

Liebe, Ulf; Bruderer Enzler, Heidi; Diekmann, Andreas; Preisendörfer, Peter

Article

One justice for all? Social dilemmas, environmental risks and different notions of distributive justice

Games

Provided in Cooperation with:

MDPI – Multidisciplinary Digital Publishing Institute, Basel

Suggested Citation: Liebe, Ulf; Bruderer Enzler, Heidi; Diekmann, Andreas; Preisendörfer, Peter (2024) : One justice for all? Social dilemmas, environmental risks and different notions of distributive justice, Games, ISSN 2073-4336, MDPI, Basel, Vol. 15, Iss. 4, pp. 1-25, <https://doi.org/10.3390/g15040025>

This Version is available at:

<https://hdl.handle.net/10419/330094>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Article

One Justice for All? Social Dilemmas, Environmental Risks and Different Notions of Distributive Justice

Ulf Liebe ^{1,*} , Heidi Bruderer Enzler ², Andreas Diekmann ^{3,4} and Peter Preisendörfer ⁵ ¹ Department of Sociology, University of Warwick, Coventry CV4 7AL, UK² School of Social Work, Zurich University of Applied Sciences, 8037 Zurich, Switzerland; bruz@zhaw.ch³ Institute of Sociology, University of Leipzig, 04107 Leipzig, Germany; diekmann@soz.gess.ethz.ch⁴ Department of Humanities, Social and Political Sciences, ETH Zurich, 8092 Zurich, Switzerland⁵ Institute of Sociology, University of Mainz, 55128 Mainz, Germany; preisendoerfer@uni-mainz.de

* Correspondence: ulf.liebe@warwick.ac.uk

Abstract: A just or fair distribution of environmental bads and goods is important for solving environmental social dilemmas and is a core idea of environmental justice politics and research. Environmental justice is mostly associated with egalitarianism as the sole justice principle for all people. In contrast, we argue that it is important to uncover and consider heterogeneity in justice concerns to achieve socially accepted solutions to environmental social dilemmas. With noise pollution as an example, we explore citizens' preferences for justice principles regarding the allocation of politically initiated environmental benefits. In our survey in four European cities, respondents were asked to choose between different outcomes of a program to reduce road traffic noise in line with the following four notions of distributive justice: equal shares, equal outcomes, the greatest benefit for the least advantaged (Rawls), and the greatest benefit for the greatest number (Bentham). We found that most respondents chose Rawls' principle, a preference that was stable over time but weaker when explicitly introducing the veil of ignorance. The preference for Rawls notwithstanding, we observed substantial heterogeneity in justice preferences. Multinomial logit analyses of survey and geo-referenced data on noise exposure showed that respondents with a higher socio-economic status and lower exposure to traffic noise were more likely to choose Rawls' principle. Taken together, our study confirms the prominence of Rawls' principle, demonstrates empirically the heterogeneity of justice preferences, and calls for more direct measurements of such preferences in research on environmental social dilemmas, environmental justice, and beyond.

Keywords: environmental justice; justice preferences; egalitarianism; Rawls principle; utilitarianism; road traffic noise



Citation: Liebe, U.; Bruderer Enzler, H.; Diekmann, A.; Preisendörfer, P. One Justice for All? Social Dilemmas, Environmental Risks and Different Notions of Distributive Justice. *Games* **2024**, *15*, 25. <https://doi.org/10.3390/g15040025>

Academic Editors: Ulrich Berger and Concetto Paolo Vinci

Received: 23 December 2023

Revised: 3 May 2024

Accepted: 21 June 2024

Published: 1 July 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

1.1. Environmental Problems as Social Dilemmas

Most environmental problems have the character of social dilemmas, as explicated in Garrett Hardin's seminal paper on the tragedy of the commons [1]. Such dilemmas include a conflict between individual and collective rationality, lead to free-riding, and often to collectively suboptimal outcomes. Game theoretic analyses have helped to model dilemma situations as well as to shed more light on the conditions under which individuals reach collectively optimal outcomes [2]. It has been shown, for example, that a long shadow of the future, i.e., the possibility of future interactions, can increase the level of cooperation and result in cooperative equilibria, aligning individual and collective interests [3–5]. Other studies indicate that communication (face-to-face or written, before or during dilemmas) can help to achieve cooperative solutions (see [6] for a meta-analysis). Several theoretical models and experimental studies in behavioral economics, experimental sociology, and social psychology highlight the relevance of other-regarding preferences for cooperation,

for example, by accounting for the importance of distributive justice concerns and by assuming that individuals strive for egalitarianism in addition to material payoffs [7–9].

Moreover, research indicates that social inequalities and group heterogeneity can greatly influence outcomes in social dilemma situations. Individuals differ in many characteristics, including endowment/income, productivity, gender, education, and ethnic background. It has been shown, for example, that cooperation is undermined by high inequality in endowments [10,11], that gender matters for the effect of legitimacy of inequality [12], and that differences in group identity and socioeconomic status affect cooperation [13,14].

All the evidence mentioned strongly indicates that economic, social, and cultural heterogeneity needs to be considered in understanding and explaining social dilemma situations. It also implies that, due to heterogeneity in societies, solutions of social dilemmas might affect different groups in society differently, and that this in turn can impact the social acceptance of solutions. In a social dilemma, either free riding is the dominant strategy (as in a prisoner's dilemma) or a cooperative solution is not attainable (as in generalizations of the game of chicken, for example). However, the nature of the dilemma and possible solutions depend on the utility functions of actors. These may include principles of justice that are not evenly distributed across the population.

This heterogeneity and potential differences in fairness/justice concerns across socioeconomic groups is the starting point for our study, where we ask how individuals evaluate the fairness of different distributions of environmental bads or goods. We challenge the (implicit) assumption of environmental justice research that egalitarianism is the *sole* justice principle supported by *all* people (similar to the long-standing assumption in economics that “material self-interest is the *sole* motivation of *all* people” ([15], p. 617).

1.2. Environmental Justice and Heterogeneity in Justice Concerns

A just society does not only refer to a fair distribution of income, wealth, and opportunities, but also to a fair distribution of environmental bads and goods such as local air pollution, residential noise exposure, clean drinking water or access to nearby green spaces. The importance of “local environmental conditions” as a dimension of social stratification has been put forward by ample research under the heading of environmental justice [16–21]. Although environmental justice researchers usually stress that, in conjunction with distributive justice, there are other crucial dimensions of justice, participatory and recognition justice in particular [22–24], the majority of empirical studies focus on distributive justice.

In this article, we will focus on distributional aspects, too, keeping in mind that this is not the only justice dimension. We attempt to disentangle different notions of distributive justice and apply them empirically to the distribution of environmental benefits. This means that we explore empirical preferences for different principles of distributive environmental justice. We argue that uncovering and considering heterogeneity in justice concerns is important to achieve solutions to environmental social dilemmas that are socially acceptable. The environmental benefits under investigation will be reductions in road traffic noise. The range of possible applications of our approach, however, is not confined to the distribution of environmental benefits. It also can be applied to problems of the distribution of environmental risks, actual environmental burdens, or financial costs for mitigating environmental damages (e.g., in the context of climate change).

Our points of departure are two shortcomings of previous research in the field of environmental justice: (1) Even though environmental justice research seriously deals with conceptual problems of justice and justice claims, in its quantitative empirical studies, it seldom measures justice and justice assessments directly on the individual level. Most quantitative studies investigate environmental inequality and environmental inequities, and then give an interpretation of their results in terms of justice and fairness considerations [25]. Other studies explore justice-seeking strategies that neighborhoods, communities, or social movement groups—confronted with threatening environmental risks—adopt to mobilize their claims; they try to show how experiences of inequity shape their definition of justice and how affected groups strive for justice [24]. Both types of studies follow an indirect approach

that does not measure peoples' justice perceptions directly. As a complement, however, it may be very useful to know these perceptions, because they guide people's behavior, also with respect to the acceptance of political decisions about environmental inequities [26]; (2) Furthermore, there exists a certain gap between the normative-philosophical literature about justice on the one hand, and empirical justice research on the other hand [23]. This gap exists in environmental research, but applies to justice research in other areas, too. David Miller ([27], p. 555) portrayed the two relatively unconnected strands of scientific work on justice as follows: "One is the steadily expanding range of works in political theory on social and distributive justice. The other is the body of empirical work on people's beliefs about justice and the expression of these beliefs in practice. One might expect there to be a fruitful symbiosis between these two bodies of research, with political theorists setting the agenda for empirical studies of justice, while the results of these studies were fed back into the theoretical literature as data against which more abstract claims about the nature of justice could be tested. But this is not the case".

With this paper, we intend to take a step in the direction towards tackling the two shortcomings. Based on (competing) philosophical justice concepts, we attempt to measure justice perceptions and preferences directly on the level of individual actors. Our specific field of application will be empirical justice preferences for the distribution of reductions in road traffic noise in four European cities. We asked respondents in a survey to choose between four distributional objectives of a program to reduce road traffic noise in the city: equal shares, equal outcomes, the greatest benefit for the least advantaged (Rawls), and the greatest benefit for the greatest number (Bentham). Which distribution of the benefits actually prefer people, and how much heterogeneity exists for these different notions of distributive justice? What are the differences in preferences between low and high social status groups? To what extent do those who are currently stronger exposed to environmental bads articulate other preferences than those who are less exposed? Answers to these questions do not only inform theoretical works on distributive justice (as hoped for by Miller [27]) and on (environmental) social dilemmas [28] but are also helpful for political decision makers. Decision makers may see more clearly the competing normative principles and beliefs, and they may be guided in specifying the political goals of programs that aim to change local environmental risks and burdens. This can help to achieve socially acceptable solutions to environmental social dilemmas.

The article proceeds as follows. In the next section, we outline – after a brief review of the environmental justice literature – different principles and notions of distributive justice, which will be examined in our empirical study. Turning then to the empirical part, we describe our data gathered in four European cities (Bern, Zurich, Hanover, Mainz), and give an overview of the dependent and independent variables for our analyses. The results are presented in three steps. In the first step, we show descriptive findings on justice preferences; in the second step, we explore their heterogeneity; and in the third step, we report additional findings (the importance of Rawls' veil of ignorance, the temporal stability of justice preferences, and results of a replication of the current study). A discussion and conclusions section closes the paper.

2. Theoretical and Empirical Background

2.1. Different Areas of Environmental Justice Research

Like justice research in general, environmental justice research is separated into two areas of research that do not take much notice of each other, as follows: abstract theoretical discussions on environmental justice, and empirical studies under the heading of environmental justice [23,29,30]. Different to justice research in general, the empirical strand of environmental justice research is much more widespread than the theoretical strand. The empirical strand itself can again be divided into the following three research lines: the first line represents the typical environmental justice study focusing on environmental inequality; the second line investigates political justice claims and justice-seeking

strategies; and the third directly looks at individual perceptions and judgements of environmental justice.

