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Manuscript Title: Why object to inequalities in health and wellbeing? A mixed-methods exploration of inequality aversion with members of the general public

Running title: Why object to inequalities in health and wellbeing?

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Precis: Participants were generally averse to inequality in health and wellbeing, with some variations in reasoning by domain and cause. But no difference by internet use.

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Title: Why object to inequalities in health and wellbeing? A mixed-methods exploration of inequality aversion with members of the general public

Abstract

Distributional cost-effectiveness analyses (DCEAs) help decision-makers incorporate equity considerations in healthcare resource allocation. Public aversion to health inequalities is well documented, but underlying reasonings are rarely explored. Existing studies often elicit inequality aversion across socioeconomic groups, potentially conflating aversion to inequalities in health with inequalities in household finances or wellbeing. Additionally, online surveys systematically exclude people who do not use the internet, a disadvantaged group.

Objectives: To examine whether:

i) reasoning for distributional preferences depend on the domain of inequality;

ii) reasoning for distributional preferences are affected by cause of inequality;

iii) participants provide and explain responses that violate 'monotonicity' (the welfare economics principle that, other things being equal, social welfare improves when at least one person is better-off); and

iv) the above vary across the digital divide.

Methods: We employed mixed-methods to collect qualitative and quantitative data, via online discussion groups with a survey (11 groups, n=53), and telephone interviews (n=15) with digital minority individuals. Participants considered scenarios comparing equal and unequal health and wellbeing outcomes for an imaginary island. Wellbeing was framed as 'equivalent income' (described to participants as household spending money, with other life aspects being good).

Results: Distributional preferences varied by domain and cause of inequality but not digital status. Health inequality caused by financial inequality was widely unaccepted. Some

preferred equal distributions, even when violating ‘monotonicity’, citing fairness and social cohesion.

Conclusions: Recruiting across the digital divide and using mixed-methods enriches inequality aversion research, enhancing the inclusivity and legitimacy of DCEA.

Keywords

Mixed-methods, inequality aversion, health and wellbeing, social preferences, telephone interviews, online discussion groups, digital divide

Highlights

What is already known about the topic?

Distributional preferences of the general public are known to be averse to inequalities in health across socioeconomic groups, but most analyses confound aversion to health inequality and aversion to socioeconomic inequality. Little is known about the reasonings behind this. More recent studies use online surveys, systematically excluding those who do not use, or are not comfortable using, the internet, so whether distributional preferences vary across the digital divide is unknown.

What does the paper add to existing knowledge?

Although a minority favoured inequality in health and wellbeing, participants were generally averse to inequality. Their reasoning varied across domains and causes e.g: healthy-life-years inequality was viewed as less visible and less obvious than financial inequality, and more unacceptable when caused by financial inequality. Some preferred the equal distribution even when nobody was better off in it (violating monotonicity), citing fairness and social cohesion. No difference in reasoning was observed across the digital divide.

What insights does the paper provide for informing healthcare-related decision making?

This paper enhances understanding of the reasoning that informs distributional preference data and inequality aversion parameters that can capture equity concerns for DCEAs. It demonstrates a novel mixed-methods approach and that including people in the digital minority can enhance inequality aversion research. Such approaches will strengthen the social legitimacy of data used within DCEAs for policy use.

Introduction

Distributional cost-effectiveness analyses (DCEA) can help decision-makers allocate limited healthcare resources, taking into account trade-offs between improving total health and reducing health inequality[1,2]. Quantitative studies find the general public largely averse to inequalities in health (e.g. [3,4]) but qualitative studies exploring reasoning behind such preferences are rare. This paper aims to contribute to the understanding of distributional preference data and inequality aversion parameters that capture equity concerns for use in DCEA. Some studies also find violation of the 'monotonicity principle'[5,6]. This welfare economics principle requires that, other things being equal, social welfare improves when at least one person is better-off. Qualitative approaches are needed to understand why people may violate this principle.

