Deciding Who Gets What, Fairly

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Goods and services are often allocated to those who spend the most resources. In many cases, this results in allocation to people who spend the most money. But people can use a variety of other resources to acquire things (e.g., time, effort, social capital). Why might some resources seem fairer to use than others? In this research, we show that people believe resources systematically differ according to how well they signal preferences (e.g., money spent seems like a worse signal of want or need than does time or effort spent) and that allocation policies seem fairer if they are based on resources that clearly signal preferences. We explore several factors that influence beliefs about preference signaling, and we explain how these intuitions shape support for business practices and public policies.

Keywords: fairness, allocation, markets, judgment and decision making, public policy

Consumers can use a variety of resources to acquire things. For example, suppose that tickets to a popular college football game are in short supply. Some people will spend money to acquire the tickets, perhaps even paying above face value to a ticket reseller. Students at the university, on the other hand, can wait in line for free seats, allocated on a first-come, first-served basis. While these students might not be spending money, they are spending another resource: time. Meanwhile, well-connected alumni often avoid spending money and time altogether by calling in favors from friends with access to tickets. Their currency of exchange—social capital—is less tangible, but hardly less common. Clearly, different resources can be used as the basis for allocation. And given that consumers care a great deal about fairness (Bolton, Warlop, and Alba 2003; Xia, Monroe, and Cox 2004), this raises a natural question: Why might some resources seem fairer to use than others?

This is a critical question because marketers often explicitly allow consumers to pay for things in different ways. To board a flight early, some airline passengers get to the airport early and spend time waiting at the gate, while others spend money on priority boarding. At amusement parks, some visitors stand in line for each ride, while others purchase "fast passes." Retailers sometimes offer new products to customers with social influence (e.g., Klout Perks, Amazon Vine), while other customers must sign up for waiting lists. In these contexts, understanding why some resources might seem fairer to use than others is important because perceptions of unfairness have been shown to affect decision making by, for example, reducing shopping intentions (Campbell 1999; Sinha and Batra 1999), triggering complaints (Huppertz, Arenson, and Evans 1978), and decreasing customer satisfaction (Oliver and Swan 1989).

Prior research suggests that people often want goods and services to go to those with the strongest preferences (Deutsch 1975). But it can be difficult to know who has the strongest want or need for something. One way to elicit preferences is to ask people how much money they are willing to pay. But people may actually believe this is a noisy signal of preferences. If one person is willing to spend twice the amount of money than someone else for a ticket to a football game, it might not be clear whether the

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higher bidder actually wants the ticket more or is simply wealthier. The same holds true for people who use their personal connections: Do they really want to see the game, or do they just have the right friends? On the other hand, the amount of time someone is willing to wait for a ticket could seem like a clearer signal of preferences. This might be because everyone has the same amount of time in a day (even if some people have more free time than others), so someone who is willing to spend more of their time waiting for something probably has a stronger preference for it. As a result, people may believe it is fairer to allocate things to those willing to spend the most time, rather than to those willing to pay the most money or use the most social capital.

In this research, we demonstrate that people believe resources (e.g., money, time, effort, social capital) systematically differ in their *preference signaling*. If people believe that a resource has high preference signaling, then they believe that it is easy to infer how much someone wants or needs something based on how much of the resource they spend or use. And these beliefs about preference signaling shape perceptions of fairness. We propose that people believe it is fairer to allocate things using resources that seem to signal preferences more clearly.

THEORETICAL BACKGROUND

Previous research has identified several ways in which money, time, and other resources differ. For example, the value of time is more ambiguous than the value of money (Okada and Hoch 2004), and people believe that in the future they will have more slack in their budgets for time, but not for money (Zauberman and Lynch 2005). As a result, people use time and money differently. For example, consumers take more risks with time (Okada and Hoch 2004), discount time more steeply (Zauberman and Lynch 2005), and plan more for the short term than the long term with time (Lynch et al. 2010). Consumers are also less prone to some mental accounting effects for time than for money (Kahneman and Tversky 1984; Leclerc, Schmitt, and Dube 1995), may be less susceptible to the sunk cost effect for time than for money (Arkes and Blumer 1985; cf. Navarro and Fantino 2009; Soman 2001), exhibit more inequity aversion for time than for money (Exley and Kessler 2017), and tend to rely more on heuristics when spending time than when spending money (Saini and Monga 2008). Time is also more emotionally evocative than money (Liu and Aaker 2008); consequently, activating the concept of time (vs. money) can improve product evaluations (Mogilner and Aaker 2009) and increase happiness (Mogilner 2010). However, despite covering a wide variety of dimensions, existing work does not explain why some resources might seem *fairer* to use than others.

In fact, prior research on fairness focuses almost exclusively on monetary prices (Xia et al. 2004). Most notably, Kahneman, Knetsch, and Thaler (1986a) highlighted how perceptions of fairness depend on reference points, such as prior prices or the price needed to maintain a profit. Price increases in response to excess demand are generally perceived to be unfair (Frey and Pommerehne 1993). However, price increases can seem fairer when they happen for reasons outside of the seller's control (Bolton et al. 2003; Okun 1981; Urbany, Madden, and Dickson 1989; Vaidyanathan and Aggarwal 2003). This work helps explain why raising prices might seem fair or unfair, but it does not explain why an auction (i.e., spending money) might seem more or less fair than asking people to wait in line (i.e., spend time) or use other resources (e.g., exert effort, use social capital). We address this question in the current work.

Research on distributive justice offers some initial guidance. This work shows that people subscribe to different allocation norms, which can depend on the goals in a particular situation. For example, when people care about fostering harmonious social relations, they tend to invoke the principle of equality (i.e., distributing everything equally); when productivity is the primary objective, people often advocate making allocations proportional to one's contribution or merit (i.e., an equity principle). However, another prominent goal is to maximize total welfare (Deutsch 1975). In these cases, people advocate allocation to those with the strongest want or need (Leventhal 1980; Leventhal, Karuza, and Fry 1980). In these cases, people desire distributive efficiency (Lerner 1944). They want goods and services to go to those who have the strongest preferences or the highest utility for them. That is, consumers often adopt a "preference-based" allocation norm.

Importantly, if you want to ensure that things go to people with the strongest preferences, then you need a way to determine those preferences. Consumers often express their preferences by indicating how much of a resource they would be willing to spend to acquire something (Sunstein 2007; Warren, McGraw, and Van Boven 2011). By "resource" we simply mean any form of capital that can be used as a means for acquiring something. Most often, that resource is money. This implicitly assumes that the consumers who are willing to pay the most must have the strongest want or need for the good or service. But people might believe money is actually a relatively noisy signal of preferences. Other resources could seem like clearer signals. For example, previous research has shown that expenditures of time are seen as better reflections of the self and personal values than expenditures of money (Gino and Mogilner 2014; Mogilner and Aaker 2009; Reed, Aquino, and Levy 2007). And while the opportunity cost of time differs from person to person, there is an explicit upper limit on its availability (i.e., 24 hours in a day). Money, on the other hand, is bound by no such upper limit. Therefore, if someone is willing to spend a lot of time to acquire

something, then it might be easier to infer that they have a strong preference for it. And in situations where people want things to go to those with the strongest preferences, it might seem fairer to use resources that more clearly signal those preferences. This leads to our first hypothesis:

> **H1:** People believe resources vary according to how well they signal preferences. Therefore, people will think that it is fairer to allocate goods and services based on resources that seem to signal preferences more clearly.