The typical environmental justice study (first line) covering the overwhelming majority of studies seeks to document the existence and extent of environmental inequalities and inequities; it examines the relationship between the distribution of environmental threats and socio-demographic characteristics in a spatial setting [17,18,20,21,31–34]. If it can be observed that disadvantaged minority groups (ethnic groups, migrant workers, low-income households, etc.) live more often in areas (urban districts, census tracks, communities, etc.) with unfavorable environmental conditions (high noise exposure, air pollution, nearby hazardous waste facilities, etc.), this relationship reveals social inequality, proves inequities, and is often interpreted as unjust and unfair.

Another fraction of empirical environmental justice studies (second line) is primarily interested in analyzing political processes of resource mobilization and protesting against environmental inequities [24,35–38]. Special features of these studies are that they usually refer to justice concepts broader than distributive justice, and that they concentrate on strategies of justice seeking and processes of justice framing.

Finally, very few studies measure individual perceptions and evaluations of environmental justice directly (third line) and then look for factors determining these justice assessments, or attempt to show that such judgements have significant effects on other variables in the field of environmental protection [39–42]. These studies usually explore whether people judge a given distribution of environmental bads (or goods) as fair, and thereby rely on subjective definitions of justice or fairness of the individuals participating in the study. This means that the studies focus on the evaluation of status quo distributions and rest on unspecified subjective justice concepts.

Our research, which can be subsumed under the third line, pertains to changes in status quo distributions and refers to clearly specified concepts of distributive justice. Both features have received little attention in previous empirical research on justice assessments but can be qualified as important research topics. Environmental justice issues often arise when changes in environmental conditions are pending, e.g., are initiated by public planning processes or political programs. The question then is how these plans or programs can and should be designed such that a majority of the people involved judge their outcomes as just and fair. Within the long-standing theoretical debate on justice, there are competing principles of distributive justice, which presumably are mixed up in global subjective assessments of justice. For political action, it is certainly helpful to know which principle is preferred by those who will benefit from or will be hurt by public plans or programs in the area of local environment conditions.

2.2. Four Notions of Distributive Justice

We examine preferences for four principles of distributive justice derived from the following three influential justice theories: egalitarianism, contractarianism, and utilitarianism. While these are comprehensive paradigms of theoretical thought, in the following study we focus on their key ideas with regard to the distribution of environmental benefits, without discussing further assumptions of the underlying theories. Table 1 provides a summary.

Table 1. Three theories and four principles of distributive justice.

Justice Theory	Distributive Justice Principle
Egalitarianism	(a) Equal shares: All citizens equally benefit, irrespective of current differences.
	(b) Equal outcomes: Current differences are levelled by benefits in order that all citizens face equal conditions.
Contractarianism (Rawls)	The greatest benefit to the least advantaged citizens.
Utilitarianism (Bentham)	The greatest benefit to the greatest number of citizens.

Egalitarianism (for an overview, see [43]) starts from the normative premise that individuals should receive the same, should be treated the same, and should be seen as equals based on the notion that all human beings possess equal worth, dignity, and moral status. This theory is the dominant paradigm in environmental justice research [23]. Delving into details of the theoretical debate on concepts of equality, however, it readily becomes evident that egalitarianism comprises different approaches and principles. Concerning the question of “equality of what?”, this can be referred to as equality of outcomes, equality of resources, equality of opportunity, or equality of capabilities. Furthermore, an equal treatment can have different effects on actors with different starting positions and different needs; therefore, it matters whether we consider this initial situation. While the concept of equality often means equal treatment without taking into account different starting positions, it frequently also considers different initial circumstances and finally aims at levelling out existing differences¹.

Based on these different meanings of equality, we differentiate in our study between two principles of distributive justice that adopt an egalitarian perspective. The first principle refers to *equal shares* where, independent of the current distribution of environmental conditions, each individual receives the same amount of environmental benefits. This position is supported only by a few theorists within environmental justice research [23]. Nevertheless, it is often applied in everyday life, mainly because it is relatively easy in its implementation. The more prominent principle, here called *equal outcomes*, refers to a distribution where existing inequalities in the exposure to environmental goods/bads are levelled. The goal of equal outcomes is that, due to the allocation, all individuals should finally be on an equal level of endowment with goods/bads.

Contractarianism (for an overview, see [45]) assumes a hypothetical society in which independent and self-interested individuals voluntarily reach a mutual agreement on a social contract that specifies the basic rules and normative standards of living together in a peaceful way. Social contract theories historically go back to Hobbes, Locke, Kant, and Rousseau, but the most important contemporary social contract theorist is John Rawls, who resurrected the theory in the second half of the 20th century. He popularized the contract perspective in his famous book “A Theory of Justice” [46]. In Rawls’ well-known thought experiment, people make their choices “behind a veil of ignorance” (i.e., nobody knows their abilities, history, and socioeconomic position). In this original position of equality, individuals agree on the following two principles ([46], p. 302): (1) “Each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all”; and (2) “Social and economic inequalities are to be arranged so that they are both: (a) to the greatest benefit of the least advantaged, consistent with the just savings principle, and (b) attached to offices and positions open to all under conditions of fair equality of opportunity”.

Adopting a Rawlsian point of view, environmental bads/goods should be allocated in a way that the least advantaged benefit most. Least advantaged can refer to the actual exposure to environmental bads/goods itself, but also to other social disadvantages (e.g., a low socioeconomic status). With respect to residential environmental conditions, this means that those who are currently most affected by environmental bads should benefit most from measures to improve environmental conditions. Under the “veil of ignorance”, Rawls’ justice principle corresponds to the maximin strategy of non-cooperative game theory [47]. Assuming that an actor makes a choice from a set of alternatives with uncertain outcomes, a maximin strategy picks the alternative that has a possible worst outcome, which is better than the worst outcomes of all other alternatives.

Classical utilitarianism (for an overview, see [48]) presupposes the maximization of pleasure or happiness and the prevention of pain or suffering in a society. It is about calculating the good (pleasure, benefit) and the bad (pain, cost). A just distribution maximizes the happiness of a community as a whole. In the words of Jeremy Bentham ([49], p. 393): “[...] it is the greatest happiness of the greatest number that is the measure of right and wrong [...]”.

Following this line of reasoning, and assuming that all in society prefer less environmental pollution over more, people are expected to opt for distributions of environmental goods (bads) that maximize (minimize) the number of people positively (negatively) affected by them. Bentham's principle implies that the number of people potentially affected by changing environmental conditions in a spatial area (e.g., in different city districts) is a crucial decision criterion.

Baliga and Naskin [50] discuss mechanism designs for environmental pollution problems that fulfill equilibrium criteria. In contrast, we are concerned with decisions of individual actors on justice principles that do not guarantee a stable equilibrium in the sense of non-cooperative game theory. The decision in favor of "equal outcome" may be consistent with Kant's categorical imperative. However, the decision strategies of many actors in favor of one or the other justice principle does not necessarily lead to a Nash equilibrium. Here, we want to identify the preference patterns for justice principles. Knowledge on preference patterns for justice principles in the population should be helpful for policymakers implementing measures against environmental pollution.

To the best of our knowledge, no previous studies directly examine the empirical preferences for the four environmental justice principles under consideration in Table 1. However, there are studies that inspired our approach by investigating the heterogeneity of justice principles at different levels (small groups, communities, societies) and in different social groups (most often outside the context of environmental justice).

2.3. Previous Research on Justice Preferences and Justice Perceptions at Different Levels

At the level of small groups, experimental research on choices of different principles of distributive justice, particularly with respect to income inequality, has a history in both political science and economics [51–55]. A relatively consistent finding of these experimental studies is that subjects agree with Rawls insofar as they are in favor of "floor constraints", have a preference for "maximin rules", and approve of "inferior-catches-up proposals" (e.g., a sufficiently high minimum wage), with respect to the situations of the least advantaged groups. However, people take into account not only the position of the worst-off individuals, but simultaneously try to integrate other justice principles such as maximizing the average welfare or allocating benefits according to individual contributions. Konow and Schwettmann ([55], p. 95) summarize this as follows: "first, justice is pluralistic, consisting of multiple principles, and second, the relevance of a principle, or combination of principles, relates to the context".

In a theoretical article about the goal orientations of "growth management programs" within communities, Beatley [56] argues that urban planning is in need of a serious discussion about the distributive rules and norms that guide, explicitly or implicitly, growth management decisions. Comparing competing justice principles (similar to those presented in Table 1 of this paper), he finally concludes that urban planners should be guided by the "moral principle" of Rawls' justice theory. Of course, this is a normative statement. Without presenting empirical evidence, Beatley believes that Rawls' principle most probably corresponds to legitimate expectations that can be found in communities. If Beatley is right, community surveys should reveal that a majority of citizens support this principle.

Mainly focusing on the societal level, there is ample sociological survey research on justice perceptions (for an overview, [57]). Looking specifically into the sphere of environmental justice, recent survey research uses the tool of multifactorial survey experiments [58] to explore the role of different distributive justice principles. Bechtel and Scheve [59] conducted a conjoint experiment to investigate the relevance of justice preferences in the context of climate change mitigation. Arguing that broad public support is essential for successful international efforts in the area of climate mitigation, they explored—based on surveys in four countries (France, Germany, UK, and USA)—factors influencing individuals' willingness to support these efforts. One of the factors under investigation was the fairness of the distribution of costs between countries. The results showed that support is higher for global climate agreements that distribute costs between participating countries according

to prominent fairness principles (i.e., costs according to current emissions and to history of emissions, rich countries pay more than poor countries). Liebe et al. [26,60] employed factorial survey experiments (vignettes) to examine more confined topics, namely, the relevance of different environmental justice aspects regarding the local acceptance of wind power (in Germany and Poland) and airport expansion projects (in Germany and Switzerland). Both studies found that aspects of procedural justice are more important than aspects of distributive justice. This reminds us that distributive justice is just one, and not necessarily the most crucial, dimension of a broader justice and fairness perspective.

Our descriptive study focuses on the heterogeneity of justice principles in the population. In addition, we explore whether social status and noise exposure is related to the choice of justice principles.

3. Data and Variables

3.1. Empirical Data: Samples of Four European Cities

The data are based on random samples from the population registers of Bern and Zurich (Switzerland) and Hanover and Mainz (Germany). The sampling frame comprises all adults between the ages of 18 and 70, and both natives and foreigners/migrants, i.e., including those without Swiss or German citizenship. The data were collected between October 2016 and March 2017 using mail and web surveys and the tailored design method of Dillman [61], with up to three reminders after the survey invitation was sent. The survey instrument was identical in all cities, with some minor adaptations to the specific city's context. To reduce the risk of selection bias, the survey title referred to housing and living conditions rather than environmental conditions per se. In each city, the initial sample consisted of 4000 addresses. The response rates (standard RR2 for postal surveys to specifically named persons, AAPOR [62]) were 55.2 percent for Bern ($n = 2196$), 48.4 percent for Zurich ($n = 1931$), 35.9 percent for Hanover ($n = 1435$), and 45.2 percent for Mainz ($n = 1800$), resulting in a total of 7362 respondents in the four cities. Table 2 below provides an overview of the characteristics of the samples (for further methodological details of the study and other research using the data, see [33,34,63]).

