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Strategic incentives undermine gaze as a signal of prosocial motives

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People often have to judge the social motives of others, for example, to distinguish truly prosocial people from those merely trying to appear prosocial. Gaze can reveal the motives underlying social decisions, as decision-makers dedicate more attention to motive-relevant information. So far, eye-tracking has mainly been used as a passive tool for the researcher; in contrast, we also provide (real-time) eye-tracking information to the participants. We extend the use of eye-tracking and apply it as a communication device to study social signaling. We find that untrained observers can judge the prosociality of decision-makers from their eye-tracked gaze alone, but only if there are no strategic incentives to appear prosocial. When gaze is strategic because decision-makers have an incentive to appear prosocial, the cues of prosociality are invalidated, as both individualistic and prosocial decision-makers put effort into appearing more prosocial. Overall, we find that gaze carries information about a person's prosociality, but also that gaze is malleable and affected by strategic considerations.

JEL Codes: C91, C92, D82, D83, D87

Keywords: eye-tracking, signaling, social preferences, social cognition, type identification

1. Introduction

Many people value face-to-face communication and are willing to travel long distances to negotiate or close deals, e.g. He et al. (2017). Many teams even have mandatory or strongly encouraged in-person meetings on a regular basis (Beck et al. 2001). The rise of remote work might challenge these rituals and call for their reinvention (Economist 2020; Dingel and Neiman 2020). He et al. (2017) propose that one crucial function of face-to-face communication is type identification. In this study, we demonstrate that type identification (in terms of prosociality) is also possible remotely, using cheap and widely accessible technology – eye-tracking. However, similarly to in-person interactions, also eye-tracked signals become less informative if there are strategic incentives to mislead.

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In our study, we explore (i) whether untrained participants are able to use the gaze of others to reveal the others' prosociality, (ii) how this ability depends on the strategic incentives of the other person, and (iii) how easily malleable gaze actually is. We extend the use of eye-tracking from being a passive tool for decision-process analysis to an active component of the interaction. Since eyes present a natural means of communication, observing *non-strategic* gaze of an allocator (i.e. with no incentives to hide her true motives) should allow observers to reveal information about her true underlying motives. In contrast, it is unclear whether *strategic* gaze (i.e. with incentives for the allocator to hide her true motives) would still reveal the true underlying motives to observers. Our work builds on Hausfeld et at. (2020). In a similar setup they investigate whether box choices can be inferred from strategic and non-strategic gaze in hide and seek, coordination and discoordination games. Thus, in their experiments, people had to directly guess the action while in our experiment the task is to assess the underlying motive.[4]

Gaze is particularly suited for studying social preferences, as heterogeneity in the prosocial motive should be – and actually is – related to how much attention they devote to the others' outcomes (F. Chen and Krajbich 2018; Melamed et al. 2020; Fiedler et al. 2013).[5] In general, eye-tracking is an affordable and precise method for measuring information acquisition; see e.g. (Duchowski 2002; Orquin and Loose 2013; Fiedler and Glöckner 2015) for a survey of eye-tracking studies. It has been used to study how people interact in games by *ex post* inferring player types from recorded gaze (Wang et al. 2010; Polonio et al. 2015; Jiang et al. 2016; Amasino et al. 2019; Knoepfle et al. 2009). Gaze has also been shown to be predictive of choices (Shimojo et al. 2003; Krajbich et al. 2010) including online purchase decisions (Shi et al. (2013), although this relationship can be heterogeneous (Thomas et al. 2019), and externally manipulating gaze behavior can lead to changes in choices (Armel et al. 2008; Ghaffari and Fiedler 2018; Pärnamets et al. 2015). Studies providing eye-tracking information to participants show that problem-solving performance benefits from seeing the gaze of others who previously worked on the same task (Velichkovsky 1995; Litchfield and Ball 2011). In addition, bilateral real-time gaze transmission positively affects performance in visual search tasks (Brennan et al. 2008; Neider et al. 2010). However, gaze can be difficult to interpret if there are various motives for looking at a piece of information (Müller et al. 2013; Shenhav et al. 2018; Hausfeld et al. 2020; Foulsham and Lock 2015).

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[4] In addition, we expand the former results including the scope of possible tasks, exploring different variations of information visualization (dynamic or static) and introducing multiple information transmitters competing.

[5] We explore prosociality-based type identification as there is ample evidence that people are prosocial (Kahneman et al. 1986; McClintock 1972; Camerer and Fehr 2006; Fehr and Fischbacher 2002) and that there is heterogeneity in prosociality (Murphy et al. 2011; Hein et al. 2016).

Eye-tracking presents a largely unexplored tool for exploring the positive impact of communication on cooperation rates. He et al. (2017) demonstrate that this impact (referred to as communication gap) is not only due to social identification or commitment, but also type identification. Other studies have shown that such identification is not confined to face-to-face interactions, as there are also informative cues in written messages (e.g. Charness and Dufwenberg 2006; J. Chen and Houser 2017) and other types of communication media (e.g. Brosig et al. 2003). We could thus plausibly expect that also eye-tracked gaze includes cues for identifying more prosocial or less prosocial types.

We show that type identification is possible in the absence of strategic incentives. However, strategic incentives affect people's gazing behavior, invalidating gaze as a signal of prosociality. This is in the tradition of the signaling literature in economics and psychology, which tackles the topic of credibly conveying some information about oneself to another party. Classic applications examine signals of ability that the agent sends to the principal in a labor market context (Spence 1974; Crawford and Sobel 1982) and signaling in evolutionary biology extends this concept to biological markets with communication between and within species (Noë and Hammerstein 1994; Barclay 2013; Hammerstein and Noë 2016). Numerous experiments have studied partner choice in situations of asymmetric information in different games (Brown et al. 2004; Holm and Engseld 2005; Barclay and Willer 2007; Coricelli et al. 2004; Sylwester and Roberts 2010; Eckel and Wilson 2004; Bornhorst et al. 2010). These studies tend to investigate the effects of either individual differences or *ex ante* cooperative behavior, but they do not consider signals that go beyond discrete messages—such as the allocators' continuous information search process. We advance the signaling literature by applying eye-tracking interactively instead of passively, such that gaze becomes a signaling device and, thus, part of the strategic consideration of the allocator: She not only needs to find the relevant information but also needs to plan what to signal to the receiving observer who has to interpret this gaze. It is an empirical question whether deceiving the observer is possible or whether the gaze pattern conveys truthful information even if this is not in the sender's interest.

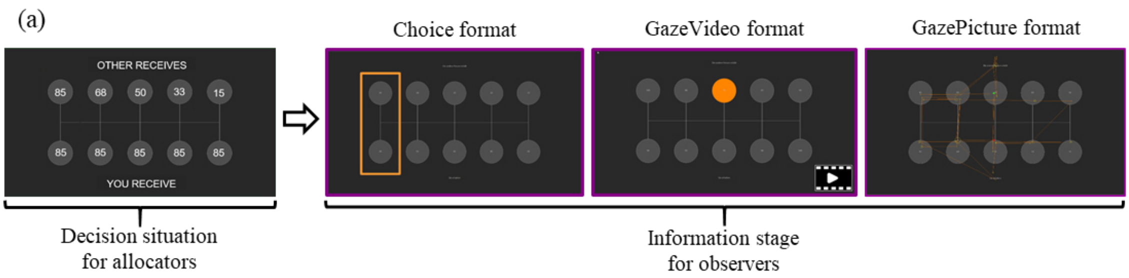
In our laboratory study, allocators make a variety of allocation decisions in slider-type Social Value Orientation (SVO) situations that are commonly used to measure social preferences (Murphy et al. 2011). In these situations, the allocators choose one of five allocation options with varying payoffs for oneself and another person. While allocators make their decision, both their choice and gaze are recorded. We then show either the eye-tracked gaze during the allocation decision (in GazeVideo or GazePicture format) or the actual chosen allocation (in Choice format) of the allocators to the observers, as depicted in Fig. 1A. The observers subsequently attempt to assess how prosocial the eye-tracked participants are based upon this information. Specifically, the observers have to (i) predict the allocators' action in another decision and (ii) guess which one of two allocators is more prosocial. In our experiments, there are two types of situations for the allocators: In the *strategic* situations, the allocators have an incentive to appear prosocial because the seemingly more prosocial types are selected for a further profitable interaction. In the *non-strategic* situations, the decision is irrelevant for future interactions.

