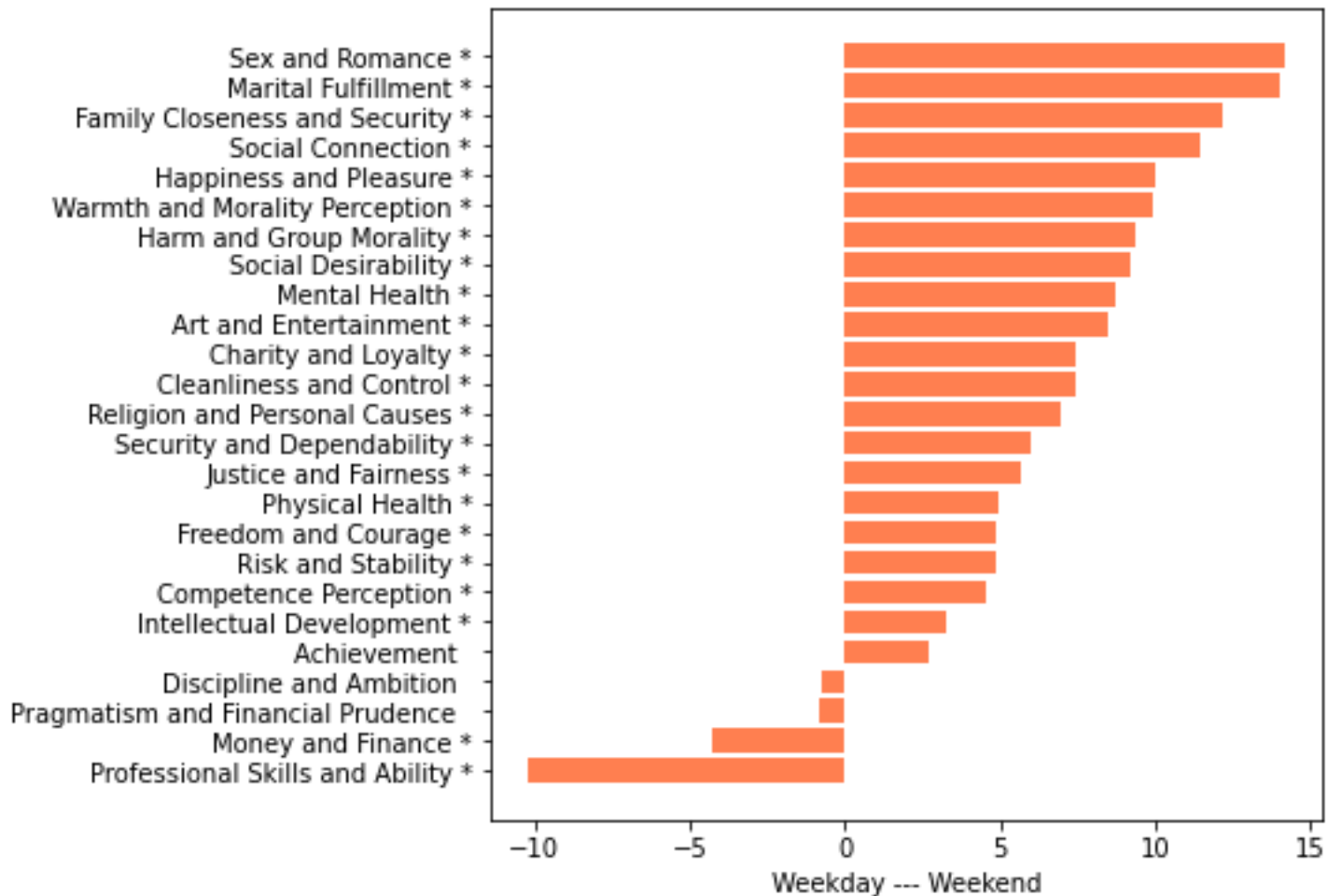
Social Context



Sorted by t-statistic for difference in attribute frequency

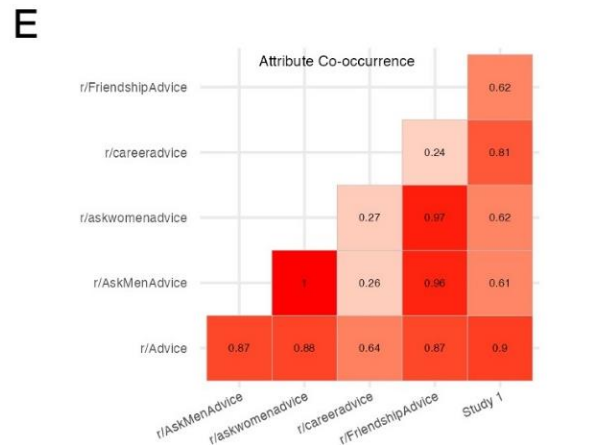
