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Special Section Paper

What drives the (un)empathic bystander to intervene? Insights from eye tracking

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Norm violations (e.g., unfair transgressions) are often met with punishment even by people who are not directly affected. However, punishing a transgressor is not the only option for a bystander to restore justice. Empathic concerns may dictate instead to give a helping hand to a victim. Using a pre-registered, fully incentivized eye-tracking study ($N = 47$), we investigated the cognitive mechanism linking bystanders' empathic concern and justice-restoring intervention behaviour. The results show that not only the decision to intervene (i.e., either costly compensating the victim or punishing the transgressor) but also the attention directed towards a victim's payoffs (i.e., measured by the proportion of fixations) during the decision-making period systematically varied with the individual level of empathic concern. Exploring this link further, we additionally instructed participants to focus on specific components of the norm violation, namely the (un)fair conduct of the offender or the victim's feelings. Surprisingly, highly empathic bystanders were more likely to punish the offender when the norm violation was highlighted. However, we did not observe the modulation of the instructed focus on the link between gaze-based measures and empathic concern. Overall, these results provide initial evidence about the interacting impact of empathic concern as well as the focus on specific components of the norm violation when bystanders respond to unfair transgressions.

Humans rely on a complex social norm system, which is crucial for the development and maintenance of society. One strong social norm is related to fairness (Fehr & Fischbacher, 2004a). However, fairness norms are violated due to selfish motivations while allocating resources. In many cases, we witness such violations merely as unaffected third-party bystanders. Previous studies in the laboratory as well as in the field have revealed that bystanders in such cases often punish unknown offenders by reducing offenders' payoffs, even when this punishment is costly and when bystanders are themselves unaffected by the breach of the fairness norm (Balafoutas, Nikiforakis, & Rockenbach, 2014; Bernhard,

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Fischbacher, & Fehr, 2006; Fehr & Fischbacher, 2004b). This so-called third-party punishment is regarded as a type of human behaviour which contributes to enforcing social norms in human society (Fehr & Fischbacher, 2004b) and develops very early in life (Lergetporer, Angerer, Glätzle-Rützler, & Sutter, 2014; McAuliffe, Jordan, & Warneken, 2015). Real-world examples that call for or allow third-party punishment can be found in a wide set of contexts and comes with different forms. While intervening when someone behind you cuts the line might be punished only with a demonstrative frowning, stepping up at the bus stop when a drunk starts yelling at another passenger takes courage and might come with large costs to oneself.

However, behavioural experiments show that, in situations in which norms were violated, bystanders sometimes prefer to help unknown victims with their own endowment instead of punishing a transgressor (Leliveld, Dijk, & Beest, 2012; Lotz, Baumert, Schlösser, Gresser, & Fetchenhauer, 2011; Lotz, Okimoto, Schlösser, & Fetchenhauer, 2011). Notably, Leliveld *et al.* (2012) revealed that the preference for a specific behaviour depended on the individual level of empathic concern in one-shot interactions. Empathic concern refers to being moved by another person's suffering (Batson *et al.*, 1988; Coke, Batson, & McDavis, 1978). As a personality trait, it has been shown to be associated with moral and prosocial behaviour (De Waal, 2008; Decety, Bartal, Uzefovsky, & Knafo-Noam, 2016; Dovidio, 1991; Preston & De Waal, 2002) and has reliably been associated with helping behaviour in a variety of different paradigms (Coke *et al.*, 1978; Eisenberg & Miller, 1987; FeldmanHall, Dalgleish, Evans, & Mobbs, 2015; Light *et al.*, 2015). In particular, results of the study by Leliveld *et al.* (2012) showed that third parties with higher levels of empathic concern were more likely to compensate the victim, while participants with lower empathic concern were more likely to punish the offender. This finding has recently been extended to a similar setting with repeated decisions (Hu, Strang, & Weber, 2015).

The above findings spark an interesting question: What are the cognitive processes driving these individual differences in third-party intervention decisions via empathic concern? Previous studies already pointed to different underlying motives. Punishment, for instance, seemed to be driven by just deserts concerns (Carlsmith, 2006; Carlsmith, Darley, & Robinson, 2002). Help and compensation, on the other hand, might be motivated by a feeling of empathic concern towards the victim (Gromet & Darley, 2009). Critically, from the perspective of information processing, the empathic response always requires the involvement of attention. According to the perception-action model of empathy (Preston & De Waal, 2002), attention is required to first represent the emotional state of the other individual, which is followed by the automatic and somatic response. Such response serves as the basis for the higher-level empathic concern (De Waal, 2008). Thus, people with higher empathic concern might pay more attention to the victim's suffering, which enhances the motives to help and finally leads to a higher probability of helping the victim.

One shortcoming of the previous literature is the lack of insight in the underlying decision mechanism. A repeatedly used tool to infer decision and information search processes is eye tracking. It provides several unobtrusive-dependent measures of gaze behaviour, which have been linked to otherwise unobservable cognitive processes involved in decision-making (Orquin & Loose, 2013). To infer how information search and processing develop during decision-making gaze recordings can be used to analyse in particular the selectivity in perception (i.e., visual attention, Ashby, Walasek, & Glöckner, 2015). The proportion of fixations is thereby one key index of gaze behaviour. It describes the proportion of fixations that are directed towards a specific information or a subset of

attributes relative to the overall fixation count in a given trial (Fiedler & Glöckner, 2015; Orquin & Loose, 2013). Previous studies have already shown a link between social preferences and attention distribution in modified dictator games (Jiang, Potters, & Funaki, 2015) and more complex public good games (Fiedler, Glöckner, Nicklisch, & Dickert, 2013). This evidence indicates that proportion of fixations towards specific pieces of information can be used as a proxy for the weighting or importance of specific attributes in the decision process. Here, especially first and last fixations are of importance: The distribution of either fixation might dissociate between the early and late effects of intrinsically driven attention during decisions (Krajbich, Armel, & Rangel, 2010; Krajbich & Rangel, 2011). Moreover, other gaze indices reflect additional attention-relevant information search processes. The fixation number, for example, is usually taken as a measure of information search effort, providing information beyond simple decision time measures (Fiedler & Glöckner, 2012; Fiedler *et al.*, 2013; Glöckner & Herbold, 2011). This effort measure is operationalized through the measurement of the number of stops in an eye movement directed at the presented information.