First, we confirm the finding that gaze in non-strategic situations carries information (Fiedler et al. 2013). We show that gaze has significant out-of-sample predictive power for the allocators' prosociality. Second, we demonstrate that untrained observers do intuitively understand that gaze presents a valuable source of information in non-strategic situations. Observers are able to distinguish the more prosocial allocators from selfish allocators more often than not and choose them as partners for a further interaction. Third, these results do not hold in strategic situations. We find that gaze becomes less informative when allocators have strategic incentives to signal prosocial social motives. In these strategic situations, the eye-tracked allocators understand how to gaze strategically and simulate a higher level of prosociality, in order to shift the partner choice in their favor. As a result, the less prosocial subjects are chosen more often for future interaction in the strategic settings than in the non-strategic settings. We conclude that people are skillful users of eye-tracking, both as signal receivers and as signal senders of social preferences.

2. Methods

2.1. Treatments

There are two types of participants in our study: "allocators" and "observers". The allocators make allocation decisions between them and a recipient using slider-type Social Value Orientation situations (Murphy et al. 2011). The observers observe either the choice or the gaze of allocators and have to assess how prosocial they are. We use three different ways to display the allocator's action or gaze: In *Choice* information, a rectangle highlights the chosen action of the allocator. In *GazeVideo* information, whenever a piece of information is being looked at, called area of interest (AOI), the respective looked at information lights up in an orange color for as long as it is being inspected. In *GazePicture* information, a scanpath connects the inspected AOIs in the sequence they are looked at, starting from the first (green) and ending with the last (red). The information in all formats is shown for the length of time the allocator took to make the decision (see Appendix for more details on information formats).



(b)

	Participants		Allocator Incentives		Info Display			Observer Task (# obs. × # assessments)	
Treatment	Allocators	Observers	Strategic	Non-strategic	Choice	GazeVideo	GazePicture	Predictions	Partner choice
Baseline	46			✓					
Infopilot		56		✓	✓	✓	✓	12×3	
Partnerpilot		54		✓	✓	✓		12×3	12×3
Interactive	48	48	✓	✓	✓	✓		4×1	4×1
Recorded		94		✓	✓	✓		4×1	4×1

Fig. 1 Summary of the experiment design. (A) The decision screen for the allocators and three information formats for the observers. We use the preferred gaze information format (GazeVideo) from the *Infopilot* in the later treatments. In Choice information, a rectangle highlights the allocator's chosen action. In GazeVideo information, whenever an option is being looked at, the respective area of interest (AOI) lights up for as long as it is being inspected. In GazePicture information, a scanpath connects the inspected AOIs in the sequence they are looked at, starting from the first (green) and ending with the last (red). The information in all formats is shown for the length of time the allocator took to make the decision. **(B)** The five treatments. Observers, generally, go through an information stage (learning about the allocators' gaze or choices via Info Display) and then do different assessment tasks (predicting the allocators' further choices and/or making partner choice for future interaction between two shown allocators). Note that only the observers in *Interactive* interacted with allocators from the same session. In all other sessions, we used the pre-recorded (non-strategic) allocator gaze and choices (dashed arrow). The allocators' first decision in each period of the *Interactive* treatment is strategic (transmitted to the observers who then make a partner choice), while a second decision is non-strategic (not transmitted) but is payoff-relevant as often as the respective allocator is chosen by observers (dotted arrow).

The study consists of five treatments outlined in Fig. 1B: *Baseline*, *Infopilot*, *Partnerpilot*, *Interactive* and *Recorded.*[6] In the *Baseline*, eye-tracked allocators make allocation decisions that affect them and a recipient (every participant in every session made these decisions as well, but only allocators were eye-tracked). The decisions and gaze of the *Baseline* allocators are then re-used in two different treatments, *Infopilot* and *Partnerpilot*. Here, we show the non-strategic gaze and choices to new observers and investigate whether and how gaze reveals motives to others. These treatments focus on our methodological contributions, test different displays of gaze, and attempt to establish a standard for using eye-tracking interactively.

In the *Interactive* treatment, we introduce strategic incentives for allocators and transmit their gaze or choice to observers who then have to assess the prosociality of the allocators and to

[6] See Appendix for more details on the treatments, matching of the participants and randomization.

select with whom of two allocators they want to engage in a future interaction. In this interaction, the observers are the recipients of the allocators, which creates a direct benefit to select the more prosocial allocator. We compare this strategic setting to a control with non-strategic situations in a within subject design. Namely, we present the choice or gaze of the allocators in non-strategic situations in the *Interactive* treatment to new observers in the *Recorded* treatment. These two treatments allow us to establish the impact of strategic incentives on the allocators' intuitive understanding of how to use gaze and choices as well as the observers' comprehension of this information.

2.2. Hypotheses and measures

We analyze the allocators' attention using different process measures (Fiedler et al. 2013). In line with this evidence, we expect that non-strategic gaze carries information about the prosociality of a person (using the *Baseline* treatment). More specifically, we hypothesize that with increasing SVO angle (i.e. more prosociality), allocators (i) spend more time on the decision (logarithmized decision time), (ii) inspect more information (number of areas of interest, or AOIs, with information about the payoffs inspected at least once), (iii) allocate more attention to the recipient's payoff (share of time on other's payoffs in percent), and (iv) make more comparisons that include the recipient's payoffs (transition index from -1 to +1, with lower values for more transitions including only own payoffs).[7] However, if allocators are able to control their gaze, then the information content of gaze should vanish as soon as gaze stems from a strategic situation (i.e. *Interactive* treatment). Here, the incentives to appear more prosocial should make all allocators alter their gaze to mimic more prosociality, thus engaging in economically costless signaling. Accordingly, if the choice is transmitted, allocators should allocate more points to the observer in the strategic situation than in the non-strategic situation, thus engaging in costly signaling. For the observers, we expect that they are also able to identify types and choose the more prosocial allocator in non-strategic situations (using *Partnerpilot*

[7] The transition index (TI) uses the variables $trans_{other}$ and $trans_{self}$. They are defined as follows: $trans_{other}$ indicates the number of transitions between AOIs, for which at least one AOI contains payoff information of the recipient and $trans_{self}$ indicates the number of transitions solely between own payoff information. We normalize the transitions based on the fact that there are more possible transitions including $trans_{other}$ than $trans_{self}$ by using k_{self} = 20 and k_{other} = 20 + 10 = 30 to indicate the number of *possible* (non-diagonal) transactions involving solely own or also other payoffs, respectively (Fiedler et al. 2013). The transition index is then defined as

$$TI = \frac{\frac{trans_{other}}{k_{other}} - \frac{trans_{self}}{k_{self}}}{\frac{trans_{other}}{k_{other}} + \frac{trans_{self}}{k_{self}}}$$

Values above zero indicate that the allocator prefers comparisons involving the payoffs of the observer, whereas values below zero indicate a preference of transitions only involving own payoffs.

treatment), but to a lesser extent than the objective measures, since participants have never been confronted with such a task and gaze sometimes shifts very quickly. This ability to recognize types should disappear when gaze (and choice) stems from strategic situations (comparing *Interactive* and *Recorded*).

2.3. Procedures

We recorded the gaze using Tobii EyeX eye-trackers (60Hz frequency, with 1920×1080-pixel resolution 22"monitors and chinrests at 58cm distance).[8] We connected them to z-Tree (Fischbacher 2007) such that (real-time) gaze data could be displayed and integrated in the interaction. We used ORSEE (Greiner 2015) and hroot (Bock et al. 2014) for recruiting student participants at the Lakelab in Konstanz, Germany. 346 participants took part in the whole study, of which 94 were eye-tracked allocators: *Baseline* (only allocators: n=46, age 21.3, 56.3% female, 50% prosocial);[9] *Infopilot* (only observers: n=56, age 21.3, 50% female, 62.5% prosocial); *Partnerpilot* (only observers; n=54, age 21.9, 59.3% female, 66.7% prosocial), *Recorded* (only observers: n=94, age 22.4, 56.4% female, 58.3% prosocial). In the *Interactive*, both allocators and observers participated (n=2×48, age 21.5, 54.2% female, 60% prosocial). In terms of the SVO orientation, there were no altruistic or competitive types in either of the sessions. The legends of the Figures and Tables specify the used statistical tests, while Fig. 1B shows the number of subjects for the tests.

3. Results

3.1. Allocator gaze and prosociality in non-strategic situations

We first describe how the four process measures relate to the allocators' SVO angles in non-strategic situations from *Baseline* treatment (see Appendix Figs. 9 and 10 and Table 3). We find that the more prosocial allocators spend significantly more time making decisions and inspect significantly more information. They also spend more time inspecting the recipients' payoffs and have a higher transition index thereby confirming former results (Fiedler et al. 2013): The differences in the SVO angles are reflected in the information search patterns in social decision making. Furthermore, we use the leave-one-out cross-validation method to predict allocators' SVO angles from their gaze (see Appendix for further details). Using all

[8] Gibaldi et al. (2017) test the Tobii EyeX and find the accuracy to be between 0.5° and 1° while the precision is at 0.25°. The points were written in font size 18 with a horizontal distance of 280 pixels between options, and the options were 320 pixels distance from the top and bottom end of the screen. This yields a sufficient distance between AOIs (Orquin et al. 2016).