Table 2. Descriptive statistics of the independent variables.

Variable	Bern		Zurich		Hanover		Mainz	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Woman	0.55		0.54		0.54		0.53	
Age in years	43.31	13.53	42.96	13.34	44.62	13.98	42.90	14.86
Education in years (8–18)	15.10	3.00	15.11	3.11	14.94	2.45	14.98	2.36
Income in CHF/Euro	5521	2446	5941	2657	2220	1244	2378	1317
International Socio-Economic Index (16–90)	53.35	17.29	55.64	17.18	52.67	16.30	52.73	16.15
Road traffic noise exposure in dB(A)	51.93	6.11	53.08	7.11	55.23	7.50	52.87	8.40

Notes: Number of cases between 1834 and 2104 for Bern; 1593 and 1861 for Zurich; 1070 and 1373 for Hanover; 1345 and 1699 for Mainz.

Notes: Number of cases between 1834 and 2104 for Bern; 1593 and 1861 for Zurich; 1070 and 1373 for Hanover; 1345 and 1699 for Mainz.

3.2. Dependent Variable: Choice of Justice Principles

The surveys in the four cities included a relatively simple question to measure preferences for distributive justice principles in the context of reductions in road traffic noise². The question concerns the distribution of reductions in road traffic noise, and respondents were asked to choose from four principles the one they perceive as most just/fair. The exact question wording was:

Imagine the city of Bern/Zurich/Hanover/Mainz is planning measures to protect citizens from road traffic noise: In your opinion, which of the following principles is most just/fair?

- All citizens should equally benefit from the protection measures, irrespective of their current noise exposure;
- The citizens with the highest noise exposure should benefit most from the protection measures;
- The highest number of citizens should benefit from the protection measures, irrespective of their current noise exposure;
- Current differences should be levelled as much as possible, so that all citizens have approximately equal levels of noise exposure.

The first option is equal shares, i.e., in line with the equality concept that the reduction in noise levels will be equally distributed among citizens. The second option corresponds to Rawls' distributive justice principle, as the least disadvantaged benefit most. The third option refers to Bentham's "the greatest benefit to the greatest number". The fourth principle refers to equal outcomes, aiming at levelling out existing differences in exposure to road traffic noise.

Of course, translating principles of fairness into short statements for presentation in a survey always involves the risk of misunderstandings. The first principle aims at equal shares. However, some respondents may mistakenly equate equal benefits with equal outcomes (principle four). There are also different interpretations of Rawls' principle of justice [64]. Furthermore, utilitarianism not only counts the number of people who benefit from a measure, but also takes into account the degree of happiness. Here, we simplified the concept by considering only the number of beneficiaries (principle three). Moreover, framing of the presentation makes a difference as well (see below). Respondents did not receive information about the costs of noise abatement measures (but see the replication study below). Operationalizations of principles of justice in surveys must be short, simple, and easily understandable statements. One cannot choose sophisticated formulations that take into account all the subtleties of a philosophical debate. However, we believe that our versions of the four principles of justice contain the core elements of the distinctive concepts and can serve as a useful approximation.

3.3. Independent Variables: Socio-Economic Status and Noise Exposure

We relied on education, income, and Ganzeboom's [65] International Socio-Economic Index (ISEI) to capture respondents' social status (see Table 2). Education was measured in years, ranging from 8 to 18. Income refers to a household's equivalized disposable income calculated by dividing the monthly household net income by the square root of the number of people living in the household. Ganzeboom's ISEI, ranging in our samples from 16 to 90, is based on a classification of occupations, taking into account their required skill level and skill specialization, and refers to respondents' current or last employment.

A specific aspect of our study is the matching of actual road traffic noise exposure data with the survey data, using spatial coordinates based on the postal addresses of the respondents (see also [34]). We obtained the spatial information from federal registers in Bern and Zurich [66]), from OpenStreetMap in Hanover, and from Google Maps in Mainz. To measure road traffic noise, we used the Lden metric, which takes into account noise levels during the day, evening, and night. This involves assessing noise in decibels (dB) as the A-weighted long-term average sound level, with penalties of 5 dB for evening noise and 10 dB for nighttime noise [67]. Average road traffic noise levels in our four cities ranged from 52 dB (Bern) to 55 dB (Hanover).

4. Results

4.1. Justice Preferences across the Four Cities

Figure 1 reveals that, in all four cities, respondents preferred the Rawls principle and hence a distribution of reductions in road traffic noise in favor of those who are currently most affected by noise pollution, i.e., the least advantaged.

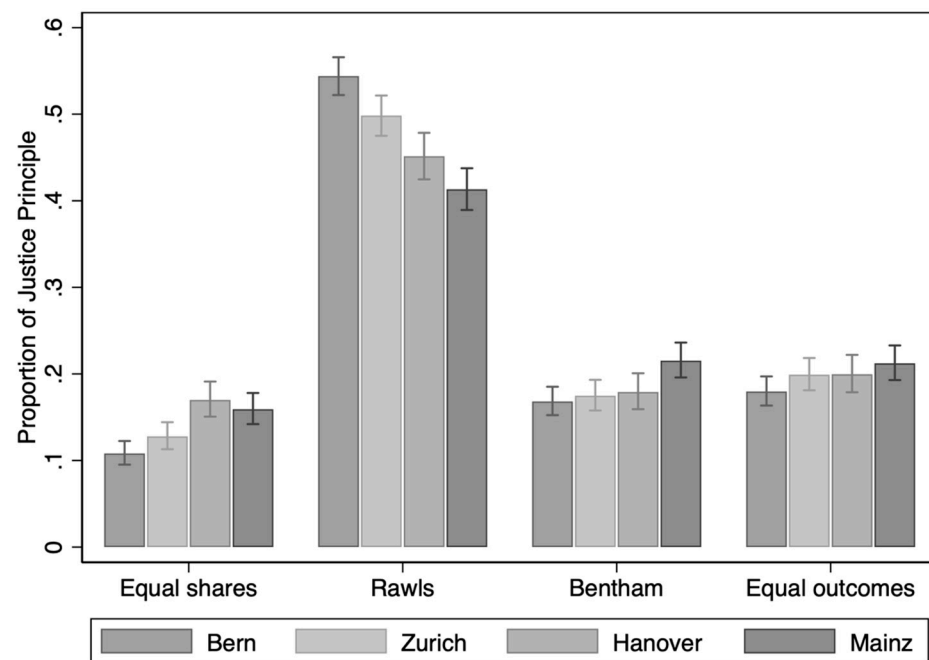


Figure 1. Choice of justice principles per city. Notes: proportions with 95% confidence intervals are shown; $n = 1998$ for Bern; $n = 1768$ for Zurich; $n = 1318$ for Hanover; $n = 1602$ for Mainz.

The share of Rawlsians in all cities was greater than 40% and was generally higher in the two Swiss cities compared with the two German cities. With respect to the other three justice principles, across all cities there was a slight tendency for equal shares to be chosen less frequently than Bentham's principle and equal outcomes. With the exception of Hanover, the probability of equal shares choices was at least five percentage points lower compared with Bentham and equal outcomes.

4.2. Heterogeneity of Justice Preferences

Table A1 (Appendix A) reports the results of multinomial logit models on the choice of justice principles including education, income, socio-economic status index (ISEI) and actual exposure to road traffic noise as separate independent variables. We expected that respondents' resources and actual environmental burdens may influence how respondents vote on the justice principles. Indicators of resources are education, income, and socio-economic status. Figures 2 and 3 illustrate our results in form of probability plots of the relationship between the socio-economic status index and choices of justice principles as well as noise exposure and choice behavior³. With respect to the social status position, the models in Table A1 and Figure 2 provide a clear picture across the four cities: better-off individuals with higher education, higher income and higher ISEI are more likely to choose Rawls' and Bentham's principle compared to equal shares and equal outcomes. In turn, individuals with a lower social standing are more likely to choose the equal outcomes and equal shares principles. While—with the exception of the city of Mainz—those with a very low ISEI still most frequently chose Rawls' principle, Figure 2 indicates that, for all cities, the probability of an equal-outcomes preference decreased with an increase in social position. For example, in the cities of Zurich and Mainz those with the lowest ISEI had a probability of 24% and 23%, respectively, in choosing the equal outcomes principle; for those with the highest ISEI these probabilities were 14% and 16%, respectively. The probabilities of Rawls choices in Zurich ranged between 36% (lowest ISEI) and 57% (highest ISEI), and, in Mainz, ranged between 25% (lowest ISEI) and 51% (highest ISEI).

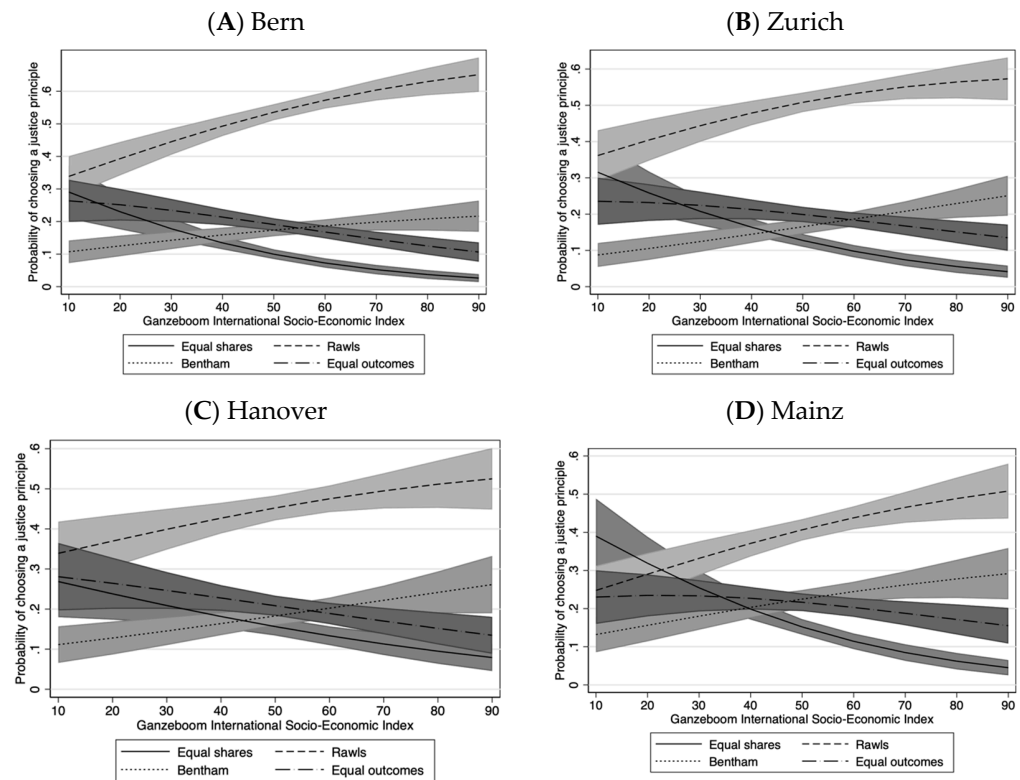


Figure 2. Choice of justice principles per city, dependent on socio-economic status. Notes: predicted probabilities with 95% confidence intervals are shown. The underlying multinomial logit models can be found in Table A1 (Appendix A). With equal outcomes as reference category all estimates are significant for $\alpha = 0.05$, except “equal shares” for the Hanover sample.