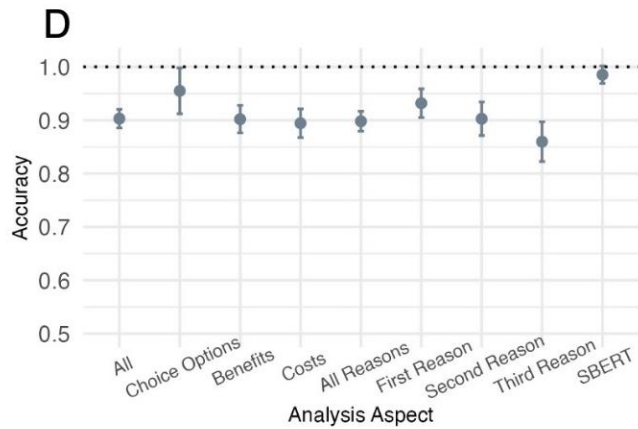
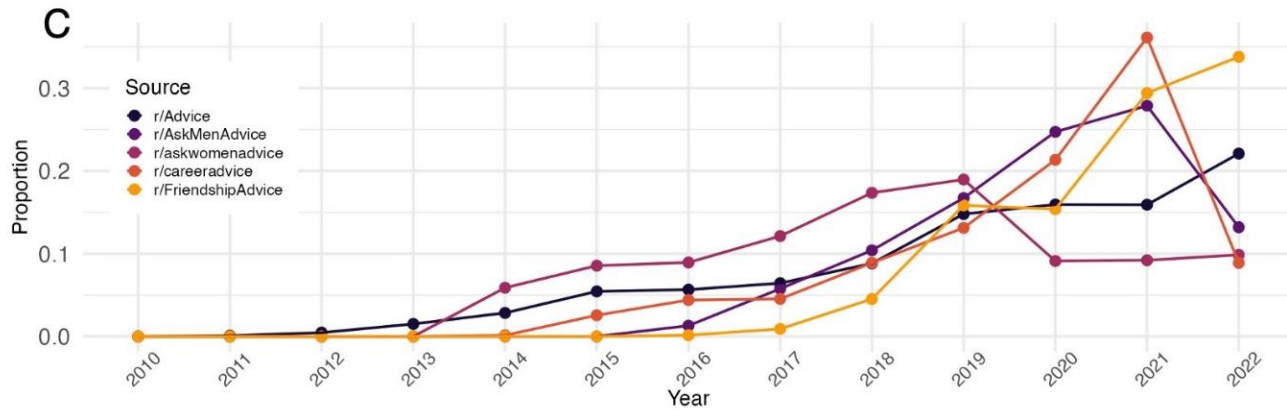
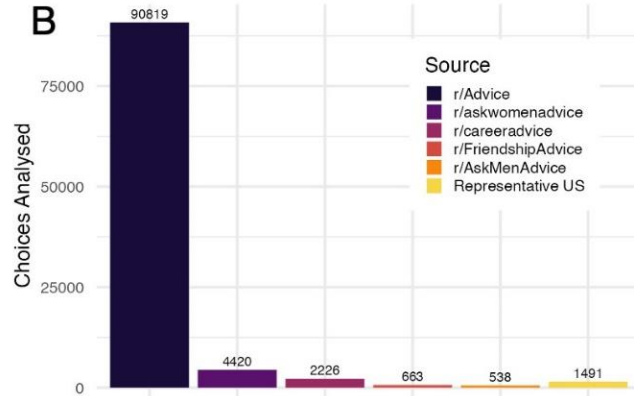
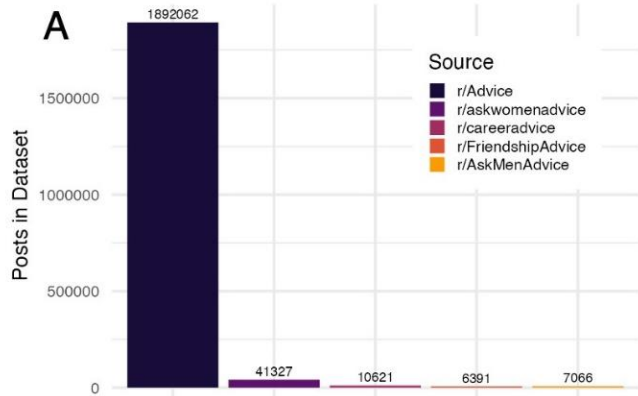