[9] Two of the initial 48 participants needed to be excluded due to technical and comprehension problems.

choices from all but one participant, we estimate the SVO angle of the left-out subject(s) for any given decision. Our best model that uses all four measures together indicates a medium-to-strong positive correlation between the actual and predicted SVO angles (Pearson's ρ=0.6, $p<0.001$). The four other models that use each of the four process measures separately indicate a weak-to-moderate Pearson's ρ of 0.49, 0.32, 0.21 and 0.43 (all $p<0.001$), respectively, for the decision time, the share of inspected information, the attention to other's payoffs and the transition index.

3.2. Allocator behavior and gaze in strategic and non-strategic situations

Figure 2 shows the actual choices (Fig. 2A) and the four process measures (Fig. 2B) from allocators in the *Interactive* sessions, separated by strategic and non-strategic situations (within-subject comparison) and prosociality type (between-subjects comparison). We first investigate whether the allocators engage in costly signaling by comparing the points allocated to the observers depending on the strategic environment and the transmitted information (Fig. 2A). We find support for strategic choices as allocators choose particularly equal allocations between themselves and the observers when Choice information is transmitted, while the allocations are comparatively more individualistic when GazeVideo information is transmitted. The allocations are most individualistic when no information is transmitted (i.e. in the non-strategic situations). Especially the individualistic allocators have an incentive to appear prosocial when Choice is transmitted, since this increases their chances to participate in a second profitable interaction. Indeed, distinguishing the allocators' types yields that the prosocial allocators do not change their behavior as much in response to the strategic incentives or information formats as the individualistic allocators do.

Interestingly, allocators do not only adapt their allocation choices, but also their gaze (Fig. 2B). First, we observe mimicry behavior or "peacock" effects in strategic compared to non-strategic situations. Namely, both the prosocial and the individualistic allocators attempt to appear more prosocial (in terms of the four measures) in the strategic situations. In fact, the two types are hard to tell apart in the strategic situations (Mann-Whitney-Wilcoxon rank sum tests all yield $p>0.07$, with six comparisons $p>0.5$), while this difference is statistically significant in some of the non-strategic situations and in all *Recorded* situations.

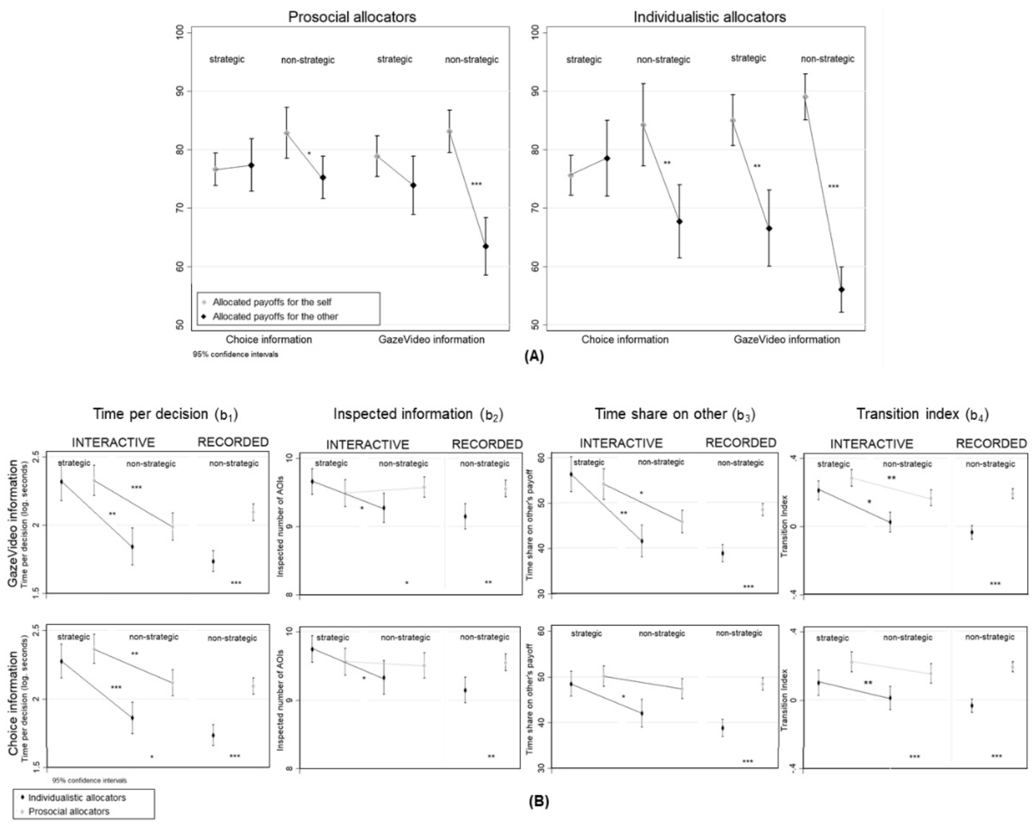


Fig. 2 Summary of the allocator's strategic and non-strategic processing and behavior. (A) Chosen Allocations. Allocated payoffs (allocator light, recipient dark) in the *Interactive* decisions by prosocial allocators (left) and individualistic allocators (right), separately by whether the decision was strategic or non-strategic (with the same situations in Choice or GazeVideo format). (B) The four process measures separated into prosocial (light) and individualistic (dark) allocators at the 22.45° SVO angle. The decisions used in *Recorded* are depicted on the right side of the sub-figures, the decisions used in *Interactive* are depicted on the middle and left side of the sub-figures. Note that these decisions stem from the same allocators. The decisions are separated by whether the decisions were strategic or non-strategic and whether GazeVideo (top) or Choice (bottom) was transmitted to the observers. The significance levels correspond to Wilcoxon signed rank tests (within-subject differences between strategic and non-strategic decisions) and Mann-Whitney-Wilcoxon rank sum tests (differences between individualistic and prosocial participants); ***p<0.001, **p<0.01, *p<0.05. For ease of comparison, the *Recorded* gaze is depicted twice for each of the four measures, even though they are the same. All error bars represent 95% confidence intervals.

We now focus on the within-subject comparisons of how subjects adapt their processing in the strategic compared to the non-strategic situation. The individualistic allocators have more "prosocial-like" process patterns in all of the eight sub-figures of Fig. 2B, while the prosocial allocators exert more "prosocial-like" process patterns in four of the sub-figures of Fig. 2B. This difference in the adaptation to the strategic situation between the prosocial and individualistic types stems from two effects. First, there is a ceiling effect for the prosocial types for some measures, e.g. the number of inspected information. This is different for the individualistic types who increase the number of inspected information in the strategic situations (both Wilcoxon signed rank tests p<0.04). Second, in order to mimic a prosocial allocator, it would be sufficient if only the individualistic types adapt their behavior. As Fig. 2B shows, the individualistic types adjust their behavior to the strategic situation with respect to all four measures and independent of whether GazeVideo or Choice is transmitted. They adapt gazing if Choice is transmitted because they have to take into account the same criteria as the prosocial types. They adapt gazing if GazeVideo is transmitted because the gaze serves as a signal for prosociality.

Actually, also the prosocial types change their processing if this increases their prosocial appearance. They adjust their behavior only with respect to response time if Choice is transmitted, consistent with the idea that they do not have to refocus their attention. However, if GazeVideo is transmitted, also the prosocial types adjust their gazing behavior and attach even more attention to the item relevant for prosocial behavior. The only exception is the inspected information where there is a ceiling effect. Finally, across all sub-figures, both prosocial and individualistic allocators have similar process measures in the non-strategic decisions in the *Interactive* treatment and in the non-strategic decisions in the *Recorded* treatment.[10] Thus, we find that the allocators' non-strategic gaze yields information about their underlying prosociality, while strategic incentives changes their gaze and behavior. We now examine whether observers can identify types based upon either non-strategic or strategic gaze.

