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Golden Gazes: Gaze Direction and Emotional Context Promote Prosocial Behavior by Increasing Attributions of Empathy and Perspective-Taking

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Prosocial behavior is fundamental to societies. But when and toward whom do humans act generously? We investigate the impact of a listeners' gaze direction and the emotional context of the story heard on (a) perceptions of their social cognition skills and (b) prosocial decisions toward them. In three experiments (two preregistered, $N = 486$), human participants witnessed prerecorded video encounters between a listener (visible) and a speaker (audible, not visible). The listener either established eye contact, averted gaze, or showed a mixed gaze pattern (*gaze direction*), while the speaker told a neutral or negatively valenced autobiographic episode (*emotional context*). Participants rated the listeners' empathy and perspective-taking after each video and played the trust game (Study 1) or the dictator game (Study 2) with the listener. Replicating previous findings, occasional gaze avoidance, especially during negative narrations, increased attributions of social understanding to the listener. Critically, mediation analyses revealed that listeners perceived as empathic and taking perspective were ultimately treated with more trust and generosity in strategic and nonstrategic economic games, suggesting that social signals and contextual cues can serve as an indication of another's reputation, thereby promoting indirect reciprocity. Last, in Study 3, we show that emotional context, but not listeners' gaze behavior, promoted the spread of generosity toward anonymous, previously unobserved individuals in a dictator game, driven by social cognition skills attributed to the listener. We conclude that social signals and contextual cues can be important drivers of cooperation in societies via mechanisms such as indirect reciprocity and social contagion of generosity.

Keywords: prosocial behavior, gaze direction, empathy, perspective-taking, communication

Supplemental materials: https://doi.org/10.1037/pspi0000437.supp

Lending a hand to assist friends, giving directions to strangers on the street, and donating money or even an organ, humans are remarkably prosocial. However, acting in ways that benefit others often requires individuals to exert effort (Lockwood et al., 2017) and to bear financial and moral costs (Crockett et al., 2014; Engel, 2011). Thus, individuals have to be selective in deciding whom they want to help or cooperate with. Theories of kin selection (W. D. Hamilton, 1964) and direct reciprocity (Trivers, 1971) have posited that individuals are more prone to cooperate with genetic relatives and with those who have been previously generous toward them. But in an ever-growing society where we regularly face unrelated and unknown individuals, how do we decide with whom to cooperate? Especially in large and anonymous groups, individuals may decide by observing others interact. In fact, several studies have shown evidence for indirect reciprocity, such that humans cooperate more and reward those with a reputation for being kind toward others (Almenberg et al., 2011; Bolton et al., 2005; Micheli et al., 2022; Wedekind & Milinski, 2000). Although most studies on indirect reciprocity are based on observations of previous and explicit behavior in economic games, social interactions are extremely rich in information, and individuals may rely on a variety of verbal and nonverbal cues to make interpersonal judgments and decisions (Behrens et al., 2020; Dores Cruz et al., 2021; Fischbacher et al., 2022; He et al., 2016; McEllin & Michael, 2022). How do people derive who is nice and worthy of generosity? Here, we investigate whether and how the observation of subtle social signals (i.e., gaze cues) and context cues promotes prosocial behavior. Although such social and contextual cues do not often occur in isolation, there is value in understanding how they specifically influence perception and behavior, as they both provide critical information in social interactions. In addition, reliance on social signals such as gaze cues might become even more important in contexts where verbal communication as well as other body language might be reduced or difficult to observe, such as in virtual video interactions or in

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The authors made an amendment to the preregistration of Study 3 to correct a mistake in our preregistered hypothesis, which was kindly pointed out by one of the reviewers: https://osf.io/38abf.

Christina Breil and Anne Böckler contributed equally to this work.

Leticia Micheli played a lead role in formal analysis and writing–original draft and an equal role in methodology and writing–review and editing. Christina Breil played a lead role in investigation and software, a supporting role in formal analysis, and an equal role in methodology and writing–review and editing. Anne Böckler played a lead role in funding acquisition and methodology and an equal role in writing–review and editing.

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situations where people do not feel comfortable or are not supposed to overtly voice their thoughts and opinions (e.g., during a work meeting, when commuting on a train or watching a play with a friend, when coordinating actions playing in an orchestra or a soccer team).

Gaze direction—where people look during social interactions—is a nonverbal cue that has been associated with increased prosocial behavior. Partners in an economic game who are allowed to look at each other cooperate more than dyads of individuals who cannot establish a mutual gaze (Behrens et al., 2020) and children share more with others who occasionally look at them (Wu et al., 2018). In addition, individuals are more generous toward those whose gaze behavior (e.g., looking at a target cue) was helpful and reliable (Rogers et al., 2014).

Despite the alleged impact of gaze direction on prosocial behavior in direct dyadic interactions, its influence in third-party contexts (i.e., when the gaze of others is observed) remains unknown. The investigation of gaze in third-party settings could add important insights to the understanding of indirect reciprocity in dynamic and naturalistic interactions, as it is currently unknown whether the mere observation of basic social and contextual cues could lead people to form impressions of others and be more or less generous toward them in subsequent interactions. Given that many of our everyday interactions do not take place with friends and family, but with strangers on a bus, in the gym, in the supermarket, or on the street, we think the role of simple nonverbal cues on impression formation and subsequent behavior may be underestimated. Initial evidence that people who establish eye contact with others are perceived by observers as more trustworthy (e.g., Breil & Böckler, 2021; Kaisler & Leder, 2016) inspires the question of whether they would also be treated more generously. After all, individuals who frequently engage in eye contact during conversations might be perceived by observers as more capable of emotional connection and more willing to tend to their conversation partners' needs. In fact, gaze direction efficiently signals one's attention, interest, and intentions (for reviews on the crucial role of gaze in social interaction, see Hessels, 2020; Kleinke, 1986; Schilbach, 2015; Tomasello et al., 2005). In observed video-based conversation snippets, listeners who frequently engage in direct gaze as opposed to avoiding eye contact are judged by third parties to be more empathic and to have a better understanding of the speaker's mental states (Breil & Böckler, 2021). As individuals with greater social understanding skills are often more prosocial (FeldmanHall et al., 2015; Leiberg et al., 2011), eye contact might be considered an important signal of one's prosocial inclinations toward others and, as such, may be reciprocated with generous behavior.

Though eye contact is a strong social signal that can shape attention and cognition within milliseconds (e.g., Senju & Johnson, 2009), the processing of gaze cues is not independent of context (Burra et al., 2019; A. F. d. C. Hamilton, 2016; McCrackin & Itier, 2018; Pittig et al., 2023). For instance, the influence of gaze direction on social perception is shaped by the emotional content of a conversation. While reduced eye contact when hearing emotionally neutral stories (e.g., about work routines or hobbies) was perceived by observers as a signal of low empathizing and perspective-taking, this was not the case during emotionally negative stories (e.g., about the loss of a loved one). In fact, averting gaze when listening to someone talking about difficult experiences may indicate respect, sympathy, and/or compassion (Breil & Böckler, 2021). Thus, the critical question is whether and how gaze direction and emotional context influence third parties' prosocial behavior toward observed partners in a conversation setup. Across three studies (two preregistered), we investigated whether the gaze direction of listeners hearing an emotionally negative or neutral story influences the prosocial behavior of observers of this social interaction. To our knowledge, this is the first study directly addressing the (context-dependent) influence of gaze cues on actual behavior in third-party settings. In Study 1, we implemented the trust game (TG; Berg et al., 1995) to test whether gaze and emotional context influence observers' trust in the listener. In Study 2, we expanded the findings to another domain of prosocial behavior, namely giving behavior in the dictator game (DG; Forsythe et al., 1994). In line with indirect reciprocity, we expected that the effects of social signals (gaze behavior) and contextual cues (story valence) on observers' prosocial behavior toward the listener would be mediated by their perceptions of the listeners' capacity to empathize with and take the perspective of the speaker.

Finally, in Study 3, we tested whether the listeners' gaze direction and the emotional context of the story heard could translate into generalized prosocial behavior (e.g., toward individuals not previously observed) by implementing a DG with anonymous receivers (rather than the listener being the receiver). Thus, we explore the possibility that observing the listeners' gaze and the emotional context of a social encounter, as well as the subsequent perception of the listener as a caring and empathic person, could put observers in a state that favored the spread of generosity toward other, previously unobserved individuals.

Study 1: The Role of Gaze and Emotional Context on Trust Behavior

Method

Transparency and Openness

For all three studies, we report how our sample was predetermined and the data exclusions conducted for some specific analyses. In addition, we describe and detail all the manipulations and measures included in the three studies. Anonymized data of each study and all research materials including instructions and examples of the experimental stimuli are available at https://osf.io/y8zj5/. We preregistered the study design and analysis plan for Study 2 (https://osf.io/8ey4f) and Study 3 (https://osf.io/kjvpr). Data were analyzed using R, Version 4.1.2 (R Core Team, 2020). For more details regarding the R packages used in the analyses, please see the Data Analyses section of each study. All studies were approved by the local ethics committee.

Participants

We recruited 162 participants (M_{age} = 27.8 years, SD = 8.4, 41% female, 59% male) from an online panel (https://prolific.co/). Only participants who were fluent in German and did not have hearing impairments and disposed of a functioning audiovisual system in their devices were invited to take part in the experiment. In addition, because the experiment involved deception (i.e., listeners did not interact with participants in the TG), only participants who had previously expressed willingness to take part in experiments with deception via Prolific were invited to participate in the study. The

experiment lasted for approximately 15 min, and participants received a flat fee of 2.40€ for their participation.

The number of participants was determined a priori using the BUCCS package in R (Anderson et al., 2017), which allows sample size planning based on effect sizes from a previous study while controlling for publication bias and uncertainty. We based our power calculation on the results of a previous experiment with a similar study design showing small effect sizes of gaze behavior and emotional context as well as its interaction on trust perceptions (Breil & Böckler, 2021). To detect the effect with an 80% level of assurance, assuming 80% of power, and an α of .05, 129 participants would be needed. We then planned to collect a sample of 162 participants, as this was the next multiple of the total number of stimuli lists in the experiment (i.e., 54, see Procedure section).

Procedure

The experimental design was adapted from Breil and Böckler (2021), and the experiment was programed using the online software PsyToolkit (Stoet, 2017). Participants were encouraged to use a computer or a laptop to complete the task and ensure a proper visualization of the video stimuli. Participants were also instructed to make certain they had a stable internet connection and working headphones or speakers before starting the experiment.