Existing studies[3] often elicit inequality aversion in health across socioeconomic groups, likely confounding aversion to inequality in health itself with aversion to socioeconomic inequality. This is problematic, because the analysis to derive the health inequality aversion parameter does not account for socioeconomic inequalities. Growing use of online surveys in quantitative preference elicitation also systematically ignores the views of digitally-excluded people, a disadvantaged group within the population, who tend to be older[7,8]. Arguably, policy decisions should be informed by societal and inclusive preferences. Given these knowledge gaps, we examine whether:

i. reasoning for distributional preferences depend on the domain of inequality;
ii. reasoning for distributional preferences are affected by cause of inequality;
iii. participants provide and explain responses that violate 'monotonicity' that, other things being equal, social welfare improves when at least one person is better-off);

iv. the above vary across the digital divide.

2. Methods

2.1 Study Design

We used a mixed-methods approach with an embedded design where qualitative research is 'embedded' within the quantitative, with concurrent quantitative and qualitative data collection[9], informed by 'GRAMMS' (Good Reporting of a Mixed-Methods Study)[10].

We conducted online discussion groups with internet users, and individual telephone interviews with people unlikely to participate in online research ('digital-minority' participants). We elicited distributional preferences for health and wellbeing outcomes via an online survey (designed to generate an inequality-aversion parameter for use in potential DCEA). We aimed for the qualitative data to provide a deeper understanding of views about inequality than survey data could alone. A separate paper (anonymised-reference 2), will focus on a welfare economic analysis of the quantitative data.

Pandemic restrictions meant we had to conduct the group research online, and in addition engage digital-minority participants in telephone interviews. Given the different methods used, we focused on exploring how both samples accounted for their views.

During discussion groups and interviews, participants were asked to discuss a set of choice tasks taken from the survey. These involved choosing between two different distributions (presented as Outcomes A and B), both across two groups ('Stripes' and 'Spots) of the same size. One of the distributions (A) was unequal, had a higher total outcome, and remained fixed through subtasks that followed. The other distribution (B) was equal, but the total size varied: it started at the same total level as the unequal distribution (A) but gradually diminished through subtasks that followed.

The choice tasks were designed to distinguish between distinct distributional preferences:

i) 'inequality-seeking': always choosing the unequal distribution (A)

ii) 'inequality-averse' (including Rawlsian): balancing between the total and how it is distributed, switching away from equal distribution (B) at some point to accept the unequal distribution A

iii) 'inequality-rejecting' always choosing the equal distribution (B) regardless of the total

The inequality-rejecting preferences violate the 'monotonicity principle' in welfare economics, which requires that other things being the same, social welfare improves when at least one person is better off [5].

The survey design determined and constrained the topics within the discussion groups and interviews (see supplementary files1 and1.1 for information about survey design rationale, the full survey and piloting).

2.2 Sampling and recruitment

The independent research company, NatCen recruited participants. For online groups, we aimed to recruit (50) internet-users from the general population, drawn from NatCen's random probability-based panel. A purposive sample aimed for maximum variation, including some diversity of views (e.g. age, self-reported financial status, gender, diversity of views on welfare). Group participants were recruited if they were able to take part online and use multiple tabs to complete the survey online during the group. These participants received a £60 shopping voucher. For the digital-minority telephone interviews, we aimed to recruit a purposive sample of 15 participants via a recruitment agency sub-contacted by NatCen. Sampling criteria were based on the recruiter's screening questions, to identify those unlikely

to participate in online research (i.e. people reporting not being confident using technology or having limited digital access). Age, gender, household size, occupation, level of education and voting at the 2019 general election were monitored to achieve variation. These participants received a £40 shopping voucher (as their participation time was less than online group participants).

2.3 Data collection

All participants were asked to consider three tasks across three domains of inequalities, presented in the same order, involving an imaginary island (see Supplementary files 1.1, 2, 3 for materials presented to participants).

- Task 1 involved wellbeing inequality, operationalised as inequality in 'equivalent-income'[11] (see Supplementary file 1), across otherwise identical individuals. This was described to participants as "household spending-money, combined with everybody having the best levels in all other aspects of life". Hereafter in this manuscript we refer to this as 'equivalent-income'.
- Task 2 involved health inequality, operationalised as inequality in healthy-life-years across otherwise identical individuals, with a good level of equivalent income. This was described to participants as "healthy years of life".
- Task 3 involved healthy-life-years inequality, across those with high and low levels of equivalent income (i.e. financially rich and poor, but otherwise identical in terms of having the best levels in non-monetary aspects of life), caused by the better-off being financially richer.