We emphasize that this and the following hypotheses apply primarily to situations in which consumers adopt a preference-based allocation norm. In domains where other distributive norms are more common, we expect that preference signaling will be less important. Support for different distributive norms (e.g., equality, equity, preferences) is often context-dependent, and it is beyond the scope of the current article to explore all of the factors that lead people to adopt one norm or another. But it is worth noting that a preference-based allocation norm seems fairly common in consumer settings. In fact, previous research has suggested that this norm is more likely to be adopted when there is insufficient supply of something (Skitka and Tetlock 1992) or when people have different needs, tastes, or beliefs (Yaari and Bar-Hillel 1984). These conditions characterize many consumer settings.

Importantly, we also do not make normative claims about which resources actually serve as clearer signals of preference. We instead examine beliefs about which resources serve as clearer signals of preference. Nor do we argue some resources are actually fairer to use as the basis for allocation than others. This work is instead descriptive: we demonstrate how people's beliefs about these resources systematically differ in meaningful ways. And these beliefs can shape perceptions of fairness.

The previous hypothesis raises a natural question: What factors affect whether a resource seems to signal preferences clearly? There are two key obstacles that interfere with preference signaling. First, it can sometimes be difficult to compare people's preferences based on their willingness to pay (or spend) some resource. As noted above, the person who is willing to spend the most may not necessarily have the strongest preferences. Second, it can sometimes be difficult for people to express their preferences using a resource. A person might be unsure of how much things usually cost in a given currency, or the value of a resource might be ambiguous. Therefore, if a resource seems to mitigate these obstacles—that is, if it makes comparison and expression of preferences easy—then people will believe it has higher preference signaling.

With respect to the first obstacle, comparisons between people can be difficult when a resource is perceived to be unequally distributed. For example, suppose that one person is willing to pay $200 for something and another person is willing to pay $100. If money were perceived to be unequally distributed, then it would be difficult to know whether the person offering more money has a stronger preference or is just wealthier. However, if money were perceived to be equally distributed, then it might seem easier to determine who has the stronger preferences. Similar reasoning applies to time. People might perceive time to be equally distributed because everyone has the same amount of it (i.e., 24 hours in a day). But if time were instead perceived to be unequally distributed (i.e., some people might acknowledge that free time is not equally distributed), then it would be difficult to know whether the person who has been standing in line the longest actually has a stronger preference or simply fewer obligations. This leads to our second hypothesis:

> **H2:** Resources that are perceived to be equally distributed will seem to more clearly signal preferences than will resources that are perceived to be unequally distributed. Therefore, a resource that is perceived to be equally distributed will seem like a fairer basis for allocation.

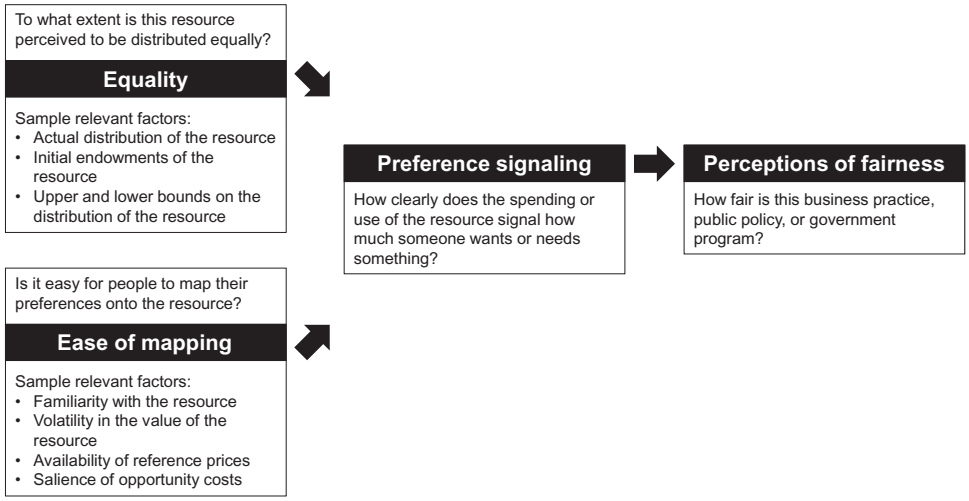
With respect to the second obstacle, if a person cannot figure out how to express their preferences using the resource, then of course the resource cannot clearly signal their preferences. Put simply, it should be easy to map one's preferences onto the resource. For example, a tourist shopping in a foreign country with an unfamiliar currency might not know whether a specific price matches her desire to acquire something. Thus, inferring preferences from her stated willingness to pay (WTP) might be more difficult. On the other hand, a local citizen shopping in her home country with a familiar currency should have little trouble determining what price to pay, and it might be easier to understand her preferences from her stated willingness to pay. There are many potential factors that can complicate this preference mapping process and undermine preference signaling (e.g., when consumers lack reference prices, cannot comprehend the rules for spending, or are unaware of opportunity costs). Therefore, when a resource makes it easy for the person who spends or uses it to map preferences onto an expenditure of that resource, it will seem to signal preferences more clearly. This leads to the following hypothesis:

> **H3:** Resources with high ease of mapping will seem to more clearly signal preferences than will resources with low ease of mapping. Therefore, a resource with high ease of mapping will seem like a fairer basis for allocation.

Together, these hypotheses offer a novel insight regarding how consumers perceive fairness in the marketplace (see figure 1). Our work is the first to show both that people believe resources systematically differ according to how well they signal preferences and that policies are perceived as fairer when they rely on resources that seem to more clearly signal preferences.

FIGURE 1

HOW FAIRNESS PERCEPTIONS DEPEND ON BELIEFS ABOUT PREFERENCE SIGNALING



OVERVIEW OF STUDIES

In the following six studies, we explore the relationship between beliefs about preference signaling and perceptions of fairness across resources. First, we establish that if people believe a resource clearly signals preferences, then they perceive it as a fairer basis for allocation (study 1) and are willing to choose it as a basis for allocation (study 2). We then show that this framework partly explains why some real-world policies seem fairer than others (study 3). Next, we demonstrate that perceived equality and ease of mapping jointly affect beliefs about preference signaling, which, in turn, influence perceptions of fairness (study 4). Finally, we directly manipulate perceived equality and ease of mapping (studies 5A and 5B) to establish a causal link between beliefs about preference signaling and perceptions of fairness.

STUDY 1: INTUITIONS ABOUT DIFFERENT RESOURCES

This study tests whether there is a relationship between beliefs about preference signaling and perceptions of fairness across resources. We tested this relationship across a range of six different resources: money, time, mental effort, physical effort, social support (i.e., broad community efforts), and social influence (i.e., connections to individual decision makers). These resources are not exhaustive, but represent some of the more common ways that consumers might acquire things. We predicted an overall positive correlation between beliefs about preference signaling and perceptions of fairness. We expected that certain resources might score higher on these dimensions than others (e.g., time, compared to money), but did not make specific a priori predictions for each resource.

Method

For all studies, we recruited participants from Amazon Mechanical Turk (MTurk) and restricted participation to US residents. In studies where we used attention checks, participants who failed the attention checks (Oppenheimer, Meyvis, and Davidenko 2009) or admitted to answering questions randomly were excluded prior to any data analysis. For all studies, we also report every independent and dependent variable that we collected, and we predetermined a sample size of 100 per cell for between-subjects designs and 150–200 for correlational designs. Finally, all data have been posted to an online repository (https://osf.io/87htt/). We recruited 151 participants for this study ($M_{age} = 36.18$; 71 females, 80 males). Fourteen participants failed the attention checks, leaving 137 participants for the analyses.

There were two parts to this study. In part 1, participants answered questions about how well each resource signals people's preferences. First, participants were told about how each resource could be used to acquire things:

> Money: People often spend money to acquire things.
>
> Time: People often spend time to acquire things.
>
> Mental energy: People often spend mental energy to acquire things. By mental energy, we mean the amount of attention, thought, planning, or creativity spent to get something. This is not the same as intelligence. You can spend a lot of mental energy without having a high IQ and vice versa.