To test the relationship between empathic concern and third-party intervention decision-making process as the primary goal of the present study, we adopted a modified third-party economic paradigm in the baseline block (i.e., the first block) of the experiment, in which participants, as uninvolved bystanders, observed unfair monetary allocations of unknown proposers (offenders). Using their own endowment, bystanders then had the chance to intervene or to keep the money. Intervening bystanders had the possibility to either help the victim by increasing their payoff, or punish the offender by decreasing their payoff. Choice behaviour, decision times and gaze-based information search patterns (i.e., number of fixations, proportion of fixations, first fixation, and last fixation) were recorded and analysed as dependent variables (DVs) during the whole study.

Based on the theoretical framework of the perception-action model of empathy, we hypothesized that individuals with a higher level of empathic concern are more sensitive to another person's suffering caused by the unfairness and thus would choose to help more often (H1a). Given previous findings (Hu *et al.*, 2015; Leliveld *et al.*, 2012), we also expected to replicate the results that less-empathic participants would choose to punish more frequently (H1a). Following this argument further individuals with high empathic concern would intuitively favour to help, hence experience less decision conflict resulting in less deliberation when choosing to help. Hence, we predicted that the information search effort (i.e., decision time and fixation number) for participants with higher level of empathic concerns would be low in helping decisions, but higher in punishment decisions (H1b). Finally, we assumed that a higher level of empathic concern would also result in a higher proportion of fixations (as well as a higher likelihood of last fixation) towards victim-relevant payoffs (rather than offender-relevant payoffs) due to the increased importance and weighting of the experienced unfairness (H1c).

To further understand the link between empathic concern and attentional focus in more detail, we additionally investigate the underlying cognitive process when different aspects of a norm violation are highlighted. Recent studies have shown that the manipulation of such focus points during the decision process can influence subsequent choices in various contexts such as food choice (Hare, Malmaud, & Rangel, 2011) or (un)fairness-related decisions (Hutcherson & Rangel, 2014; Makwana, Polania, & Hare, 2014). Particularly, within our recent experiment (David, Hu, Krüger, & Weber, 2017), bystanders were presented the various unfair scenarios and asked to choose to punish the

offender, compensate the victim or do nothing (i.e., keep all endowments). As a key manipulation, we instructed bystanders sometimes to consider the (un)fairness of the violator (offender-focused condition) or to think about the feelings of the victim (victim-focused condition) before making a choice. Intriguingly, bystanders became more help-oriented in the victim-focused condition but increased their punishment frequency while focusing on the offender's unfairness.

To further investigate the decision process characterizing the causal relationship between decision-making focus and third-party intervention behaviours, in the present study, we introduced a manipulation of instructed focus as mentioned above (i.e., one offender-focused block; one victim-focused block) after the baseline block (i.e., the block where participants made decisions without the guide of any instruction). Our instructions aimed to increase the salience of different aspects in a norm violation context which might modulate the cognitive process of bystanders' varying in empathic levels. Based on previous findings, we first expected that bystanders would help more often in the victim-focused block, while punishing more often in the offender-focused block (H2a). Furthermore, the instruction to consider the feelings of the victim (i.e., victim-focused block vs. baseline block) aimed at directing more attention to the victim and facilitate the process of choosing the help option. In contrast, focusing on the (un)fairness of the offender (i.e., offender-focused block vs. baseline block) was thought to reducing their attention resource to the victim and hence obstruct the process of helping.

Meanwhile, when deciding to help, we expected that information search efforts (i.e., reflected by decision time and fixation numbers) would be reduced in the victim-focused block but increased in offender-focused block, while the reverse pattern for punishment decisions was expected (H2b). Bystanders would, in the victim-focused block, thereby focus predominantly on the victim-relevant payoffs (i.e., higher proportion of fixations and higher likelihood of last fixation) (H2c). We also tested the interaction between instructed focus and empathic concern on the above measures (H3a-c). All hypotheses introduced above as well as the corresponding analyses plan were pre-registered at https://osf.io/m92pc/ (also see Table S1).

Methods

Participants

For this eye-tracking study, 47[1] participants were recruited to participate as third parties (e.i., bystanders) in the laboratory (17 males: mean ± *SD* age = 24.26 ± 6.02). To complete our fully incentivized design avoiding any form of deception, an additional 94 participants in the role of an offenders ($N = 47$) or victims ($N = 47$) were matched to the bystanders through an online experiment. Notably, none of these online participants attended the eye-tracking study. All participants were recruited via ORSEE (Greiner, 2015). The study was approved by the ethics committee of the University, and written informed consent was given by all participants according to the Declaration of Helsinki (BMJ 1991; 302: 1194).

[1] *An a priori power analysis using the effect estimates from a previous study (Hu* et al., *2015) revealed that thirty-four participants would be needed to reach 80% power (see Table S3 for the protocol; also see pre-registration for details). We went above this suggestion in the limits of our budget and decided to collect data from 47 triplets (one offender, one victim, one bystander).*

Procedure

We adopted a modified version of the third-party punishment game (Fehr & Fischbacher, 2004b), described by Leliveld *et al.* (2012) and used in previous studies (Hu *et al.*, 2015, 2016). The game included three roles, namely the offender (online participants, labelled as 'Player A'), the victim (online participants, 'Player B'), and the bystander (participants invited to the lab). In the online part, the offenders were presented with a series of monetary allocation pairs between themselves and an anonymous victim. Both offenders and victims were informed that their decisions as well as their initials would be forwarded to third parties, who could influence their final payoff. Based on the choices of offenders, 84 unfair offers with different monetary allocations were selected as target stimuli for the eye-tracking study and supplemented by 15 fair offers as non-target trials (see Table S2 for details). Five days after the online experiment, in the subsequent eye-tracking phase of the experiment, the participants (i.e., bystanders) were presented with the allocations made by the offenders and asked to decide whether and in which capacity they wanted to intervene. Participants needed to choose one from the following three options: reducing the offenders' payoff, increasing the victims' payoff (both with a 1:3 investment ratio[2]), or keeping their entire personal endowment for themselves (i.e., €10 per round). To make sure all participants understand the task (including the setting, the payoff structure, the rule of payment, etc.), participants had to answer a set of control questions before starting their decision sets. The real task would not start unless they answered all the questions correctly.