(See supplementary file 4 for definitions of spending-money and healthy-life-years given to participants).

Throughout the three tasks, all other aspects of life are controlled, to be equal for all and at the best levels, in order to isolate the distributional preference for the domain in question (e.g., Task 1 focuses on inequality in 'equivalent-income' alone).

Figure 1 gives an example of Tasks 1, 2 and 3 (for all subtasks discussed within groups see supplementary file 2, for all tasks discussed during telephone interviews see supplementary file 3).

Figure 1: Example of Tasks 1, 2 and 3

Online groups were facilitated by four NatCen facilitators, using a facilitation guide (supplementary file 5). Group participants were asked to share views on whether they preferred the unequal distribution A or equal distribution B for the island, and why. Participants were encouraged to listen to others' views and were free to change their mind. Facilitators did not aim to achieve group consensus. Discussion paused after each task so participants could complete the online survey individually and privately via a link to a Qualtrics survey.

All groups were conducted online via Zoom, recorded and professionally transcribed. All participants completed a consent form. A hardcopy of the survey was sent in advance to telephone interview participants (supplementary file 3) to have to hand during interviews, but not to complete. Telephone interviews were conducted by a researcher using an interview guide (supplementary file 6). Telephone participants were asked to explain whether they preferred the unequal (A) distribution or equal distribution (B), and why, and for their responses to the survey questions, which the researcher recorded on the Qualtrics survey.

XXXXX research ethics committee, University XXXX approved this study.

2.4 Analysis

The quantitative and qualitative datasets were initially analysed separately, then findings between the two integrated.

Initial quantitative analysis involved analysing patterns of distributional preferences (i.e. inequality-seeking, inequality-averse, inequality-rejecting) by participant by task, testing hypotheses regarding the patterns across the tasks, and interpreting the results against welfare economic theory.

Initial qualitative analysis involved an inductive and deductive thematic analysis[12,13] of the online discussion group and telephone interview transcripts, using NVivo R1. Following familiarisation, the lead author coded all transcripts to develop an initial coding frame informed by our research aims, noting reflections. Three group and three telephone transcripts were read by two other researchers. A final coding frame was agreed following team discussion. All transcripts were coded by the lead author using this coding frame. A further six transcripts (three group, three telephone) were coded by another researcher. No substantial differences were identified (supplementary file 7-final coding frame).

Both datasets were coded with the aim of understanding the reasons underlying participant's choices and exploring whether there appeared to be any substantial differences in views expressed by the two different samples and, if so, why.

The first two pilot groups were not included in this analysis, given substantial changes made to materials after piloting. A third pilot group and three pilot telephone interviews were

included, as materials did not change after these. Codes were grouped into related categories and preliminary themes discussed within the team. A descriptive analysis[14] focused on reasons given for supporting unequal or equal distributions and views expressed about each type of inequality (i.e.: Task 1 compared to Task 2, Task 2 compared to Task 3).

Integration of qualitative and quantitative findings was based on 'following a thread', a technique suggested to aid integrating findings specifically at the analysis stage of mixed-methods projects[15,16]. For instance, given the patterns of distributional preferences identified quantitatively, the qualitative analysis explored views supporting these, and inequality-seeking and -rejecting preferences in particular, whilst recognising that participants may have changed their views between discussions and completing the survey individually. Themes identified within the qualitative data then led to re-examination of survey data. For example, an initial theme suggested participants considered healthy-life-years inequality worse than 'equivalent-income' inequality (when other aspects of life were controlled for). So, we examined the survey data, to see if such views were reflected in subtask response patterns. We then re-examined the qualitative data to further explore reasoning behind such views and other differences between tasks. An iterative and collaborative process informed our analysis which focused on generating explanations for views expressed, resulting in the final themes reported in this paper.

3. Results

3.1 Participant characteristics

3.1.1 Main characteristics of online group participants

Fifty-three participants participated in 11 online groups, with between three and seven in each group. Each lasted approximately three hours. Table 1 summarises main characteristics of group participants. We also sampled for variation, including diversity of views and financial status (see supplementary file 8).