Physical energy: People often spend physical energy to acquire things. By physical energy, we mean the amount of manual labor spent to get something. This is not the same as strength. You can spend a lot of physical energy without being incredibly strong and vice versa.

Social support: People often use social support to acquire things. By social support, we mean calling on friends and neighbors to help you get something (e.g., vouching for you, recommending you, signing a petition, etc.).

Social influence: People often use social influence to acquire things. By social influence, we mean calling on people you know in positions of power to help you get something (e.g., asking for favors, using personal connections, etc.).

Participants read about these resources sequentially, in random order. For each resource, they answered two questions: whether the amount of the resource that someone is willing to spend or use to acquire an item is a clear signal of how much they (1) want that item and (2) need that item. Participants responded on seven-point scales ("Not at all clear" = 1; "Very clear" = 7).

In part 2, which was presented after a filler task, participants rated the fairness of using these resources. Participants read a hypothetical scenario in which the US Forest Service had to allocate a limited number of cabins to a large number of interested people. There were two versions of this scenario—one in which people wanted the cabins (want condition) and one in which people needed the cabins (need condition)—shown below:

Throughout the country, the US Forest Service maintains a number of restricted-use cabins on protected land. These cabins are not typically open to the public, but are rather used for operational purposes. [want condition: Due to the popularity of these areas as vacation destinations, the agency has decided to make these cabins available for short-term rental to people who are interested in vacationing at these sites.] [need condition: However, forest fires near one residential neighborhood have significantly diminished the air quality near that neighborhood. As a result, the Forest Service is making some cabins in a nearby park available for short-term rental.] The cabins are in limited supply, however, so not everyone who applies for a rental will be able to get one. The Forest Service is thinking about different ways to decide who gets to rent the cabins. We're going to ask you about how fair you think different policies are.

Participants then rated how fair it would be to allocate the cabins using the following rules:

Money: The Forest Service is planning to offer the cabins to those who are willing to pay the most money.

Time: The Forest Service is planning to offer the cabins on a first-come, first-served basis. So people who wait in line the longest at their local office are most likely to get a cabin.

Mental energy: The Forest Service is planning to offer the cabins in exchange for some data entry work. This work does not require tremendous intelligence, but it does take attention and mental energy. They will rent the cabins to people who are willing to do the most data entry.

Physical energy: The Forest Service is planning to offer the cabins in exchange for some manual labor. This work does not require tremendous strength, but it does take physical energy. They will rent the cabins to people who are willing to do the most weeding of invasive plants.

Social support: The Forest Service is planning to offer the cabins to people who can get the most community members to support their application (by signing a petition).

Social influence: The Forest Service is planning to work with the offices of elected officials to allocate these cabins. These cabins will go to applicants who have sponsorship from an elected official.

Participants read about these rules sequentially, in random order, and rated the fairness of each on seven-point scales ("Not at all fair" = 1; "Very fair" = 7).

Results and Discussion

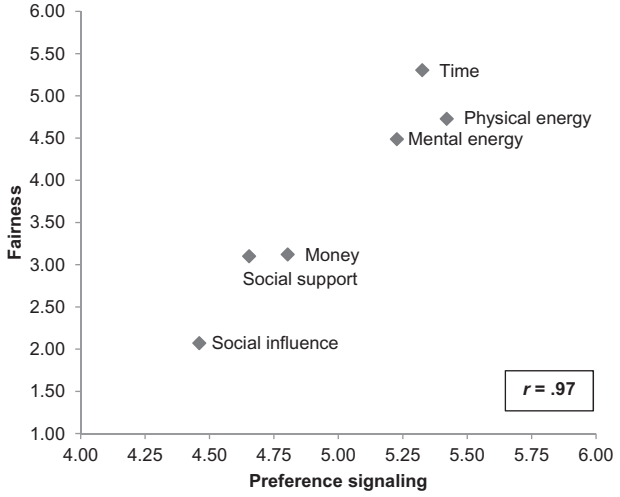
We analyzed the relationship between perceived fairness and preference signaling at the participant level. Specifically, we fit a random-effects linear regression (to account for repeated measurement) with perceived fairness as the dependent variable, and preference signaling (averaging responses to the want and need preference signaling questions for each resource), scenario (want vs. need), and the interaction thereof as the dependent variables. As predicted (hypothesis 1), we observed a significant, positive effect of preference signaling on fairness ($B = .48$, 95% CI = [.33, .62]; $z = 6.28$, $p < .001$), no effect of scenario ($B = .37$, 95% CI = [–.77, 1.52]; $z = .64$, $p = .522$), and no interaction ($B = –.12$, 95% CI = [–.33, .10]; $z = –1.03$, $p = .301$). These results suggest that, on average, if a participant believed a resource more clearly signaled preferences, then that resource seemed like a fairer basis for allocation. The absence of an interaction suggests that this relationship held equally for wants and needs ($B_{wants} = .36$, 95% CI = [.22, .49]; $z = 5.24$, $p < .001$; $B_{needs} = .28$, 95% CI = [.16, .40]; $z = 4.44$, $p < .001$).

To make this relationship easier to visualize, we next calculated the correlation between the average preference signaling ratings and average fairness ratings across the six resources (i.e., using six pairs of observations in total). We again observed a significant, positive relationship (correlation coefficient: $r = .97$, $t(4) = 7.46$, $p = .002$). Such group-level correlations can be inflated by aggregation across participants, but they provide an illustrative snapshot of the association between variables (see figure 2).

One concern with this study might be that participants were directly asked about both preference signaling and fairness. Despite our inclusion of a filler task, demand characteristics or common-method bias could artificially

FIGURE 2

STUDY 1: WHEN PEOPLE THINK A RESOURCE MORE CLEARLY SIGNALS PREFERENCES, THAT RESOURCE ALSO SEEMS LIKE A FAIRER BASIS FOR ALLOCATION



inflate the correlation between the two. To address this potential issue, we replicated this correlation with 202 participants ($M_{age} = 36.02$; 91 females, 110 males, one undisclosed); 196 passed the attention checks. Participants rated either preference signaling or fairness, but not both. Across resources, we again observed a strongly positive group-level correlation between preference signaling and fairness (correlation coefficient: $r = .93$, $t(4) = 5.77$, $p = .004$).

These initial results reveal a strong, positive correlation between beliefs about preference signaling and perceptions of fairness. But do these intuitions actually affect choices regarding which resources to use as a basis for allocating goods and services? Study 2 addresses this question directly.

STUDY 2: PREFERENCE SIGNALING AND CHOICE

Study 1 suggests that people believe allocation policies are fairer when they rely on resources that seem to more clearly signal preferences. But in many consumer settings, fairness is just one of many potential concerns. This study tests whether beliefs about preference signaling also influence which policies people choose for allocating goods and services.

Method

We recruited 301 participants ($M_{age} = 33.08$; 164 females, 137 males) and excluded none from the analyses. We asked the first 100 participants to rate the preference signaling of six resources following the same procedure as in study 1, with one exception. Rather than answering two questions for each resource (i.e., one for "wants" and one for "needs"), participants answered a single question for each resource: "Is the amount of [money/time/mental energy/physical energy/social support/social influence] that someone [spends/uses] to acquire something a clear signal of how much they want or need that item?" Participants responded using seven-point scales ("Not at all clear" = 1; "Very clear" = 7).

The remaining 201 participants were randomly assigned to one of two conditions: fairness vs. choice. In both conditions, participants reviewed a hypothetical scenario in which a restaurant had to allocate a limited number of tables to a large number of interested people:

> A local restaurant has just won a major culinary award and is hosting a special dinner to celebrate. The head chef has planned a gourmet seven-course meal, and many members of the community are interested in attending the dinner. The restaurant has limited capacity, however, so not everyone who wants a table at the dinner will be able to get one. The restaurant is thinking about different ways to decide who gets to attend the dinner.