Upon consenting to take part in the experiment and answering demographic questions, participants were told that they would witness six trials of short video-based encounters between two other people, namely a speaker and a listener (henceforth also referred to as the *target person*). In each episode, participants could hear (but not see) the speaker narrating an autobiographical episode and see a video record of the listener/target person, who remained mostly static while allegedly listening to the narration. Participants were instructed to take the perspective of the speaker while observing each encounter, after which they were asked to answer two questions regarding their perceptions of the target person and subsequently had the opportunity to interact in an economic game with this person. To ensure a correct understanding of the task, after reading the instructions, participants were asked to answer four multiple-choice comprehension questions. If an incorrect response was provided, participants saw a pop-up message explaining why their answer was inaccurate and were given a second chance to answer correctly. Only participants who answered all questions correctly were allowed to move forward with the experiment.

In total, participants completed one training trial and six test trials. The training trial had the exact same structure as the test trials and aimed to familiarize participants with the stimuli and with the questions they would be asked. Importantly, the stimuli (i.e., autobiographical episode narrated by the speaker as well as the video record of the target person) used in the training trial were not reused in any of the test trials to avoid biasing participants' responses.

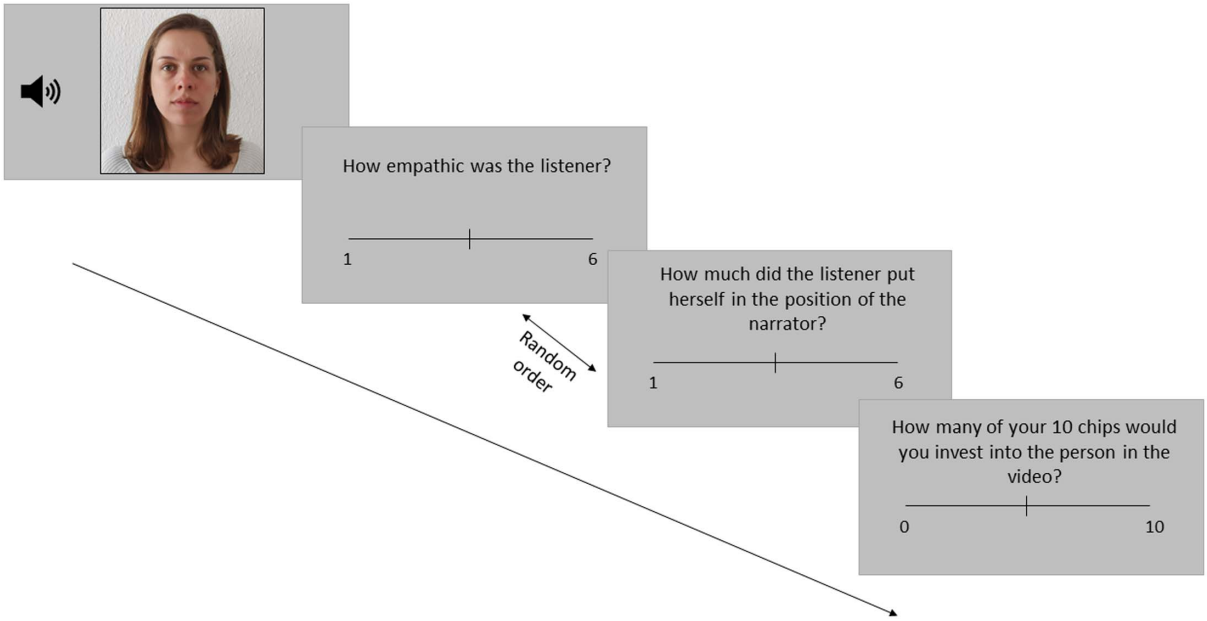
In each trial, participants could hear a different speaker recounting either a neutral or a negative autobiographical episode. The audio narrations used in the experiment were taken from the validated EmpaToM task (Kanske et al., 2015). While neutral stories mostly revolved around mundane events (e.g., daily routine after coming home from work), negative stories evoked experiences of losses or disappointment (e.g., sick family member) and have been shown to elicit considerably more negative affect than neutral stories (Breil et al., 2021; Kanske et al., 2015; Tholen et al., 2020).

Each narration was paired with a short video (~15 s) created specifically for this dyadic conversation setup and displaying the target person (the listener of the story). In every trial, participants could see the head and torso of a target person in front of a light-neutral background. The target person did not speak and kept a neutral facial expression while remaining mostly static for the duration of the video. In each trial, participants saw a different target person who would either constantly look directly into the camera (*direct gaze* condition), constantly look downwards (*averted gaze* condition), or intermittently switch between direct and averted gaze for the duration of the video (*mixed gaze* condition). Videos used in the experiment were taken from Breil and Böckler (2021). Audio transcripts exemplifying a negative and a neutral autobiographical episode and an example of the video stimuli can be found in the Open Science Framework (OSF) project folder (https://osf.io/y8zj5/).

To prevent characteristics of the target person (e.g., gender, age) or the specific content of the autobiographical episode from influencing participants' perceptions and decisions, 18 audios from nine different speakers (with each speaker recounting one neutral and one negative story) and 18 videos from six different target persons (each with one video portraying direct gaze, one mixed gaze, and one averted gaze) were counterbalanced so that each audio and video were paired equally often across participants. This resulted in 54 stimuli lists containing six trials each. Participants were randomly assigned to one stimuli list in a way that they were exposed only once to a given speaker and target person across the six experimental conditions (direct-neutral, direct-negative, averted-neutral, averted-negative, mixed-neutral, mixed-negative). For balancing purposes, data were collected until each list was completed by three participants.

In each trial, after observing the encounter, participants were asked to answer two questions regarding their perceptions of the target person. Specifically, participants were asked to answer one item measuring how empathic the target person was perceived during the encounter ("How empathic was the listener?") and one item measuring how much the participant thought that the target person was able to take the perspective of the speaker ("How much did the listener put him or herself in the position of the narrator?"). Our two measures meant to tap into the two distinct components of social understanding that have been distinguished on behavioral and neural levels (Kanske et al., 2015; Tholen et al., 2020): (a) an affective component that is often referred to as "empathy," "empathic resonance," or "affect sharing" and that is defined as an affective response that is elicited by and isomorphic to the observed or imagined state of another (de Vignemont & Singer, 2006) and (b) a cognitive component, referred to as mentalizing or cognitive perspective-taking, that is defined as the process of cognitively attempting to understand others' mental states (Frith & Frith, 2003; Schurz et al., 2021). While these components have been differentiated in the literature (see also Weisz & Cikara, 2021), we suppose that people often use these terms less strictly in everyday life and that these aspects co-occur in many dynamic and realistic social situations. Critically, while this co-occurrence has been observed when participants are asked to indicate empathy and perspective-taking in everyday life, it seems that participants are well able to distinguish affect sharing and perspective-taking (Depow et al., 2021). The order of presentation of both questions was randomized, and each question was answered on a 6-point Likert scale ranging from *not at all* to *a lot* (Figure 1).

Figure 1
Trial Outline of Study 1



Note. Participants witnessed an encounter in which they heard a speaker narrating either a neutral or negative autobiographical episode to a target person who displayed either direct, averted, or mixed gaze in a video. After each encounter, participants were asked to rate the target person in terms of empathy and perspective-taking. Participants then played a one-shot trust game with the target person and were asked to decide how many of their 10 chips they would like to send to the target person. After imputing their responses, a new trial began. See the online article for the color version of this figure.

Next, to investigate how gaze and emotional context might affect prosocial behavior, participants played the role of the investor in a one-shot TG (Berg et al., 1995) with the target person as the trustee in each trial. Participants were endowed with 10 chips and asked how much (if any) they would like to invest in the target person. Participants could enter their answers on a scale ranging from 0 to 10 chips with increments of .25 chips. Participants were told that the amount of chips sent to the target person would be tripled and the target person would have the chance to return a freely selected amount of this increased pot of money back to them. Importantly, the target person could choose to not send any chips back to the participant in the TG. Participants were informed that, at the end of the experiment, one trial would be randomly selected, and they would be paid according to the sum of chips they kept for themselves plus the amount of chips the target person returned to them in that trial (with one chip = 0.2€). Unbeknownst to participants, the target person was not part of the experiment and thus was not informed of the participants' decision in the TG. All participants were paid the full corresponding amount of 10 chips (2€) in addition to the flat fee.

At the end of the experiment, participants were asked whether they had noticed anything during the experiment with an open-ended question ("Did you notice anything during the experiment? If yes, what was it?"). We decided against explicitly asking participants whether they believed the conversations were real to not prompt suspicion. We also asked participants whether they had any assumptions about the goals of the study and whether they encountered any technical issues with the video and audio playback. Participants were then debriefed and thanked.

Data Analysis

We employed a 2 (emotional context: negative or neutral) × 3 (gaze: direct, averted, or mixed) within-subjects design. We first analyzed the effects of emotional context and gaze direction on participants' perceptions of the target person's ability to empathize with the speaker and take their perspective using a 2 × 3 repeated-measures analysis of variance (ANOVA). The same analysis was conducted to investigate the effect of emotional context and gaze direction on participants' willingness to trust the target person in the TG. Whenever appropriate, we applied Greenhouser–Geisser correction to adjust for lack of sphericity in the repeated-measures ANOVA. In addition, pairwise comparison tests were conducted whenever we observed a significant main effect of gaze direction or a significant interaction between gaze direction and emotional context. All pairwise tests were Bonferroni corrected for multiple comparisons. For all analyses, we report generalized η^2 or Cohen's d as effect sizes. In order to be better able to interpret possible nonsignificant effects of gaze direction and emotional context, we further investigate nonsignificant effects with Bayesian ANOVAs. The Bayes factor is a ratio comparing the likelihood of data fitting under the null hypothesis versus the alternative hypothesis, where the higher the value the greater the evidence for the null hypothesis (Jarosz & Wiley, 2014). In our case, Bayes factors were computed as $BF01 = f(\text{data}|H0)/f(\text{data}|H1)$, where a Bayes factor for the ANOVA model containing an interaction between gaze direction and emotional context was divided by the factor obtained for the ANOVA model containing only the main effects of gaze direction and emotional context. Bayes factors higher than 3 (BF01 > 3) were

interpreted as strong evidence for the null hypothesis and weak/anecdotal evidence in favor of the alternative hypothesis, according to guidelines suggested by different authors (see Jarosz & Wiley, 2014). Finally, to investigate the psychological mechanisms underlying a potential effect of emotional context and/or gaze direction on participants' trust behavior, we conducted a multiple mediation analysis accounting for the repeated-measures structure of the data using the package *brms* in R (Bürkner, 2017).