3.3. Observer behavior: Predicting allocators' future actions

The observers' first task was to predict the allocators' future actions. Throughout the following section, we consider two measures for prediction correctness, in line with our applied two-step incentive procedure (see Appendix for more details on the Assessment stage for observers). As depicted in Table 1, we examine (i) side predictions (i.e. correctly guessing whether the allocator was rather more prosocial or more individualistic than average) and (ii) option predictions (i.e. correctly guessing the allocator's exact chosen option). We chose this two-step procedure, because we expected that observers might be able to predict who is more or less prosocial than average, but not necessarily the exact correct option (see Appendix Figs. 5-7 for decision screens). Indeed, we find that the observers successfully use gaze information to predict the direction of the choice but are less successful in predicting the correct choice. Since not all options are chosen with equal probability, the chance to make the correct prediction is

[10] In addition to the gaze and behavioral data, the allocators' statements in the post-experiment question ("Did you have a particular strategy for gazing when your gaze was transmitted?") further support that allocators adapted their gaze in the strategic situation (23 of 48), for example, "Yes, I focused my gaze on the best option for the observer", "I sometimes tried to mislead using my gaze", or "Yes, I looked at a positive option for the partner and took the best option for myself afterwards".

higher than the naïve chance level of 50% for the direction and 20% for the option. We focus on the empirical chance level as a benchmark and report it in the table.

Table 1 Summary of prediction correctness in all experiments

Treatment	N	Periods	Side predictions				Option predictions			
			Empirical chance	Choice	Gaze-Video	Gaze-Picture	*Empirical chance*	Choice	Gaze-Video	Gaze-Picture
Infopilot	56	12×3	*57.7%*	70.9%***	65.3%***	66.0%***	*55.4%*	59.5%**	53.0%	53.5%
Partnerpilot	54	12×3	*56.0%*	65.4%***	61.0%**	-	*47.0%*	53.0%**	48.8%	-
Recorded	94	4	*62.5%*	62.5%	59.4%	-	*42.0%*	48.0%*	45.1%	-
Interactive	48	4	*55.6%*	57.3%	57.3%	-	*47.2%*	44.5%	43.8%	-

"N" indicates the total number of observers, "Periods" indicate the number of periods per information type (three information types in the *Infopilot* treatment, two information types in all other sessions). The naïve chance levels are at 0.20 for option predictions or 0.50 for side predictions. The median empirical chance levels are higher in accordance to $\sum p_i^2$, where p denotes the empirical option or side probabilities for each situation, respectively. Note that the empirical chance levels differ for *Infopilot* and *Partnerpilot*, because different randomly drawn decision situations were used. All significance levels for the differences (both from the empirical chance levels in *Infopilot* and *Partnerpilot* prediction correctness, and between *Recorded* and *Interactive* prediction correctness) refer to regressions testing the average correctness per person minus the empirical chances; ***p<0.001, **p<0.01, *p<0.05.

In the *Infopilot,* all three information formats—Choice, GazePicture and GazeVideo—consistently lead to significantly better prediction correctness of the side prediction than the empirical chance level. Among the three formats, Choice information outperforms GazePicture and GazeVideo information, considering all observers and all situations together, although the option prediction was never significantly better than the empirical chance level. In the *Partnerpilot*, we observe similar trends in the prediction correctness as in the *Infopilot*—again the side predictions are better than chance, but the option predictions were not particularly successful. The possibility to compare two allocators in the same situation (*Partnerpilot* compared to *Infopilot*) does not improve the prediction correctness of the observers. In the *Recorded* treatment, only Choice significantly helped to predict the option.[11] Even though the predictions were better in the *Recorded* treatment than in the *Interactive* treatment, this difference is not significant. Nevertheless, the next section shows that observers were able to choose the more prosocial of two allocators.

[11] The split into the two sides is based upon the *Baseline* data, which was also the basis for payment. If we use the split that results from the behavior in the actual prediction task, we find significantly better side predictions than by chance (55.6%) in *Recording,* p=0.002 for Choice and p=0.022 for GazeVideo.

3.4. Observer behavior: Choosing the more prosocial allocator for future interaction

Observers had to choose one of two observed allocators for further interaction. Throughout this section, we define partner choice correctness in terms of choosing the prosocial allocator when one allocator is prosocial and the other is individualistic (using the difference in the degree of prosociality leads to similar results; see Appendix Fig. 11 for results with alternative definitions of partner choice correctness). Figure 3 shows the frequency of choosing partner 2 depending on whether only partner 1 was prosocial, both partners were of the same type, or only partner 2 was prosocial.

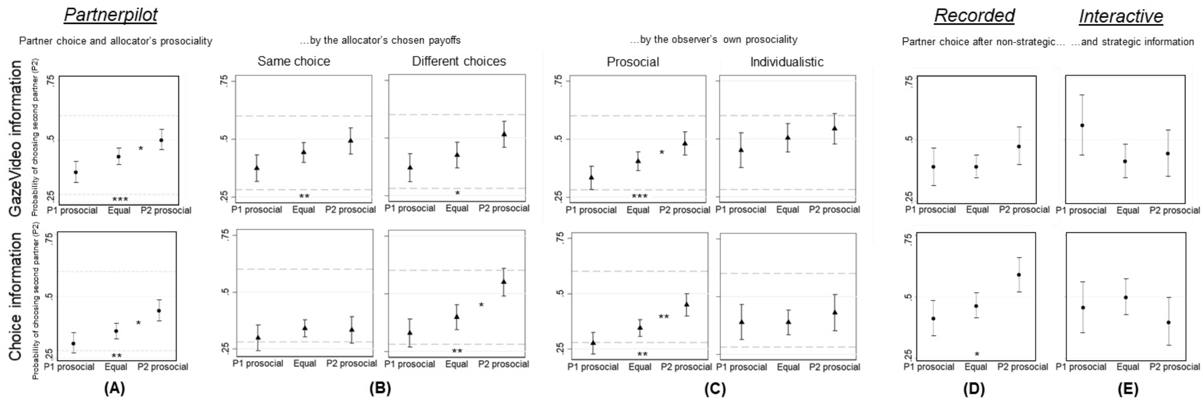


Fig. 3 Summary of the observer's partner choice results and allocators' prosociality. (A) The partner choice correctness in non-strategic situations in the *Partnerpilot*, with (B) separating these situations in which the actual choices of the allocators were the same or not the same, (C) separating partner choices made by prosocial and individualistic observers, and (D) contrasting the non-strategic *Recorded* with (E) the strategic *Interactive* situations. In all graphs, "Partner choice" is the probability of picking the second partner (on the y-axes), and "correct" partner choice predicts higher probabilities when only partner 2 is prosocial (right side on the x-axes) than when only partner 1 is more prosocial (left side on the x-axes). Here, the stars under "equal" yields comparison. All error bars represent 95% confidence intervals. Note that the sub-figures include dashed lines with the partner choice of our best-performing leave-one-out cross-validation model for predicting allocators' choices from their gaze. All significance levels refer to coefficients of the respective comparison dummies from probit regressions; ***p<0.001, **p<0.01, *p<0.05.

First, we find a strong bias in favor of partner 1, but we will focus on whether the observers were able to interpret the available data. In *Partnerpilot*, we find that observers are able to correctly interpret non-strategic gaze and choose the correct partners in both GazeVideo (top sub-figure) and Choice (bottom sub-figure) as depicted in Fig. 3A. Further, observers perform only moderately worse than the benchmark set by our best-performing model of out-of-sample predictions (dashed lines in the figure as described in Appendix). Importantly, only GazeVideo information allows to successfully choose the prosocial partner even if the two partners made the same choice in the Information stage. This is shown in Fig. 3B where the partner decisions are separated by whether the two matched allocators made the same (left sub-figures, 57% of decisions) or a different choice (right sub-figures). Furthermore, if we separate partner choice decisions by the observers' prosociality (Fig. 3C left sub-figures compared to right sub-figures), we find that the ability to judge the allocator's prosociality is mainly driven by the prosocial observers.

We now examine the effects of the introduced strategic incentives. The observers in the non-strategic *Recorded* treatment (Fig. 3D) pick the more prosocial allocators, while the observers in strategic *Interactive* treatment (Fig. 3E) are unable to pick the correct partner. Second, we find that partner choices are more often correct in the non-strategic *Recorded* situations than in the strategic *Interactive* situations. In particular, the observers make the optimal partner choice less often in the strategic *Interactive* treatment than the non-strategic *Recorded* treatment (57.3% compared to 48.4% correct choices in terms of prosociality). This difference translates into an average payoff decrease of 7.9 points or 10.6% per decision for the observers (rank sum test, $p<0.001$) and an average payoff increase of 9.4 points or 12.4% per decision for the allocators ($p<0.001$, excluding the payoff multipliers). That is, if the allocators have incentives to gaze or choose strategically, the observers are less able to choose the correct partner for future interaction.