Each eye-tracking session consisted of three blocks. The baseline block was always first and used to measure the intrinsically motivated, 'natural' behaviour of the participants. Since we were interested in how an instructed focus influences behaviour, participants were not informed about the upcoming two blocks until they completed the baseline block. In the 'attention manipulation' blocks, participants were instructed either to focus their attention on the offender ('Focus on the justice of Player A's conduct', offender focus), or on the victim ('Focus on Player B's feeling', victim focus) before making their choice (for details of the instruction, see Supplementary Information). The order of the two blocks with instructed focus was counterbalanced across participants.

At the beginning of each block, participants saw an instruction screen informing them about the task and the specific aspects (if any) which they should focus on during their decisions. Additionally, on each decision screen, a short reminder was displayed and five practice trials were performed to ensure understanding of the task and the display. Each block included 33 incentivized trials. In each trial, participants were endowed with €10. Before each decision, a blank screen (2,000 ms) and a fixation cross (500 ms) were presented. Participants then saw the chosen monetary allocation for a pair of offender and victim, including the payoffs (in Euro) and corresponding proportion of overall payoffs (in per cent) from both parties, which were displayed in a white ellipse with four parts. To individualize each decision, the initials of the offender and the victim were also displayed on the screen (see Figure 1). On each decision screen, participants were asked whether they would like to decrease the offender's payoff or to increase the victim's payoff. Once they made a choice, the trial went to the transfer phase, in which participants were asked to indicate further by how much they would like to increase or decrease the payoffs of the other players (the transfer phase). A cue was shown on top of the option that participants

[2] *For an investment of € 1, the offenders' payoffs could be reduced by € 3 or the victims' payoffs could be increased by € 3 (see Fehr & Fischbacher, 2004b, Leliveld* et al., *2012, and Hu* et al., *2015 for similar procedures).*