Results

Empathy Ratings

Replicating earlier findings (Breil & Böckler, 2021), ANOVA results showed a main effect of gaze direction on the perceived empathy of the target person, $F(2, 322) = 7.69$, $p < .001$, $\eta^2_{gen} = .012$. Post hoc t tests revealed that target persons displaying mixed gaze were considered more empathic than those displaying averted gaze, $t(323) = 4.01$, $p < .001$, $d = .254$; $M_{mixed} = 3.12$, $SD = 1.46$; $M_{averted} = 2.75$, $SD = 1.46$, and direct gaze, $t(323) = 2.67$, $p = .024$, $d = .183$; $M_{direct} = 2.86$, $SD = 1.38$. There were no significant differences between the empathy perception of target persons displaying direct and averted gaze, $t(323) = 1.17$, $p = .73$, $d = .078$.

We also observed a main effect of emotional context on the perceived empathy of the target person, $F(1, 161) = 56.8$, $p < .001$, $\eta^2_{gen} = .059$, such that those who were confided a negative story were rated as more empathic than those who were told a neutral story by the speaker ($M_{neg} = 3.26$, $SD = 1.49$; $M_{neutral} = 2.57$, $SD = 1.3$).

The interaction between gaze and emotional context was not significant, $F(2, 322) = 2.79$, $p = .063$, $\eta^2_{gen} = .004$. This was further supported by a Bayesian ANOVA showing substantial evidence in favor of the model that did not contain the interaction term between gaze direction and emotional context (BF01 = 0.25). The mean empathy ratings per condition are shown in Table 1 and Figure 2, left panel.

Perspective-Taking Ratings

The mean perspective-taking ratings per condition can be seen in Figure 2, middle panel. ANOVA results revealed a similar pattern compared to empathy ratings. We found a main effect of gaze direction on the perceived perspective-taking of the target person, $F(2, 322) = 6.98$, $p = .001$, $\eta^2_{gen} = .012$. Post hoc t tests showed that target persons displaying mixed gaze were rated higher in perspective-taking than those displaying averted, $t(323) = 3.8$, $p < .001$, $d = .240$; $M_{mixed} = 3.14$, $SD = 1.36$; $M_{averted} = 2.81$, $SD = 1.46$, and direct gaze: $t(323) = 2.98$, $p = .01$, $d = .204$; $M_{direct} = 2.87$, $SD = 1.33$. There were no significant differences between target persons displaying averted and direct gaze, $t(323) = -.67$, $p = .1$, $d = -.044$.

We also found a main effect of emotional context, indicating that those who listened to negative stories were rated higher in perspective-taking than those who listened to neutral stories, $F(1, 161) = 45.06$, $p < .001$, $\eta^2_{gen} = .044$; $M_{neg} = 3.23$, $SD = 1.42$; $M_{neutral} = 2.65$, $SD = 1.29$.

In line with previous findings (Breil & Böckler, 2021), we found a significant interaction between gaze direction and emotional context on perspective-taking ratings, $F(2, 322) = 3.36$, $p = .036$, $\eta^2_{gen} = .004$. Post hoc tests indicated that differences between mixed and averted gaze, as well as between mixed and direct gaze, were only significant when the target person was told a negative story by the speaker, mixed versus averted gaze: $t(161) = 3.13$, $p = .01$, $d = .31$; mixed versus direct gaze: $t(161) = 3.4$, $p = .003$, $d = .36$, whereas no differences were found between the different gaze conditions when the target person heard a neutral story, mixed versus averted gaze: $t(161) = 2.18$, $p = .09$, $d = .183$; mixed versus direct gaze: $t(161) = .5$, $p = 1$, $d = .045$. Differences between direct and averted gaze were nonsignificant in both emotional contexts, neutral: $t(161) = 1.61$, $p = .33$, $d = .148$; negative: $t(161) = -.48$, $p = 1$, $d = .046$.

Investment in the TG

The mean investment on the target person per condition in the TG is displayed in Figure 2, right panel. Across conditions, participants invested 4.4 out of 10 ($SD = 2.67$) chips in the target person. We found a main effect of gaze direction on the amount sent to the target person in the TG, $F(2, 322) = 5.92$, $p = .003$, $\eta^2_{gen} = .007$. Post hoc t tests showed that target persons displaying mixed gaze were trusted with a higher investment in the TG than target persons displaying averted gaze ($t(323) = 3.77$, $p < .001$, $d = .210$; $M_{mixed} = 4.65$, $SD = 2.57$; $M_{averted} = 4.1$, $SD = 2.68$). No differences in investment were found between mixed and direct gaze ($t(323) = 1.49$, $p = .41$, $d = .086$; $M_{direct} = 4.42$, $SD = 2.74$) and direct and averted gaze ($t(323) = 1.99$, $p = .14$, $d = .119$).

Similar to the results for empathy and perspective-taking ratings, we found a main effect of emotional context indicating that target persons who heard a negative story were trusted more in the TG than those hearing a neutral story, $F(1, 161) = 26.66$, $p < .001$, $\eta^2_{gen} = .023$; $M_{neg} = 4.8$, $SD = 2.76$; $M_{neutral} = 3.99$, $SD = 2.51$.

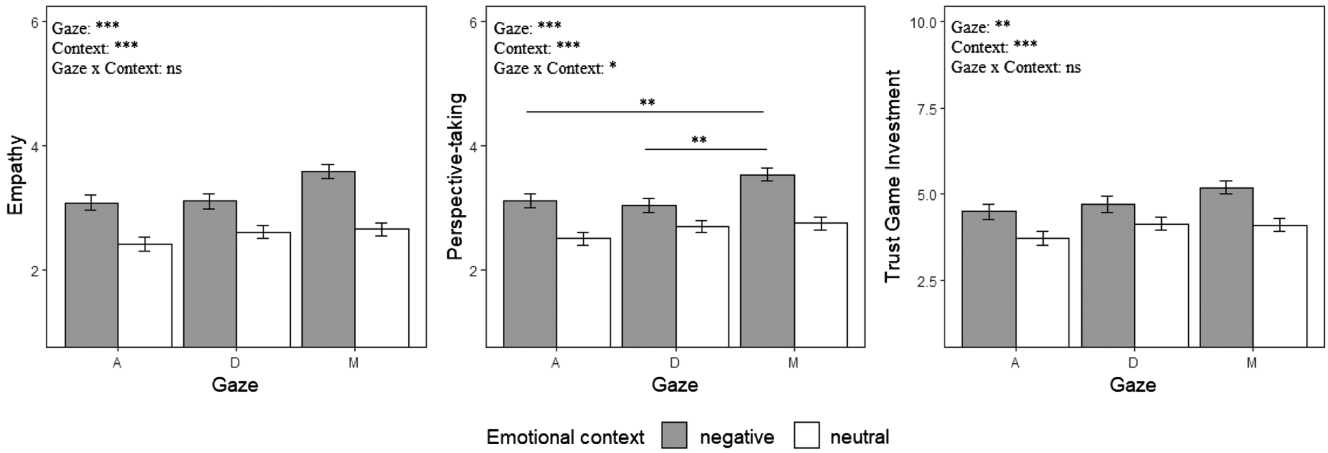
Table 1
Means and Standard Deviations of Empathy Ratings, Perspective-Taking Ratings, and Giving Behavior in the Trust Game

Gaze	Emotional context	Empathy	Perspective-taking	Trust game investments
Averted	Neutral	2.42 (1.33)	2.51 (1.39)	3.71 (2.6)
Direct	Neutral	2.62 (1.21)	2.7 (1.18)	4.15 (2.44)
Mixed	Neutral	2.66 (1.35)	2.75 (1.3)	4.11 (2.48)
Averted	Negative	3.09 (1.51)	3.11 (1.46)	4.49 (2.7)
Direct	Negative	3.11 (1.5)	3.04 (1.46)	4.7 (2.99)
Mixed	Negative	3.59 (1.41)	3.54 (1.3)	5.2 (2.54)

Note. Mean ratings of empathy, perspective-taking, and behavior in the trust game are reported by condition followed by the standard deviations between parentheses.

Figure 2

Results per Gaze Condition and Emotional Context (Study 1)



Note. The figure displays how participants rated the target person regarding their tendency to empathize with the speaker (left panel) and take their perspective (middle panel) on a 6-point scale. Higher ratings indicate a higher capacity for empathy and perspective-taking. The right panel shows the average chips (from 0 to 10) participants invested in the target person in the trust game. The *x*-axis shows the gaze conditions (A = averted gaze; D = direct gaze; M = mixed gaze). The legend on the top corner of each panel summarizes the main results of the repeated-measures analysis of variance. Gaze refers to the main effect of gaze direction, context refers to the main effect of emotional context, and the term Gaze × Context refers to the interaction between gaze direction and emotional context.
ns: $p > .05$. * $p < .05$. ** $p < .01$. *** $p \leq .001$.

The interaction between gaze direction and emotional context was not significant, $F(1.9, 310.4) = 1.67$, $p = .19$, $\eta^2_{gen} = .002$, Greenhouser–Geisser corrected. As for empathy, the lack of interaction was further supported by a Bayesian ANOVA indicating positive and strong evidence in favor of the model that did not contain the interaction term between gaze direction and emotional context (BF01 = 0.09).