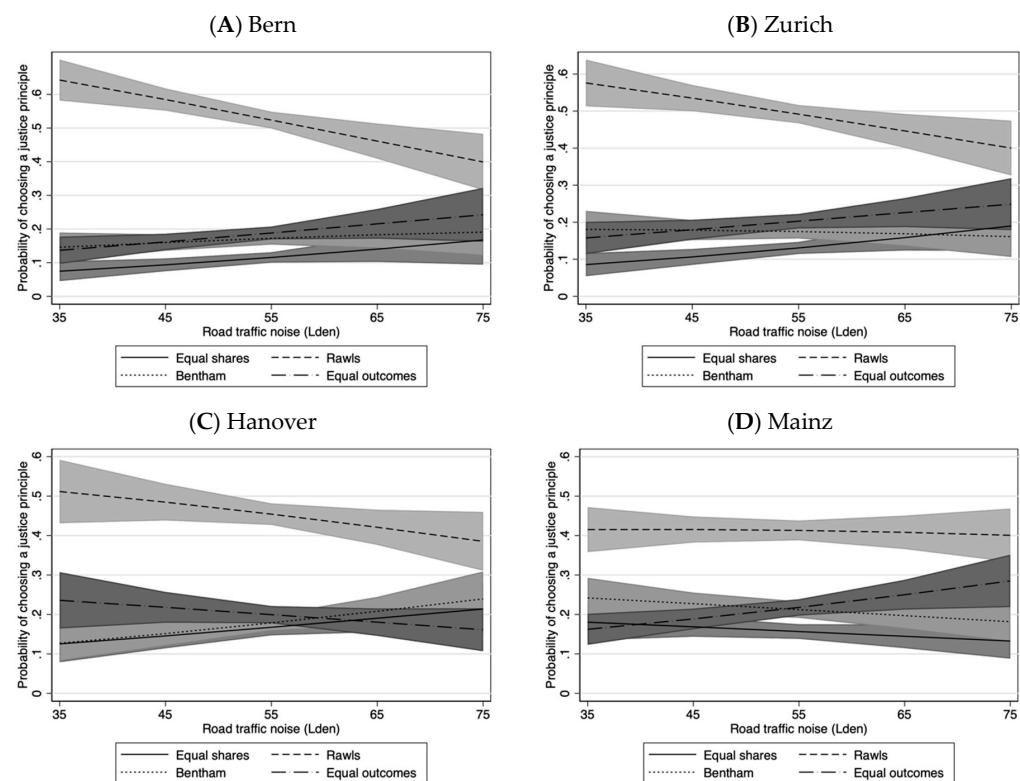


Figure 3. Choice of justice principles per city, dependent on road traffic noise levels. Notes: predicted probabilities with 95% confidence intervals are shown. The underlying multinomial logit models can

be found in Table A1 (Appendix A). With equal outcomes as reference category, “equal shares” is significant for the Mainz data, “Rawls” for Bern and Zurich data, and “Bentham” for Mainz and Hanover data (all estimates for $\alpha = 0.05$).

We found that actual exposure to road traffic noise correlated less strongly than socio-economic status with preferences for justice principles. However, Figure 3 shows a trend for all cities, except Hanover, that the probability of equal outcomes choices increases with increasing levels of road traffic noise. For example, the probabilities of equal outcomes choices in Mainz ranged from 16% for a noise level of 35 dB to 29% for a level of 75 dB, and in Zurich from 14% (for 35 dB) to 24% (for 75 dB). The probabilities of Rawls’ choices clearly decrease in all cities with increasing levels of road traffic noise, except in Mainz. They ranged, for example, in Zurich between 58% (for 35 dB) and 40% (for 75 dB), and in Mainz between 42% (for 35 dB) and 40% (for 75 dB).

4.3. Additional Findings

The importance of Rawls’ veil of ignorance is an additional finding in our study. As outlined in the previous sections, we aimed for a simple measurement instrument for the preferences of distributive justice principles. Yet, it can well be argued that, with respect to the evidently very prominent Rawlsian principle, we failed to mirror the veil of ignorance, a fundamental starting point of Rawls’ justice theory [68–71]. We took up this issue in a follow-up to our main study, which included—confined to the two Swiss cities, Bern and Zurich—a survey experiment testing the importance of Rawls’ veil of ignorance.

While our study was not promoted as a panel, the mail questionnaire explained that a follow-up was planned, and respondents could indicate their willingness to further participation. About one year later, those who had not opted out were sent a postal invitation to a follow-up online survey. We invited 1628 and 1359 persons in Bern and Zurich, respectively, to take part in the follow-up survey. When needed, up to two reminders were used. This resulted in response rates of 51.3% for Bern ($n = 830$) and 49.3% for Zurich ($n = 668$).

Our question on justice principles in the main study did not include Rawls’ veil of ignorance, i.e., the idea that people reveal their preferences without knowing their own position in society. To test the relevance of the veil of ignorance, in the follow-up survey in Bern and Zurich, we randomly assigned respondents to one of three versions of the justice principles question: the first version simply replicated the original question from the main survey, whereas the second and third versions introduced variants of the veil of ignorance before asking the question. The corresponding questions were as follows:

- Veil of ignorance I: Imagine you move to another city. This city is just planning measures to protect citizens from road traffic noise: In your opinion, which of the following principles is most just/fair?
- Veil of ignorance II: Imagine you move to another city. It is difficult to find a flat in this city. Therefore, you do not know yet where you will live in this city and how noisy or quiet it will be in your new area. This city is planning measures to protect citizens from road traffic noise: In your opinion, which of the following principles is most just/fair?

Both “veil of ignorance questions” stress that respondents should imagine making their decision in a situation where they do not know the level of their own exposure to road traffic noise and hence do not know to what extent they personally will be affected by road traffic noise.

Figure 4 contains the results of the described survey experiment, where one group received the justice question without the veil of ignorance and two groups with the veil of ignorance. As can be seen in the figure, the veil of ignorance decreases the probability of Rawls’ choices by between eight and ten percentage points and increases the probability of Bentham and equal outcomes choices by up to seven and six percentage points, respectively. This association between experimental treatments and justice preferences is significant at

the 5%-level (Chi-square = 15.64, 6 df, $p = 0.016$). It seems that, without the veil of ignorance, our Rawls measurement also captures equal outcomes and Bentham preferences.

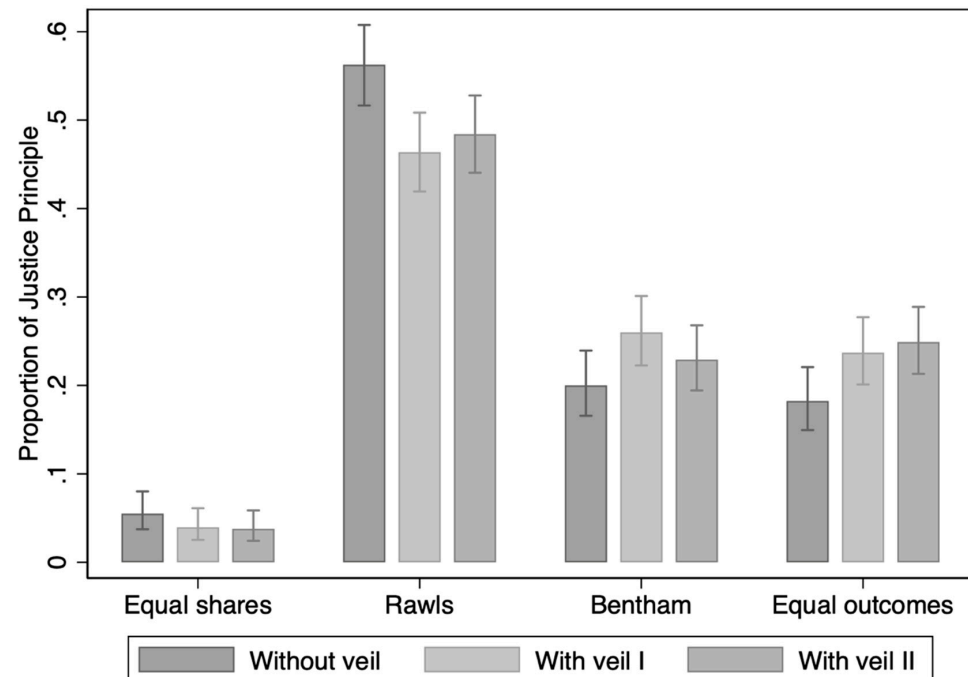


Figure 4. Choice of justice principles with and without veil of ignorance. Notes: proportions with 95% confidence intervals are shown; $n = 455$ for “Without veil”; $n = 481$ for “With veil I”; $n = 502$ for “With veil II”.

Temporal stability of justice preferences. Since one group in the Bern/Zurich follow-up survey received exactly the same justice principles question as in the main survey, we were able to examine how stable our findings are over time. Table 3 provides the crosstabulation of justice preferences for 2017 and 2018 for this group. Overall, the relative frequencies of justice principles are rather similar in both surveys. At the individual level, 54% (241 of 444 respondents) chose exactly the same justice principle. Cohen’s Kappa, as a measure of test–retest agreement, is 0.227. While 46% of the respondents changed their preferred justice principle over time, the differences between the test and retest choices were not systematic. A corresponding test proposed by Bowker [72] does not allow for a rejection of the null hypothesis of symmetry between test and retest choices (Chi-square = 5.93, 6 df, $p = 0.431$). Yet, for the two experimental groups with the veil of ignorance, we found significant differences between test and retest choices, i.e., the deviations from the original justice preferences are asymmetric (experimental group with veil I: agreement of 49%, Chi-square = 17.58, 6 df, $p = 0.0074$; experimental group with veil II: agreement of 50%, Chi-square = 23.37, 6 df, $p = 0.0007$). This confirms that introducing Rawls’ veil of ignorance makes a difference in respondents’ justice preferences.

Replication in a second study. We replicated our original justice question in a subsample of the Swiss Environmental Survey 2018 [73]. This survey is the third wave of a Swiss panel study which started with a representative sample in 2007 ($n = 3478$), followed by the second wave in 2011 ($n = 1945$) and the third wave in 2018 ($n = 1098$). Regarding sample characteristics in 2018, 47% of the respondents were men (and 53% women), mean age amounted to 60.8 years (standard deviation of 14, minimum of 25 and maximum of 93), and 54% had higher education, i.e., at least a university entrance diploma.