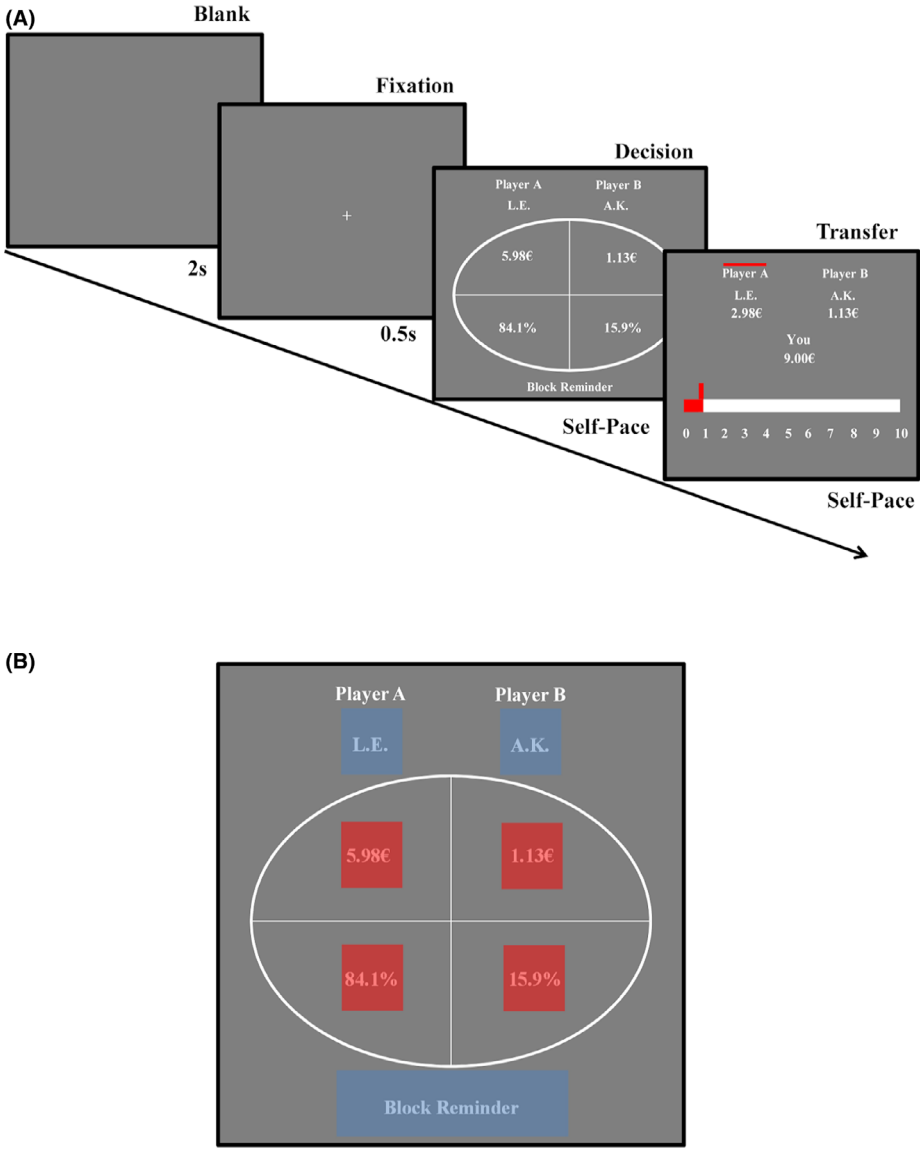

Figure 1. (A) Procedure per trial in the eye-tracking part. (B) Decision screen including a layover of the pre-defined areas of interest (AOI). *Note.* Block reminder refers to either 'consider A(B)'s (un)fairness' or 'consider B(A)'s feeling', depending on the experimental condition (block) and the display version (see Supplementary Information for details); seven non-overlapping areas of interest (AOIs) were pre-defined. In particular, four target AOIs, containing the absolute/relative payoff of either the offenders or the victims, were sized 100 × 100 pixels (marked in red in the figure, but not visible to the participant, approx. 28 × 28°visual angle).). Besides, we adopted three additional AOIs, used to quantify the quality of the eye-tracking data per trial during the pre-processing (see supplementary Information for details). These AOIs included the following areas: Two square areas covered the initials of either the offender or the victim sized (100 × 100 pixels), and one rectangular area covered the instruction reminder sized (390 × 100 pixels, approx. 87 × 28°visual angle).). [Colour figure can be viewed at wileyonlinelibrary.com]

chose. In both phases, all payoff and name information were counterbalanced between participants to correct for biases due to natural reading behaviour (see Figure S1). In both, the decision and the transfer phases, there was no time limit. Participants responded by key press in both phases of the task. The display of the task and response collection was performed with NBS Presentation 14.9 (program available at https://osf.io/4rn6z/. Eye movements were recorded using the eye gaze binocular system (LC Technologies) with a remote binocular sampling rate of 120 Hz and an accuracy of about 0.45°. We ran up to three people in parallel and decisions were presented on a 17" or a 19" colour monitor with a native resolution of 1,280 × 1,024. The pixel size of the information presented was kept constant with all three eye-trackers. Participants were seated in a distance of approx. 60 cm from the screen; this distance was the same for all eye-tracking devices.

It is important to highlight the following details of the paradigm and the procedure: First, the words 'help/punish' and 'offender/victim' were not used in the instructions (but rather labelled as 'increase/subtract' and 'Player A'/'Player B', respectively) to avoid demand characteristics. Second, participants were clearly told that they could decide to invest €0 in the transfer phase. In this way, every costly decision could be regarded as their voluntary decision. Third, the default position of the amount participants could invest in the transfer phase was randomly set between 0 and 10 in each trial. Finally, the offender could not receive negative payoffs (i.e., the minimum payoff was €0).

After completing the above task, participants had a short break and were asked to perform another independent task.[3] At the end of the study, one trial was randomly selected to pay all three parties accordingly.

Empathic concern measures

For all participants, empathic concern was measured by the empathic concern subscale (seven items, e.g., 'I often have tender, concerned feelings for people less fortunate than me'; 0 = *does not describe me very well*, 4 = *describes me very well*; Cronbach's $\alpha = 0.79$; total scores: mean ± *SD* = 18.39 ± 3.72; range: 9–26) of the Interpersonal Reactivity Index (Davis, 1980, 1983), and demographic variables (e.g., gender, age) were collected at least 12 hr before they came to the lab using an online questionnaire administered via Unipark (questionnaire available at https://osf.io/4rn6z/).[4]

Data analyses

Fixation number and the proportion of fixations towards pre-defined areas of interests (AOI) were aggregated per trial. Mixed-effect repeated-measures regressions were adopted as the main statistical approach within our pre-registered analyses. We report two-sided test statistics in all analyses below. In case we have directed hypotheses (H1 to H2c), we also interpret marginally significant effects ($p < .10$, two-sided), which corresponds to a one-sided test of $p < .05$. A full description of the data pre-processing, including the definition of the AOI as well as quality thresholds and regression analysis

[3] *In this task, participants were asked to rate the perceived unfairness of the offers, experienced empathic concern for the victim, and deserved punishment for the offender in trials they saw in the baseline block, with their eye movement also recorded. These data will be reported elsewhere.*

[4] *In the online questionnaire, participants provided responses to the full IRI, which includes three additional subscales (i.e., Fantasy, Personal Distress and Perspective Taking) besides empathic concern. Additionally, we ran the social value ring measure (Liebrand & McClintock, 1988) for another explorative study. Hence, we only used the empathic concern subscale in the current study based on our pre-registered hypotheses.*

details, is presented in the supplementary information. The means ($\pm$ *SD*) of all dependent variables are listed in Table S4. Correlations between all continuous predictors used in the later analyses are listed in Table S5. In the current study, we report all measures, manipulations, and exclusions. All data and codes of analyses are available at https://osf.io/bva3z/. All analyses were pre-registered and further exploratory analyses[5] are labelled as such.

Results

Uninstructed decision-making in the baseline block (H1a-1c)

Choice behaviour

In order to test whether the effect of empathic concern on choice found in previous studies could be replicated, we calculated a mixed-effects repeated-measures logistic regression on intervention behaviour with empathic concern as our target predictor, and trial number controlling for the time effect (H1a). Results showed that people were more likely to help victims the higher their empathic concerns were ($OR = 1.215$, $z = 1.93$, $p = .053$), while, as expected, with higher-level empathic concern, people were less likely to punish offenders ($OR = 0.769, z = -1.92, p = .055$). Additionally, we found that empathic concern was not significantly associated with the general decision to intervene in the situation ($OR = 0.959, z = -0.46, p = .65$; see Table S6).

Information search behaviour

To test whether individual empathic concern was linked to information search effort, we ran a mixed-effect repeated-measures linear regression on fixation number and decision time with empathic concern as a predictor, again controlling for trial number (H1b).[6] Contrary to H1b, empathic concern did not predict the overall fixation number and decision time during either help (fixation number: $b = 0.002$, $z = 0.12$, $p = .907$; decision time: $b = -0.014$, $z = -0.70$, $p = .487$) or punishment choices (fixation number: $b = -0.004$, $z = -0.12$, $p = .901$; decision time: $b = -0.011$, $z = -0.44$, $p = .662$; see Table S7).