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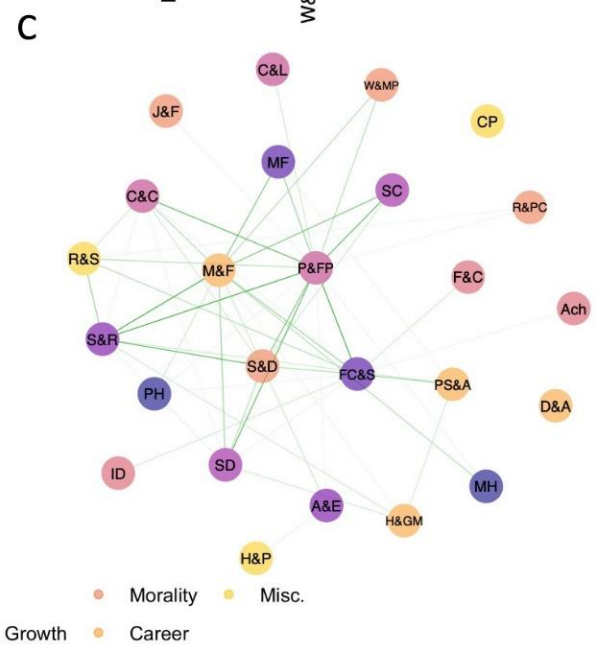
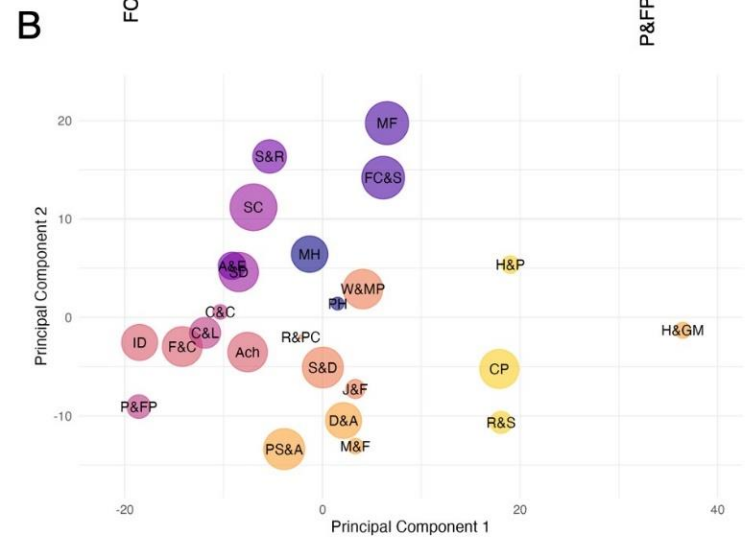
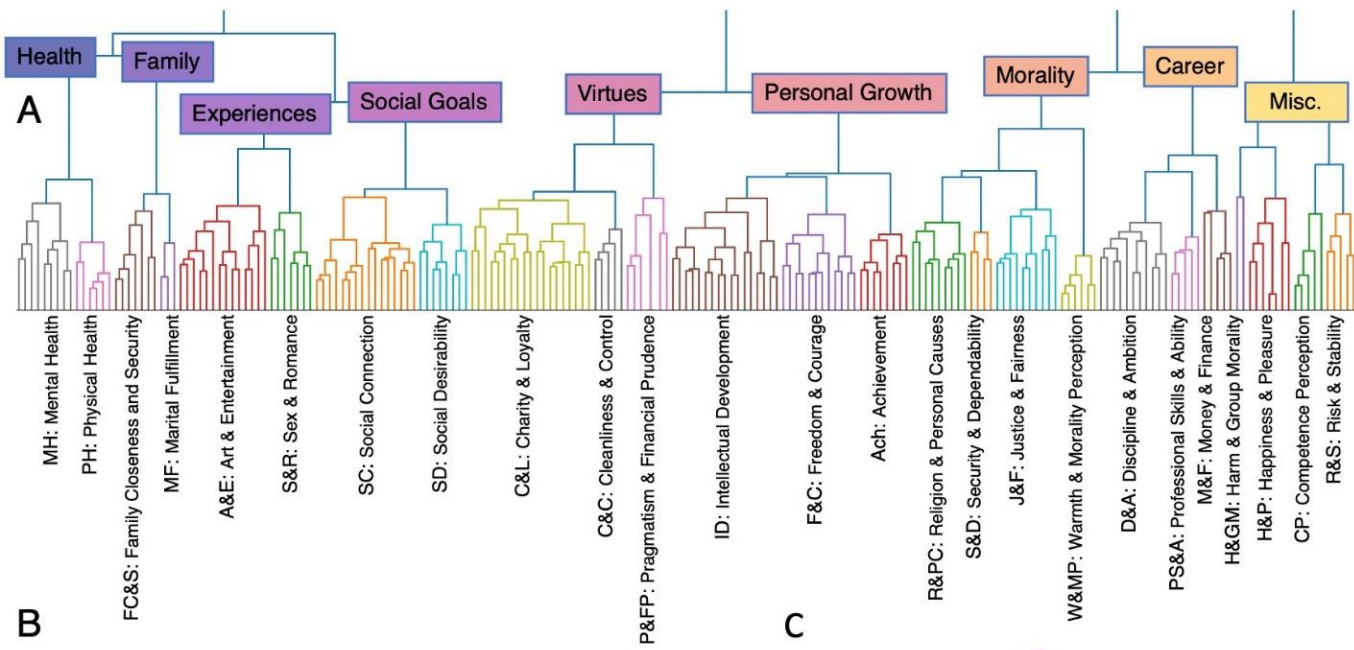
Temporal Context