In the replication study, we did not only ask respondents to choose the most just justice principle but also the principle they perceived as most unjust. Answers to both questions were provided by 338 respondents. In addition, we gave an indication of the costs of the

measures by adding the phrase: “The financial resources are limited”. (Appendix B). The results are presented in Figure 5 and carry three main messages.

Table 3. Temporal stability of justice preferences, question without veil of ignorance.

		Justice Preferences 2017				
		Equal Shares	Rawls	Bentham	Equal Outcomes	Total
Justice Preferences 2018	Equal shares	4	12	3	5	24
		17.39	4.51	3.95	6.33	5.41
	Rawls	5	179	31	37	252
		21.74	67.29	40.79	46.84	56.76
	Bentham	6	39	33	12	90
		26.09	14.66	43.42	15.19	20.27
	Equal outcomes	8	36	9	25	78
		34.78	13.53	11.84	31.65	17.57
	Total	23	266	76	79	444
		100.00	100.00	100.00	100.00	100.00

Notes: in each cell, the first value refers to the number of observations, the second to the proportions.

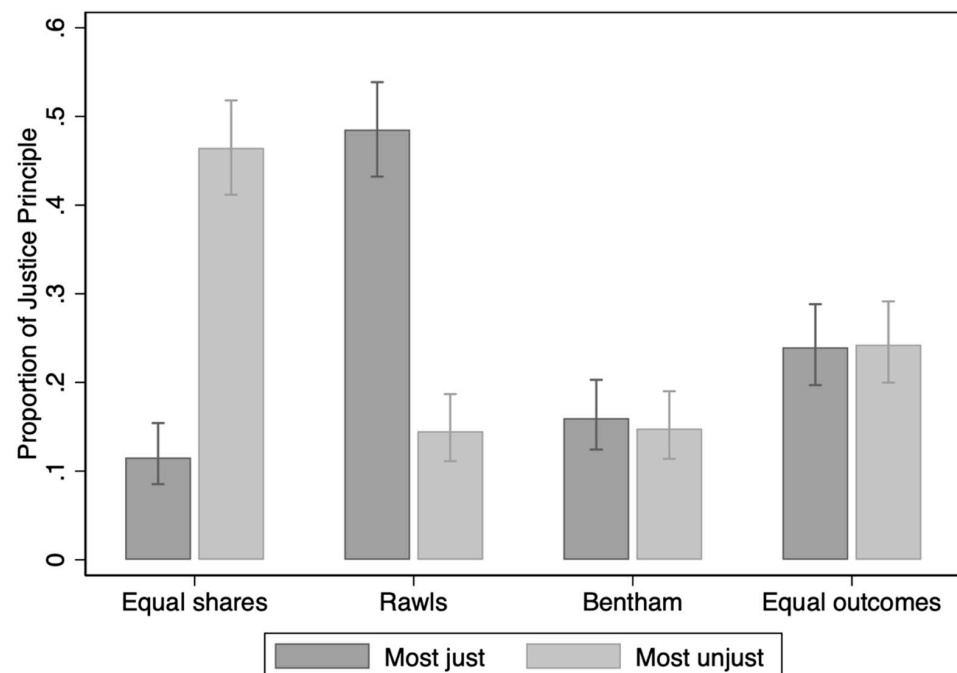


Figure 5. Choice of most just und most unjust principle. Note: proportions with 95% confidence intervals are shown.

First, similar to the original survey, respondents have a clear preference for Rawls’ principle; furthermore, equal outcomes are chosen more frequently than Bentham’s principle and equal shares. Second, at 47%, equal shares is perceived as the most unjust principle, followed by equal outcomes, Bentham’s, and Rawls’ principles (the latter two with similar shares). Third, we received relatively robust replication results, although we have mentioned the limited financial resources at least to some extent.

In the Swiss Environmental Survey 2018, two further sub-samples received decision tasks on how to allocate benefits of noise reduction programs. The three sub-samples, i.e., the replication mentioned above and two additional samples, were selected at random. While the replication served as a control group, we varied the framing of the additional tasks (see Appendix B). However, these tasks differ from our original justice question discussed in this paper. In both additional tasks, respondents were faced with the following

status quo distribution of noise levels: 1000 inhabitants suffered from a high noise level of 70 dB, and 5000 inhabitants endured a lower level of 60 dB. Then, the respondents were asked to choose between three alternative programs. Program A decreased the level to 60 dB for all individuals (Rawls and equal outcomes combined), program B reduced the noise level by 5 dB for all individuals (equal shares), and program C provided a reduction of 10 dB, but only for the majority of individuals, i.e., those with the low noise level (Bentham). We presented numerical values for noise levels in the first sub-sample, while in the second, a graphical illustration of noise values was employed. In the numerical version, program A was the second most-preferred program after program B (33% versus 49%, $n = 333$). In the graphical version, program A was the most-preferred program but was almost even with program B (42% versus 40%, $n = 314$). Program C was the least preferred option in both versions. Since Rawls and equal outcomes were combined, one would expect an even larger majority in favor of alternative A. However, our observations point in the opposite direction. Particularly, the numerical version yielded the observation that focusing on the least advantaged is not the overall preferred principle. This indicates that the framing of justice questions can matter and should be focused on in further research.

5. Discussion and Conclusions

Based on three justice theories and four corresponding notions of distributive justice, we analyzed individuals' preferences regarding the distribution of environmental benefits in the form of reductions in road traffic noise. Using the same measurement instrument (justice question) in independent population surveys in four European cities, we find an overall strong preference for Rawls' principle that environmental benefits should be distributed in a way that the least advantaged benefit most. In all four cities, respondents most frequently chose a distribution of road traffic noise reductions where those who benefit most are currently most affected by noise pollution. On the other hand, between 46% and 59% of the respondents in our main study opted for a non-Rawlsian principle, which indicates clear heterogeneity in justice preferences. We were able to shed further light on this heterogeneity and found that those with higher socio-economic status and lower actual exposure to road traffic noise have a stronger preference for Rawls' principle than those with lower socio-economic status and higher noise exposure. The latter (low status and high exposure) have a relatively stronger preference for the equal outcomes principle, which is in line with the common notion of environmental justice; that is, that all in society should be equally affected by environmental bads and goods. In our study, the status correlations are stronger than the estimates of noise exposure.

Important questions are why Rawls' principle dominates in the aggregate and why those with higher socio-economic status and lower noise exposure are more likely to opt for Rawls than those with lower status and noise exposure. With regard to heterogeneity in distributive justice preferences across social groups, previous research shows that the "haves" and "have-nots" differ in their preferences. Concerning attitudes towards the welfare state, for example, Reeskens and van Oorschot [74] report that those with a high socio-economic status measured by income and education expressed stronger preferences for equity-based principles, i.e., principles balancing contributions and rewards. Those with lower socio-economic status, on the other hand, preferred equality and needs-based principles. These distinct preferences can partly be explained by a self-interest model [75]. While high-status individuals benefit more from equity principles where rewards depend on contributions, low-status individuals benefit from principles that target the neediest, "poorest" or worst-off in society [76].

In our study about the distribution of environmental benefits, the equity principle does not apply because there are no (direct) own contributions and the benefits come as a windfall gain. Following a self-interest model and ignoring, in a first step, the Bentham principle, the "have-nots"—those with lower socio-economic status and high exposure to environmental pollution—can be expected to prefer equal outcomes or Rawls to equal shares. For the "haves", the ranking based on self-interest should be equal shares,

Rawls, and equal outcomes. However, in a public debate about distributive justice of “unearned” environmental benefits, the privileged groups would have a difficult standing to claim equal shares (i.e., all benefit equally) as a fair principle. We therefore reason that they switch to their second preference, the Rawls principle. This can signal altruism and prosocial behavior [77,78], tends to result in social approval [79,80], and prevents equal outcomes as their most costly option. The omitted Bentham principle is a special case, insofar as it does not have a priori predictable consequences favoring the “haves” or the “have-nots”. Since the latter group can argue with more legitimacy that additional benefits should go to them, it seems reasonable to predict that they are less comfortable with uncertainty and thus prefer Bentham less often than privileged groups.

Taken together, these reasonings lead to the following three propositions: (1) In the aggregate, the Rawls principle should be the most often preferred principle (it ranks first or second for the “have-nots” and first for the “haves”); (2) More often than the less-privileged groups, the privileged ones prefer Rawls and Bentham; and (3) The “have-nots” prefer equal outcomes more often than the “haves”. Although we found some support for these propositions in our data, our study needs to be seen as a starting point.

As already mentioned, we did not address the costs of noise abatement measures in the survey in the four cities. These were not included, and the benefit of noise abatement was a “windfall profit”. The costs may be relevant and may interact with the socioeconomic position and the degree of noise exposure. It will also matter whether the noise abatement measures are funded by taxpayer’s money or by contributions from local residents, and there are good reasons to assume that the latter make a bigger difference than the former. However, we pointed out in the replication survey “that the financial resources are limited”. Despite this addition, the results remained relatively stable. Of course, this was not a statement about the exact costs of the measures. Future research should investigate whether, how and under what circumstances costs play a role.

Another explanation for our findings can be an interplay between inequality aversion and a “Rawlsian motive for helping the least well-off” ([15], p. 1912, see also [81]). As the relevance of such motives might also depend on the decision context and previous research mainly focused on “neutral”, non-environmental contexts [15], more experimental and quantitative empirical research should try to explain heterogeneity in justice preferences related specifically to environmental bads and goods.

Additional findings showed that explicitly introducing the veil of ignorance decreases the probability of Rawls’ choices in favor of Bentham and equal outcomes choices. This means that, with the veil of ignorance, some of the respondents rather opt for maximizing the number of people who benefit or for an equal outcome exposure to noise pollution. Presenting to respondents the same justice question in a retest revealed a stable overall preference for Rawls’ principle, but also some preference changes over time. However, these changes did not seem to be systematic. This supports the reliability of our approach. The robustness of our findings is also supported in a replication study implemented in another population survey, which again showed a clear preference for Rawls’ principle and additionally revealed that only a minority of respondents perceived Rawls’ principle as the most unjust. In fact, most respondents perceived an equal-shares distribution as most unjust/unfair. While the results of the verbal presentations of the justice principles seem robust, we should also note that in additional experimental treatments, we observed divergent results regarding the Rawls principle when a numerical presentation of the justice principles was employed.

Our approach to the direct measurement of environmental justice preferences can complement and strengthen environmental justice research, on the one hand, and may be helpful for environmental politics, on the other hand. For research in political mobilization against environmental inequalities, it is important to know how affected citizens perceive and evaluate empirical inequalities and how these perceptions are related to normative justice concepts. As argued by many authors in the field of environmental justice [24,82,83], subjective and collective framing processes affect the chances of political mobilization

against environmental inequalities. Justice perceptions and evaluations can be seen as a result of group strategies to define and frame social problems in terms of justice. Even though feelings of injustice and unfairness are not a sufficient condition for political action, they are a crucial prerequisite.