Participants then considered 15 pairs of policies that could be used to allocate the available tables. These 15 pairs represented every possible combination of policies involving the six resources described above. For example, the policy involving money read: "The restaurant can offer the tables to people who are willing to pay the most money." The policy involving time read: "The restaurant can offer the tables on a first-come, first-served basis. So people who wait in line the longest at the restaurant would be most likely to get a table." We described similar policies for mental energy, physical energy, social support, and social influence. See the web appendix for stimuli. In the fairness condition, participants chose the policy that seemed fairer ("Of the options below, which do you think is the fairer thing for the restaurant to do?"). In the choice condition, participants chose the policy that they would like the restaurant to use ("Of the options below, which would you prefer the restaurant do?").

Results and Discussion

We predicted that a larger difference in average preference signaling scores between any two resources would make it more likely that participants would choose the policy/resource with higher perceived preference signaling. Therefore, we first computed the difference in average preference signaling scores between each pair of resources. For example, the average preference signaling score for money was 4.74, and the average preference signaling score for time was 5.44, yielding a difference score of .70.

Meanwhile, the average preference signaling score for mental energy was 5.64, and the average preference signaling score for physical energy was 5.64, yielding a difference score of .02. The large difference in preference signaling scores between money and time should make it more likely that participants consistently choose time over money (i.e., it is relatively easy to discriminate between the two), while the small difference in preference signaling scores between mental energy and physical energy should make it less likely that participants consistently choose mental energy over physical energy (i.e., it is relatively difficult to discriminate between the two). We computed these difference scores for all 15 pairs of resources. We then used these difference scores to predict the likelihood that participants in the fairness and choice conditions would choose the policy/resource that scored higher on preference signaling.

We analyzed the relationship between difference scores and choice at the participant level. We fit a random-effects logistic regression (to account for repeated measurement) with difference score as the independent variable and choice of the policy/resource with higher preference signaling as the dependent variable. As predicted (hypothesis 1), within the fairness condition, we observed a significant, positive effect of difference score, such that participants indicated the policy/resource with higher preference signaling seemed fairer ($B = 1.87$, 95% CI = [1.46, 2.28]; $z = 8.98$, $p < .001$). Similarly, as predicted (hypothesis 1), within the choice condition, we observed a significant, positive effect of difference score, such that participants were more likely to choose the policy/resource with higher preference signaling ($B = .64$, 95% CI = [.25, 1.02]; $z = 3.25$, $p = .001$). We also observed a significant interaction between difference score and condition ($B = 1.25$, 95% CI = [1.80, .69]; $z = 4.38$, $p < .001$), suggesting that the effect was stronger in the fairness condition than in the choice condition. Preference signaling seemed to matter more for fairness, but also significantly influenced choice.

These results suggest that participants' beliefs about preference signaling influence not only perceptions of fairness, but also which policies they think should be used in consumer settings. Resources that score higher on preference signaling seem like both a fairer basis for allocation and a more appropriate basis for allocation.

This study also further addresses concerns about demand characteristics and common-method bias from study 1. In study 1, the correlation could have been inflated because participants rated both preference signaling and fairness and thus may have felt the need to answer both questions similarly. But that is not the case here, because different participants rated preference signaling and chose policies.

These initial studies suggest a link between beliefs about preference signaling and perceptions of fairness across resources. But these studies all explicitly draw attention to the resources being used as the basis for allocation. Participants were told whether policies required people to use money, time, mental energy, physical energy, social support, or social influence. This might have led participants to more heavily base their fairness judgments on their perceptions of the resources. When consumers are considering real policies, their perceptions of fairness may depend on many other factors beyond the types of resources involved. In the next study we address these issues by asking participants to evaluate real-world policies without explicitly telling them which resources need to be spent or used.

STUDY 3: PERCEPTIONS OF REAL-WORLD POLICIES

In study 3, we predicted that the perceived fairness of real-world policies would depend, in part, on which resources people need to spend or use in order to acquire a good or service. Specifically, if a policy requires people to spend or use a resource with higher perceived preference signaling, that policy should be regarded as fairer than a policy that requires people to spend or use a resource with lower perceived preference signaling. We test this prediction in study 3.

Method

We recruited 201 participants ($M_{age} = 33.54$; 103 females, 97 males, one undisclosed); 175 passed the attention checks. Participants read about 22 different real-world public policies or business practices that are responsible for allocating goods, services, or access to government programs (e.g., Uber surge pricing, Kickstarter campaigns, Broadway tickets; see the web appendix for stimuli). After reading about each policy, participants rated the fairness of each. We then asked participants to identify which resource people needed to spend or use in order to acquire the good or service (e.g., money, time, mental energy, physical energy, social support, or social influence). Participants were told to pick the resource that they thought actually affected allocation, even if it was an unintended consequence of the policy.

For example, in the scenario involving Apple products, participants saw the following information: "What is being allocated? New products released by Apple (e.g., iPhone, iPad). How is it being allocated? Customers preorder items online or visit an Apple store or Apple distributor on the release date." Participants then rated the fairness of the policy ("How fair does the above policy seem?") on a seven-point scale ("Not at all fair" = 1; "Very fair" = 7). Next, participants identified which resource people needed to spend or use, in order to acquire the items ("In your opinion, which resource primarily determines who gets new Apple products?") from among the six different resources ("New Apple products go to people who spend more

money," "New Apple products go to people who spend more time," etc.). For this question, participants could select only one option. Finally, participants selected all of the resources potentially involved in allocation ("Now, please identify all resources that, in your opinion, can contribute to determining who gets new Apple products"). Participants could select up to six resources. Every participant answered these three questions for each of the 22 policies, which were presented in random order.

Results and Discussion

We first analyzed the relationship between perceived fairness and preference signaling at the participant level. For each of the 22 different policies, participants identified the resource primarily responsible for determining allocation. We translated this into a preference signaling score by using the average preference signaling scores for each resource from studies 1 and 2 (we did not measure preference signaling in study 3). For example, for Apple products, if a participant selected "time," we assigned Apple products, for that particular participant, a preference signaling score of 5.35 (i.e., the average preference signaling score for time from studies 1 and 2). If a different participant selected "money," we assigned Apple products, for that particular participant, a preference signaling score of 4.70 (i.e., the average preference signaling score for money from studies 1 and 2). We did this for each policy considered by every participant.

We then fit a random-effects linear regression (to account for repeated measurement) with preference signaling as the independent variable and fairness as the dependent variable. As predicted (hypothesis 1), we observed a significant, positive relationship between preference signaling and fairness ($B = 1.01$, 95% CI = [.87, 1.34]; $z = 14.79$, $p < .001$). This result suggests that, on average, allocation policies seemed fairer if participants believed those allocations were based on resources that more clearly signaled preferences.

For each policy, participants also identified *all* resources that could potentially play a role in allocation (not just the resource primarily responsible for allocation). We could therefore also compute the implied preference signaling score for each policy based on the entire set of resources selected by each participant for each policy. For example, for Apple products, if a participant selected "money," "time," and "mental energy" as the resources involved in allocation, we averaged the three preference signaling scores associated with each resource (again, using the average preference signaling scores from studies 1 and 2). We did this for each policy considered by every participant.

We then fit a random-effects linear regression with preference signaling as the independent variable and fairness as the dependent variable. The above relationship still holds; we again observed a significant, positive relationship between preference signaling and fairness ($B = 1.58$, 95% CI = [1.36, 1.80]; $z = 14.29$, $p < .001$).