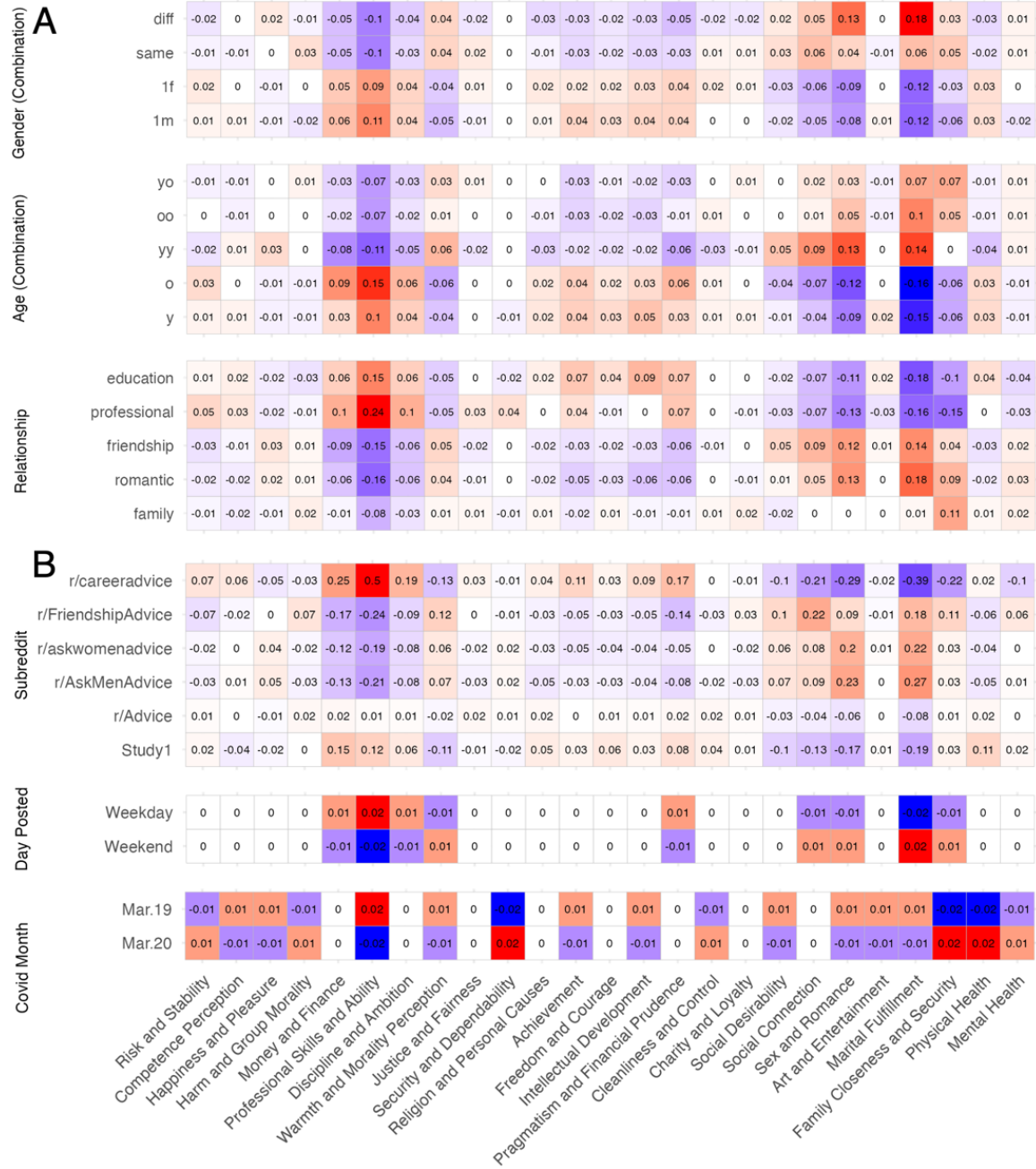


Sorted by t-statistic for difference in attribute frequency

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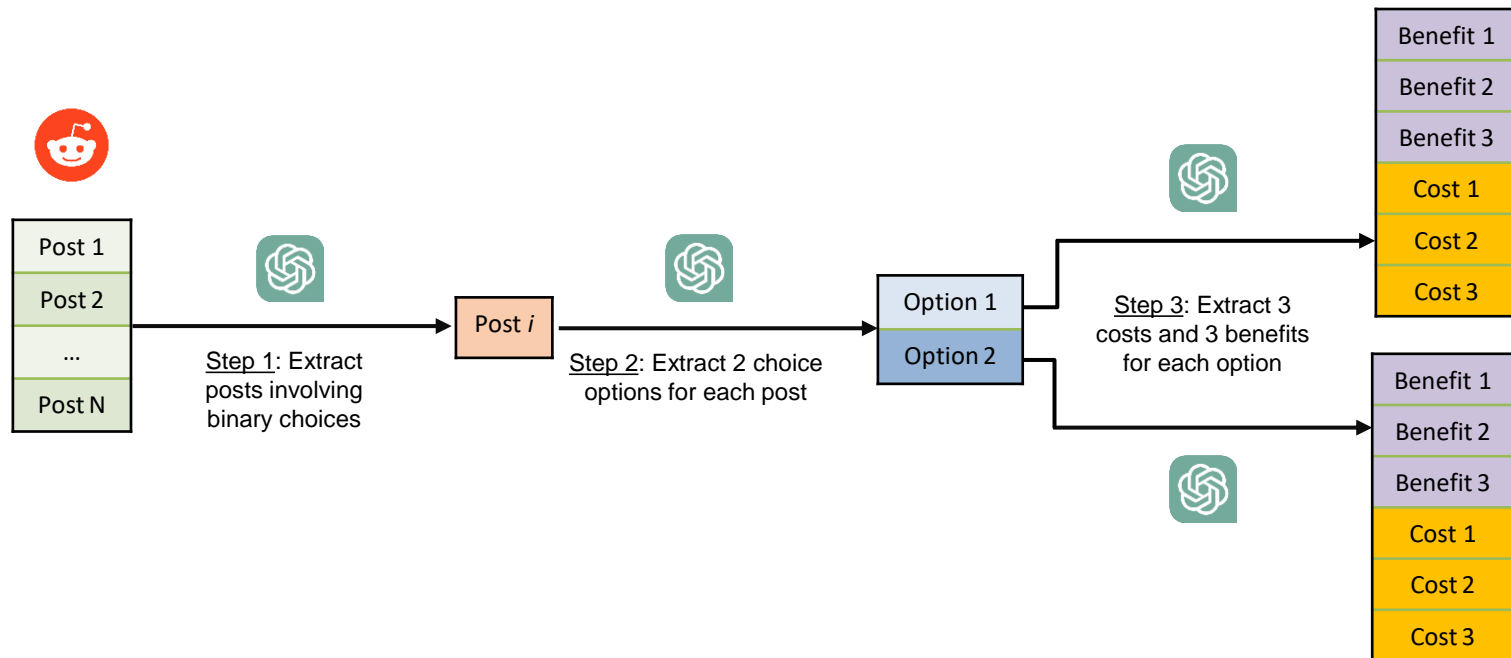