In conventional environmental politics—as opposed to protest movements—it is vitally important to develop policies that will be supported by the general public. Today, many projects and measures affecting environmental quality (airport expansion projects, changes in road traffic infrastructure, and other so-called LULUs, i.e., locally unwanted land uses) are controversial and lack citizens' acceptance and support. Fairness considerations and justice evaluations are highly relevant for finding political support. It seems reasonable advice for political action to communicate distributional consequences of environmental measures in a clear and open way. Such an open communication can spell out the conflicting justice principles and explain the heterogeneity of interests and preferences. Here, our heterogeneity findings suggest that high-status individuals show an increased support if measures aim to improve the situation of the least advantaged, while low-status individuals are more supportive when equal outcomes serve as normative orientation. It should also be taken into account that, to some extent, Rawls' principle and equal outcomes are not mutually exclusive. Political measures can focus on the least advantaged in society and, at the same time, aim for equal outcomes across groups. It is a common critique of Rawls' principle that, while improving the situation of those most disadvantaged, the distribution of goods and bads can still be very unequal among the remaining groups in society ([84], chap. 6). Therefore, considering the least advantaged *and* equal outcomes among (other) groups in society might be acceptable for a large majority in a population.

Our study has some limitations and provides several avenues for future research. First, we rely on a single and relatively simple survey-based justice question, which cannot consider fine-grained theoretical assumptions and confronts respondents with a hypothetical scenario. More detailed measurement instruments could help to uncover preferences for different justice principles taking, for example, the relationship between efficiency and equality into account [53]. Laboratory experiments can be used to test more complex assumptions and, at the same time, confront subjects with incentivized decision tasks [55,68]. The fact that our scenario is hypothetical does not mean that the decisions do not reflect real beliefs. Studies using natural experiments as a behavioral benchmark find that hypothetical choices measured in survey experiments clearly correlate with real-world behavior [85].

Second, many authors in the environmental justice literature argue that justice concepts and justice evaluations are highly complex issues that depend on cultural values, are context-specific and situational, and subject to framing processes [24,83]. This is probably true, but it should not prevent us from striving for measurements and looking for empirical regularities. If we follow a quantitative research approach, cross-national surveys are conventional methods with which to explore cultural variation. Website presentations of online decision tasks to potential respondents world-wide is a promising alternative method. The “moral machine” project of MIT is a prominent example of this approach [86]. At least on a small scale, framing processes and framing effects, which undoubtedly are important for political mobilization, can also be studied in surveys [87]. Future research should examine in which way, and to what extent, stated justice preferences are affected by how justice questions are worded and how the distribution of environmental goods and bads is presented—for example, text-based with a general description as in our study, or by using actual pollution values such as noise level reductions in decibels. Moreover, there was no “price tag” informing participants about the costs of implementing a preferred alternative. However, the varying costs of implementing environmental improvements may be relevant for justice evaluations.

Third, it is an important insight of environmental justice research that justice does not only refer to distributive aspects, but also to participatory aspects as well as recognition [23]. The role of participatory or procedural justice for environmental decision-making can be studied in laboratory experiments (see [88] for a general application, and [89] for a theoretic-

cal model), and multifactorial survey experiments can help to disentangle the importance of different justice aspects (see [26,60] for applications) as well as the interrelation between different justice principles. At the same time, they can confront respondents with situations that also include non-justice related attributes.

Our own study and other environmental justice and social dilemma studies suggest a broader research agenda that seeks to clarify and elaborate the relationship between observed inequalities/inequities, justice perceptions and evaluations, and normative-philosophical justice principles. Under which conditions do inequalities/inequities result in perceived injustice, and how does this relate to normative justice concepts? This could be the leading question of a research agenda that is challenging for both justice and social stratification research. The topic of our study, empirical preferences for competing justice principles in a given scenario, would be one facet of this agenda.

Author Contributions: Conceptualization, U.L., H.B.E., A.D. and P.P.; Methodology, U.L., H.B.E., A.D. and P.P.; Formal analysis, U.L.; Writing—original draft, U.L. and P.P.; Writing—review & editing, U.L., H.B.E., A.D. and P.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Swiss National Science Foundation SNSF (project grant 100017E-154251) and the German Research Foundation DFG (project grants PR 237/7-1, KU 1926/3-1, and DI 292/6-1 Nr. 465644158).

Data Availability Statement: The data is available at GESIS, Cologne. Data File Version 1.0.0, <https://doi.org/10.7802/1993>.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Multinomial logit models for choice of preferred justice principle, equal outcomes as reference category.

Variable	Bern	Zurich	Hanover	Mainz
Education in years	Equal: −0.147 (−4.92) Rawls: 0.127 (6.06) Benth: 0.168 (6.18)	Equal: −0.115 (−4.20) Rawls: 0.088 (4.22) Benth: 0.110 (4.15)	Equal: −0.134 (−3.65) Rawls: 0.078 (2.47) Benth: 0.105 (2.64)	Equal: −0.119 (−3.47) Rawls: 0.127 (4.31) Benth: 0.159 (4.55)
LL ₀	−2307.33	−2131.63	−1584.05	−2034.09
LL _{Model}	−2231.39	−2087.72	−1558.28	−1992.86
n	1960	1724	1234	1545
Income in thousands CHF/Euro	Equal: −0.179 (−4.26) Rawls: 0.064 (2.35) Benth: 0.071 (2.13)	Equal: −0.104 (−2.77) Rawls: 0.086 (3.29) Benth: 0.136 (4.33)	Equal: −0.295 (−2.77) Rawls: 0.207 (2.82) Benth: 0.266 (3.17)	Equal: −0.222 (−2.60) Rawls: 0.160 (2.69) Benth: 0.190 (2.84)
LL ₀	−2099.33	−1965.45	−1313.46	−1667.45
LL _{Model}	−2073.74	−1938.27	−1291.63	−1649.45
n	1789	1591	1028	1276
Socio-Economic Status (ISEI)	Equal: −0.019 (−3.18) Rawls: 0.020 (5.02) Benth: 0.020 (4.23)	Equal: −0.018 (−3.28) Rawls: 0.013 (3.11) Benth: 0.020 (3.93)	Equal: −0.006 (−0.93) Rawls: 0.015 (2.86) Benth: 0.020 (3.24)	Equal: −0.022 (−3.58) Rawls: 0.014 (2.91) Benth: 0.015 (2.76)
LL ₀	−2040.50	−1844.64	−1352.00	−1695.04
LL _{Model}	−2001.89	−1815.98	−1341.02	−1668.98
n	1731	1512	1054	1288
Actual noise exposure in dB(A)	Equal: 0.006 (0.43) Rawls: −0.026 (−2.63) Benth: −0.008 (−0.62)	Equal: 0.008 (0.71) Rawls: −0.021 (−2.30) Benth: −0.014 (−1.30)	Equal: 0.023 (1.86) Rawls: 0.002 (0.23) Benth: 0.025 (2.10)	Equal: −0.022 (−2.20) Rawls: −0.015 (−1.90) Benth: −0.021 (−2.34)

Table A1. Cont.

Variable	Bern	Zurich	Hanover	Mainz
LL ₀	−2397.22	−2147.35	−1669.77	−2235.13
LL _{Model}	−2392.66	−2142.08	−1665.52	−2231.51
n	1953	1740	1296	1601

Notes: Equal = equal shares; Benth = Bentham. Constants are not reported. Maximum likelihood estimation of $p_j/(1-p_j) = c_j + b_jx$ where p_j is the proportion of support for justice principle j , c_j and b_j are the parameters estimated by the data and x is the independent variable. Constants b_j are not reported. All effects are significant at $p < 0.05$, except those in italics.

Appendix B

Version 1

Traffic noise reduction: Imagine a city planning measures to protect the population from road noise. The financial resources are limited. Therefore, the noise pollution remains disturbingly high for parts of the population.

Under these circumstances, which of the following principles A, B, C or D do you think is **most just** and which is **least just**?

A All citizens should *equally* benefit from the protection measures, irrespective of their current noise exposure.

B The citizens *with the highest noise exposure* should benefit *most* from the protection measures. This means that noise pollution is to be reduced by the same amount across the entire city.

C *The highest number of citizens* should benefit from the protection measures, irrespective of their current noise exposure.

D *Current differences* should be *levelled* as much as possible, so that all citizens have approximately equal levels of noise exposure.

In my opinion, principle ____ is the **most just**.

Principle ____ is the **least just**.

Version 2

Traffic noise reduction: Which measure do you think is just?

Assume the following situation:

In a municipality, there are areas with *very high* and *high* noise pollution.

1000 people live in areas with very high noise pollution,

5000 people live in areas with high noise pollution.

Noise protection measures are being discussed by the municipal council. The budget is limited. For this reason, noise pollution remains disturbingly high for parts of the population. There are three proposals for noise reduction measures. The question now is **which proposal is most just**.

- The aim of **Proposal A** is to ensure that the *same average noise level* is not exceeded across the entire municipal area with the protective measures. The measures are therefore concentrated on the areas with very high noise pollution where few people live.
- In **Proposal B**, the aim is for *all residents to benefit equally* from the protective measures, regardless of their current noise exposure. Therefore, traffic noise is reduced by the same amount across the entire municipality.
- The aim of **Proposal C** is to ensure that *as many residents as possible* experience a *substantial reduction in noise pollution*. The measures are therefore concentrated on areas with high noise pollution where many people live.

In summary, it looks like this (noise in decibels, dB):

	Areas with Very High Noise Pollution	Areas with High Noise Pollution
	1000 Citizen	5000 Citizen
Traffic noise in dB without measures	70	60
Proposal A	60	60
Proposal B	65	55
Proposal C	70	50

How do you see it: Would you prefer proposal A, B or C as just?
In my opinion, principle ____ is the **most just**.
Principle ____ is the **least just**.

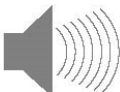
Version 3

Traffic noise reduction: Which measure do you think is just?

In a municipality, there are areas with *very high* and *high* noise pollution.
1000 people live in areas with very high noise pollution (areas 1),
5000 people live in areas with high noise pollution (areas 2).

Initial situation

Gebiete 1



70 dB 1000 Personen

Gebiete 2





60 dB 5000 Personen

Noise protection measures are being discussed by the municipal council. The budget is limited. For this reason, noise pollution remains disturbingly high for parts of the population. There are three proposals for noise reduction measures. The question now is **which proposal is most just**.



- Proposal A**
All measures are implemented in areas with very high noise pollution so that the *same average noise level* is not exceeded throughout the entire municipal area.
- Proposal B**
The measures are distributed evenly between areas 1 and 2 so that *all residents benefit equally* from them, regardless of their current noise exposure.
- Proposal C**
All measures are implemented in areas with high noise pollution so that *as many residents as possible* experience a substantial reduction in noise pollution.