4. Discussion

We use interactive eye-tracking to examine type identification and gaze behavior in non-strategic compared to strategic settings. In the non-strategic settings, allocators convey their type truthfully, albeit noisily. Using benchmark models for out-of-sample predictions of social value orientation, we establish that gaze can help to predict levels of prosociality. Further, we find that laypeople-observers are capable of such type recognition in non-strategic settings. That is, the observers can use the allocators' gaze to identify the more prosocial and generous allocators, even if their actual choices are unknown, and this ability has material consequences for future interactions. Non-strategic gaze is revealing even in situations in which the underlying choices of the allocators are the same. Although this might seem trivial at first, note that the Choice information format includes the choice and the decision times. It is thus purely the gaze that helps the observers to identify the more generous allocators.

The ability to recognize types vanishes when strategic incentives come into play. In the strategic settings, the allocators are able to strategically manipulate their gaze and choices, as to appear more generous and shift the observer's partner choice in their favor. The allocators also react to what type of information is being transmitted to the observers by splitting the payoffs relatively equally when choice is transmitted but allocating significantly more to oneself in equivalent situations when gaze is transmitted. Likewise, the allocators alter their gaze by shifting more of their attention to the observers' payoff when gaze is transmitted than when choice is transmitted. The allocators' strategic adaption of gaze and choices leads to consistently less optimal behavior by the observers in the strategic settings than in the non-strategic settings, which results in significantly worse payoffs for the observers.

A key feature of our experiment is that subjects see another person's focus of attention either in real-time or in a recording. However, the scope of applicability of our results is not straightforward. This situation environment is likely to become more important given the increased prevalence of remote work, which is accompanied by more information tracking or surveillance (CNBC 2020). But these situations are likely to only add, and not replace, to situations where people meet face-to-face and have to anticipate the other person's actions following in-person interactions.

In addition, since this study is, together with Hausfeld et al. (2020), one of the first studies featuring real-time transmission of gaze with known incentives, all participants were unfamiliar with the used technology, which makes it more surprising that it worked. The prediction quality might strongly increase in an environment in which people get feedback about their prediction quality, as the higher accuracy in the *Infopilot* might suggest. It remains an open question whether more practice would help observers to identify strategic or sincere prosociality in the *Interactive* treatment.

In general, our findings reveal that it is an easier task to identify which allocator is more prosocial than to predict which option an allocator chose. Especially the prosocial observers tend to choose the more prosocial allocators more often. This could be due to the prosocial participants identifying their own types better, although this reasoning should then also hold for individualistic participants who should avoid choosing their own type. These results present a potential direction for future research, namely examining the heterogeneity (De Haas et al. 2019) in how different types learn from others' motives and actions.

On a more abstract level, our experiment has shown that people are able to derive other people's motives from their attention that is revealed in the gaze—as long as people do not have an incentive to conceal their motive. We have shown that this works in the context of social preferences, where heterogeneity in the strength of a motive naturally occurs. It remains open whether this result applies to other applications like product choice, time preferences or risk preferences. Interactive eye-tracking is quite a new research field for studying type identification, e.g. in job-market settings, and this study in combination with Hausfeld et al. (2020) opens further directions that can be pursued, including what types of information can be conveyed using interactive eye-tracking and the recognition of the conveyed information's quality or truthfulness.

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Appendix

Decision situations for allocators. The decision situations are slider-type Social Value Orientation (SVO) allocation decisions with five possible allocation options adjusted from (Murphy et al. 2011), as depicted in Fig. 1A. The SVO situations were originally designed to measure the magnitude of concern that allocators have for others. For the purpose of eye-tracking processing, we reduce the number of available options within each SVO allocation decision to five and standardize the displayed values from 0 to 100. All sessions included a first part in which participants had to make 26 different allocation decisions (13 situations plus the same 13 situations jittered). These decisions were incentivized via one randomly chosen paid-out allocation (random dictator procedure, i.e. random pairs were formed and in each pair one of the participants was randomly selected as the dictator and the other as the recipient). These decisions were *non-strategic* because they had no impact on future earnings. In the *Baseline* and *Interactive* treatments, both gaze and choices from this part were recorded and transmitted to subsequent sessions as information (*Baseline* to *Infopilot* and *Partnerpilot*, *Interactive* to *Recorded*). Note that we only transmitted the information of 12 (plus 12 jittered) situations: We dropped the competitive item of the primary items due to non-existing heterogeneity (see Fig. 4 for all used situations). Importantly, in the *Interactive* treatment, there were nine periods, and in each period, the allocators had to take decisions that stem from the same set of SVO decisions. In each period, two observers could choose with whom to interact, based on the information from a first decision in the same period. The payoff of the allocators consisted of two parts: 1) the payoff that they chose for themselves in the first decision and 2) the payoff that they chose for themselves in the second decision, multiplied by the number of the observers (two, one or zero) who chose this allocator in the partner choice stage. Thus, the first decision was a *strategic* situation because it could also affect the payoff in the second decision, and the second decision was a *non-strategic* situation since it did not affect future earnings.

Information stage for observers. All sessions except *Baseline* featured observers (see Fig. 1B). The observers were first in an "Information stage": In the *Infopilot*, the observers saw information about a decision of one matched allocator. In the *Partnerpilot*, *Interactive* and *Recorded* treatments, observers saw information about the same situation of two allocators, one after another. After this information, they had to assess the allocators' next actions. After this assessment, they were re-matched with a new allocator or new allocator pair. We initially used three information formats for showing information of the allocators' decisions to the observers, as illustrated in Fig. 1A: (i) "Choice" (action information), (ii) dynamic "GazeVideo" (process information) and (iii) static "GazePicture" (process information). For comparability, the information in all formats is shown for the length of time the allocator took to make the decision. Note that we analyze the allocators' eye-tracking data in a format that exactly reflects how the observers saw the gaze.

Assessment stage for observers. After the Information stage, observers entered the "Assessment stage". Here, one new randomly drawn situation was displayed to observers in the *Interactive* and *Recorded* treatments and three new randomly drawn situations were displayed in the *Infopilot* and *Partnerpilot* treatments. Then, the observers had to assess the prosociality of the allocators based on the information they received in the previous Information stage. More specifically, the observers had to make predictions (and non-incentivized prediction certainty) about the allocators' actions in these situations. We examine how the observers assess the preferences of the matched allocators using two methods:

predictions of next decisions (i.e. 1 out of 5 options) and partner choice (i.e. 1 out of 2 allocators).

(i) Prediction stage for observers (Infopilot, Partnerpilot, Interactive, Recorded). The observers were rewarded based on a two-step procedure. Firstly, the observers received a fixed payment if they correctly guessed the exact chosen option (1 of 5). Secondly, they additionally received a fixed payment if they correctly guessed the correct side of the choice. Here, we separated the five options into two sides such that the allocators from *Baseline* chose the two sides as similarly frequently as possible. This information was also made available to the observers: They saw an orange "average choice" line that separated the two sides (see the decision screens and instructions).

(ii) Partner choice stage for observers (Partnerpilot, Interactive, Recorded). The observers first saw the information about two different allocators and then had to decide with whom they want to interact in the next situations. The observer received the payoff allocated to the recipient by the chosen allocator in these next situations. The implicit task for the observers was to identify the more prosocial or generous of the two matched allocators in the group. We always used purple and blue colored frames around the decision screens to color-code the first and second allocator to the observers.

Design of the Infopilot treatment. The *Infopilot* served to pilot the information representation for the observers and to pilot whether observers do understand information content of non-strategic gaze. In this treatment, observers saw non-strategic choice and gaze data from *Baseline* treatment. In each period, the observer saw information about one single allocator in one decision and then stated her predictions of this allocator's actions in the next three decisions. The *Infopilot* comprised 36 periods in total: 12 periods for each of the three information formats (Choice, GazePicture and GazeVideo) respectively in counter-balanced blocks. The incentives for the observers were the prediction correctness one randomly chosen allocator's decision in one of the three next decisions for each of the three information treatments.

Design of the Partnerpilot treatment. In the *Partnerpilot*, observers saw non-strategic choice and gaze data from *Baseline* treatment. Importantly, they saw the information about two allocators and then not only stated their predictions of the two allocators' actions in the next three decisions, but also made a partner choice, i.e. they picked with whom of the two allocators to interact in these decisions. The *Partnerpilot* comprised 24 periods in total: 12 periods for

Choice and GazeVideo information formats respectively in counter-balanced blocks. The incentives for the observers were: (i) prediction correctness for each information treatment about a randomly chosen allocator's decision in one of the three next decisions and (ii) the payoff that the selected allocator allocated to the recipient in one of the next three decisions.