[Table 1]

3.1.2 Main characteristics of digital-minority participants

Fifteen people (seven men, eight women) participated in telephone interviews ranging from 38-61 minutes. Ages ranged from 43-76 years, higher than the online sample. Main characteristics, including digital exclusion, are presented in Table 2.

[Table 2]

3.3 Results from the mixed-methods analysis

3.3.1 Summary of distributional preferences and inequality aversion from the survey analysis

The survey found: that participants were generally averse to health and wellbeing inequality across otherwise identical people; that they were more averse to health inequality of the same magnitude when it was caused by the better off being financially richer. Also, some respondents violated 'monotonicity' (choosing an equal distribution over an unequal distribution, even when nobody was better off in the equal distribution). Figure 2 illustrates the spread of preferences observed across the survey tasks and samples. Across both samples, in Task 1 ('equivalent-income' inequality), around half the participants were inequality-rejecting i.e. always choosing the most equal outcome, regardless of the total. For Tasks 2 (healthy-life-years inequality) and 3 (healthy-life-years inequality caused by financial

inequality), the median preference was 'inequality-averse' (i.e. switching from equal distribution B to unequal distribution A during the tasks, after the first subtask).

[Figure 2: Summary of online survey and telephone interview responses]

3.3.2 Distributional preferences depend on the inequality of 'what' domain (Task 1 vs. Task 2)

As shown in Figure 2, distributional preferences depended on the domain of inequality (i.e. across Tasks). Views expressed within both samples indicated that 'equivalent-income' inequality was viewed as different to healthy-life-years inequality. We identified several reasons for such views within the qualitative data, including:

i) Experiencing a healthy-life-years inequality may feel less bad than 'equivalent-income' inequality. Healthy-life-years inequality (Task 2) was regarded as less visible and obvious than financial inequality (Task 1). Participants considered Spots and Stripes would be more aware of 'equivalent-income' inequality than healthy-life-years inequality. For example, Stripes would have more expensive material possessions than Spots (e.g. cars, clothes, holidays) - leading to strong resentment. Participants acknowledged healthy-life-years inequality may also cause resentment, but to a lesser extent.

ii)A less popular view suggested unequal distributions of equivalent-income could offer incentive, motivation or opportunity, which benefits society. This argument was not suggested for healthy-life-years inequality.

iii) Having more older people within society was viewed as valuable, as society benefits from older people's experience and the support they provide within families and communities. This view supported choices for the unequal distribution when considering healthy-life-years inequality (Task 2), but not for 'equivalent-income' inequality (Task 1).

iv) In Task 1, all else being equal and good was used to justify inequality-rejecting views and violate monotonicity. This reassured participants choosing the equal distribution (B) at the last subtask, that despite everybody having the least financial means, everybody's basic needs were met, with good health etc, implying a good quality of life. So, for those who valued fairness and equality, this was the preferable distribution. However, in Task 2, this reasoning was not used to justify inequality rejecting views.

3.3.3 Distributional preferences were affected by the cause of the inequality (Task 2 vs. Task 3)

Keeping all other aspects of life equal and good, most participants found inequality in healthy-life-years less acceptable when it is caused by financial inequality.

We found this difference reflected within the overall pattern of survey responses (Fig.2): across both samples, i.e. larger proportions were inequality-rejecting in Task 3 than in Task 2. Thus, we examined the qualitative data, identifying the following reasons for such views:

i) Financial inequality causing healthy-life-years inequality was mostly regarded as objectionable because it would be divisive, and, such an outcome was intrinsically unfair.

ii) Potential benefits of having more older people, which justified healthy-life-years inequality in Task 2 for some, no longer held if it was only the rich living longer (Task 3), since it now offered little benefit to the rest of society, and was regarded as unfair.

3.3.4 Participants gave and explained responses that violated the 'monotonicity principle'

Participants from both samples gave 'inequality-rejecting' survey responses (Fig. 2), which violates the 'monotonicity principle'. Within group discussions and interviews, participants explained such preferences.