Multiple Mediation Analysis

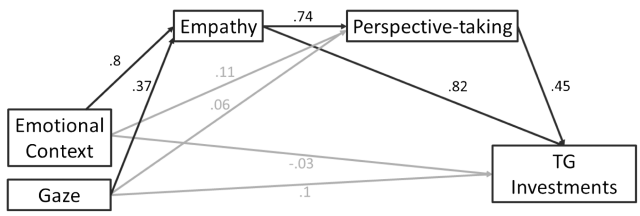
Next, we tested whether perceptions of the target person's social affect and social cognition could underlie the effect of gaze direction and emotional context on trust behavior. Perceptions of empathy and perspective-taking were significantly correlated even after controlling for gaze direction and emotional context ($r = .79$, $p < .001$), suggesting that these two perceptions may affect each other. In such cases, multiple mediation analyses are recommended over conducting repeated single mediation analyses (Hayes, 2017; Jérolon et al., 2021). Hence, we conducted a multiple mediation analysis with gaze direction and emotional context as independent variables (baseline was averted gaze and neutral valence), investment in the TG as the dependent variable, perceived empathy as the first mediator, and perceived perspective-taking as the second mediator. Importantly, despite the significant correlation between empathy and perspective-taking perceptions, there was no indication of multicollinearity issues. All variance inflation factors were low (below 2.75) and tolerance levels were high (above 0.36; Shrestha, 2020). Given that we only found significant differences in trust behavior between averted and mixed gaze, we only considered these two gaze conditions in this analysis.

Results are summarized in Figure 3. We found that the indirect effect of gaze direction on trust via empathy and perspective-taking was significant ($M = .12$, 95% CI [.06, .19]). Likewise, the indirect effect of emotional context on trust via empathy and perspective-taking was significant ($M = .26$, 95% CI [.18, .36]), whereas the direct effect of gaze and emotional context on trust was not significant. Our results suggest that the effects of gaze and emotional context on trust behavior are mediated by perceptions of the target person's social understanding. Specifically, target persons who displayed mixed gaze or who listened to negative stories were attributed higher empathy and perspective-taking and these attributions led to higher trust in the TG.

Note that we considered empathy as a first mediator because empathic resonance with other's emotional or physical states is assumed to be a more immediate process than cognitive perspective-taking (de Vignemont & Singer, 2006; Kanske et al., 2015). However, results were similar when the order of the mediators was

Figure 3

Multiple Mediation Model Displaying the Direct and Indirect Effects of Gaze and Emotional Context on Trust Behavior



Note. Mixed gaze (vs. averted gaze), as well as negative emotional context (vs. neutral context), significantly increased participants' perceptions of the target person's empathy, which in turn also led to higher ratings of perspective-taking and higher investments in the trust game (TG). Grey arrows indicate non-significant effects.

inverted (see Supplemental Figure S1). In addition, results also held if we considered gaze direction and emotional context separately (Supplemental Figure S2).

Finally, we repeated all the analyses reported above excluding participants ($N = 16$) who did not believe the instructions of the experiment (i.e., that they were playing the TG with another participant). Excluding these participants led to the same results, except that the interaction between gaze direction and emotional context on perspective-taking perceptions was no longer significant ($p = .18$).

Discussion

With a validated and incentivized behavioral measure of trust, Study 1 shows, for the first time, that gaze behavior and emotional context that are observed during an alleged online conversation between others (hence, in a third-party setting) can effectively promote trust toward the observed listener. Our results extend previous findings by showing that emotional context and gaze direction may affect not only trustworthiness perceptions of the target person but participants' willingness to actually place their trust in this person in an incentivized interaction. Moreover, our results show that gaze direction and emotional context ultimately influence the prosocial behavior of observers by affecting their perceptions of the target person's social affect and social cognition. Those who were deemed more skilled in social understanding were more trusted in subsequent social interactions.

One possible interpretation of this result is that gaze behavior and emotional context influence prosocial behavior through indirect reciprocity. That is, individuals observing a social interaction might consider the observed agent's social affect and cognition as a genuine signal of their inclination for attending to the needs of others. Hence, observers might use social signals (e.g., appropriate gaze behavior) and emotional context (e.g., being confided in negative experiences) as markers for other's empathy and social competence. As a result, those who are considered more socially competent may then be met with greater generosity, in line with previous results (von Bieberstein et al., 2021). This assumption is supported by studies showing that the motives underlying generous behavior matter for observers (Berman & Silver, 2022) and that observers use a range of cues to infer genuine motives such as decision speed (Critcher et al., 2013), display of positive emotions (Ames & Johar, 2009; Barasch et al., 2014), and empathy (Erlandsson et al., 2020).

Study 2 aimed to replicate and extend the findings of Study 1. We investigated whether perceptions of others' social affect and social cognition also affect prosocial behavior in a nonstrategic setting, namely giving behavior in the DG, according to indirect reciprocity. This is especially important because the results of Study 1 could, alternatively, be due to participants' strategic behavior. That is, participants might have expected that individuals with higher levels of empathy and perspective-taking would be more prosocial (von Bieberstein et al., 2021) and thus more likely to reciprocate their trust in the TG. This assumption is not unreasonable considering that previous studies have shown a positive correlation between social understanding and prosocial behavior (FeldmanHall et al., 2015; Leiberg et al., 2011). As a consequence, participants might have invested more in individuals whom they deemed more socially competent in order to maximize their own output.

If participants act merely strategically, we should not find effects of gaze direction and emotional context on prosocial behavior in the DG, where the target person has a passive role, and participants' earnings are determined exclusively by their own actions. Alternatively, if the listeners' gaze and the emotional context also shape participants' generosity in a nonstrategic context, mediated by the perceived social competence of the listener, this would be more in line with an indirect reciprocity account. We preregistered these competing hypotheses as well as an analysis plan of Study 2 on OSF (https://osf.io/8ey4f).

Study 2: The Role of Gaze and Emotional Context on Giving Behavior

Method

Participants

We recruited 162 participants ($M_{age} = 28.65$ years, $SD = 9.71$, 46% female, 51.5% male, 2.5% diverse) from the same online panel as in Study 1. We used the same inclusion criteria as in Study 1. Individuals who participated in Study 1 could not participate in Study 2. The experiment lasted for approximately 15 min and participants received a flat fee of 2.4€ for their participation. Sample size was determined a priori to be the same as in Study 1, as to increase comparability between the studies.

Procedure

We followed the same study design and procedure of Study 1 with three differences. First, instead of playing a TG with the target person, participants were asked to play a DG (Camerer, 2003) where they would be in the role of the dictator and could freely decide how to allocate chips between themselves and the target person. The use of the DG is crucial to the goals of Study 2, as in this game the target person is passive. Thus, participants' decisions are devoid of a strategic component (Camerer, 2003; List, 2007), as their payoff does not depend on how the target person reacts to their decisions. Participants were endowed with 10 chips in each trial and asked how they would like to allocate these chips between themselves and the target person. Participants were informed that, at the end of the experiment, one trial would be randomly selected, and they would be paid according to how many chips they decided to keep for themselves (one chip = 0.2€).

Second, when playing the DG, participants were asked to input their responses in a text box (instead of a scale as in the TG in Study 1). This option allowed more granularity in participants' responses, as they could enter any rational number between 0 and 10 chips. Third, and last, the experiment was programed in Inquisit (INQUISIT, 2016) as it is better suitable to handle video stimuli. One of the limitations of Study 1 was that we relied on participants to start the audio and video at the same time in each trial. In Study 2, the experiment was programed such that video and audio would start simultaneously. At the end of the study, participants were asked with an open-ended question whether they doubted something about the task or instructions ("Is there anything about this experiment or the instructions that you doubted? If yes, what is it?"), whether they had any assumptions about the goals of the study, and whether they encountered any technical issues.

Data Analysis

As in Study 1, we employed a 2 (emotional context: negative or neutral) × 3 (gaze: direct, averted, or mixed) within-subjects design. We conducted the same analyses described in Study 1, following our preregistered analyses plan.

Results

Empathy Ratings

As in Study 1, ANOVA results revealed a main effect of gaze direction on empathy perceptions, $F(2, 322) = 20.62$, $p < .001$, $\eta^2_{gen} = .027$. Post hoc t tests showed that target persons displaying mixed gaze were considered more empathic than those displaying averted, $t(323) = 6.48$, $p < .001$, $d = .39$; $M_{mixed} = 3.21$, $SD = 1.48$, $M_{averted} = 2.63$, $SD = 1.5$, or direct gaze, $t(323) = 2.81$, $p = .02$, $d = .17$; $M_{direct} = 2.95$, $SD = 1.44$. Target persons displaying direct gaze were also considered more empathic than those with averted gaze, $t(323) = 3.48$, $p < .001$, $d = .22$.

We also found a main effect of emotional context, $F(1, 161) = 99.29$, $p < .001$, $\eta^2_{gen} = .063$, with higher empathy ratings being attributed to target persons who listened to a negative versus neutral story ($M_{neg} = 3.3$, $SD = 1.53$; $M_{neutral} = 2.56$, $SD = 1.35$).

Similar to previous findings (Breil & Böckler, 2021) and differently from Study 1, the interaction between gaze and emotional context was significant, $F(2, 322) = 4.54$, $p = .011$, $\eta^2_{gen} = .006$. Post hoc t tests showed that mixed gaze led to higher perceptions of empathy than averted gaze in both emotional contexts, neutral: $t(161) = 4.21$, $p < .001$, $d = .37$; negative: $t(161) = 4.92$, $p < .001$, $d = .44$, whereas perceptions of mixed gaze only led to higher empathy ratings than direct gaze in the negative emotional context, neutral: $t(161) = -.098$, $p = 1$, $d = .009$; negative: $t(161) = 4.07$, $p < .001$, $d = .35$. In contrast, target persons displaying direct gaze were perceived to be more empathic than those displaying averted gaze only in the neutral context, neutral: $t(161) = 4$, $p < .001$, $d = .37$; negative: $t(161) = 1.06$, $p = .88$, $d = .09$. Results can be seen in Table 2 and Figure 4 (left panel).

Perspective-Taking Ratings

Similarly to the empathy ratings, ANOVA results showed a main effect of gaze direction, $F(2, 322) = 19.15$, $p < .001$, $\eta^2_{gen} = .028$. Post hoc t tests revealed again that target persons displaying mixed gaze were rated higher in perspective-taking than those displaying averted gaze, $t(323) = 6.63$, $p < .001$, $d = .4$; $M_{mixed} = 3.2$, $SD = 1.48$, $M_{averted} = 2.6$, $SD = 1.5$, and direct gaze, $t(323) = 2.91$, $p = .01$, $d = .18$; $M_{direct} = 2.92$, $SD = 1.46$. Likewise, target persons showing direct gaze were rated higher in perspective-taking than those with averted gaze, $t(323) = 3.32$, $p = .003$, $d = .21$.

A main effect of emotional context on perspective-taking ratings of the target person was also observed, $F(1, 161) = 71.52$, $p < .001$, $\eta^2_{gen} = .049$, with higher ratings attributed to target persons who listened to a negative versus neutral story ($M_{neg} = 3.23$, $SD = 1.52$; $M_{neutral} = 2.58$, $SD = 1.4$).