Moreover, we analysed the proportion of fixations directed towards victim-relevant payoffs (both the absolute and relative payoff). In line with H1c, participants showed a higher proportion of fixations towards victims' payoffs with increasing empathic concern ($b = 1.046$, $z = 2.83$, $p = .005$). This effect did not vary between help and punishment choices (see also Table S6). The analyses testing whether empathic concern predicts the likelihood of looking at the victim right before the decision (i.e., the last fixation) failed to reach standard levels of significance ($OR = 1.080$, $z = 1.50$, $p = .134$). Additionally, an explorative analysis on the first fixation with the same predictors revealed a trend that more empathic participants were more likely to attend the victim's payoff information at the very first glance ($OR = 1.305, z = 1.79, p = .074$; see Table S8 for the separate analysis of helping and punishment and choices).

[5] *All of our analyses on the first fixation as well as those analyses of robustness check (regression analyses controlling for sum of payoffs, offender taking, and gender) were regarded as additional analyses (also see Supplementary Information).*

[6] *Given that the fixation numbers and decision times are not normally distributed in either Baseline (Jarque-Bera (S-K) test: fixation number: $\chi^2(2) = 423.34$, $p < 0.001$; decision time: $\chi^2(2) = 318.74$, $p < 0.001$) or all conditions (Jarque-Bera (S-K) test: fixation number: $\chi^2(2) = 1{,}237.52$, $p < 0.001$; decision time: $\chi^2(2) = 1{,}461.52$, $p < 0.001$), we performed a log-transformation on both measures before the analyses.*

The effect of instructed focus (H2a-3c)

Choice behaviour

We then analysed whether manipulating the instructed focus influenced choices. We ran a repeated-measures mixed-effect logistic regression separately for helping and punishing choices, with instructed focus (dummy coded; with baseline block as the reference category, same below) and empathic concern as predictors, controlling for time (H2a). To test the interaction of instructed focus manipulation with empathic concern further (H3a), we added the respective interactions (dummy variables) as additional predictors in a second regression. Consistent with H2a, participants were generally more likely to punish ($OR = 2.213, z = 3.17, p = .002$) while focusing on the norm violation of the offender (vs. baseline block). However, the helping behaviour was only marginally boosted when bystanders considered the victim's feeling (victim-focused block vs. baseline block; $OR = 1.302, z = 1.43, p = .141$). An analysis of the interaction showed that participants with higher levels of empathic concern, compared with those with lower levels of empathic concern, were *less* likely to help in either offender-focused block ($OR = 0.885$, $z = -3.88$, $p < .001$) or victim-focused block ($OR = 0.925$, $z = -2.44$, $p = .015$), but more likely to punish in offender-focused block ($OR = 1.125$, $z = 3.09$, $p = .002$, see Figure 2 and Tables S9 and S10). Thus, results were in only partially in line with H3a (see Table S1 for a systematic compilation of all hypotheses to allow for easy comparison).

Information search behaviour

Investigating the changes elicited by instructed focus in the underlying cognitive processes (H2b) revealed that the effort of information search was increased when focusing on the offender's norm violation (i.e., offender-focused block) during helping decisions (fixation number: $b = 0.104$, $z = 2.40$, $p = .017$; decision time: $b = 0.122$, $z = 2.83$, $p = .005$). The same analyses on punishment yielded a similar effect (fixation number: $b = 0.189, z = 1.78, p = .075$; decision time: $b = 0.158, z = 1.65, p = .099$). No such increase was observed for situations in which participants were asked to focus on the feelings of the victim (victim-focused block), and empathic concern had no significant overall effect (Table 1). However, participants with higher (vs. lower) level of empathic concern showed consistently more fixations ($b = 0.046, z = 2.14, p = .032$) and needed more time ($b = 0.045, z = 2.30, p = .021$) to make a punishment decision in the victim-focused block (H3b; Table 1).

Additionally, we investigated the attention-induced changes concerning the proportion of fixations as a measure of weight given to a particular piece of information. Contrary to H2c, participants did not show different fixation distribution patterns towards victim's payoff in the offender-focused ($b = -0.930, z = -0.70, p = .486$) or victim-focused block ($b = 0.083, z = 0.06, p = .949$). Also, we observed no overall effect of empathic concern on proportion of fixations ($b = 0.685$, $z = 1.45$, $p = .146$). However, participants with increasing empathic concern fixated less on the victim in both the offender-focused ($b = -0.511$, $z = -2.04$, $p = .042$) and victim-focused block (H3c; $b = -0.552$, $z = -2.15, p = .032$; see Table 2; Figure 3).

Furthermore, as predicted (H2c), the analyses on the last fixation revealed that participants were less likely to attend victim-related information in the offender-focused block (vs. baseline block: $OR = 0.727$, $z = -1.79$, $p = .073$). Unlike the prediction of H2c, however, they were not more likely to attend the same piece of information in the victim-focused block (vs. baseline block: $OR = 0.860$, $z = -0.84$, $p = .402$). Moreover, we showed that participants with a higher empathic concern level, compared with those

