

WHO GETS WHAT, ACCORDING TO WHOM?

An Analysis of Fairness Perceptions in Service Allocation

Jacqueline Hannan, Hwei-Yen “Winnie” Chen, Kanneth Joseph



Introduction

Recently, the goal of algorithmic fairness research has shifted from defining an “objective” measure of fairness to understanding and acknowledging the **many perspectives that exist within a given sociotechnical system**. In an effort to explore these perspectives, **we experimentally tested multiple novel research questions at the intersection of the “Who,” “What,” and “How” of fairness perceptions**.

Survey Design

We designed a **conjoint analysis** study that quantifies the effects of the specific context in which a question is asked, the framing of the given question, and who is answering it.

CONJOINT ANALYSIS

- A systematic random sampling approach.
- Grants the ability to test all attribute levels without a need to create all attribute combinations.

Each participant was presented with two profiles, containing a set of randomly selected attribute levels to create a hypothetical individual [See Figure 1]. The participant was asked to make a decision about allocating a resource to one of the two individuals. The overall conditions of question type, service setting, and severity of decision were created using the following conditions:

- The conjoint analysis was nested within a 2x2x2x2 factorial experimental design to test the service setting and the phrasing of the question.
- Each participant was placed in one of the 16 experimental combinations, and responded to ten profile questions with consistent conditions.
- In total, 747 Amazon Mechanical Turk workers participated in the survey.

Attribute	Person A	Person B
Age	20	70
Children	Two kids	Two kids
Occupation	doctor	nurse
Criminal History	Prior history of non-violent crime	Prior history of violent crime
Race	Hispanic	Hispanic
Upbringing	Grew up poor	Grew up middle class
Political Affiliation	Democrat	None specified
Health Issues	Generally Healthy	Mental health issues



Figure 1. Example of question format presented in the survey. The participant was asked to select Person A or Person B for the allocation of a community college stipend.

Results

- **Who allocates the resource is important** - Fairness perceptions varied along partisan lines [See Figure 2].
- **What resource is being allocated is important** - Perceptions of who should get services varied in both predictable and unpredictable ways [See Figure 3].

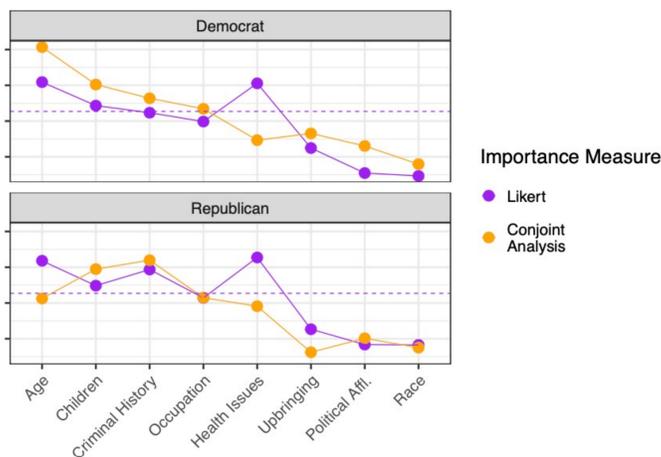


Figure 2. Importance of each attribute along partisan lines.

Predictably, it was perceived to be fair to consider a person’s upbringing when allocating affordable housing, but not a COVID medication. Unexpectedly, however, respondents were more likely to give old people (relative to young people) palliative care, but less likely to give them life-saving resources.