The interaction between gaze direction and emotional context was significant, $F(2, 322) = 12.16$, $p < .001$, $\eta^2_{gen} = .015$. Post hoc t tests showed the same pattern as empathy ratings, such that mixed gaze led to higher perspective-taking ratings than averted gaze in both emotional contexts, neutral: $t(161) = 3.73$, $p < .001$, $d = .31$; negative: $t(161) = 5.55$, $p < .001$, $d = .51$, whereas the comparison between mixed and direct gaze was only significantly different in the negative emotional context, neutral: $t(161) = -1.29$, $p = .59$, $d = -.11$; negative: $t(161) = 5.12$, $p < .001$, $d = -.47$, and the comparison between direct and averted gaze only differed in the neutral emotional context, neutral: $t(161) = 4.38$, $p < .001$, $d = .41$; negative: $t(161) = .41$, $p = 1$, $d = .037$. In addition, we also found that emotional context had no effect when the target person displayed direct gaze, $t(161) = 1.49$, $p = .14$, $d = .14$, whereas negative emotional context led to higher perspective-taking ratings in the mixed gaze, $t(161) = 8.6$, $p < .001$, $d = .75$, and averted condition, $t(161) = 5.51$, $p < .001$, $d = .49$, compared to the neutral emotional context.

Giving in the DG

Results followed a similar pattern like empathy and perspective-taking ratings. On average, participants transferred 2.3 out of 10 ($SD = 2.23$) chips to the target person. ANOVA results showed a main effect of gaze direction, $F(2, 322) = 7.5$, $p < .001$, $\eta^2_{gen} = .005$. Post hoc t tests revealed that target persons displaying mixed gaze were transferred more chips in the DG than those displaying averted gaze, $t(323) = 3.72$, $p < .001$, $d = .17$; $M_{mixed} = 2.5$, $SD = 2.26$, $M_{averted} = 2.12$, $SD = 2.22$, whereas no differences were observed between mixed and direct gaze, $t(323) = 1.5$, $p = .4$, $d = .07$; $M_{direct} = 2.36$, $SD = 2.21$, or direct and averted gaze, $t(323) = 2.17$, $p = .092$, $d = .11$.

We observed a significant main effect of emotional context on the amount transferred to the target person in the DG, $F(1, 161) = 35.16$, $p < .001$, $\eta^2_{gen} = .02$, with participants giving more to the target

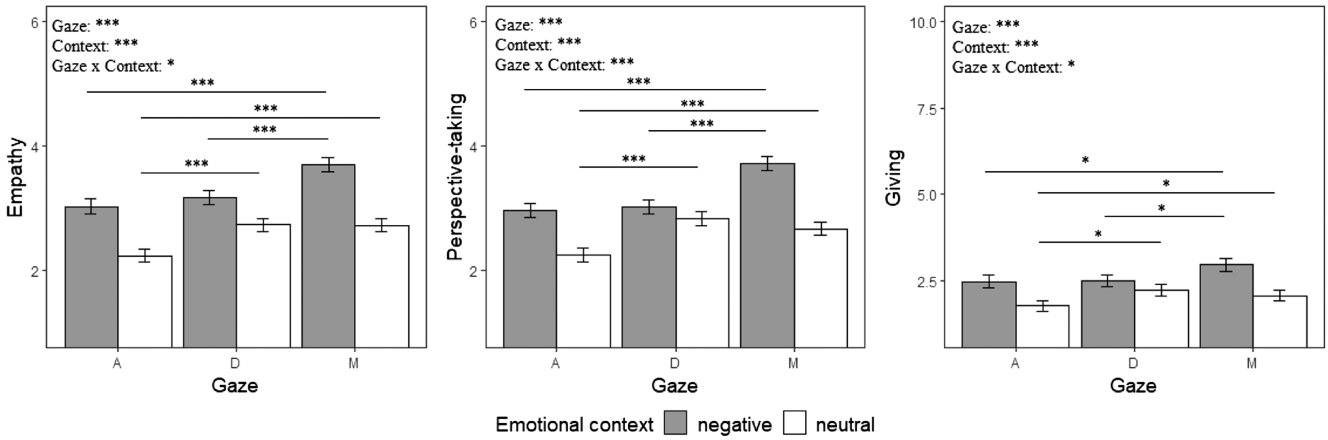
Table 2
Means and Standard Deviations of Empathy Ratings, Perspective-Taking Ratings, and Giving Behavior in the Dictator Game (Study 2)

Gaze	Emotional context	Empathy	Perspective-taking	Giving
Averted	Neutral	2.23 (1.33)	2.25 (1.39)	1.78 (1.99)
Direct	Neutral	2.73 (1.35)	2.83 (1.43)	2.22 (2.18)
Mixed	Neutral	2.72 (1.31)	2.67 (1.32)	2.06 (1.91)
Averted	Negative	3.03 (1.55)	2.96 (1.51)	2.47 (2.38)
Direct	Negative	3.17 (1.49)	3.02 (1.49)	2.51 (2.24)
Mixed	Negative	3.7 (1.49)	3.72 (1.45)	2.97 (2.48)

Note. Mean ratings of empathy, perspective-taking, and giving in the dictator game are reported by condition followed by standard deviations between parentheses.

Figure 4

Results per Gaze Condition and Emotional Context (Study 2)



Note. Participants' ratings of the target person regarding their empathizing with the speaker (left panel) and their perspective-taking (middle panel) are shown on a 6-point scale, where higher ratings indicate higher levels of ascribed empathy and perspective-taking. The average number of chips (from 0 to 10) transferred to the target person in the dictator game is shown in the right panel. The *x*-axis shows the gaze conditions (A = averted gaze; D = direct gaze; M = mixed gaze). The legend on the top corner of each panel summarizes the main results of the repeated-measures analysis of variance. Gaze refers to the main effect of gaze direction, context refers to the main effect of emotional context, and the term Gaze × Context refers to the interaction between gaze direction and emotional context.

* $p < .05$. *** $p \leq .001$.

person after they heard a negatively valenced story ($M_{neg} = 2.65$, $SD = 2.37$; $M_{neutral} = 2.02$, $SD = 2.04$).

Again, we found a significant interaction between gaze direction and emotional context, $F(2, 322) = 4.13$, $p = .017$, $\eta^2_{gen} = .003$. In particular, post hoc *t* tests showed that giving was higher for mixed compared to averted gaze for both neutral and negative contexts, neutral: $t(161) = 2.54$, $p = .036$, $d = .14$; negative: $t(161) = 2.8$, $p = .017$, $d = .2$. In contrast, the difference between mixed and direct gaze was statistically different in the negative emotional context, but not significantly different for neutral stories, neutral: $t(161) = -1.25$, $p = .64$, $d = -.074$; negative: $t(161) = 2.92$, $p = .012$, $d = .19$. Furthermore, direct and averted gaze were significantly different for neutral, but not for negative emotional context, neutral: $t(161) = 2.93$, $p = .012$, $d = .21$; negative: $t(161) = .25$, $p = 1$, $d = .017$. Moreover, emotional context did not influence giving behavior when the target person displayed direct gaze, $t(161) = 1.67$, $p = .097$, $d = .13$. In contrast, target persons were transferred a higher amount in the DG in the negative emotional context when they displayed mixed gaze, $t(161) = 5.65$, $p < .001$, $d = .4$, and averted gaze, $t(161) = 4.4$, $p < .001$, $d = .31$.

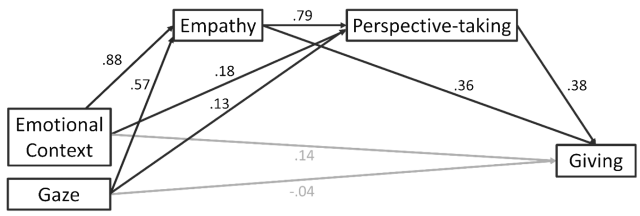
Multiple Mediation Analysis

As in Study 1, perceptions of empathy and perspective-taking were significantly correlated even after controlling for gaze direction and emotional context ($r = .83$, $p < .001$). Nevertheless, there was no indication of multicollinearity issues, as variance inflation factors were low (below 3.22) and tolerance levels were high (above 0.31). Thus, as preregistered, we conducted a multiple mediation analysis with gaze direction and emotional context as independent variables, giving in the DG as the dependent variable, perceived empathy as the first mediator, and perceived perspective-taking as the second mediator. Because the significant differences in gaze behavior were between averted and mixed gaze, we only considered these two conditions in this analysis.

Results can be seen in Figure 5. Similar to Study 1, we found that the indirect effect of gaze direction on giving through perceived empathy and perspective-taking was significant ($M = .17$, 95% CI [.11, .25]). The indirect effect of emotional context on giving through perceived empathy and perspective-taking was also significant ($M = .26$, 95% CI [.18, .36]), whereas the direct effect of gaze and emotional context on giving was nonsignificant. These results suggest that, as in Study 1, the effects of gaze direction and emotional context on prosocial behavior were fully mediated by participants' perceptions of the target person's empathy and perspective-taking. Results were similar when the order of mediators was inverted (Supplemental Figure S3) or when considering only gaze direction or only emotional valence as predictors in the model

Figure 5

Multiple Mediation Model Displaying the Direct and Indirect Effects of Gaze and Emotional Context on Giving Behavior



Note. Mixed gaze (vs. averted gaze), as well as negative emotional context (vs. neutral context), significantly increased participants' attributions of empathy to the target person, leading to higher ratings of perspective-taking and higher giving in the dictator game. Grey arrows indicate non-significant effects.

(Supplemental Figure S4). Excluding participants who did not believe they were playing with other real participants ($N = 4$) did not meaningfully change results (for full results, see the reproducible report in the OSF project folder).

Based on the results of Study 1, we hypothesized in our preregistration that the interaction between gaze direction and emotional context on giving behavior would not be significant in Study 2. In line with previous results (Breil & Böckler, 2021), however, ANOVA results showed a significant interaction between gaze and emotional context on perceived empathy and perspective-taking as well as giving behavior. We therefore conducted an exploratory multiple mediation analysis accounting for the interaction between gaze and emotional context (see Supplemental Figure S5). For this analysis, only direct and mixed gaze were included, and for each subject and outcome (i.e., empathy, perspective-taking, and giving), we calculated the difference in scores between negative and neutral contexts. We found a significant indirect effect of gaze direction on giving behavior through perceived empathy and perspective-taking ($M = .11$, 95% CI [.037, .213]). These results indicate that mixed gaze (compared to direct gaze) led to increased differences between negative and neutral contexts for empathy and perspective-taking ratings, which in turn also led to increased differences in giving behavior between negative and neutral contexts. When being confided a negative personal story, occasional gaze aversion is far more acceptable, and met with more generosity, than gaze aversion while hearing a neutral story.