As we saw above, in Task 1 ('equivalent-income' inequality) all else being equal and good was used to justify inequality-rejecting views and violate monotonicity, but not in Task 2.

Fairness emerged as the key driver for inequality-rejecting views in Task 1 ('equivalent-income' inequality) and Task 2 (healthy-life-years inequality); equal distribution (B) was viewed as kinder, more harmonious, and socially cohesive. Concern about how life would be for poorer or shorter-living Spots in unequal distribution (A) was expressed, alongside beliefs in the intrinsic importance of fairness within society.

Fairness remained the key driver for responses violating 'monotonicity' in Task 3, which involved richer people living longer, due to their better finances. Here, fairness as a guiding principle was expressed even more keenly. Also, inequality-rejecting responses were supported by the view that there may be some societal benefit to having shared experience, born of a fair distribution of healthy-life-years. Additional reasoning focused on concerns that the poorer Spots in the unequal distribution (A) had two disadvantages (in healthy-life-years plus 'equivalent-income'), and that the equal distribution (B) involving only one disadvantage in 'equivalent-income' was perhaps the 'least-worst option'.
Illustrative quotes are provided in Table 3.

[Table 3]

3.3.5 Similar views were expressed across the digital divide, and group dynamics prompted richer data

Our survey found aversion to health and wellbeing inequalities across the digital divide, with similar views expressed by both samples. However, the one-to-one telephone dialogues with an interviewer, aiming to be as neutral as possible, lacked the dynamic observed in groups so that the resulting data were less rich, reflective or insightful than group discussions. Group dynamics generated data based on more wide-ranging and interactive discussions, thereby

providing most of the illustrative quotes.

4. Discussion

We found that the domain and cause of inequality affect the reasoning for distributional preferences. Furthermore, some responses violated 'monotonicity'; participants explained that equal distributions were always better because they were fairer, and fairer distributions were perceived to benefit everyone. Quantitative studies report public aversion to health inequalities ([3,4]) but studies exploring reasoning behind such preferences are uncommon. Our mixed-method study enhances understanding of distributional preferences for health and wellbeing outcomes.

Robson et al (2024)[17] offer insight into possible reasons for health inequality aversion by distinguishing between aversion to inequality in health: on its own (similar to our Task 2); in correlation with income; and caused by income (similar to our Task 3). The median respondent is more averse to income-caused health inequality than to health inequality on its own, but is no more averse to health inequality when it is income-caused than when it is simply income-related. This is at odds with our finding that it is the health inequality being caused by the financial inequality that makes it unacceptable. However, Robson et al (2024)[17] did not collect qualitative data to confirm whether or how respondents reasoned differently across the contexts.

Hurley et al[18] examined written explanations for distributional preferences elicited via an online survey about inequality across different domains (i.e. income, health and income-related health, controlling for any other inequalities). Overall, they found that "…dominant patterns of reasoning were similar across domains" (p.11). In contrast, a surprising finding within our study was the different reasoning expressed across domains; spending-money inequality was viewed as less acceptable than healthy-life-years inequality, when other life

aspects were equal and good, because participants felt people would be more aware of spending-money inequalities.

However, some reasoning expressed by participants in our study does appear similar to Hurley et al's[18] findings. For example, fairness as a valued principle (deontological), was used to explain choices for equal distributions in both studies. Reasoning supporting unequal distributions was also similar; i.e. that money inequality may benefit society via economic growth (instrumental), and provide incentive and opportunity (instrumental).

A less surprising but nevertheless key finding was that, when healthy-life-years inequality was caused by spending-money inequality, this was mostly viewed as unacceptable. This aligns with views contending that health inequality is most problematic when systematically caused by socioeconomic inequality[19], as is the case within many countries[20].

We also observed inequality-rejecting preferences (i.e., always preferring the equal distribution) that violate monotonicity, a welfare economics principle. Our findings illustrate not only that people do make choices deemed irrational from the perspective of economic theory in a survey, group discussions and interviews, but that they can provide coherent explanations for these choices.