Finally, to make this relationship easier to visualize, we calculated the group-level correlation between the average implied preference signaling score and average fairness rating for each policy. For each policy, we analyzed the entire distribution of resources identified by all participants. For example, for Apple products, 126 participants (72.00%) selected "money" as the resource primarily responsible for determining who receives new Apple products, 37 participants (21.14%) selected "time," six participants (3.43%) selected "mental energy," two participants (1.14%) selected "physical energy," one participant (.57%) selected "social support," and three participants (1.71%) selected "social influence." Next, we calculated a blended preference signaling score for each policy (again, using the average preference signaling scores from studies 1 and 2), based on the percentage of participants that selected each resource. So, for Apple products, we calculated the weighted average by summing the product of each resource's choice share and its average preference signaling score from studies 1 and 2 (e.g., $72.00\% \times 4.70_{\text{money signal}} + 21.14\% \times 5.35_{\text{time signal}} + 3.43\%*5.27_{\text{mental energy signal}} + 1.14\% \times 5.44_{\text{physical energy signal}} + .57\% \times 4.84_{\text{social support signal}} + 1.71\% \times 4.64_{\text{social influence signal}} = 4.86_{\text{blended signal}}$).

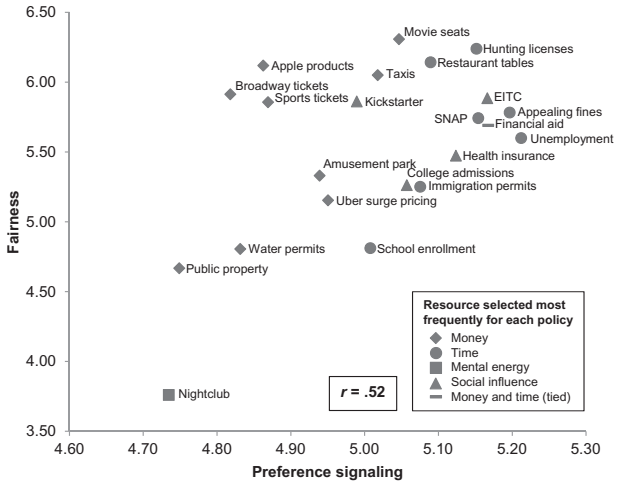
We next calculated the correlation between the blended preference signaling scores and average fairness ratings across the 22 different policies (i.e., using 22 pairs of observations in total). As predicted, we observed a significant, positive relationship (correlation coefficient: $r = .52$, $t(20) = 2.69$, $p = .014$; see figure 3).

These results suggest that policies seem fairer if they rely on resources that people believe more clearly signal preferences. Interestingly, many policies first require that applicants qualify for benefits (e.g., Earned Income Tax Credit, Supplemental Nutrition Assistance Program, school enrollment). And yet, even when these systems depend on other criteria, people seem to acknowledge that applicants who meet the criteria must nevertheless spend resources to obtain benefits (e.g., wait in line, fill out forms, pay fees). The fairness of these policies, therefore, still depends, in part, on which resources are perceived to play a role in allocation.

Moreover, participants did not rate preference signaling in study 3, thereby reducing the potential that demand characteristics or common-method bias artificially inflated the correlation between beliefs about preference signaling and perceptions of fairness. We used the average preference-signaling scores from studies 1 and 2 to compute these correlations. Critically, in each study, these preference-signaling scores were collected either before or in the absence of fairness ratings. In study 1 participants rated preference signaling before fairness and, in both the study 1 between-subjects follow-up and study 2,

FIGURE 3

STUDY 3: WHEN A POLICY IS PERCEIVED TO ALLOCATE BASED ON RESOURCES WITH CLEARER PREFERENCE SIGNALING, PEOPLE RATE THE POLICY AS FAIRER



participants did not rate fairness if they rated preference signaling. These preference-signaling ratings nevertheless predicted the perceived fairness of real-world policies in study 3.

These initial studies provide evidence for the notion that people believe resources vary according to how well they signal preferences and that these beliefs influence perceptions of fairness. But what affects beliefs about preference signaling? As noted in the introduction, we suggest that there are two factors that can influence these perceptions. First, resources that are perceived to be equally distributed will seem like clearer signals of preference because they make it easier to compare people (i.e., it is easier to infer that whoever spends the most actually has the strongest preference). Second, resources with high ease of mapping will seem like clearer signals of preference because they make it easier for consumers themselves to translate their preferences into an expenditure of the resource. In study 4, we directly measure these factors and demonstrate how they influence beliefs about preference signaling and, in turn, perceptions of fairness.

STUDY 4: EQUALITY AND EASE OF MAPPING AFFECT BELIEFS ABOUT PREFERENCE SIGNALING

Our framework suggests that perceived equality and ease of mapping jointly shape beliefs about preference signaling. It is worth noting that resources might be higher on one dimension than the other. For example, because the value of time is relatively ambiguous (Okada and Hoch 2004), it might be more difficult for people to translate preferences into willingness to spend time. This should decrease ease of mapping for time. However, because there is an upper limit on the amount of time available to each person in a day (i.e., 24 hours), time is likely to be perceived as more equally distributed. The value of money, on the other hand, might seem relatively unambiguous. People are used to translating preferences into monetary prices (although we note WTP is often malleable). This should increase ease of mapping. However, because there is no upper limit on the amount of money someone might have, money is likely to perceived as more unequally distributed (Norton and Ariely 2011).

We suggest that perceived equality and ease of mapping shape beliefs about preference signaling in a compensatory manner. So, for example, if perceived equality is relatively high, a resource might still seem to clearly signal preferences if ease of mapping is relatively low (and vice versa). To parsimoniously capture the joint effect of these factors on beliefs about preference signaling, we propose that a simple average of perceived equality and ease of mapping will together shape beliefs about preference signaling for a given resource. Other methods of combining these factors could also be tested (e.g., a weighted average or multiplicative combinations), but for simplicity we test a simple average. Therefore, in study 4 we measured the perceived equality and ease of mapping of six resources to compute a composite score for each. And we expected that this composite score would predict beliefs about preference signaling and perceptions of fairness.

Method

We recruited 202 participants ($M_{age} = 33.71$; 99 females, 103 males) and excluded none from the analyses. There were two parts to this study.

In part 1, participants rated the equality and ease of mapping of each of six resources (money, time, mental effort, physical effort, social support, and social influence). We counterbalanced the order in which participants rated equality and ease of mapping.

For equality, we asked participants to rate the equality of each resource. For example, the question for money read: "Do you think the amount of money that people have is equal (everyone has the same amount of money) or unequal (some people have a lot, some people have a little)?" We constructed similar questions for each resource. See the web appendix for stimuli. Participants responded on seven-point scales ("Very unequally distributed" = 1; "Very equally distributed" = 7), and the order of questions was randomized.

For ease of mapping, we first told participants: "People often have to think about how much something is worth to them. In other words, they think about how much of a resource they would be willing to spend for that thing."

We then asked participants to rate the ease of mapping of each resource. For example, the question for money read: "How easy is it for people to figure out how much money they would be willing to spend to get something?" We constructed similar questions for each resource. See the web appendix for stimuli. Participants responded on seven-point scales ("Very difficult" = 1; "Very easy" = 7), and the order of questions was randomized.

In part 2, which was presented after a filler task, participants rated preference signaling and fairness. Participants read a hypothetical scenario in which a restaurant had to allocate a limited number of tables to a large number of interested people (the same scenario described in study 2). They considered the same six policies as in study 2. For each policy, participants evaluated preference signaling of the resource ("Is the amount of [money/time/mental energy/physical energy/social support/social influence] that someone is willing to [spend/use] a clear signal of how much they want a table?") using a seven-point scale ("Not at all clear" = 1; "Very clear" = 7). They also evaluated the fairness of each policy ("How fair is this policy?") using a seven-point scale ("Not at all fair" = 1; "Very fair" = 7). Participants read about these policies sequentially, in random order, and we counterbalanced the order of the preference signaling and fairness questions across participants.