Discussion

Results of Study 2 extend the findings of Study 1 to nonstrategic, incentivized generous behavior. In particular, individuals were more generous to the target person when they listened to negative stories and displayed mixed gaze in both strategic (TG) and nonstrategic (DG) contexts. These results are in line with indirect reciprocity motives (Nowak & Sigmund, 2005; Rand & Nowak, 2013), suggesting that individuals pay attention to subtle social and contextual cues and are more trusting and generous in future encounters with those whom they perceive to have displayed empathy and perspective-taking toward others (von Bieberstein et al., 2021).

We note that despite our efforts to keep the experiments as similar as possible to each other, we observed one difference in the results: While emotional context modulated the effects of gaze on prosocial behavior in Study 2, it did not in Study 1. In line with previous research (Breil & Böckler, 2021), Study 2 revealed that (occasionally) averted gaze was more accepted when the target person allegedly listened to negative stories rather than neutral ones. The modulation of gaze behavior by emotional context affected both social understanding ratings (empathy and perspective-taking) and prosocial behavior in Study 2, but only perspective-taking ratings in Study 1 (the pattern for empathy and prosocial behavior being numerically,[1] but not statistically present).

To get further insights, we conducted a direct comparison of Studies 1 and 2. Results of a mixed ANOVA with experiment (Study 1 or 2) as an additional between-subjects factor and gaze direction and emotional context as within-subjects factors revealed an expected main effect of experiment with participants transferring significantly more chips to the target person in the TG than in the DG presumably due to the strategic component of the TG, $F(1, 322) = 103.9$, $p < .001$, $\eta^2_{gen} = .15$; $M_{Study\ 1} = 4.39$, $SD = 2.67$; $M_{Study\ 2} = 2.34$, $SD = 2.23$. The main effects of gaze direction, $F(1.95, 627.2) = 12.4$, $p < .001$, Greenhouser–Geisser corrected, and emotional context, $F(1, 322) = 57.7$, $p < .001$, were significant, as well as the interaction between gaze and emotional context, $F(2, 644) = 4.95$, $p = .007$. Critically, the interactions between experiment and gaze, experiment and emotional context, and the three-way interaction between experiment, gaze, and emotional context were all nonsignificant, suggesting that the effects of gaze and emotional context did not substantially differ between Studies 1 and 2 and that the interaction is present overall (see Section S2.4 in the Supplemental Materials).

Evidence from both Studies 1 and 2 is in line with gaze and emotional context mattering for indirect reciprocity. We note, however, that other mechanisms might additionally shape the influence of gaze and emotional context on observers' prosocial behavior. In Study 3, we test whether the mere observation of someone displaying behaviors of social understanding (i.e., eye contact and listening to negative narrations) could prompt generosity toward other unknown people. Although the observation of a good act often does not influence the spread of generosity through social networks (Liu et al., 2015; Suri & Watts, 2011; Tsvetkova & Macy, 2014), these previous studies have predominantly focused on monetary exchanges in economic games, where the motives and intentions behind the observed generous behavior might not have been easily detected and/or inferred. Social contagion of generosity, however, may happen through sharing others' internal states. Based on evidence showing that eye contact can modulate the synchronization of physiological states between people (Fawcett et al., 2016; Wohltjen & Wheatley, 2021), we aimed to investigate whether observing the target person showing social understanding toward the speaker might also promote social contagion and facilitate the spread of generosity across human networks (Fowler & Christakis, 2010).

Study 3: The Role of Gaze and Emotional Context on Social Contagion of Generosity

Method

Participants

We recruited another 162 participants ($M_{age} = 28.54$ years, $SD = 9.92$, 57.5% female, 40.7% male, 1.8% diverse) from the same online panel as in Studies 1 and 2 using the same inclusion criteria as specified before. Individuals who participated in Study 1 or 2 were not eligible to participate in Study 3. The experiment lasted for 15 min and participants received a flat fee of 2.4€ for completing the study. Sample size was determined a priori to be the same as in Studies 1 and 2, as to increase comparability between the studies.

[1] See Table 1. Empathy ratings of the target person were higher in the mixed gaze negative condition ($M = 3.59$) than in the mixed gaze neutral condition ($M = 2.66$). Similarly, in the trust game, participants allocated more chips to the target person in the mixed gaze negative condition ($M = 5.2$) than in the mixed gaze neutral condition ($M = 4.11$). Nevertheless, the interaction between gaze direction and emotional context was only present for perspective-taking in Study 1.

Procedure

Study design and procedure were the same as in Study 2. The only difference being that, after viewing each video conversation, participants played a DG with an unknown and anonymous person and not with the listener they had just observed. This change in design was crucial to investigate whether observing subtle cues in social interactions can influence generous behavior toward anyone via social contagion or whether the effect on prosocial behavior is limited to indirect reciprocity and thus only regards people who have been observed before. After each video conversation, participants were endowed with 10 chips and asked how many they would like to transfer to an anonymous person, who was described as being neither the person they saw or heard in the conversation, but another individual who was participating in an unrelated online experiment. As in Study 2, participants were informed that at the end of the experiment, one random trial would be selected to determine their earnings and that they would be paid according to how many chips they decided to keep for themselves (one chip = 0.2€). At the end of the study, we asked participants whether they doubted something about the task or instructions, whether they had any assumptions about the goals of the study, and whether they encountered any technical issues using the same question as in Study 2. Hypotheses and analysis plans were preregistered on the OSF at https://osf.io/kjvpr.

Data Analysis

Following our preregistered plan, we conducted the same analyses as in Studies 1 and 2.

Results

Empathy Ratings

Replicating the findings of Studies 1 and 2, ANOVA results showed a main effect of gaze direction, $F(2, 322) = 12.56$, $p < .001$, $\eta^2_{gen} = .02$, on empathy ratings. Post hoc t tests showed that target persons displaying mixed or direct gaze were rated more empathic than those displaying averted gaze, mixed versus averted: $t(323) = 5.12$, $p < .001$, $d = .29$; $M_{mixed} = 3.06$, $SD = 1.45$, $M_{averted} = 2.63$, $SD = 1.48$; direct versus averted: $t(323) = 4.0$, $p < .001$, $d = .28$; $M_{direct} = 3.03$, $SD = 1.41$. No significant differences were observed between mixed and direct gaze, $t(323) = .36$, $p = .72$, $d = .02$.

In addition, we found a main effect of emotional context, with target persons confided a negative story receiving higher rates of empathy than those who listened to a neutral story, $F(1, 161) = 76.7$, $p < .001$, $\eta^2_{gen} = .061$; $M_{neg} = 3.26$, $SD = 1.49$; $M_{neutral} = 2.56$, $SD = 1.33$.

Similar to Study 2 and previous findings (Breil & Böckler, 2021), we observed a significant interaction between gaze direction and emotional context, $F(2, 322) = 10.39$, $p < .001$, $\eta^2_{gen} = .014$. Post hoc t tests revealed that mixed gaze led to higher perceptions of empathy than averted gaze in both emotional contexts, neutral: $t(161) = 4.17$, $p < .001$, $d = .34$; negative: $t(161) = 3.26$, $p = .004$, $d = .29$. Mixed gaze also led to higher empathy ratings than direct gaze in the negative context, whereas the opposite was true in the neutral context, neutral: $t(161) = -2.54$, $p = .04$, $d = -.23$; negative: $t(161) = 2.8$, $p = .02$, $d = .27$. Direct gaze led to higher empathy ratings than averted gaze only in the neutral context, neutral: $t(161) = 6.13$, $p < .001$, $d = .57$; negative: $t(161) = .36$, $p = 1$, $d = .037$. Results are shown in Table 3 and Figure 6 (left panel).

Perspective-Taking Ratings

Results are shown in Table 3 and Figure 6, middle panel. We found a main effect of gaze direction on perspective-taking ratings, $F(1.9, 305.6) = 11.49$, $p < .001$, $\eta^2_{gen} = .019$, Greenhouser–Geisser corrected. Post hoc t tests indicated that, in line with our preregistered hypotheses, higher perspective-taking was observed when the target person displayed mixed or direct gaze in comparison to averted gaze, mixed versus averted: $t(323) = 4.79$, $p < .001$, $d = .29$; $M_{mixed} = 3.04$, $SD = 1.41$, $M_{averted} = 2.63$, $SD = 1.41$; direct versus averted: $t(323) = 3.9$, $p < .001$, $d = .27$; $M_{direct} = 3.01$, $SD = 1.32$. In turn, mixed and direct gaze were not statistically different from each other, $t(323) = .34$, $p = 1$, $d = .021$.

A main effect of emotional context was found with higher perspective-taking ratings when the target person listened to negative stories as opposed to neutral stories, $F(1, 161) = 64.21$, $p < .001$, $\eta^2_{gen} = .051$; $M_{neg} = 3.2$, $SD = 1.39$; $M_{neutral} = 2.58$, $SD = 1.33$.