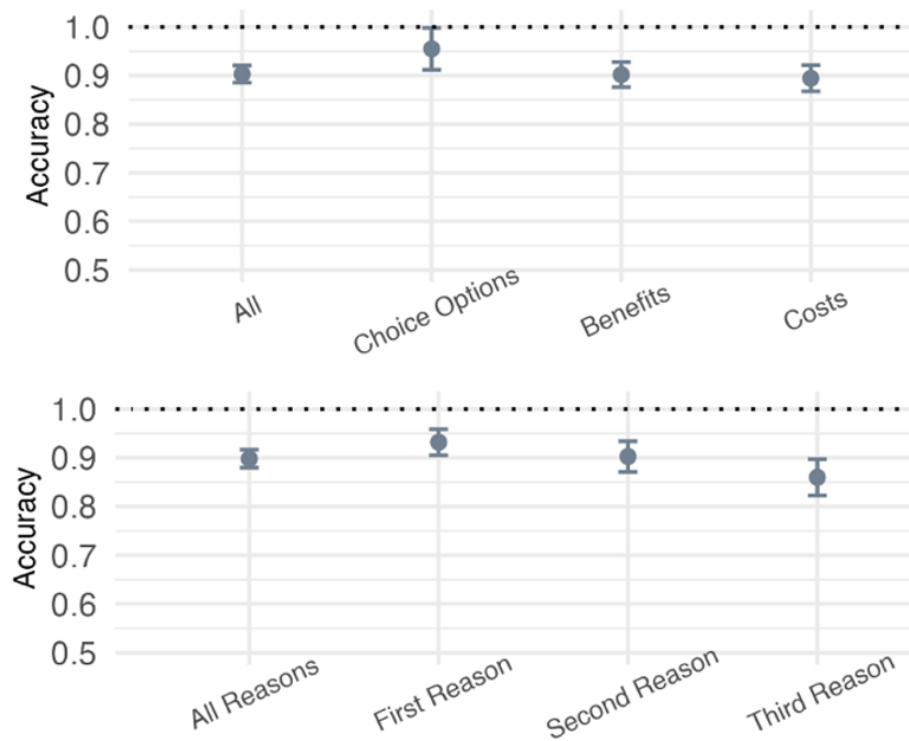
Validation Studies

Study 2 (GPT): 50 online participants judged GPT outputs of 100 randomly sampled posts as appropriate or inappropriate



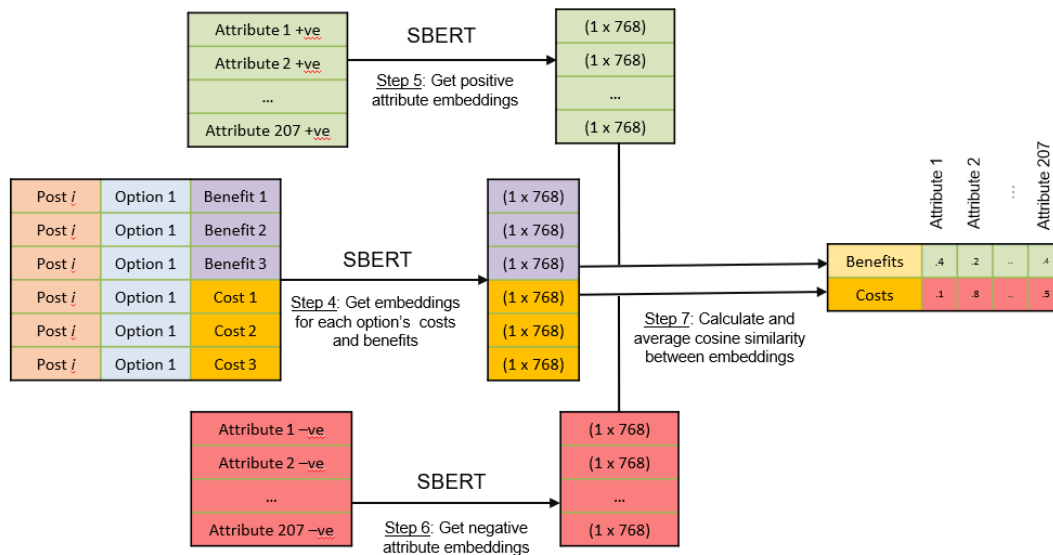
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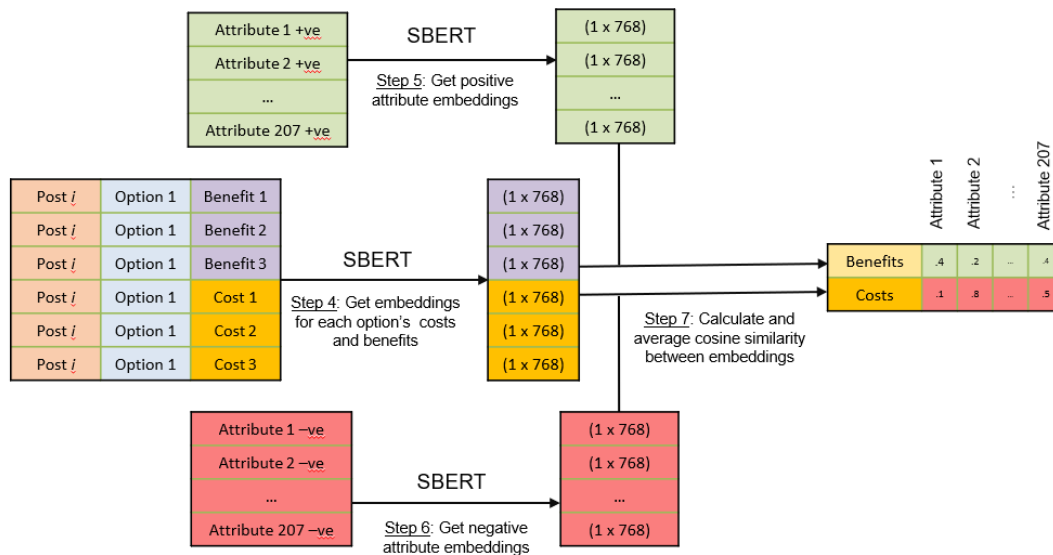
Validation Studies