Gebiete 1





60 dB 1000 Personen

Gebiete 2





60 dB 5000 Personen

Gebiete 1





65 dB 1000 Personen

Gebiete 2





55 dB 5000 Personen

Gebiete 1



70 dB 1000 Personen

Gebiete 2



50 dB 5000 Personen

How do you see it: Would you prefer proposal A, B or C as just?
In my opinion, principle ____ is the **most just**.

Principle ____ is the **least just**.

Note: “Gebiete” means areas.

Notes

- ¹ We decided not to introduce the equity concept here because it has two, relatively different meanings within literature. Based on classical equity theory [44], the first meaning pertains to a fair balance of own contributions/inputs/costs and own rewards/outcomes/benefits in a social relationship. The second meaning in contexts without direct own contributions pertains to a distribution of benefits/goods (or costs/bads) that takes different starting positions into account (including different needs) and tries to equalize the final distribution.
- ² We developed and repeatedly modified this question in a series of pretests.
- ³ The dependent variable is a classification of four categories (“nominal scale”). Hence, we used the multinomial logit model to estimate the impact of education, income, socioeconomic status, and level of noise exposure on the choice of justice principles. We estimated bivariate linear equations by maximum likelihood estimation (MLE). The category “equal outcome” is chosen as a reference category. Coefficients of the respective category (e.g., “Rawls”) should be interpreted as an increase (decrease) in the log-odds ($p/(1-p)$; p is the proportion of votes for the respective principle) by an increase of a unit of the independent variable. In formal terms: $p_j/(1-p_j) = c_j + b_jx$ where p_j is the proportion of support for justice principle j , c_j and b_j are the parameters estimated by the data and x is the independent variable. The solution for p_j results in a non-linear relation between the independent variable and the proportion of support for the respective justice principle. Figure 2 graphically depicts the relationship $p_j = f(x)$ between the socioeconomic index and the proportion of votes for the justice principles in the four cities. Figure 3 shows the relationship between the level of noise exposure and the proportion of support for the justice principles.

References

1. Hardin, G. The Tragedy of the Commons. *Science* **1968**, *162*, 1243–1248. [\[CrossRef\]](#)
2. Kollock, P. Social Dilemmas: The Anatomy of Cooperation. *Annu. Rev. Sociol.* **1998**, *24*, 183–214. [\[CrossRef\]](#)
3. Friedman, J.W. A Noncooperative Equilibrium for Supergames. *Rev. Econ. Stud.* **1971**, *38*, 1–12. [\[CrossRef\]](#)
4. Axelrod, R. *The Evolution of Cooperation*; Basic Books: New York, NY, USA, 1984.
5. Dal Bó, P. Cooperation under the Shadow of the Future: Experimental Evidence from Infinitely Repeated Games. *Am. Econ. Rev.* **2005**, *95*, 1591–1604. [\[CrossRef\]](#)
6. Balliet, D. Communication and cooperation in social dilemmas: A meta-analytic review. *J. Confl. Resolut.* **2010**, *54*, 39–57. [\[CrossRef\]](#)
7. Fehr, E.; Schmidt, K.M. A Theory of Fairness, Competition, and Cooperation. *Q. J. Econ.* **1999**, *114*, 817–868. [\[CrossRef\]](#)
8. Fehr, E.; Schmidt, K.M. The economics of fairness, reciprocity and altruism—experimental evidence and new theories. In *Handbook of the Economics of Giving, Altruism and Reciprocity*; Kolm, S.-C., Ythier, J.M., Eds.; North-Holland: Amsterdam, The Netherlands, 2006; Volume 1, pp. 615–691.
9. Bolton, G.E.; Ockenfels, A. ERC: A Theory of Equity, Reciprocity, and Competition. *Am. Econ. Rev.* **2000**, *90*, 166–193. [\[CrossRef\]](#)
10. Hauser, O.P.; Hilbe, C.; Chatterjee, K.; Nowak, M.A. Social dilemmas among unequals. *Nature* **2019**, *572*, 524–527. [\[CrossRef\]](#) [\[PubMed\]](#)
11. Martinangeli, A.F.M.; Martinsson, P. We, the rich: Inequality, identity and cooperation. *J. Econ. Behav. Organ.* **2020**, *178*, 249–266. [\[CrossRef\]](#)
12. Aksoy, O.; Weesie, J. Inequality and Procedural Justice in Social Dilemmas. *J. Math. Sociol.* **2009**, *33*, 303–322. [\[CrossRef\]](#)
13. Simpson, B. Social Identity and Cooperation in Social Dilemmas. *Ration. Soc.* **2006**, *18*, 443–470. [\[CrossRef\]](#)
14. Aksoy, O. Crosscutting circles in a social dilemma: Effects of social identity and inequality on cooperation. *Soc. Sci. Res.* **2019**, *82*, 148–163. [\[CrossRef\]](#) [\[PubMed\]](#)
15. Fehr, E.; Naef, M.; Schmidt, K.M. Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments: Comment. *Am. Econ. Rev.* **2006**, *96*, 1912–1917. [\[CrossRef\]](#)
16. Pellow, D.N.; Brulle, R.J. (Eds.) *Power, Justice, and the Environment: A Critical Appraisal of the Environmental Justice Movement*; MIT Press: Cambridge, MA, USA, 2005.
17. Ringquist, E.J. Assessing evidence of environmental inequities: A meta-analysis. *J. Policy Anal. Manag.* **2005**, *24*, 223–247. [\[CrossRef\]](#)
18. Brulle, R.J.; Pellow, D.N. Environmental Justice: Human Health and Environmental Inequalities. *Annu. Rev. Public Health* **2006**, *27*, 103–124. [\[CrossRef\]](#) [\[PubMed\]](#)
19. Mohai, P.; Pellow, D.; Roberts, J.T. Environmental Justice. *Annu. Rev. Environ. Resour.* **2009**, *34*, 405–430. [\[CrossRef\]](#)
20. Banzhaf, S.H.; Ma, L.; Timmis, C. Environmental Justice: The Economics of Race, Place, and Pollution. *J. Econ. Perspect.* **2019**, *33*, 185–208. [\[CrossRef\]](#) [\[PubMed\]](#)
21. Banzhaf, S.H.; Ma, L.; Timmis, C. Environmental Justice: Establishing Causal Relationships. *Annu. Rev. Resour. Econ.* **2019**, *11*, 377–398. [\[CrossRef\]](#)
22. Bryant, B. *Environmental Justice: Issues, Policies, and Solutions*; Island Press: Covelo, CA, USA, 1995.
23. Schlosberg, D. *Defining Environmental Justice: Theories, Movements, and Nature*; Oxford University Press: Oxford, UK, 2007.

24. Banerjee, D. Toward an Integrative Framework for Environmental Justice Research: A Synthesis and Extension of the Literature. *Soc. Nat. Resour.* **2014**, *27*, 805–819. [\[CrossRef\]](#)
25. Preisendörfer, P. Umweltgerechtigkeit. Von sozial-räumlicher Ungleichheit hin zu postulierter Ungerechtigkeit lokaler Umweltbelastungen. *Soz. Welt* **2014**, *65*, 25–45. [\[CrossRef\]](#)
26. Liebe, U.; Bartczak, A.; Meyerhoff, J. A Turbine is not only a Turbine: The Role of Social Context and Fairness Characteristics for the Local Acceptance of Wind Power. *Energy Policy* **2017**, *107*, 300–308. [\[CrossRef\]](#)
27. Miller, D. Distributive Justice: What the People Think. *Ethics* **1992**, *102*, 555–593. [\[CrossRef\]](#)
28. Van Lange, P.A.M.; Joireman, J.; Parks, C.D.; Van Dijk, E. The Psychology of Social Dilemmas: A Review. *Organ. Behav. Hum. Decis. Process.* **2013**, *120*, 125–141. [\[CrossRef\]](#)
29. Liu, F. *Environmental Justice Analysis: Theories, Methods, and Practice*; CRC Press: Boca Raton, FL, USA, 2001.
30. Walker, G. *Environmental Justice: Concepts, Evidence and Politics*; Routledge: London, UK, 2012.
31. Crowder, K.; Downey, L. Interneighborhood Migration, Race, and Environmental Hazards: Modeling Microlevel Processes of Environmental Inequality. *Am. J. Sociol.* **2010**, *115*, 1110–1149. [\[CrossRef\]](#)
32. Mohai, P.; Saha, R. Which came first, people or pollution? A review of theory and evidence from longitudinal environmental justice studies. *Environ. Res. Lett.* **2015**, *10*, 125011. [\[CrossRef\]](#)
33. Preisendörfer, P.; Bruderer Enzler, H.; Diekmann, A.; Hartmann, J.; Kurz, K.; Liebe, U. Pathways to Environmental Inequality: How Urban Traffic Noise Annoyance Varies Across Socioeconomic Subgroups. *Environ. Res. Public Health* **2022**, *19*, 14984. [\[CrossRef\]](#)
34. Diekmann, A.; Bruderer Enzler, H.; Hartmann, J.; Kurz, K.; Liebe, U.; Preisendörfer, P. Environmental Inequality in Four European Cities: A Study Combining Household Survey and Geo-Referenced Data. *Eur. Sociol. Rev.* **2023**, *39*, 44–66. [\[CrossRef\]](#)
35. Bullard, R.D. *Dumping in Dixie: Race, Class, and Environmental Quality*, 3rd ed.; Westview Press: Boulder, CO, USA, 2000.
36. Schlosberg, D.; Carruthers, D. Indigenous Struggles, Environmental Justice, and Community Capabilities. *Glob. Environ. Politics* **2010**, *10*, 12–35. [\[CrossRef\]](#)
37. Harrison, J.L. *Pesticide Drift and the Pursuit of Environmental Justice*; MIT Press: Cambridge, MA, USA, 2011.
38. Banerjee, D. *Conceptualizing Environmental Justice: Plural Frames and Global Claims in Land Between the Rivers, Kentucky*; Lexington Books: Lanham, MD, USA, 2018.
39. Clayton, S. Models of Justice in the Environmental Debate. *J. Soc. Issues* **2000**, *56*, 459–474. [\[CrossRef\]](#)
40. Syme, G.; Kals, E.; Nancarrow, B.E.; Montada, L. Ecological Risks and Community Perceptions of Fairness and Justice: A Cross-Cultural Model. *Hum. Ecol. Risk Assess.* **2006**, *12*, 102–119. [\[CrossRef\]](#)
41. Parris, C.L.; Hegtvædt, K.A.; Watson, L.A.; Johnson, C. Justice for All? Factors Affecting Perceptions of Environmental and Ecological Injustice. *Soc. Justice Res.* **2014**, *27*, 67–98. [\[CrossRef\]](#)
42. Clayton, S.; Kals, E.; Feygina, I. Justice and Environmental Sustainability. In *Handbook of Social Justice Theory and Research*; Sabbagh, C., Schmitt, M., Eds.; Springer: New York, NY, USA, 2016; pp. 369–386.
43. Arneson, R. Egalitarianism. In *The Stanford Encyclopedia of Philosophy*; Zalta, E.N., Ed.; Stanford University: Stanford, CA, USA, 2013. Available online: <https://plato.stanford.edu/archives/sum2013/entries/egalitarianism/> (accessed on 24 June 2024).
44. Adams, S.J. Inequity in Social Exchange. In *Advances in Experimental Social Psychology*; Berkowitz, L., Ed.; Academic Press: New York, NY, USA, 1965; Volume 2, pp. 267–299.
45. Cudd, A.; Eftekhari, S. Contractarianism. In *The Stanford Encyclopedia of Philosophy*; Zalta, E.N., Ed.; Stanford University: Stanford, CA, USA, 2018. Available online: <https://plato.stanford.edu/archives/sum2018/entries/contractarianism/> (accessed on 24 June 2024).
46. Rawls, J. *A Theory of Justice*; Harvard University Press: Cambridge, UK, 1971.
47. Binmore, K. Playing Fair. In *Game Theory and the Social Contract*; MIT Press: Cambridge, MA, USA, 1994; Volume 1.
48. Driver, J. The History of Utilitarianism. In *The Stanford Encyclopedia of Philosophy*; Zalta, E.N., Ed.; Stanford University: Stanford, CA, USA, 2014. Available online: <https://plato.stanford.edu/archives/win2014/entries/utilitarianism-history/> (accessed on 24 June 2024).
49. Bentham, J. A Fragment on Government: PREFACE. In *The Collected Works of Jeremy Bentham: A Comment on the Commentaries and A Fragment on Government*; Burns, J.H., Hart, H.L.A., Eds.; Oxford University Press: Oxford, UK, 1977.
50. Baliga, S.; Maskin, E. Mechanism design for the environment. In *Handbook of Environmental Economics*; Mäler, K.-G., Vincent, J.R., Eds.; Elsevier: Amsterdam, The Netherlands, 2003; Volume 1, pp. 306–324.
51. Frohlich, N.; Oppenheimer, J.A.; Eavey, C.L. Choices of Principles of Distributive Justice in Experimental Groups. *Am. J. Political Sci.* **1987**, *31*, 606–636. [\[CrossRef\]](#)
52. Frohlich, N.; Oppenheimer, J.A. *Choosing Justice: Experimental Approach to Ethical Theory*; University of California Press: Berkeley, CA, USA, 1992.
53. Scott, J.T.; Matland, R.E.; Michelbach, P.A.; Bornstein, B.H. Just Deserts: An Experimental Study of Distributive Justice Norms. *Am. J. Political Sci.* **2001**, *45*, 749–767. [\[CrossRef\]](#)
54. Michelbach, P.A.; Scott, J.T.; Matland, R.E.; Bornstein, B.H. Doing Rawls Justice: An Experimental Study of Income Distribution Norms. *Am. J. Political Sci.* **2003**, *47*, 523–539. [\[CrossRef\]](#)
55. Konow, J.; Schwettmann, L. The Economics of Justice. In *Handbook of Social Justice Theory and Research*; Sabbagh, C., Schmitt, M., Eds.; Springer: New York, NY, USA, 2016; pp. 83–106.
56. Beatley, T. Applying Moral Principles to Growth Management. *J. Am. Plan. Assoc.* **1984**, *50*, 459–469. [\[CrossRef\]](#)