In line with Studies 1 and 2 and Breil and Böckler (2021), the interaction between gaze and emotional context was significant, $F(2, 322) = 10.02$, $p < .001$, $\eta^2_{gen} = .012$. Post hoc t tests showed that mixed gaze led to higher perspective-taking ratings than averted gaze in both negative and neutral contexts, neutral: $t(161) = 3.38$, $p = .003$, $d = .29$; negative: $t(161) = 3.4$, $p = .003$, $d = .3$. Mixed gaze also led to higher perspective-taking ratings than direct gaze in the negative context. In the neutral context, however, the opposite pattern was found, neutral: $t(161) = -2.64$, $p = .03$, $d = -.22$; negative: $t(161) = 2.84$, $p = .015$, $d = .26$. Direct gaze only resulted in higher ratings

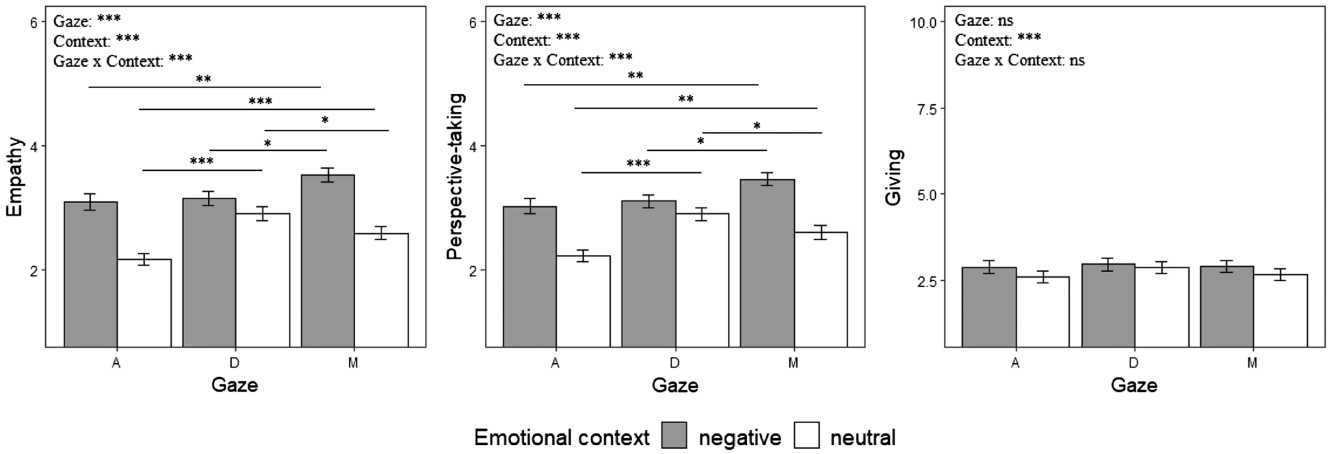
Table 3
Means and Standard Deviations of Empathy Ratings, Perspective-Taking Ratings, and Giving Behavior in the Anonymous Dictator Game (Study 3)

Gaze	Emotional context	Empathy	Perspective-taking	Giving
Averted	Neutral	2.17 (1.2)	2.23 (1.23)	2.6 (2.21)
Direct	Neutral	2.91 (1.38)	2.9 (1.35)	2.87 (2.14)
Mixed	Neutral	2.59 (1.32)	2.61 (1.33)	2.68 (2.09)
Averted	Negative	3.1 (1.58)	3.03 (1.47)	2.89 (2.3)
Direct	Negative	3.15 (1.43)	3.11 (1.28)	2.96 (2.27)
Mixed	Negative	3.54 (1.42)	3.46 (1.37)	2.9 (2.14)

Note. Mean ratings of empathy, perspective-taking, and giving in the dictator game are reported by condition followed by standard deviations between parentheses.

Figure 6

Results per Gaze Condition and Emotional Context (Study 3)



Note. Participants' ratings of the target person regarding their empathizing with the speaker (left panel) and their perspective-taking (middle panel) are shown on a 6-point scale, where higher ratings indicate higher levels of ascribed empathy and perspective-taking. The average number of chips (from 0 to 10) transferred to an unknown and anonymous person in the dictator game is shown in the right panel. The *x*-axis shows the gaze conditions (A = averted gaze; D = direct gaze; M = mixed gaze). The legend on the top corner of each panel summarizes the main results of the repeated-measures analysis of variance. Gaze refers to the main effect of gaze direction, context refers to the main effect of emotional context, and the term Gaze × Context refers to the interaction between gaze direction and emotional context.
ns: $p > .05$. * $p < .05$. ** $p < .01$. *** $p \leq .001$.

than averted gaze in the neutral context, neutral: $t(161) = 5.34$, $p < .001$, $d = .52$; negative: $t(161) = .57$, $p = .1$, $d = .058$. In addition, negative emotional contexts led to higher perspective-taking ratings than neutral contexts for both mixed, $t(161) = 6.7$, $p < .001$, $d = .63$, and averted gaze, $t(161) = 6.72$, $p < .001$, $d = .59$, whereas this difference was not significant for direct gaze, $t(161) = 1.83$, $p = .069$, $d = .16$.

Giving to an Unknown Person in the DG

On average, participants transferred 2.82 out of 10 ($SD = 2.19$) chips to an unknown person. In contrast to Studies 1 and 2, we only found a small, but significant main effect of emotional context on giving behavior, suggesting that participants transferred more to an unknown person in the DG after hearing a negative than a neutral story, $F(1, 161) = 12.29$, $p < .001$, $\eta^2_{gen} = .002$; $M_{neg} = 2.92$, $SD = 2.23$; $M_{neutral} = 2.72$, $SD = 2.15$.

The main effect of gaze direction, $F(2, 322) = 2.5$, $p = .083$, $\eta^2_{gen} = .001$, as well as the interaction between gaze and emotional context, $F(1.77, 284.4) = 0.86$, $p = .41$, $\eta^2_{gen} = .0003$, Greenhouser–Geisser corrected, did not reach significance. The lack of a significant main effect of gaze direction was supported by Bayesian analysis, which provided strong evidence in favor of a model containing only emotional context as a predictor of giving, compared to a model with both emotional context and gaze direction as predictors (BF01 = 5.58). Likewise, the lack of a significant interaction between gaze direction and emotional context was also supported by Bayesian analysis indicating that the data are indeed more likely when the model contains only emotional context as compared to a model containing also the interaction between gaze and emotional context (BF01 = 109.4).

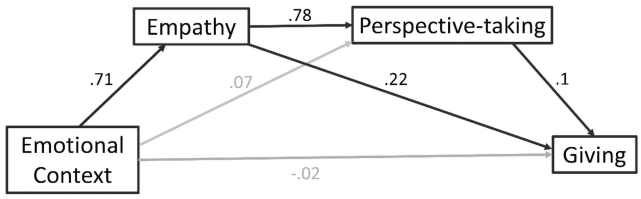
Multiple Mediation Analyses

As in the previous studies, perceptions of empathy and perspective-taking were significantly correlated even after controlling for gaze direction and emotional context ($r = .82$, $p < .001$). Nevertheless, there was no indication of multicollinearity issues, as variance inflation factors were low (below 3.16) and tolerance levels were high (above 0.32). As only emotional context significantly influenced giving behavior, we deviated from our preregistration and conducted a multiple mediation analysis with only emotional context as a predictor. We considered giving in the DG as the dependent variable, empathy as the first mediator, and perspective-taking as the second mediator.

Results can be seen in Figure 7. We found that negative emotional contexts increased attributions of empathy to the target person, which in turn led to increased attributions of perspective-taking as

Figure 7

Multiple Mediation Model Displaying the Direct and Indirect Effects of Emotional Context on Giving Behavior



Note. Negative emotional context (vs. neutral context) significantly increased participants' attributions of empathy and perspective-taking to the target person, leading to higher giving to an unknown person in the dictator game. Grey arrows indicate non-significant effects.

well, subsequently rising giving behavior to an unknown person in the DG. The indirect effect of emotional context on giving to an unknown person through empathy and perspective-taking was significant ($M = .05$, 95% CI [.015, .09]), whereas the direct effect of emotional context on giving was no longer significant. These results suggest that the emotional context of conversations can play a role in social contagion, increasing generosity toward anonymous others through increased perceptions of previously observed listeners' social understanding in a social encounter. Results were similar when reversing the order of mediators (Supplemental Figure S6). Excluding participants who did not believe they were playing with other real participants ($N = 23$) did not change results in a substantial or meaningful way (for full results, see the reproducible report in the OSF project folder).

Discussion

Results of Study 3 show that the emotional context of an observed video-based conversation, but not the gaze direction of the listener, promotes prosocial behavior toward previously unobserved individuals in subsequent interactions. Observers who witnessed listeners hearing a negative story gave more to a stranger in an immediately following interaction. Importantly, this effect was mediated by perceptions of the listeners' social understanding. This finding suggests that prosocial behavior was not solely influenced by the negative content of the story or the negative emotions it may have elicited but rather by the perceptions of the listeners' empathy and perspective-taking. Hence, participants behaved more generously toward strangers due to the prosocial tendencies they just observed in another, a mechanism referred to as social contagion of generosity (Fowler & Christakis, 2010; Tsvetkova & Macy, 2014).

To specifically address the differences between generosity toward the listener and a stranger, we conducted an exploratory direct comparison of Studies 2 and 3. Results of a mixed ANOVA with experiment (Study 2 or 3) as an additional between-subjects factor and gaze direction and emotional context as within-subjects factors revealed a main effect of experiment, $F(1, 322) = 5.17$, $p = .024$, $\eta^2_{gen} = .012$, $M_{Study\ 2} = 2.34$, $SD = 2.23$, $M_{Study\ 3} = 2.82$, $SD = 2.19$, such that giving behavior in the DG was slightly higher in Study 3 than in Study 2. Because Studies 2 and 3 were conducted in different moments with different participants, we interpret this result with caution as differences could simply reflect one sample having slightly more prosocial tendencies than the other. Nevertheless, this is an interesting and counterintuitive result that could be further explored in future studies, as it might suggest that in some contexts, social contagion could elicit higher generosity than indirect reciprocity. We also found an interaction between experiment and gaze, $F(2, 644) = 4.14$, $p = .016$, $\eta^2_{gen} = .001$, reflecting the fact that gaze direction significantly influenced generosity toward the listener (Study 2), but not toward an anonymous person (Study 3). The interaction between the experiment and emotional context was also significant, $F(1, 322) = 12.83$, $p < .001$, $\eta^2_{gen} = .002$, such that the difference between negative and neutral emotional contexts was significantly greater in Study 2 than in Study 3. Altogether, these results suggest that social signals and contextual cues mattered more when interacting with a previously observed person than when interacting with an anonymous person. This is likely because such signals and cues provide specific information about the observed person, and this information is only relevant when interacting with this person in the future. Nevertheless, Study 3 gives some indication that the emotional context of an observed encounter can lead to prosocial contagion via the ascribed social competence of the observed listener.