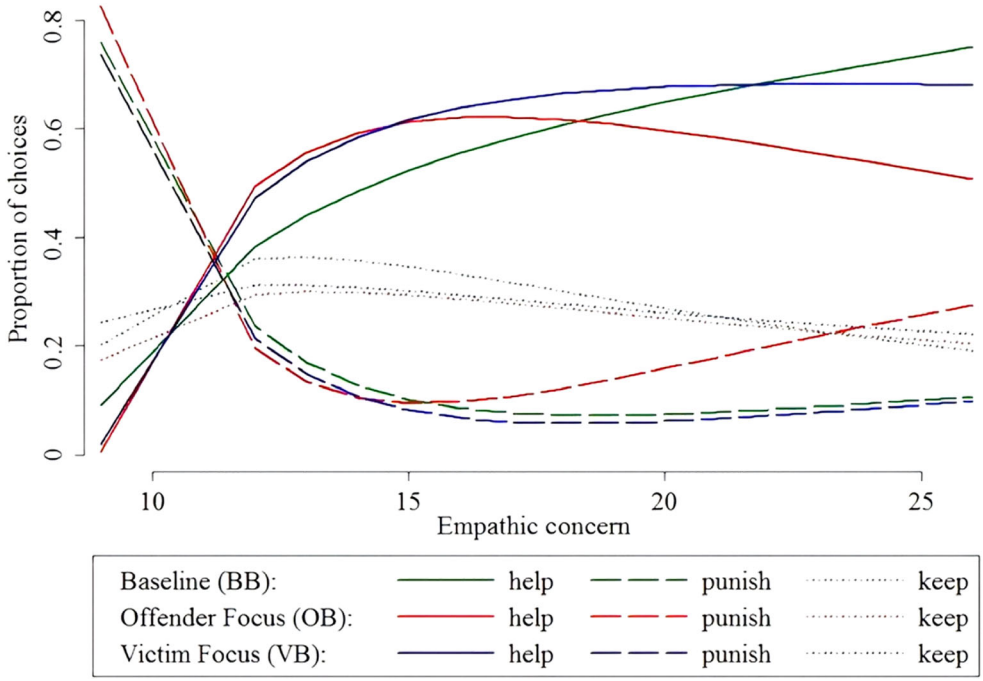

Figure 2. Probability of choice predicted by empathic concern in all three conditions. The fitted curves are the prediction for the proportion of help, punishment, and keep choices from the estimation of a fractional polynomial predicted by the level of empathic concern in each condition. [Colour figure can be viewed at wileyonlinelibrary.com]

with lower empathic concern, were less likely to allocate their last fixations to the victim information in both the offender-focused block ($OR = 0.920, z = -2.55, p = .011$) and a similar effect in the victim-focused block ($OR = 0.940$, $z = -1.86$, $p = .063$). These results were not completely consistent with H3c. The explorative analyses on the first fixation showed similar results (see Tables S12 and S13 for regression details).

Discussion

The primary goal of the present study was to investigate how interindividual differences in empathic concern and the underlying cognitive processes relate to third-party intervention behaviour. We replicate previous research (Hu *et al.*, 2015; Leliveld *et al.*, 2012), demonstrating the effect of empathic concerns on choice behaviour: With increasing empathic concern, bystanders were more likely to help and less likely to punish when no aspect of the norm violation context was specifically highlighted. Building on this finding, we showed that empathic concern is not only linked to choices, but also related to the choice construction process. We present evidence for an attentional orientation towards the victim's payoffs for people with higher empathic concern when deciding to restore fairness through intervention. This attentional bias manifests early on in the decision process, indicated by the increased likelihood of first fixation allocated to victim-relevant information.

These systematic processing differences highlight the role of attention during third-party intervention behaviours and its link to the trait of empathic concern. Given the perception-

Table 1. Results of repeated-measure mixed-effect linear regression predicting the fixation number and decision time by instructed focus manipulation, empathic concern, and their interaction for helping and punishment

	Fixation number (Log)				Decision time (Log; in ms)			
	Help	Help	Punish	Punish	Help	Help	Punish	Punish
Baseline (ref.)								
Offender focus	0.104*(2.40)	0.111*(2.49)	0.189^{+}(1.78)	0.235*(2.14)	0.122**(2.83)	0.119**(2.69)	0.158^{+}(1.65)	0.192^{+}(1.93)
Victim focus	0.029 (0.68)	0.036 (0.84)	−0.012 (−0.12)	0.033 (0.30)	0.036 (0.87)	0.035 (0.80)	0.013 (0.14)	0.044 (0.46)
Empathic Concern (EC)	0.001 (0.05)	0.006 (0.30)	0.009 (0.32)	−0.008 (−0.25)	−0.017 (−0.82)	−0.010 (−0.50)	0.009 (0.37)	−0.010 (−0.37)
Baseline (ref) # EC								
Offender focus# EC		−0.012 (−1.40)		0.014 (0.72)		−0.010 (−1.18)		0.021 (1.20)
Victim focus # EC		−0.004 (−0.54)		0.046*(2.14)		−0.011 (−1.39)		0.045*(2.30)
Trial	−0.007*** (−11.28)	−0.007*** (−11.01)	−0.007*** (−5.32)	−0.008*** (−5.33)	−0.009*** (−14.97)	−0.009*** (−14.23)	−0.007*** (−5.92)	−0.008*** (−5.75)
Constant	2.224*** (5.75)	2.244*** (32.66)	2.304*** (4.58)	2.468*** (21.29)	8.312*** (21.24)	7.994*** (120.76)	8.042*** (17.78)	8.202*** (78.48)
Observations	2,063	2,063	432	432	2,063	2,063	432	432

Note. Values refer to unstandardized coefficients. The *z* statistics are provided in parentheses. Significance level: $^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$. The main effect of instructed focus manipulation, empathic concern, and their interaction still hold after we controlled additionally for the total amount of payoff of the offender and the victim (i.e., sum of payoffs), the proportion kept by the offender (i.e., offender taking), and gender of participants in the analyses to check the robust of our results further (see Table S11).

Table 2. Results of repeated-measure mixed-effect linear regression predicting the fixation proportion of attention towards victim-related payoffs by attentional focus, empathic concern, and their interaction for helping, punishment, and both choices, respectively

	Fixation proportion					
	Help + punish	Help + punish	Help	Help	Punish	Punish
BB (ref.)						
OB	−0.930 (−0.70)	−0.928 (−0.67)	0.902 (0.63)	0.536 (0.37)	−5.827^{+}(−1.75)	−6.726^{+}(−1.93)
VB	0.083 (0.06)	0.090 (0.07)	0.491 (0.36)	0.168 (0.12)	−6.876*(−2.08)	−7.694*(−2.23)
Empathic Concern (EC)	0.685 (1.45)	1.018*(2.05)	0.454 (1.15)	0.725^{+}(1.75)	0.796^{+}(1.87)	0.403 (0.69)
BB (ref) # EC						
OB # EC		−0.511*(−2.04)		−0.272 (−0.97)		0.716 (1.21)
VB # EC		−0.552*(−2.15)		−0.568*(−2.09)		0.171 (0.25)
Trial	−0.010 (−0.53)	−0.009 (−0.49)	−0.021 (−1.05)	−0.013 (−0.66)	0.033 (0.76)	0.051 (1.10)
Constant	44.29***(5.00)	56.89***(32.08)	52.76***(7.07)	60.96***(42.35)	27.18***(3.40)	40.76***(18.01)
Observations	2,495	2,495	2,063	2,063	432	432

Note. Values refer to unstandardized coefficients. The *z* statistics are provided in parentheses. BB = baseline block, OB = offender focus block, VB = victim focus block. Significance level: $^{+}p < .10$, $*p < .05$, $***p < .001$.