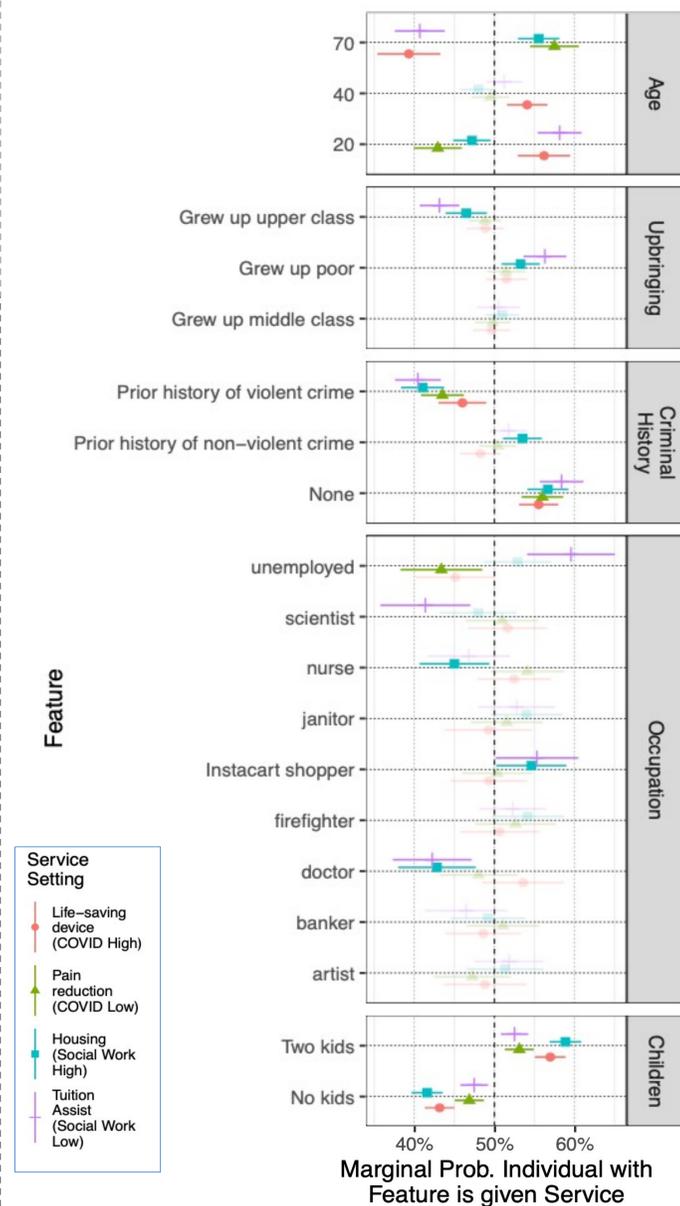


Figure 3. Partial results of the survey, showing statistically significant preferences for a specific set of conditions in bolded color.

Conclusions

Results do not align neatly with any one theoretical understanding of how individuals perceive fairness. Rather, for any given respondent and service setting, our results suggest we should expect to require a mix of theoretical perspectives to understand fairness perceptions.

- Our results provide significant evidence that the *What* and *Who* of fairness perceptions matter.
- Partisan differences in allocation preferences are present in our results.
- Regardless of how one asks questions, fairness perceptions should not be seen as a solution for creating fair, just, or equitable models.

NOTEWORTHY LIMITATIONS

- Requirement that respondents are forced to choose between two options
- Hypothetical nature of the decisions made
- Our analysis is conducted on a non-representative sample of U.S. adults

Acknowledgements

This work was supported an NSF award IIS1939579, with partial support from Amazon, and by an REU Supplement for the first author. Thanks to the C4SG group at UB for comments and thoughts !

<https://c4sg.cse.buffalo.edu/>

References

- Grgic-Hlaca, et. al, 2018. Case Study of Criminal Risk Prediction. WWW '18, 903–912.
- Ani Saxena, et. al, 2020. How Do Fairness Definitions Fare? Artificial Intelligence 283.
- Mallari, et. al, 2020. Do I Look Like a Criminal? CHI 2020, 1–13.
- Van den Bos. 2003. On the Subjective Quality of Social Justice. Journal of personality and social psychology 85, 3 (2003), 482.
- Van den Bos & Lind. 2002. Uncertainty Management by Means of Fairness Judgments.