Results and Discussion

First, for each resource, we averaged the equality and ease of mapping ratings to form an equality and ease of mapping composite score (see table 1). We then fit a random-effects linear regression (to account for repeated measurement) with the equality and ease of mapping composite score as the independent variable and preference signaling as the dependent variable. As predicted (hypotheses 2 and 3), we observed a significant, positive effect of the composite score on preference signaling ($B = .41$, 95% CI = [.32, .50]; $z = 8.67$, $p < .001$). We next fit a random-effects linear regression with preference signaling as the independent variable and fairness as the dependent variable. As predicted (hypothesis 1), we observed a significant, positive effect of preference signaling on fairness ($B = .51$, 95% CI = [.45, .57]; $z = 17.18$, $p < .001$). We then fit a random-effects linear regression with the composite score as the independent variable and fairness as the dependent variable. As predicted (hypotheses 2 and 3), we observed a significant, positive effect of composite score on fairness ($B = .68$, 95% CI = [.58, .78]; $z = 13.07$, $p < .001$). When we included preference signaling in this regression, both predictors remained positive and statistically significant, but the effect of composite score was attenuated ($B_{\text{preference signaling}} = .44$, 95% CI = [.38, .49]; $z = 14.89$, $p < .001$; $B_{\text{composite score}} = .51$, 95% CI = [.41, .60]; $z = 10.28$, $p < .001$).

To that end, we conducted a mediation analysis to determine whether preference signaling mediated the effect of the composite score on fairness. We used the bootstrap procedure, with 20,000 resamples (Preacher, Rucker, and Hayes 2007). All subsequent studies employing a mediation analysis follow this procedure. Testing the full model, we found that preference signaling indeed significantly mediated the effect of the composite score on fairness (indirect effect = .112, SE = .02, bias-corrected 95% confidence interval = [.079, .147], consistent with partial mediation).

We also performed the above analysis separately with both perceived equality and ease of mapping. We observed a significant, positive effect of equality on both preference signaling ($B = .16$, 95% CI = [.10, .22]; $z = 5.07$, $p < .001$) and fairness ($B = .39$, 95% CI = [.32, .46]; $z = 11.14$, $p < .001$). We also observed a significant, positive effect of ease of mapping on both preference signaling ($B = .25$, 95% CI = [.18, .32]; $z = 6.98$, $p < .001$) and fairness ($B = .26$, 95% CI = [.18, .34]; $z = 6.33$, $p < .001$). Finally, we found that preference signaling mediated the effect of both equality on fairness (indirect effect = .067, SE = .02, bias-corrected 95% confidence interval = [.033, .104], consistent with partial mediation) and ease of mapping on fairness (indirect effect = .090, SE = .02, bias-corrected 95% confidence interval = [.060, .122], consistent with partial mediation).

These results offer evidence for each link in our framework (see figure 1). Equality and ease of mapping shape perceptions of preference signaling and, in turn, influence perceptions of fairness. However, establishing a causal effect requires direct manipulation of perceived equality and ease of mapping. We test this in studies 5A and 5B.

STUDY 5A: EQUALITY AND PREFERENCE SIGNALING

Suppose an observer sees the prices several consumers are willing to pay for an item. How can the observer know who most wants it? If the resource were perceived to be equally distributed, then it might be easier to infer that the person who bids the most probably has the strongest preference. But if the resource were perceived to be unequally distributed, it might be less clear. Those who bid the most might desire the item less than those who can afford to bid only a little. That is, whether a resource is perceived to be equally distributed might have a strong influence on whether people believe it can clearly signal preferences. Study 5A tests whether perceived equality in the distribution of a resource affects beliefs of preference signaling and, therefore, perceptions of fairness.

Method

We recruited 625 participants ($M_{\text{age}} = 36.70$; 394 females, 231 males); 568 passed the attention checks.

TABLE 1

MEAN (SD) OF EQUALITY AND EASE OF MAPPING RATINGS ACROSS RESOURCES

	Preference signaling inputs		
Resource	Perceived equality	Ease of mapping	Composite score
Money	1.74 (1.20)	5.29 (1.42)	3.51 (.83)
Time	3.66 (2.02)	5.04 (1.27)	4.35 (1.13)
Mental energy	3.19 (1.53)	4.43 (1.42)	3.81 (1.03)
Physical energy	2.92 (1.40)	4.86 (1.35)	3.89 (.94)
Social support	2.44 (1.36)	4.45 (1.42)	3.44 (1.04)
Social influence	2.24 (1.43)	4.03 (1.39)	3.14 (1.01)

Participants were randomly assigned to an equality condition (equal vs. unequal) and one of three scenarios. Each scenario described how a good or service would be auctioned off. The resource used for the auction was either distributed equally or unequally among bidders. Participants rated the preference signaling of the bids and the fairness of the auctions.

In the "employee housing" scenario, participants read about an American company that was temporarily relocating some employees to another country (see the web appendix for stimuli). The company was auctioning off corporate housing options to employees. In the equal condition, participants read: "Employees will earn the same salary in the new country. In other words, no employee will make more money than any other employee. Contracts cannot be negotiated, and there are no performance-based bonuses." In the unequal condition, participants read: "Employees will earn different salaries in the new country. In other words, some employees will make more money than other employees. Contracts cannot be negotiated, and there are no performance-based bonuses." Participants then evaluated, in counterbalanced order, the preference signaling of bids ("Are the bids submitted by employees a clear signal of how much they want or need the different housing options?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding who gets the different housing options?"; "Not at all fair" = 1; "Very fair" = 7).

In the "course registration" scenario, participants read that a local university used a point system to allow students to bid for courses. In the equal condition, participants read: "All students receive the same number of points in the first year, so no student starts off with more points than any other student." In the unequal condition, participants read: "Each student receives a different number of points in the first year, so some students start off with more points than other students." Participants then evaluated, in counterbalanced order, the preference signaling of bids ("Are the fall semester bids submitted by freshmen a clear signal of how much they want to take each course?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding which courses freshmen get to take in the fall semester?"; "Not at all fair" = 1; "Very fair" = 7).

Finally, in the "cruise" scenario, participants read that a cruise line used a point system to allow customers to bid for various activities with limited capacity. In the equal condition, participants read: "All passengers receive the same number of points at the outset of the cruise, so no customer starts off with more points than any other customer." In the unequal condition, participants read: "Each passenger receives a different number of points at the outset of the cruise, so some customers start off with more points than other customers." All participants subsequently read that the first event for the week was jet-skiing and evaluated, in counterbalanced order, the preference signaling of bids ("Are the bids submitted by customers a clear signal of how much they want to participate in the jet-skiing event?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding who gets to participate in the jet-skiing event?"; "Not at all fair" = 1; "Very fair" = 7).

Results and Discussion

For our analyses, we collapsed across all scenarios and tested how equality affected perceptions of preference signaling and fairness (hypothesis 2). Participants perceived preference signaling to be higher in the equal condition ($M = 5.31$, 95% CI = [5.12, 5.51]) than in the unequal condition ($M = 4.87$, 95% CI = [4.67, 5.07]; $t(566) = 3.14$, $p = .002$, $d = .26$). Participants also perceived the policy to be fairer in the equal condition ($M = 4.44$, 95% CI = [4.21, 4.66]) than in the unequal condition ($M = 2.85$, 95% CI = [2.65, 3.05]; $t(566) = 10.36$, $p < .001$, $d = .80$). These results held to varying degrees for each scenario. However, the effect of equality condition did not differ across scenarios for preference signaling ($F(2, 562) = .39$, $p = .684$) or fairness ($F(2, 562) = 2.15$, $p = .117$). See table A1 in the appendix for full details. Moreover, as predicted (hypothesis 2), preference signaling significantly mediated the effect of equality condition on perceptions of fairness (indirect effect = .189, SE = .06, bias-corrected 95% confidence interval = [.072, .320], consistent with partial mediation).