The main effects of attentional focus, empathic concern, and their interaction still hold after we controlled additionally for the total amount of payoff of the offender and the victim (i.e., sum of payoffs), the proportion kept by the offender (i.e., offender taking), and gender of participants in the analyses to check the robustness of our results further (see Table S9).

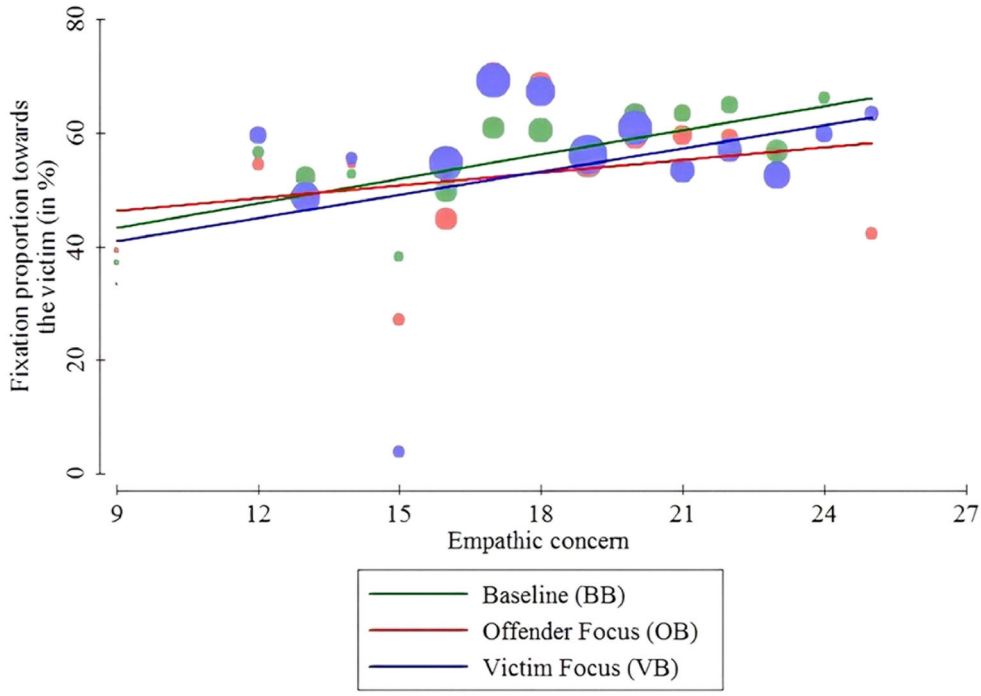

Figure 3. The linear prediction of overall fixation proportion towards victim payoff-relevant areas of interest (AOIs) by the level of empathic concern in each condition. The size of the markers indicates the number of observations for different levels of empathic concern. [Colour figure can be viewed at wile yonlinelibrary.com]

action theory (De Waal, 2008; Preston & De Waal, 2002), attention is automatically required to represent other's affect state, which could be transformed into higher level of empathy (Decety & Jackson, 2006; Decety & Lamm, 2006; Singer, 2006). Thus, our results suggest that bystanders with a higher level of empathic concern automatically activate such victim-oriented attention faster and more persistent, which presents one potential channel conveying the effect of empathic concern in driving third-party intervention behaviour. Supporting this claim, a recent fMRI study showed that empathic concern positively correlates with neural activity in fronto-parietal regions, as key nodes for goal-directed attention (Dosenbach, Fair, Cohen, Schlaggar, & Petersen, 2008; Markett *et al.*, 2014), during help in comparison with punishment choices (Hu *et al.*, 2015).

Moreover, we were interested whether an instructed focus manipulation could override or strengthen the observed empathy-helping link in information search and subsequent choice behaviour. In line with previous findings (David *et al.*, 2017; Gromet & Darley, 2009; Hare *et al.*, 2011; Hutcherson & Rangel, 2014; Makwana *et al.*, 2014), the results showed that bystanders were more likely to punish while considering the conduct and the social norm violation (offender-focused block). Further analyses on the interaction of instructed focus and individual differences in empathic concern showed that the increase (decrease) in punishment (help) in the offender-focused block was driven by individuals with high levels of empathic concern, suggesting that highly empathic individuals are tougher in their punishment behaviour than their less-empathic counterparts. One common mechanism explaining third-party punishment is anger or moral outrage (McCall, Steinbeis, Ricard, & Singer, 2014; Nelissen & Zeelenberg, 2009).

While focusing on the offender's behaviour, bystanders might produce stronger offender-focused moral outrage, which resulted in more punishment (Lotz, Okimoto, *et al.*, 2011). Within the context of the experiment, highly empathic participants might have experienced more anger towards the offender when the norm violation of the unfair offender was highlighted. Supporting this rationale, a recent study has shown that the degree of empathic concern also serves as a positive predictor of third-party punishment, via the mediating role of moral outrage (Pfattheicher, Sassenrath, & Keller, 2019). Facing both help and punishment options, those with a higher level of empathic concern might have a stronger feeling of moral outrage especially when the norm violation becomes salient. As a consequence, they are more inclined to switch the channel from compensation to punishment to restore justice. Thus, the present findings suggest that empathic concern is not only about helping a victim – it is also about harming a perpetrator when a norm violation becomes salient, which contributes to the increasing literature revealing helping *and* harmful consequences of empathic concern.