There is growing use of online surveys to examine distributional preferences for health outcomes[3] resulting in exclusion of people who do not use or are not comfortable using the internet. Against this background, we compared distributional preferences across the digital divide, and found similar views expressed by the two samples. However, researchers need to be cautious and consider how to capture the perspectives of people who cannot participate

online, especially as digital-minorities are amongst those most affected by societal inequalities[7]. Policymakers using DCEA and other equity-sensitive evaluations may, and we would contend, should, demand such perspectives are accounted for in the relevant research informing them.

Using an embedded mixed-methods design, concurrent qualitative and quantitative data collection and integrating qualitative and quantitative findings during analysis is a novel contribution. These methods enabled us to consider the reasoning that may inform survey responses, offering a deeper understanding of views about and preferences for inequality across different domains than offered by a survey alone. Online groups which elicited reasoning in support of distributional preferences via discussion, including diversity of views and the rich data generated from the groups, are strengths of this study.

Limitations

Although most participants engaged with the tasks, some needed support to engage with an exercise that demands considering imaginary distributions and outcomes, as the hypothetical nature of the tasks appeared to affect some participants' engagement. It is unclear whether or not all participants understood or held onto the concept of 'equivalent-income', presented to them as household spending-money and 'all other aspects of life are equal and good'. Instructions to ignore how the different distributions might evolve over time were, for example, not always heeded. Also, the facilitation guide did not explicitly state that there were equal numbers of people in the Spots and Stripes, so participants were not consistently made aware of this, which may have affected understanding or responses.

Given the pandemic, we could not engage digitally-minoritised people by running in-person

discussion groups. Thus, instead we conducted individual telephone interviews. There is a range of digital use within the digital-minority sample, which may mean our findings do not fully reflect the perspectives of those who are most digitally-excluded. However, recruiting a sample of only individuals who do not use the internet at all was beyond our resources. In-person group discussions, involving both people comfortable online and those who are not, would allow further exploration of whether differences in findings appear to relate to differences in these populations. The sample size of telephone interviews was pre-determined, and interviews preceded analysis, meaning that preliminary analysis was not used to identify data saturation and inform sample size. However, analysis did indicate saturation.

The different data collection methods necessitated for each sample may have resulted in some limitations. Group discussions generated richer data than individual telephone interviews. Body language and other visual cues were not available to aid interaction and participant understanding for the digitally-marginalised telephone sample. The digitally-marginalised sample were older than the online sample, so there is possible conflation between the effect of digital status and that of age. However, in the real-world people who are digitally-excluded or digitally-marginalised are generally older[7,8]. Furthermore, since different age compositions and different data collection methods make it less likely that views found would be similar, our findings about similarities of views between the samples remain strong.

Task order may have affected reasoning. For example, there was generally less detailed discussion of Task 3. We do not know whether this was because participants were fatiguing and time was short, and/or because they had already discussed 'equivalent-income' and healthy-life-years inequalities in Task 1 and Task 2, leaving less to say.

Group facilitators and the interviewer needed to encourage participants to feel comfortable, confident to express themselves and complete on time, so it was not possible to pick-up on all potential misunderstandings. Group facilitator training was cascaded from one facilitator trained directly by the research team to three others.

Conclusion

We found that across the digital divide, samples of the UK public were averse to inequality in health and wellbeing outcomes, and large minorities always rejected inequality, which violates 'monotonicity', a key welfare economics principle. The domain and cause of inequality affected distributional preferences.

Inequality in household spending money was viewed as less acceptable than inequality in healthy-life-years, when controlling for other aspects of life as equal and good. In addition, inequality in healthy-life-years resulting from household spending money was viewed as intolerable. Valuing fairness and social cohesion as key societal principles supported inequality-rejecting views. Our mixed-methods approach contributes uniquely to evidence about views informing distributional preferences for health and wellbeing. Although we found no evidence of different reasoning by digital status, we are cautious about concluding that distributional preferences between online and digital minority samples would always be similar as this study is the first to explore this issue. Online surveys designed to elicit distributional preferences and inequality aversion parameters to support equity informed cost-effectiveness evaluations should be supplemented with more inclusive and mixed and group-based methods, including digitally-marginalised people. This would enhance understanding of such data, and its social legitimacy for use in potential policy decisions.

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