Here, preference signaling partially mediates the relationship between equality and perceived fairness. We acknowledge that other factors might also contribute to this relationship. One possibility is that because people exhibit inequity aversion (Bolton and Ockenfels 2000; Fehr and Schmidt 1999; Rabin 1998), they simply associate equality with fairness by default. For example, people might grant a company that pays all its employees equal wages the benefit of the doubt when assessing the fairness of a new housing policy, assuming that the same egalitarian motivation

underlies both. People may also regard as unfair the distribution itself, and this could create spillover effects for how people judge various policies.

We should also note that in order to isolate the effect of perceived equality on beliefs about preference signaling, we exogenously imposed equality (or inequality) on the distribution of resources in each scenario. In the real world, however, different endowments may arise due to differences in effort or merit (e.g., higher-paid workers may work longer hours or have more specialized skills). Or, resource levels could differ because people simply have different spending habits. We expect that those endogenous factors would attenuate these effects (perhaps because spending and work habits also signal people's preferences).

In summary, the results of study 5A suggest that people believe it is easier to determine who most desires something when the resource is equally distributed. This, in turn, may lead people to believe that equally distributed resources are a fairer basis for exchange. The next study tests whether perceptions of preference signaling also depend on whether people can easily map their preferences onto prices.

STUDY 5B: EASE OF MAPPING AND PREFERENCE SIGNALING

Consider a tourist shopping in a foreign country with an unfamiliar currency. This person would be unsure of what price best represents her preferences. That is, when a resource makes it difficult for people to map their preferences onto a price (i.e., decide how much of the resource to spend or use), that resource will seem worse at signaling preferences. In this study, we focus on three factors that can undermine ease of mapping (e.g., when consumers lack reference prices, cannot comprehend the rules for spending, or are unaware of opportunity costs). But we acknowledge that many other potential factors can also undermine ease of mapping. We predicted that a resource with high ease of mapping would seem like a stronger signal of preferences and, hence, would also be perceived as a fairer basis for allocation.

Method

We recruited 616 participants ($M_{age} = 33.92$; 309 females, 303 males, four undisclosed); 583 passed the attention checks. Participants were randomly assigned to an ease of mapping condition (high vs. low) and one of three scenarios. As in study 5A, each scenario described how a good or service would be auctioned off. Ease of mapping for the resource used in the auction was either high or low. Participants rated the preference signaling of the bids and the fairness of the auctions.

In the "employee housing" scenario, participants read about an American company that was temporarily relocating a number of employees to another country (see the web appendix for stimuli). The company was auctioning off corporate housing options to employees. Rental payments would be denominated in the foreign currency and due in six months. In the high ease of mapping condition, participants read: "The exchange rate between the dollar and the foreign currency is virtually fixed and very easy to predict." In the low ease of mapping condition, participants read: "The exchange rate between the dollar and the foreign currency is highly volatile and very difficult to predict." Participants then evaluated, in counterbalanced order, the preference signaling of bids ("Are the bids submitted by employees a clear signal of how much they want or need the different housing options?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding who gets the different housing options?"; "Not at all fair" = 1; "Very fair" = 7).

In the "course registration" scenario, participants read that a local university used a point system to allow students to bid for courses. The university held informational sessions to explain the basics of the system (e.g., how many points would be allocated, when points expire, how to acquire additional points). In the high ease of mapping condition, participants read: "The info session is held prior to the start of the fall semester, so freshmen are able to bid for their fall semester courses after learning all the ins and outs of the point system." In the low ease of mapping condition, participants read: "The info session is held after the start of the fall semester, so freshmen bid on their fall semester courses without knowing all the ins and outs of the point system." Participants then evaluated, in counterbalanced order, the preference signaling of bids ("Are the fall semester bids submitted by freshmen a clear signal of how much they want to take each course?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding which courses freshmen get to take in the fall semester?"; "Not at all fair" = 1; "Very fair" = 7).

Finally, in the "cruise" scenario, participants read that a cruise line used a point system to allow customers to bid for various activities with limited capacity. Cruise passengers submitted bids for each event, one at a time. In the high ease of mapping condition, participants read: "Passengers are told all of the events on the schedule for the whole week, so they can carefully plan out their bids for the events. They are also told the typical price, in points, for the events from previous cruises." In the low ease of mapping condition, participants read: "Passengers do not know the schedule of events for the whole week. Instead, events are simply announced and bids are taken as the events come up. And passengers are not told the typical price, in points, for the events from previous cruises." All participants subsequently read that the first event for the week was jet-skiing and evaluated, in counterbalanced

order, the preference signaling of bids ("Are the bids submitted by customers a clear signal of how much they want to participate in the jet-skiing event?"; "Not at all clear" = 1; "Very clear" = 7) and the fairness of the policy ("How fair is this method of deciding who gets to participate in the jet-skiing event?"; "Not at all fair" = 1; "Very fair" = 7).

Results and Discussion

For our analyses, we collapsed across all scenarios and tested how ease of mapping affected perceptions of preference signaling and fairness (hypothesis 3). Participants perceived preference signaling to be higher in the high ease of mapping condition ($M = 5.17$, 95% CI = [4.99, 5.34]) than in the low ease of mapping condition ($M = 4.24$, 95% CI = [4.02, 4.45]; $t(581) = 6.67$, $p < .001$, $d = .53$). Participants also perceived the policy to be fairer in the high ease of mapping condition ($M = 4.06$, 95% CI = [3.86, 4.26]) than in the low ease of mapping condition ($M = 3.00$, 95% CI = [2.81, 3.19]; $t(581) = 7.45$, $p < .001$, $d = .59$). The effect of ease of mapping condition differed across scenarios for preference signaling ($F(2, 577) = 8.47$, $p < .001$). The effect size was largest in the "course registration" scenario ($d = .88$), followed by the "cruise" scenario ($d = .47$) and the "employee housing" scenario ($d = .29$). The effect of ease of mapping condition also differed across scenarios for fairness ($F(2, 577) = 5.24$, $p < .001$). The effect size was largest in the "course registration" scenario ($d = 1.03$), followed by the "employee housing" scenario ($d = .51$) and the "cruise" scenario ($d = .25$). See table A2 in the appendix for full details. Moreover, as predicted (hypothesis 3), preference signaling significantly mediated the effect of ease of mapping condition on perceptions of fairness (indirect effect = .369, SE = .07, bias-corrected 95% confidence interval = [.247, .513], consistent with partial mediation).

As in the previous study, preference signaling partially mediates the relationship between ease of mapping and perceived fairness. It is possible that it simply seems unfair to ask people to make decisions with incomplete information, as in some of our manipulations above. Or when a company designs a policy that subjects employees to a volatile exchange rate, the policy might seem unfair because it shifts risk to employees. While beliefs about preference signaling played a reliable mediating role across scenarios, we acknowledge that they are likely not the only factor.

These results suggest that people believe resources are clearer signals of preference if they make it easy to map one's preferences onto the resource. As a result, people believe allocation policies are fairer when they are based on resources with high ease of mapping. Together, studies 5A and B demonstrate how perceived equality and ease of mapping jointly influence perceptions of preference signaling (and therefore perceptions of fairness).

GENERAL DISCUSSION

We can use a variety of resources and policies to determine who gets what (Roth 2015). For example, when a hotel increases prices during the holidays, it allocates rooms based on money. When a retailer offers promotions to customers with a lot of followers on social media, it allocates access based on social influence. When a health clinic requires people to wait in line, it allocates service based on time. There are often multiple kinds of prices for the same thing. Our theory suggests that some of these "prices" will seem fairer than others. And these fairness perceptions depend on beliefs about how well different resources signal preferences.