We note that our results contradict some of the previous literature showing no evidence of social contagion of generosity after observing a generous act (Liu et al., 2015; Suri & Watts, 2011; Tsvetkova & Macy, 2014). One possible explanation for this difference is that in our study the motivations behind prosocial inclinations might have been interpreted as more genuine. In previous studies, participants observed others being generous in economic games (e.g., public goods game: Liu et al., 2015; Suri & Watts, 2011), where it can be arguably difficult to infer whether people were simply being generous or whether other motivations played a role (e.g., their expectations that other players would also be cooperators; concerns about maximizing one's monetary gains in the experiment). Future studies should investigate whether the motivations underlying a generous act—or the ambiguity of such motivations—influence social contagion.

General Discussion

Humans rely on a range of verbal and nonverbal cues to decide whether or not being generous toward others is worth its costs. Here, we investigated whether and how social signals such as gaze direction and contextual cues like the emotional content of conversations influence the interpersonal behavior of third-party observers. Although the effect of gaze, especially eye contact, on the prosocial behavior of interacting dyads has already been established (Behrens et al., 2020; Kret et al., 2015), nothing is known about (a) whether these gaze effects extend to third-party settings, (b) how they are modulated by the emotional context of the encounter, and (c) whether prosocial behaviors are mediated by perceived social competence of the observed others. This investigation is important as it expands the typical settings in which indirect reciprocity is studied and could contribute to a more comprehensive understanding of indirect reciprocity in real life, taking into account how social and contextual cues might influence observers in forming initial impressions of others and acting on said impressions.

Across two studies, we expanded previous findings by demonstrating that subtle social signals like gaze behavior and the content of social encounters affect not only observers' perceptions of the listener's social skills but a range of costly prosocial behaviors toward the listeners in subsequent interactions in both strategic and nonstrategic settings. Specifically, listeners who displayed mixed gaze (as compared to averted gaze) and who were confided a negative story (as compared to a neutral story) were rated higher in terms of empathy and perspective-taking and were met with more trusting (Study 1) and more giving behavior (Study 2). Additionally, our findings shed light on the process by which gaze and contextual cues affect observers' prosocial behavior. In both studies, observers' perceptions of the listeners' social understanding fully mediated the relationship between gaze direction, emotional context, and prosocial behavior.

Because we found a significant influence of gaze direction and emotional context on the prosocial behavior of observers in both strategic (i.e., the TG) and nonstrategic settings (i.e., the DG), we ruled out that participants behaved generously toward the listeners purely due to strategic considerations to maximize their payoffs.

Instead, our results are in line with indirect reciprocity (Nowak & Sigmund, 2005; Rand & Nowak, 2013). That is, participants might have been more generous to listeners whom they previously perceived to have acted nicely toward the speaker.

Indirect reciprocity is essential for the maintenance of cooperation in large societies (Rand & Nowak, 2013). By observing others interact, individuals can learn important information about other's reputations, which is then selectively used in subsequent social encounters. Previous studies have focused on observed prosocial behavior (mostly in economic games) toward another as a signal of reputation (Almenberg et al., 2011; Watanabe et al., 2014; Wedekind & Milinski, 2000). More recently, a study showed that observing others' empathy scores in a standardized test also elicited indirect reciprocity (von Bieberstein et al., 2021). Here, we extended these results to a more naturalistic situation and showed that individuals use social signals and contextual cues in social interactions as an indication of others' disposition for tending to others' needs, which in turn leads to indirect reciprocity.

Interestingly, previous studies show that being seen acting nicely toward others not necessarily translates to a good reputation. The motives underlying one's behavior seem crucial for reputation building (Berman & Silver, 2022). While helping others due to self-interest is negatively perceived, individuals who show signs of emotions or empathy while doing good deeds are usually seen as more altruistic (Erlandsson et al., 2020), likely because emotions are perceived as a genuine signal of one's concern for others (Barasch et al., 2014). Similarly, we argue that social signals such as where individuals are looking while listening to other people and contextual cues such as whether they are confided a personal negative story might provide insights into their social affect and social cognition, which are perceived as genuine and reliable signs of their prosocial inclinations. This perception, in turn, leads others to reciprocate and behave more trusting and generously toward them.

Beyond indirect reciprocity, results of Study 3 indicate that observing someone listening to an emotionally difficult personal story, but not their gaze behavior, influences generosity toward previously unobserved individuals possibly through a mechanism of social contagion. Social contagion of generosity is a contentious topic with mixed results. Some studies find evidence that being the target of a good action increases generosity toward others (Fowler & Christakis, 2010; Tsvetkova & Macy, 2014), while other studies report null results (Capraro & Marcelletti, 2014). The mere observation of a good act, however, does not seem to necessarily influence prosocial behavior toward others (Liu et al., 2015; Suri & Watts, 2011; Tsvetkova & Macy, 2014). While our results provide further indications that witnessing a listener shows social understanding toward a speaker could induce social contagion of generosity toward strangers, further studies are needed to provide more conclusive evidence. For example, it would be interesting to examine whether contextual cues provoke incidental emotional effects that lead to generosity or whether social contagion could happen through a synchronization of emotional and physiological states between the person doing a good deed and the observer, which later yields more generosity.

Our results have several implications. First, our findings replicate previous research (Breil & Böckler, 2021) on the importance of emotional context for the interpretation of gaze behavior. While (occasional) direct gaze usually leads to increased attributions of social understanding to the listener, gaze avoidance in negative situations seems to be fairly acceptable and does not hurt listeners' reputations as an empathic person. This pattern is also in line with findings demonstrating that while people generally evaluate eye contact positively, there is a limit to how long eye contact should last before it becomes less comfortable (Binetti et al., 2016). Our findings indicate that, beyond explicit and verbal behavior, subtle gaze signals and contextual cues can also impact different forms of prosocial behavior (i.e., trust and giving) through indirect reciprocity and social contagion. These results open up interesting venues for future research on the interpretation of gaze behavior. The observation of gaze behavior in dynamic settings could allow a more comprehensive understanding of how a variety of gaze signals (e.g., frequency of shifting gaze, direction and timing of gaze shifting) is interpreted. Furthermore, given the richness of social interactions, future studies could investigate whether our results generalize to other social and contextual signals such as gestures (Chu et al., 2014). Second, our findings reiterate the important interplay between social perception and social decision making (Jenkins et al., 2018) by showing that gaze direction and emotional context in an observed interaction influence prosocial behavior through perceptions of the social–affective and cognitive skills of others. The observation of those deemed to be socially competent leads to increased generous behavior toward them but also seems to influence the spread of generosity to other social encounters. Future studies could expand our findings to other domains of prosocial behavior such as partner selection (Fu et al., 2008) and altruistic punishment and compensation. Although one's empathic concern has been demonstrated to be relevant to determine reactions to injustice (Leliveld et al., 2012), less is known regarding how perceptions of offenders' and victims' social affect and cognition may influence their respective punishment and compensation. Similarly, it would be interesting to investigate whether gaze direction and emotional context are differently interpreted and acted upon when observing social interactions with imbalance power structures such as in leadership contexts (Cheng et al., 2022). Finally, the chain from social signals and contextual cues to social perception and social decision making brings important reflections regarding the treatment of nonneurotypical individuals. Research has shown that the gaze behavior of individuals on the autism spectrum differs from neurotypical individuals (Senju et al., 2004, 2005). As a consequence, they might be misperceived as being less empathic (Johnson et al., 2009), which might have negative consequences for how they are treated, ultimately impacting their well-being (Mitchell et al., 2021). Future studies could examine whether social cognition training as an intervention for nonneurotypical individuals as well as inclusive education for neurotypical individuals could minimize this misperception as well as its consequences. It might also be interesting to investigate how the perception of nonverbal cues in social interactions as well as its downstream consequences in prosocial behavior differ in nonneurotypical populations or different cultures.

We note that to better understand the specific role of gaze direction and emotional context on third-party decision making, we deliberately left out other important social cues in human interaction such as facial expressions. This high level of experimental control also can be seen as a limitation of our study, as the lack of listeners' facial expressions and emotional reactions to the speakers' narration could arguably have made the social interactions presented to participants feel somewhat unnatural, which in turn could limit how much participants believed our stimuli. Indeed, we observed that,

when asked whether they had noticed or doubted something about the experiment, some participants mentioned they did not believe the person in the video was real across the three reported experiments. Nevertheless, they only made up a small proportion of total participants, and excluding these suspicious individuals from our analyses did not meaningfully change any of the results. Regarding the generalizability of our findings, we argue that the simultaneous presentation of additional congruent social cues could make our results stronger, presumably by making the evaluation of others' social affect and cognition prompter and/or by increasing confidence in these evaluations. Accordingly, recent studies have shown that immediate effects of gaze direction on attention capture are strengthened when emotion expression and gaze direction are congruent in terms of approach or avoidance orientation (Breil et al., 2022; Pittig et al., 2023; van der Wel et al., 2022).

Another limitation of our studies is that the prosocial decision always followed the social understanding evaluations of the target person. Thus, we cannot rule out an anchoring effect, such that thinking of how much the target person was empathic and able to take others' perspectives influenced prosocial decisions toward them. We argue, however, that when deciding whether to be prosocial, individuals might already spontaneously engage in thoughts about the target of the prosocial behavior (e.g., how nice they usually are, how much they need help). Hence, even when not prompted to deliberately think about their perceptions of others, witnessing a range of social cues and contextual signals that indicates how warm, kind, and caring one person is might increase prosocial behavior toward them. Finally, some aspects of our experimental design (e.g., asking participants to take the perspective of the speaker, the target person's gaze behavior directed at the camera) might have encouraged some participants to adopt a dyadic interaction mindset. However, we believe such effects should be minor. For once, individuals might generally take the perspective of the people they observe interacting independent of instructions; however, given that the interactions were rather short and that the narrations clearly dealt with specific autobiographic episodes from other people, we doubt that our results were caused by participants fully immersing in the interaction as if they were themselves the narrators. The development of experimental settings that can more clearly distinguish third-party and second-party effects (for instance, by having participants themselves tell autobiographic stories in a dyadic interaction) could add valuable insight into the role of social cues and social settings for interpersonal decisions.

Taken together, our results suggest that both where someone is looking during a conversation and the emotional content of said conversation shape how we perceive their socio-affective and sociocognitive skills. Crucially, this perception of others' empathy and perspective-taking influences our trusting and generous behavior toward them. Beyond these clear indications of indirect reciprocity—acting nicer toward those whom we perceived as nice—our results suggest that this generosity can even generalize to anonymous others through social contagion. Hence, despite their subtlety, gaze cues show a substantial impact on third-party social interactions—an impact, that, similar to second-party interactions, critically depends on the context.

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