Study 3 (SBERT): 100 online participants judged the similarity of GPT-generated reasons to the 207 attributes



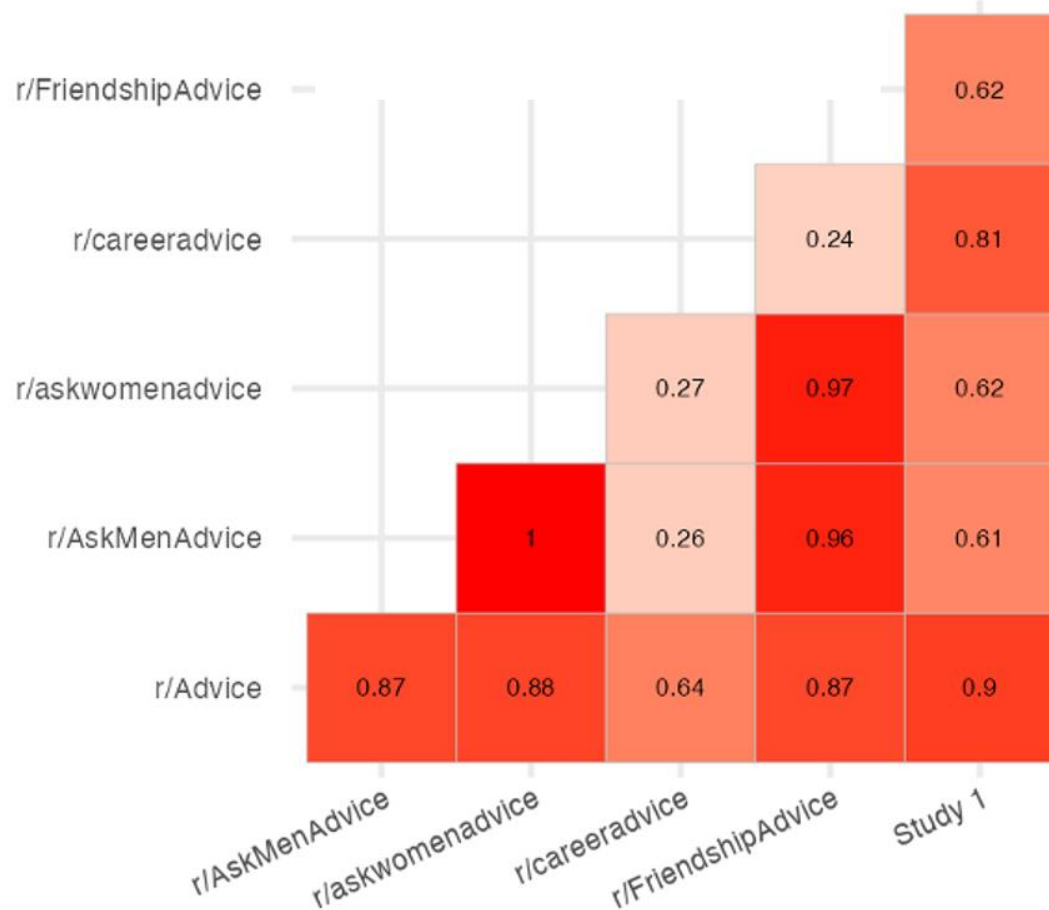
Validation Studies

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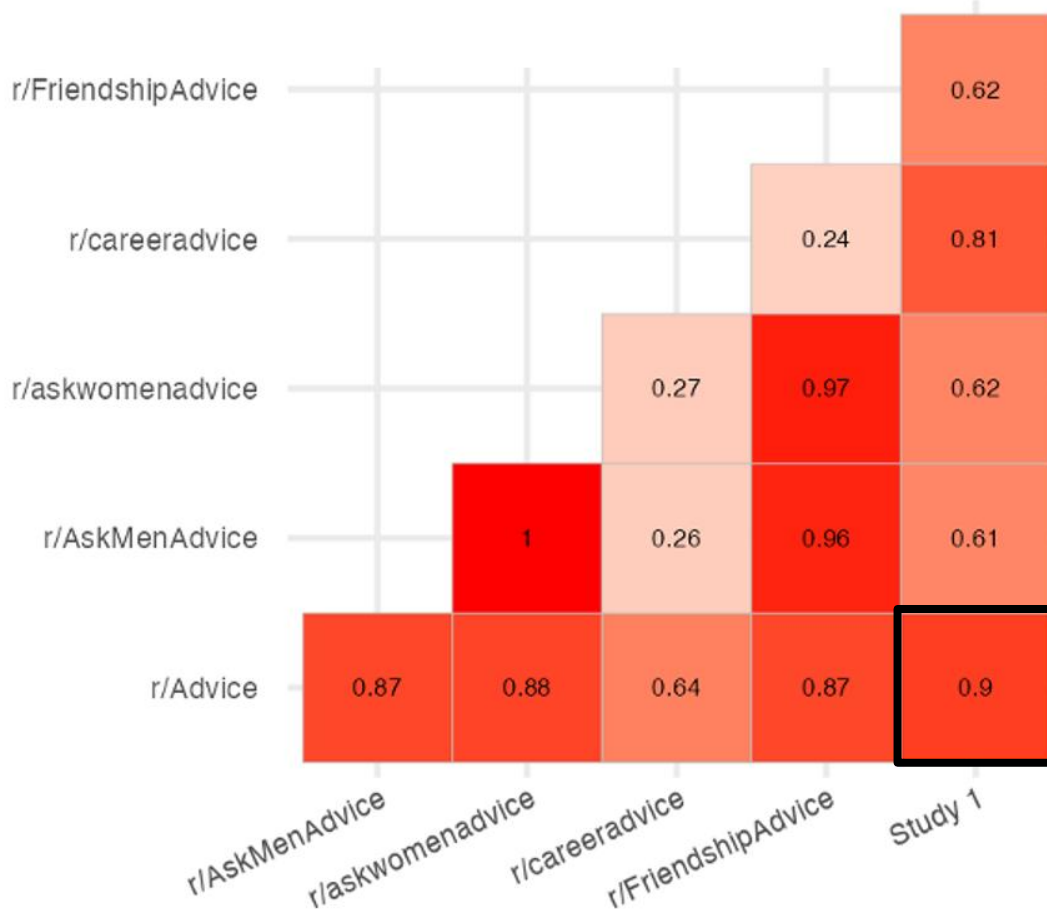
Accuracy = 98.53%

Representativeness of r/Advice



Attribute Frequency Correlations

Representativeness of r/Advice



r/Advice is highly correlated with Study 1

both of which are less correlated with remaining datasets

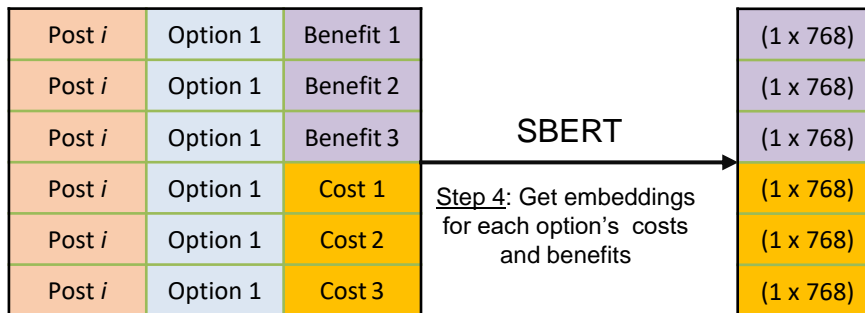
Attribute Frequency Correlations

Theory-based Attributes

Attribute Type	#	Example Attribute	Example Positive Sentence
decision theory	5	safety vs. risk	<i>prevents risk</i>
decision outcomes	11	money	<i>increases wealth</i>
consumer behavior	6	experiential consumption	<i>produces pleasant memories</i>
emotions	6	anger	<i>defuses hostility</i>
self-determination	3	social relatedness	<i>fosters a sense of belonging</i>
values	10	tradition	<i>encourages preservation of cultural heritage and customs</i>
goals	135	sexual desirability	<i>enhances romantic appeal</i>
moral foundations	5	harm	<i>helps someone weak or vulnerable</i>
person perception	10	competence	<i>involves being competent</i>
SVO	4	competitiveness	<i>enhances personal status</i>
altruism	9	efficiency	<i>maximizes the use of available resources</i>
fairness	3	procedural fairness	<i>advances fair and inclusive decision making</i>