57. Liebig, S.; Sauer, C. Sociology of Justice. In *Handbook of Social Justice Theory and Research*; Sabbagh, C., Schmitt, M., Eds.; Springer: New York, NY, USA, 2016; pp. 37–59.
58. Auspurg, K.; Hinz, T. *Factorial Survey Experiments*; Sage: Thousand Oaks, CA, USA, 2015.
59. Bechtel, M.M.; Scheve, K.F. Mass Support for Global Climate Agreements Depends on Institutional Design. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 13763–13768. [\[CrossRef\]](#)
60. Liebe, U.; Preisendörfer, P.; Bruderer Enzler, H. The Social Acceptance of Airport Expansion Scenarios: A Factorial Survey Experiment. *Transp. Res. Part D* **2020**, *84*, 102363. [\[CrossRef\]](#)
61. Dillman, D.A. *Mail and Internet Surveys. The Tailored Design Method*, 2nd ed.; Wiley: Hoboken, NJ, USA, 2007.
62. AAPOR. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*, 9th ed.; The American Association for Public Opinion Research: Oakbrook Terrace, IL, USA, 2016.
63. Bruderer Enzler, H.; Diekmann, A.; Hartmann, J.; Herold, L.; Kilburger, K.; Kurz, K.; Liebe, U.; Preisendörfer, P.; Widmer, A. *Dokumentation Projekt “Umweltgerechtigkeit—Soziale Verteilungsmuster, Gerechtigkeitseinschätzungen und Akzeptanzschwellen”*; ETH Zürich: Zürich, Switzerland, 2019.
64. Rawls, J. Justice as Fairness: Political not Metaphysical. *Philos. Public Aff.* **1985**, *14*, 223–251.
65. Ganzeboom, H.B.G.; De Graaf, P.M.; Treiman, D.J. A Standard International Socio-Economic Index of Occupational Status. *Soc. Sci. Res.* **1992**, *21*, 1–56. [\[CrossRef\]](#)
66. Swiss Federal Statistical Office. *Federal Register of Buildings and Dwellings*; Swiss Federal Statistical Office: Bern, Switzerland, 2017.
67. Brink, M.; Schäffer, B.; Pieren, R.; Wunderli, J.M. Conversion between Noise Exposure Indicators Leq24h, LDay, LEvening, LNight, Ldn and Lden: Principles and Practical Guidance. *Int. J. Hyg. Environ. Health* **2018**, *221*, 54–63. [\[CrossRef\]](#) [\[PubMed\]](#)
68. Traub, S.; Seidl, C.; Schmidt, U.; Levati, M.V. Friedman, Harsanyi, Rawls, Boulding—Or somebody else? An experimental investigation of distributive justice. *Soc. Choice Welf.* **2005**, *24*, 283–309. [\[CrossRef\]](#)
69. Harsanyi, J.C. Can the Maximin Principle Serve as a Basis for Morality? A Critique of John Rawls’s Theory. *Am. Political Sci. Rev.* **1975**, *69*, 594–606. [\[CrossRef\]](#)
70. Wolf, S.; Dron, C. The effect of an experimental veil of ignorance on intergenerational resource sharing: Empirical evidence from a sequential multi-person dictator game. *Ecol. Econ.* **2020**, *175*, 106662. [\[CrossRef\]](#)
71. Inoue, A.; Zenkyo, M.; Sakamoto, H. Making the Veil of Ignorance Work: Evidence from Survey Experiments. In *Oxford Studies in Experimental Philosophy Volume 4*; Lombrozo, T., Knobe, J., Nichols, S., Eds.; Oxford University Press: Oxford, UK, 2021; pp. 53–80.
72. Bowker, A.H. A Test of Symmetry in Contingency Tables. *J. Am. Stat. Assoc.* **1948**, *43*, 572–574. [\[CrossRef\]](#) [\[PubMed\]](#)
73. Diekmann, A.; Naef, M. *Codebook Schweizer Umweltsurvey 2018*; ETH Zürich: Zürich, Switzerland, 2020.
74. Reeskens, T.; van Oorschot, W. Equity, equality, or need? A study of popular preferences for welfare redistribution principles across 24 European countries. *J. Eur. Public Policy* **2013**, *20*, 1174–1195. [\[CrossRef\]](#)
75. d’Anjou, L.; Steijn, A.; van Aarsen, D. Social Position, Ideology and Distributive Justice. *Soc. Justice Res.* **1995**, *8*, 351–384. [\[CrossRef\]](#)
76. Van Hootegem, A.; Abts, K.; Meuleman, B. Differentiated Distributive Justice Preferences? Configurations of Preferences for Equality, Equity and Need in Three Welfare Domains. *Soc. Justice Res.* **2020**, *33*, 257–283. [\[CrossRef\]](#)
77. Korndörfer, M.; Egloff, B.; Schmukle, S.C. A Large Scale Test of the Effect of Social Class on Prosocial Behavior. *PLoS ONE* **2015**, *10*, e0133193. [\[CrossRef\]](#) [\[PubMed\]](#)
78. Tutic, A.; Liebe, U. Contact Heterogeneity as a Mediator of the Relationship between Social Class and Altruistic Giving. *Socius Sociol. Res. A Dyn. World* **2020**, *6*, 1–16.
79. Schwartz, B. The Social Psychology of the Gift. *Am. J. Sociol.* **1967**, *73*, 1–11. [\[CrossRef\]](#)
80. van de Ven, J. The Demand for Social Approval and Status as a Motivation to Give. *J. Institutional Theor. Econ.* **2002**, *158*, 464–482. [\[CrossRef\]](#)
81. Engelmann, D.; Strobel, M. In equality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments. *Am. Econ. Rev.* **2004**, *94*, 857–869. [\[CrossRef\]](#)
82. Taylor, D.E. The Rise of the Environmental Justice Paradigm: Injustice Framing and the Social Construction of Environmental Discourses. *Am. Behav. Sci.* **2000**, *43*, 508–580. [\[CrossRef\]](#)
83. Holifield, R. Defining Environmental Justice and Environmental Racism. *Urban Geogr.* **2001**, *22*, 78–90. [\[CrossRef\]](#)
84. Sandel, M.J. *Justice: What’s the Right Thing to Do?*; Farrar, Straus and Giroux: New York, NY, USA, 2009.
85. Hainmueller, J.; Hangartner, D.; Yamamoto, T. Validating Vignette and Conjoint Survey Experiments against Real-World Behavior. *Proc. Natl. Acad. Sci. USA* **2015**, *112*, 2395–2400. [\[CrossRef\]](#) [\[PubMed\]](#)
86. Awad, S.; Dsouza, E.; Kim, R.; Schulz, J.; Henrich, J.; Shariff, A.; Bonnefon, J.-F.; Rahwan, I. The Moral Machine Experiment. *Nature* **2018**, *563*, 59–64. [\[CrossRef\]](#)
87. Kahneman, D.; Tversky, A. (Eds.) *Choices, Values and Frames*; Cambridge University Press: Cambridge, UK, 2000.
88. Bolton, G.E.; Brandts, J.; Ockenfels, A. Fair Procedures: Evidence from Games Involving Lotteries. *Econ. J.* **2005**, *115*, 1054–1076. [\[CrossRef\]](#)
89. Krawczyk, M.W. A model of procedural and distributive fairness. *Theory Decis.* **2011**, *70*, 111–128. [\[CrossRef\]](#)

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.