Design of the Interactive and Recorded treatments. In the *Interactive* treatments, the observers saw strategic (interactive) information from two allocators within the same session. In *Recorded* treatment, the observers saw non-strategic recorded information from two allocators from the first part (SVO assessment stage) from the *Interactive* sessions. Thus, the information about the same eye-tracked allocators was transmitted in *Recorded* and *Interactive*. In the *Interactive* treatment (after the SVO assessment stage), it was known to all participants that the allocators' gaze or choice from a first decision will be shown to the observers. The allocators had an incentive to gaze strategically, as it was also common knowledge that their payoff in a second decision will be multiplied by the number of observers (two, one or zero) who choose this allocator in the partner choice stage after the transmitted decision. In the *Recorded* treatment, the same setup applied except that the first and second decisions stemmed from the non-strategic preceding part of Interactive. In both *Interactive* and *Recorded*, each period consisted of these first and second choices. In total, there were 9 periods: 4 periods with GazeVideo information and 4 periods with Choice information (counter-balanced blocks), and 1 final period in which the information format was determined by the observers (either GazeVideo or Choice). The incentives for the observers in the *Interactive* and *Recorded* treatments were the same: (i) payoff (for the recipient) that was chosen by a randomly determined allocator in the first decision, (ii) payoff (for the recipient) that was chosen by the picked allocator in a second decision and (iii) prediction correctness about a randomly determined allocators' second decision. Only *Interactive* treatment involved new allocators. The incentives for the allocators in the Interactive treatment were: 1) payoff that they themselves chose in the first decision and 2) payoff that they themselves chose in the second decision, multiplied by the number of the observers (two, one or zero) who chose this allocator in the partner choice stage.

Information formats. In Choice information, a rectangle highlights the allocator's chosen action. In GazeVideo information, whenever an option is being looked at, the respective payoff lights up for as long as it is being inspected. This results in a sequence of rectangles lighting up. The rectangles correspond to areas of interest (AOIs). There is an AOI for each payoff, which we define somewhat larger than the circles containing the payoff information, in order to allow for slight imprecisions in the eye-tracking data. Accordingly, we define 10 AOIs in the vicinity of the payoff numbers. Further, we define 2 AOIs near the legend texts, and 2 AOIs covering the rest of the screen. In result, the whole screen is divided into (more or less informative) AOIs. Note that we analyze the allocators' eye-tracking data in a format that exactly reflects how the observers saw the gaze. In GazePicture information, a scan path connects the inspected AOI in the sequence they are looked at, starting from the first AOI (green dot) and ending with the last AOI (red dot). The hollow circles increase in size with the time spent looking at the respective AOIs in accordance to the rule $100x(1\text{-}e^{-0.25xDurationSeconds})$ and move toward the centre of the picture with decision time. We explored this information format only in the *Infopilot*.

Randomization and matching. *All experiments and sessions:* In the first part of every experiment, each subject had to make 26 choices. These 26 choices were 13 different SVO-type situations (see Fig. 4, including the item in grey color) used twice—once jittered and once non-jittered. Each subject received a random order of the 13 situations and a random draw for each situation determining whether the jittered or non-jittered version was played first. We drop one situation (two decisions, see Table 2) when displaying choice or gaze as everyone chose the same option.

In order to control for a potential top or bottom bias, half of the subjects saw "you receive" in the top part and "the other person receives" in the bottom part of the screen and vice versa for the other half of subjects. More specifically this counterbalancing was within a session in the *Infopilot* and *Partnerpilot* treatment, while it was between sessions in the *Interactive* and *Recorded* treatment. The *Interactive* sessions differed in two aspects—(i) whether GazeVideo came in the first four periods and Choice in the next four periods and (ii) whether "you receive" was located in the top part or the bottom part of the screen—resulting in four different sessions. In the *Recorded* treatment, the observers saw the behavior of the allocators from one of the *Interactive* sessions.

For the *Infopilot* and *Partnerpilot*, we used 24 pre-recorded decisions of 44 allocators from *Baseline*; the data on four of the original 48 subjects had to be dropped either due to misunderstood instructions, a loose cable, or a programming error. In the following description, a *situation* refers to both the jittered and non-jittered situation versions.

Infopilot: In the Information stage, each observer saw each of the 12 situations once in every information format (GazeVideo, GazePicture, Choice), while the three situations for the

Assessment stage were randomly determined. The order of the information format was randomly determined for every subject. Before every choice, the observers saw whether the following situation was displayed with “you receive” on top or bottom and had the chance to familiarize themselves with the situation. This way, we avoided that observers might not have seen the whole situation, as the information display lasted only for as long as the corresponding decision took for the allocator.

Partnerpilot: In the Information stage, each observer saw each of the 12 situations once in both information formats (GazeVideo, Choice), while the three situations for the Assessment stage were randomly determined. As every observer saw the situations from two allocators, we matched these two allocators such that they both saw the information in the same manner (“you receive” on top or not) and no observer saw the same allocator couple twice, while four allocators were shown twice (48 Information stages but only 44 allocators). The order of the information format was randomly determined for every observer, and the observers had the chance to familiarize themselves with the situation before every Information Stage.

For the *Interactive* and *Recorded*, we used the decisions that the 48 allocators in the *Interactive* treatment made in the experiment (either first task or main task).

Interactive: In the main part of the experiments, there were nine periods. Two observers always formed a group, and this group was kept constant across all periods. The sessions differed in whether the GazeVideo or Choice information was shown in the first four periods. In order to be able to control for decision situation effects, the situation in the two information formats of the Information stage were the same, e.g. the situations in periods 1 and 5 were the same, the situations in periods 2 and 6 were the same, and so on. The situation of the Assessment stage was randomly determined for every session. It should be noted that some situations are more diagnostic than other, as most subjects choose the same option in some of the situations (namely, decision situations 2, 4, 5, 6, 7, 9 were diagnostic, as determined by the data from Barrafrem and Hausfeld (2019) and the *Baseline* treatment). Therefore, the random draw for the first four periods always consisted of two diagnostic and two non-diagnostic situations. We further pre-programmed a matching for the observer-allocator pairs. The allocators were put in a group with a new allocator in each period, and they faced all observers at least once but never with the same situation in the Information stage, e.g. the matched observers differed between the periods n and n + 4. In period 9, the observers could choose themselves whether they saw the information in GazeVideo or Choice format. This format choice of both observers was shown to everyone in the group.

Recorded: These sessions mimicked the *Interactive* sessions, as the observers were assigned a number that was equivalent to an observer from the *Interactive* sessions. This way, they faced the same allocators and situations in the same order as a corresponding observer in the *Interactive* sessions. But in contrast to the *Interactive* sessions, the allocator information shown in the Information stage consisted of information recorded in the first part of the experiment, i.e. non-strategic decisions, in which the allocators had no incentive to boost their behavior.

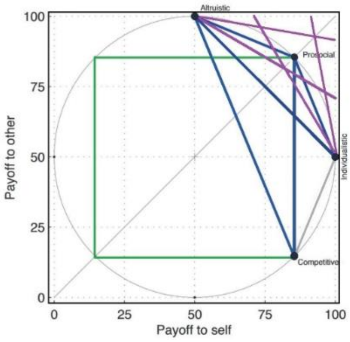

Fig. 4 Graphic illustration of the twelve different choice situations. Selected SVO primary items in blue, selected SVO secondary items in purple, additional custom-created items in green.

Table 2 The twelve different choice situations (in monetary units)

Primary items					
You receive	85	85	85	85	85
Other receives	85	68	50	33	15
You receive	100	96	93	89	85
Other receives	50	59	68	76	85
You receive	50	59	68	76	85
Other receives	100	96	93	89	85
You receive	50	59	68	76	85
Other receives	100	79	58	36	15
You receive	100	88	75	63	50
Other receives	50	63	75	88	100

Secondary items					
You receive	100	93	85	78	70
Other receives	50	63	75	88	100
You receive	100	88	75	63	50
Other receives	70	78	85	93	100
You receive	50	63	75	88	100
Other receives	100	98	95	93	90
You receive	90	93	95	98	100
Other receives	100	88	75	63	50

Additional items					
You receive	15	15	15	15	15
Other receives	85	68	50	33	15
You receive	85	68	50	33	15
Other receives	85	85	85	85	85
You receive	85	68	50	33	15
Other receives	15	15	15	15	15

The full dataset comprised the twelve situations two times, once as depicted and once with jittered values (+5 or -5). In addition, a thirteenth situation between Competitive and Individualistic points (the final SVO primary item, by (Murphy et al. 2011)) was added in the recording stages for SVO angle calculation.