Consistent with the interpretation above, our eye-tracking results also show a decrease in proportion of fixations towards the victim when empathic participants decide to intervene in the offender-focused block. Since the AOI only contained the (payoff) information related to the offender and the victim, this result means that higher empathic bystanders paid more attention to the offender during the decision period, maybe indicating a stronger moral outrage towards the norm violator. However, such interpretation needs future studies to confirm which should collect anger (or other relevant emotions) ratings or more direct measures of the bystanders as well.

Additionally, our results showed that bystanders increased their information search efforts (i.e., decision time and fixation number) when the offender's norm violation was put into focus by the experimental manipulation. In line with previous findings (David *et al.*, 2017), this occurred for helping as well as punishment choices. Unlike the general effect of the offender focus, we detected a positive interaction effect between the victim focus and empathic concern on decision time of the punishment choice, suggesting that highly empathic bystanders experienced the largest decision difficulty (i.e., increase in the extent of information processing) when the final choice (i.e., punishment) stood in conflict with both the endogenous preference (i.e., high level of empathic concern) and exogenous consideration (i.e., focusing on victim's feeling). These results indicate different mechanisms underlying the two instructed focus manipulations even when they are confronted with the same norm violation.

Notably, we observed a dissociated effect of empathic concern and instructed focus on the proportion of fixations and the fixation number. In particular, the participants' relative attention towards victim payoff-relevant information was shaped by empathic concern, but not by the instructed focus, whereas the fixation number was predicted by the instructed focus, but hardly by empathic concern. Such dissociation suggests that the bystanders paying more attention to the victim is likely to be driven by the intrinsic nature (i.e., empathic concern), rather than by the instructed focus (i.e., consider the victim's feeling). In contrast, the externally induced focus influenced the time invested and hence the processing depth and extent of information intake.

Limitations and future directions

The primary goal of this experiment was to investigate the link between empathic concern and underlying cognitive processes during third-party intervention decisions. To this end, we adopted the design in which the baseline was always implemented prior to

the two blocks with instructed focus (i.e., offender focus and victim focus), which is conducive to avoid the lagging effect due to the instructed focus on the natural decisions. However, this design might cause a disadvantage such that participants might already have established specific search strategies in the first block, which may not have been overruled by the newly introduced focus instructions. Another potential limitation of the present study is that we cannot completely rule out the potential influence on gaze-based measures simply by the unequal nature of instructions, such that considering the offender's justice might require a more intense visual search (for comparing the payoff information) than thinking about the victim's feeling (which might be less dependent on gaze-based information search). Future studies may therefore add between-subject designs with modified instructions to test its effect with the same paradigm.

Our research can also be extended by examining other potential factors which might modulate the preference of bystanders to restore the justice together with its underlying process mechanisms. For instance, the bystander effect initially proposed by Latané and Darley (1970) refers to that an individual is less likely to help a person in need when someone else is present, due to the diffusion of responsibility. In contrast, signalling theory indicates that an individual might be more motivated to help a victim in the same context, as such altruistic behaviour signals a reputation of trustworthiness (Jordan, Hoffman, Bloom, & Rand, 2016). Enlightened by these theories, later studies could test whether and how the appearance of another bystander (i.e., the fourth party) could shape the third-party intervention behaviours and the underlying cognitive processes.

Conclusion

Employing this bystander paradigm using eye tracking, the current study shows how empathic concern guides third-party intervention behaviours through changes in information intake and weighting reflected by gaze-based measures during decision-making and how such relationship could be affected by manipulating focus via instructions. In a broad sense, our findings highlighted the important role of attention in social decision-making and points to future avenues to investigate the attention-driven process underlying social decision-making by means of eye-tracking technique.

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Conflicts of interest

All authors declare no conflict of interest.

Data Availability Statement

The data that support the findings of this study are openly available on the OSF at http://doi.org/10.17605/OSF.IO/BVA3Z].

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. All hypotheses and dependent measures used in the present study.
Table S2. Offer combinations shown for the on-line part of the experiment.
Table S3. Protocol of power analysis using G*Power 3.1.9.2.
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Table S5. Pair-wise correlations between all continuous predictors used in the regression analyses.
Table S6. Results of repeated-measure mixed-effect logistic regression predicting the helping, punishment or keep choice by empathic concern in the baseline block (BB).
Table S7. Results of repeated-measure mixed-effect linear regression predicting the log-transformed fixation number, decision time and proportion of fixations by empathic concern for helping and punishment choices in the baseline block (BB).
Table S8. Results of repeated-measure mixed-effect logistic regression predicting the distribution of the first and the last fixation (towards victim payoff-relevant AOIs) by empathic concern for help and punishment choice respectively in the baseline block (BB).
Table S9. Results of repeated-measure mixed-effect logistic regression predicting the helping, punishment or keep choice by instructed focus, and empathic concern. Original models controlling for trials (odd columns).
Table S10. Results of repeated-measure mixed-effect logistic regression predicting the helping, punishment or keep choice by instructed focus, empathic concern and their interaction. Original models controlling for trials (odd columns).
Table S11. Results of repeated-measure mixed-effect linear regression predicting the log-transformed fixation number, decision time and proportion of fixations by instructed focus, empathic concern (odd columns) and their interaction for helping and punishment choices (even columns).
Table S12. Results of repeated-measure mixed-effect logistic regression predicting the distribution of the first and the last fixation (towards victim payoff-relevant AOIs) by instructed focus and empathic concern for help and punishment choice respectively.
Table S13. Results of repeated-measure mixed-effect logistic regression predicting the distribution of the first and the last fixation (towards victim payoff-relevant AOIs) by instructed focus, empathic concern and their interaction for help and punishment choice respectively.
Figure S1. Four types of display used for the eye-tracking study and counterbalanced across participants (In A/C: Player A is the offender; In B/D: Player B is the victim).