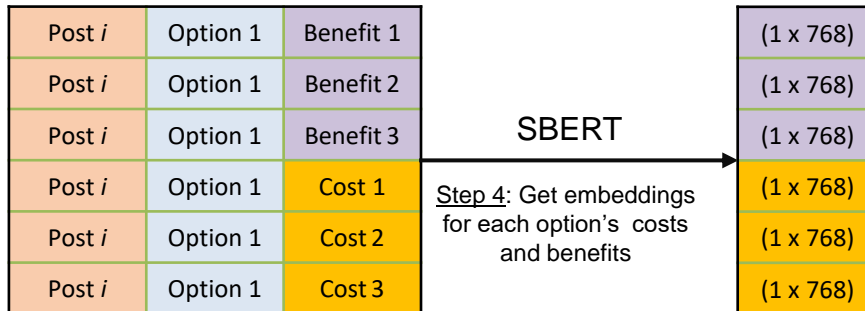
Total 207 distinct attributes

Pipeline



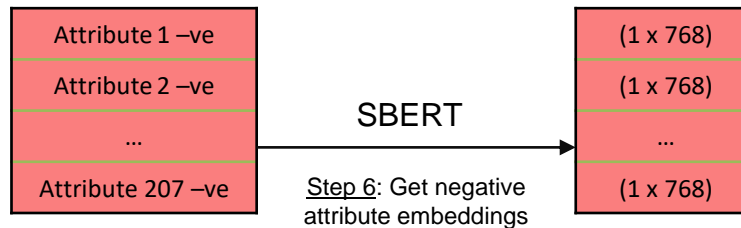
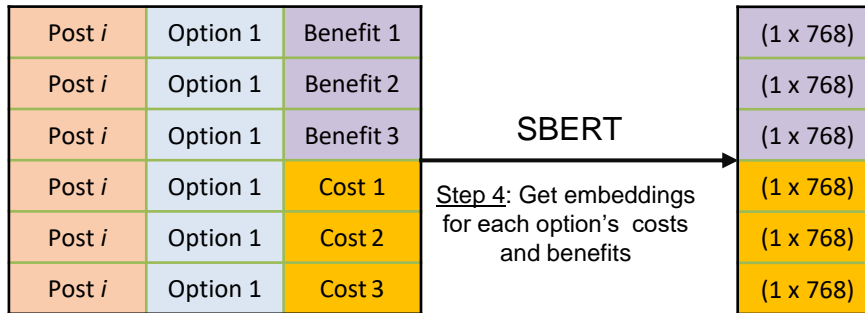
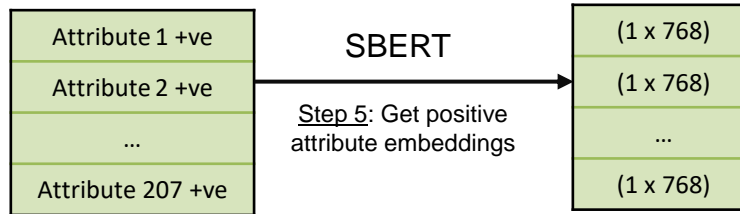
Pipeline

Attribute 1 +ve
Attribute 2 +ve
...
Attribute 207 +ve

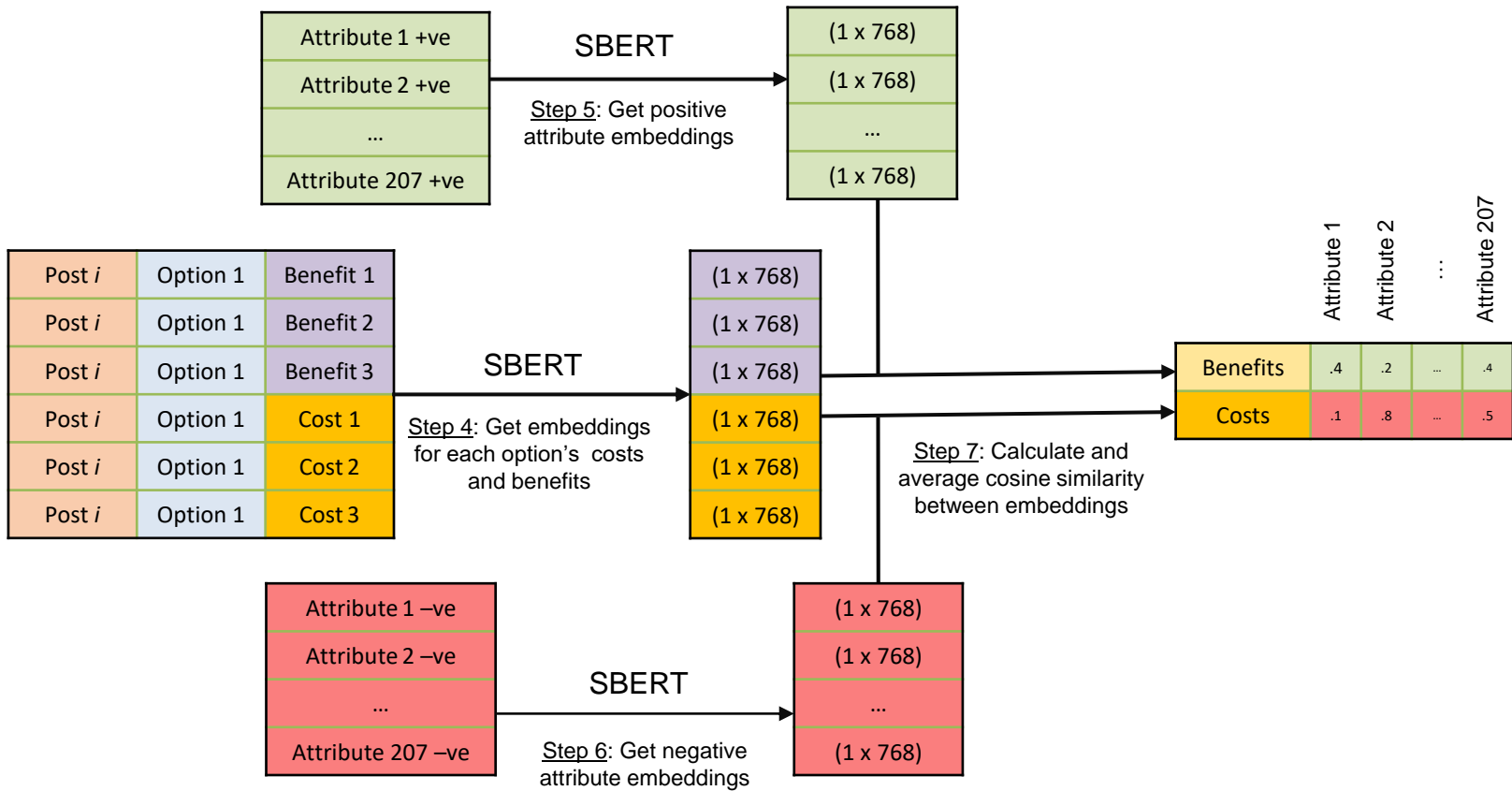


Attribute 1 -ve
Attribute 2 -ve
...
Attribute 207 -ve

Pipeline



Pipeline



Pipeline