Theoretical Implications

In study 1, we found that the relationship between beliefs about preference signaling and perceptions of fairness held equally for wants and needs, but it is possible that our scenarios were so similar that they obscured any potential differences. An important question for future work is whether these patterns are qualitatively similar. Our framework assumes that people simply treat needs as stronger preferences than wants. To the extent that wants and needs differ, we might expect the relationship between perceptions of fairness and preference signaling to be slightly weaker for needs than for wants. If many people all *need* something, there is little variance in the strength of their preferences (i.e., they are all at ceiling). As a result, it would be difficult for people to meaningfully signal differences in preference strength.

This may be why people sometimes prefer lotteries to auctions when allocating items that people need (Kahneman, Knetsch, and Thaler 1986b). Lotteries do not allow people to signal their preferences. But if there is little variance in preferences, then there is no meaningful signal to detect because everyone has equal need. In that case, random allocation might seem fair. Indeed, our framework can potentially be extended to help explain *when* people will prefer different norms of distributive justice (Deutsch 1975). Namely, if there is little variance in preferences, people might believe that lotteries (i.e., an equal opportunity norm) are fairer. But if there is meaningful variance in preferences, then it could seem fairer to adopt a preference- or need-based allocation norm and to use some resource to allocate accordingly.

Moreover, in this work we define "resource" as any form of capital that can be used as a means to acquire something. This is an admittedly broad definition. Future research could explore how different features of these resources may interact with beliefs about preference signaling. For example, some resources can be depleted more quickly than others (e.g., physical energy might be more easily depleted than social influence). Perhaps people

believe that depletable resources more clearly signal preferences because consumers have to think more carefully about when and how to use them. Furthermore, many resources are inextricably linked. Spending mental energy or physical energy, for instance, inherently requires spending time. It could be possible to reframe certain policies as basing allocation on one resource or another, depending on which resource is believed to offer clearer preference signaling. Finally, some resources are actually transferred between the buyer and seller (e.g., money), while others are not (e.g., time). Nontransferrable resources might seem like a fairer basis for allocation because their primary purpose is not to increase a seller's profit, but rather to determine which buyer has the strongest preferences.

Marketing and Policy-Making Implications

Firms and policy makers are increasingly concerned with how to fairly allocate goods and services in the marketplace. To that end, this research offers a different perspective on how consumers perceive fairness. Prior work on price fairness has mainly focused on whether sellers seem to be taking advantage of buyers (Campbell 1999; Kahneman et al. 1986a; Maxwell 2002). But the current research suggests that fairness perceptions also depend on whether markets can reliably determine who wants or needs something the most. Consumers are concerned not just about whether markets allow sellers to profit unfairly, but also about whether they allow buyers to acquire things that they might want or need less than other people do. Thus, to the extent that firms and policy makers care about perceptions of fairness, these factors impose an important potential constraint.

Our framework further provides guidance for firms and policy makers aiming to design policies that are perceived as fairer. For example, some government programs require people to enroll during business hours. This might seem unfair because not everyone has the same amount of free time to enroll in the program (i.e., people who work two jobs will find it harder to enroll than retirees). This makes it difficult to know whether those who enroll need it the most (i.e., those with the strongest preferences) or simply have the most free time. An intervention that designs around inequality in free time may increase perceptions of fairness for such policies (see supplemental study 1 in the web appendix). Similarly, some business practices might be perceived as unfair when consumers are unable to evaluate certain prices. For example, dynamic pricing policies often meet resistance because consumers find it difficult to map their preferences onto a volatile price (e.g., Uber "surge pricing"). Ease of mapping is low in these cases. To that end, an intervention that helps customers better contextualize prices might increase perceptions of fairness (see supplemental study 2 in the web appendix).

Finally, this theory also highlights how markets can seem fair, even when they emerge in unconventional settings. Recent research highlights, for instance, how food banks can benefit from markets (Prendergast 2016). Feeding America is a large nonprofit that distributes donations to food banks across the US. Initially, it allocated donations on a first-come, first-served basis, with needier food banks given some priority. But this made efficient distribution difficult. More recently, Feeding America created an artificial currency that allows its food banks to bid on the items they want most. Now, each food bank is better able to acquire the goods it needs. At first glance, it may seem strange to submit food banks to market forces. And indeed, people are often reluctant to introduce market pricing into domains where it seems taboo (Fiske and Tetlock 1997; McGraw and Tetlock 2005). But our results suggest that at least some of this discomfort might be alleviated if the markets allow people to clearly signal their preferences and are able to reliably detect those differences in preferences. Our account can thus potentially inform market design more broadly.

CONCLUSION

This work highlights a way in which people are intuitive economists. That is, in many situations they desire distributive efficiency: they believe goods and services should go to those who have the strongest preferences. Our research suggests psychology plays a role in shaping intuitions about how to achieve this efficiency. In particular, people believe that some resources are better than others for signaling preferences. This means that they might regard some policies as unfair if they use certain resources. The resulting sense of unfairness, however, does not stem from some disagreement about basic economic principles. Rather, it stems from differing perceptions about how to *best achieve* those principles.

DATA COLLECTION INFORMATION

For all studies, the first author managed data collection on Amazon Mechanical Turk from fall 2015 to fall 2017. The first author analyzed the data under the supervision of the second author.

APPENDIX

TABLE A1

STUDY 5A: PREFERENCE SIGNALING MEDIATES THE EFFECT OF EQUALITY ON FAIRNESS PERCEPTIONS (RESULTS, BY SCENARIO)

	Preference signaling			Fairness			
	Equal	Unequal	Sig.	Equal	Unequal	Sig.	Mediation
Employee housing	5.19 [4.87, 5.51]	4.76 [4.45, 5.07]	†	4.41 [4.03, 4.79]	3.16 [2.82, 3.50]	***	.208 [.005, .459]
Course registration	4.94 [4.56, 5.31]	4.63 [4.27, 5.00]		4.16 [3.77, 4.54]	2.63 [2.28, 2.99]	***	.113 [–.070, .328]
Cruise	5.84 [5.56, 6.11]	5.23 [4.87, 5.59]	**	4.76 [4.35, 5.17]	2.74 [2.38, 3.10]	***	.275 [.086, .514]
Overall	**5.31 [5.12, 5.51]**	**4.87 [4.67, 5.07]**	**	**4.44 [4.21, 4.66]**	**2.85 [2.65, 3.05]**	***	**.189 [.072, .320]**

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

TABLE A2

STUDY 5B: PREFERENCE SIGNALING MEDIATES THE EFFECT OF EASE OF MAPPING ON FAIRNESS PERCEPTIONS (RESULTS, BY SCENARIO)

	Preference signaling			Fairness			
	High ease of mapping	Low ease of mapping	Sig.	High ease of mapping	Low ease of mapping	Sig.	Mediation
Employee housing	4.72 [4.37, 5.08]	4.21 [3.84, 4.58]	*	4.01 [3.63, 4.39]	3.11 [2.79, 3.43]	***	.197 [.009, .445]
Course registration	5.07 [4.78, 5.36]	3.54 [3.21, 3.88]	***	4.10 [3.77, 4.43]	2.29 [2.02, 2.55]	***	.540 [.307, .869]
Cruise	5.68 [5.44, 5.93]	4.94 [4.58, 5.30]	**	4.07 [3.71, 4.43]	3.61 [3.25, 3.97]	†	.276 [.111, .509]
Overall	**5.17 [4.99, 5.34]**	**4.24 [4.02, 4.45]**	***	**4.06 [3.86, 4.26]**	**3.00 [2.81, 3.19]**	***	**.369 [.247, .513]**

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

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