Decision screens. The main components of the observers' decision screens, as depicted in Figs. 5 to 7, include (i) predictions of the allocators' choices (clicking 1 of 5 rectangles for each observed allocator; all treatments) and prediction certainty elicitation (clicking 1 of 5 circles for each prediction; all treatments except *Partnerpilot*) and (ii) partner choices for further interaction (clicking 1 of 2 longer rectangles; all treatments except *Infopilot*).

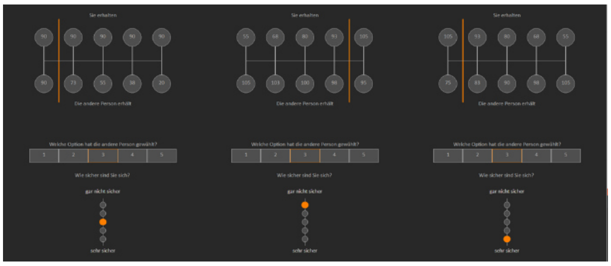

Fig. 5 Decision screen as seen by all observers in the Assessment stages of the non-strategic *Infopilot*

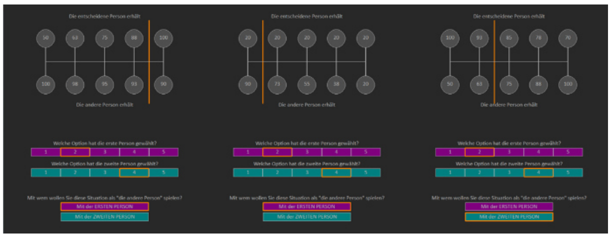

Fig. 6 Decision screen as seen by all observers in the Assessment stages of the non-strategic *Partnerpilot*

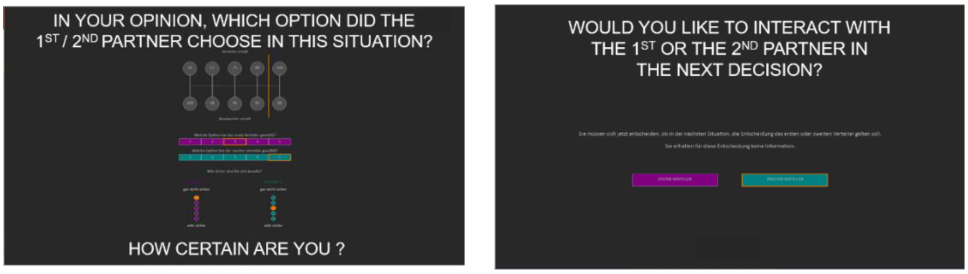

Fig. 7 Decision screens as seen by all observers in the Assessment stages of both the strategic *Interactive* and non-strategic *Recorded.* Note that the decision screens include with illustrative translations in a larger font size.

Leave-one-out cross-validation method. In order to determine how well the different process measures were accurately predicting the SVO angle of the participants, we use a leave-one-out cross-validation approach. This approach first uses the data from all choices of n - 1 participants and then estimates the model parameters for the respective models, e.g. using the four process measures mentioned in Table 3 separately or all together for the GazeVideo information, and using the choice and decision time for the Choice information. The estimated parameters are subsequently used to predict the SVO angle for the left-out subject for every single decision (24 times). We then use the median of these 24 estimates for every subject as the predicted SVO score.

We apply this approach without controlling for the decision situation (1-24), which is related to decision time and included in the models of Table 3, as the observers in the experiments also faced the shown information without knowing the decision number of the situation and the allocators faced the situations in a random order. Using this approach, we mimicked an observer who is presented a random situation of a random allocator, but who knows how all the other allocators behaved in all situations. Accordingly, for the predictions of whom to choose in the partner choice task, we changed the approach to a leave-two-out method with two allocators' behavior being left out in the initial stage and then predicting the score for both allocators left out.

Information treatments. As depicted in Fig. 8, we compare the GazePicture and GazeVideo formats by examining self-reported prediction certainty and post-experiment evaluations. We conclude that there is a tendency for observers to slightly prefer GazeVideo over GazePicture information (Mann-Whitney-Wilcoxon rank sum tests, $p < 0.1$). We thus focus on the GazeVideo information format in the *Partnerpilot*, *Interactive* and *Recorded* treatments.

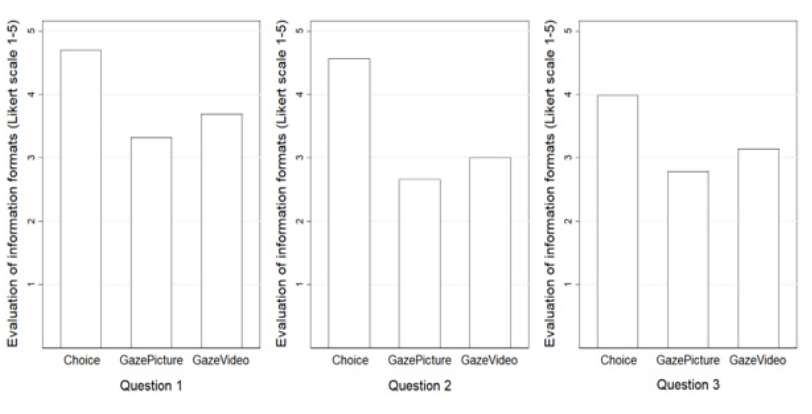

Fig. 8 Self-reported evaluations of the information treatments in the *Infopilot*. The three evaluation questions were as follows. Question 1: How well did you understand the information that you saw? Question 2: How well could you tell from the seen information which option did the other person choose? Question 3: How well did the seen information help you predict, which option the other person would choose in another situation?

Further allocator results I. As depicted in Fig. 9, the allocators in *Baseline* appear to be quite attentive. The decisions were not made too quickly (median decision time at 8.3 seconds; top left sub-figure), and almost all decisions were made after looking at all 10 AOIs (top left sub-figure). The allocators considered both own payoffs and the observer's payoffs, although usually own payoffs more carefully (majority below 50%; bottom left sub-figure). Finally, the allocators' search direction was quite balanced (bottom right sub-figure).

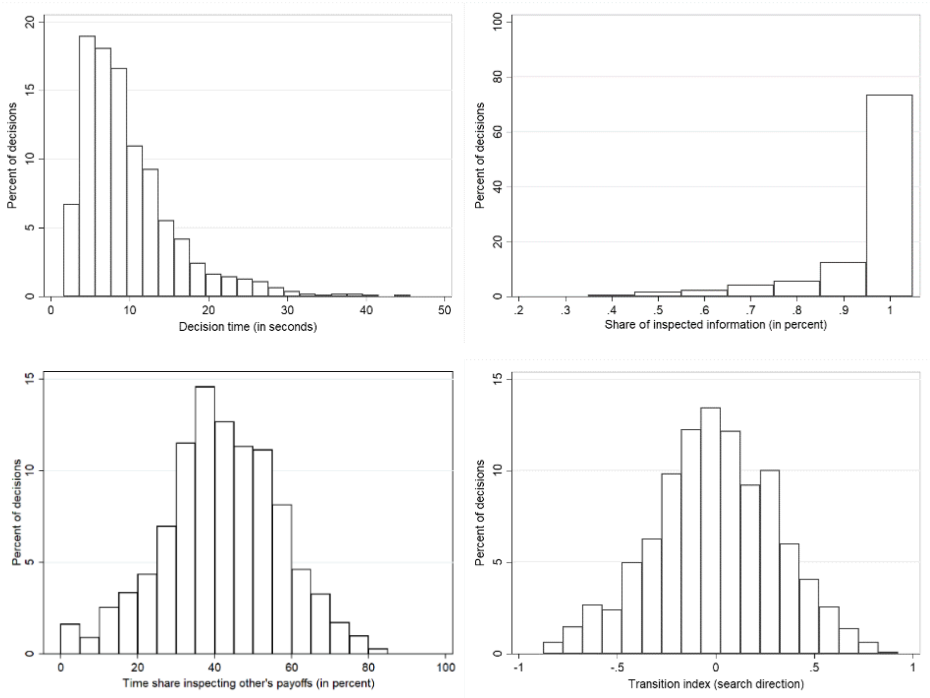

Fig. 9 Descriptive results of allocators' processing measures. Shares of decision times (top left), inspected information (top right), attention to other's payoffs (bottom left) and transition index (bottom right) in the *Baseline* treatment.

We chose these four gaze measures due to our expectation that the decision processes yield additional information about types in our heterogeneous sample, with type distribution ranging from (purely) individualistic to (purely) prosocial allocators. In line evidence accumulation models, e.g. Ratcliff and Smith (2004); Krajbich et al. (2010), we expected that the information would be sampled proportionally to the weight it has in the decision process and a stochastic process of fluctuating attention between outcomes realizes the sampling process until a decision threshold for one of the alternatives is reached.

Further allocator results II. As depicted in Fig. 10, we can largely replicate the results of Fiedler et al. (2013): all four gaze measures are directly proportional to allocators' prosociality in terms of the SVO scores. These results correspond to the results depicted in Table 3. Note that our results here and in the main text are robust to omitting the transitions that correspond to the shortest fixations of less than 50 milliseconds.

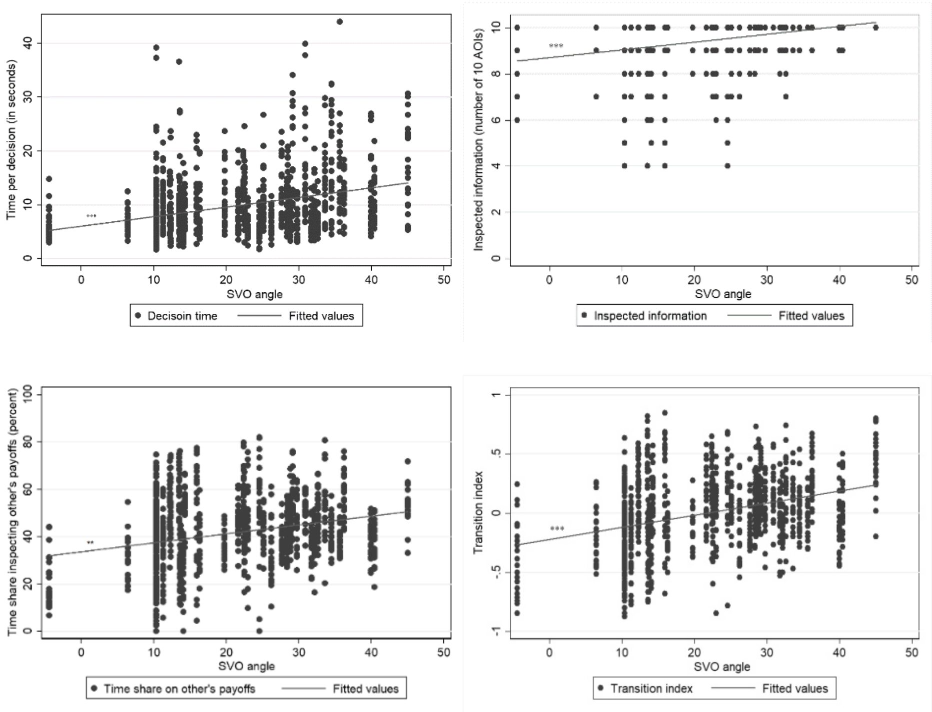

Fig. 10 Processing measures and allocators' SVO. Relation between the allocators' SVO and their shares of inspected information (top left), decision times (top right), attention to other's payoffs (bottom left) and transition index (bottom right) in the *Baseline* treatment. All significance levels refer to the SVO angle regression coefficients in Table 3; ***p < 0.001, **p < 0.01, *p < 0.05.

Table 3 Results of regression models for the allocators' gaze in *Baseline*

	Log decision time	Inspected AOIs	Time share other	Transition index
SVO angle	0.018***	0.034***	0.378**	0.010***
	(0.004)	(0.009)	(0.133)	(0.002)
Period	-0.021***	-0.019**	-0.085	-0.002
	(0.002)	(0.006)	(0.064)	(0.001)
Constant	2.022***	8.956***	34.795***	-0.198**
	(0.092)	(0.240)	(3.597)	(0.064)
R^2	0.183	0.116	0.074	0.129
N	1104	1104	1104	1087

Four measures of allocators' gaze: (i) "Log decision time" includes logarithmized total decision time (seconds) per decision, (ii) "Inspected AOIs" include number of inspected information areas (of the total 10 AOIs seen at least once) per decision, (iii) "Time share other" includes the share of decision time spent inspecting other's payoffs (percent) per decision, and (iv) "Transition index" describes transitions between the payoffs for self and other (index from -1 to +1, with -1 meaning only transitions between own payoffs) per decision. Unstandardized regression weights, robust standard errors clustered at participant level in parentheses. ***p < 0.001, **p < 0.01, *p < 0.05. Note that the regressions include 46 recorded allocators in 24 allocation situations, but some observations lack transitions including the observer.

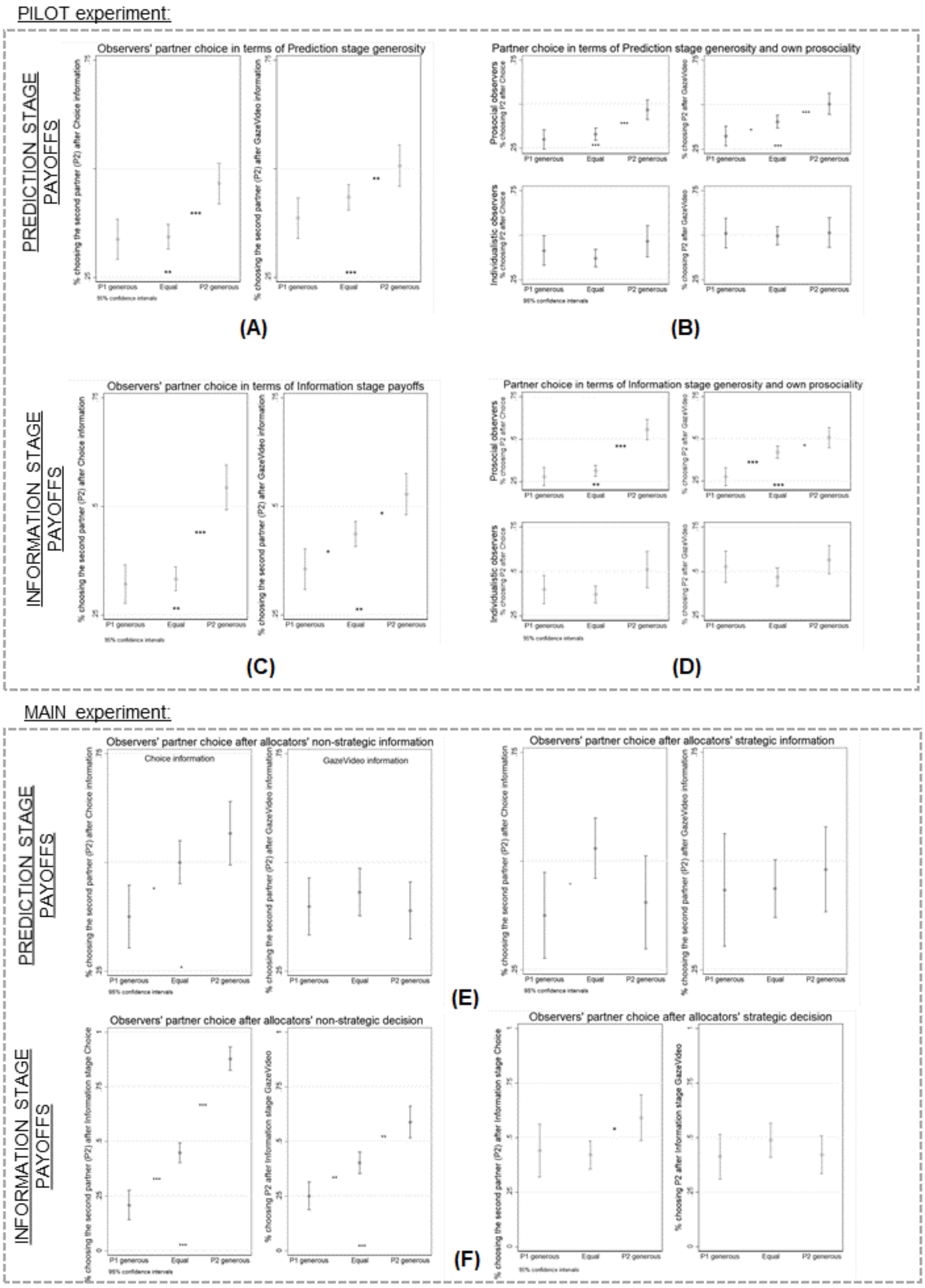

Fig. 11 Partner choice and other measures for correctness. Partner choice correctness (A)-(B) in terms of Prediction stage payoffs and (C)-(D) in terms of Information stage payoffs in the non-strategic *Partnerpilot*, as well as (E)-(F) in the strategic *Interactive* compared to the non-strategic *Recorded*. Note that the Information stage payoffs constitute a less noisy indicator of the observers' comprehension of the allocators' motives than the Prediction stage payoffs, i.e. the slopes appear to be steeper in the Information stage compared to the Prediction stage. ***p < 0.001, **p < 0.01, *p < 0.05.

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