4. GAZE DIRECTION AND DECISIONS
How does gaze direction affect decision-making?
Perceived Gaze Direction Modulates Neural Processing of Prosocial Decision Making

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“... someone else’s gaze informs us about the object or place he/she is looking at, and in turn how important or interesting such information is to him/her.”

Eye gaze information provides information about other’s attention.
"GAZE DIRECTION [IS] A PRIVILEGED STIMULUS [ASSOCIATED WITH] THE MENTAL STATE OF OTHERS"

PCC: Posterior Cingulate Cortex; TPJ: Temporal-Parietal Junction; STG: Superior Temporal Gyrus; PFC: Prefrontal Cortex.

Brain regions related to Theory of Mind (ToM) → implicated in social cognitive and decision making processes.
To accept the counterpart’s proposal is beneficial to both players. To reject the proposal indicates a plan more advantageous to the participant.

The counterpart will have 50-50 chance to know whether the participant has accepted or rejected the counterparts offer.

If the participant makes no action, all benefits will be delivered to the counterpart in that trial.

If the participant rejects an offer, their share in that trial will be transferred to the counterpart when he/she knows your choice – else participant will keep their share.

Right STG is sensitive to direct gaze discrimination. *STG: involved in the intentionality of others.
Gaze direction, social behavior and neural activity

Prediction - direct gaze $\rightarrow$ prosocial rSTN activity

Hypothesis 1
Gaze direction, social behavior and neural activity

1. Averted gaze → more difficult to infer intentionality & therefore greater cognitive effort

2. Alternative hypothesis!
5. PROSOCIAL OR SELFISH?

Can fMRI detect the intentionality of a participant by looking at eye gaze?
Sun et al. report that the averted gaze condition elicited stronger activations in the rSTG (BA 22).

Note: The stronger activations only occurred during the prosocial choice condition with an averted gaze.
The findings suggest that both rSTG and rSTG–PCC functional connections are more involved for making prosocial choices than selfish decisions when the perceived subtle social cues signal a lack of intentions for social contact.
6. MIND CHANGING

Can you change your attitudes by what you look at?
Does what we look at affect how we think?
Biasing moral decisions by exploiting the dynamics of eye gaze

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“Murder is sometimes justifiable.”

“Sometimes Justifiable”

“Never Justifiable”

Timing of decisions.

“Can one change the course of individuals’ decisions, even when they are reasoning about high-level, moral issues.”


Can the participants’ eye gaze reveal their decision process?
Significance

Where people look generally reflects and reveals their moment-by-moment thought processes. This study introduces an experimental method whereby participants’ eye gaze is monitored and information about their gaze is used to change the timing of their decisions. Answers to difficult moral questions such as “Is murder justifiable?” can be influenced toward random alternatives based on looking patterns alone. We do this without presenting different arguments or response frames, as in other techniques of persuasion. Thus, the process of arriving at a moral decision is not only reflected in a participant’s eye gaze but can also be determined by it.
“We hypothesized that tracking the gaze of participants while they decided between two options would provide sufficient knowledge that could be exploited to influence the outcome of the moral deliberation.”

Participants first hear a moral statement being read out loud while viewing a central fixation point.

Two alternatives appear on the screen randomly assigned to the left or right position.

The participants’ gaze is monitored by a remote eye tracker.

Participants view the alternatives until their choice is prompted.

7. TRACKING MORAL DECISIONS
Can eye gaze track the trajectory of an unfolding moral decision?
“While participants view both alternatives their gaze is being tracked; once one alternative has accumulated at least 750 ms of gaze and the other at least 250 ms the decision prompt is activated and the trial is interrupted.

Whatever alternative has the most accumulated gaze time at the time of interruption is designated the target.”

Participants chose the alternative most viewed at the time of interruption.

Eye gaze reflects the current decision trajectory for moral decisions.
8. **INFLUENCE MORAL DECISIONS?**

Can one control how a decision is made by eye gaze?
“The target is randomly determined before trial onset.

Participants’ gaze is measured while they view alternatives and once the target alternative has been viewed for at least 750 ms and the other alternative has been viewed for at least 250 ms the decision prompt is activated and the trial is interrupted.”
Experiment 2 tested this causal hypothesis that decisions can be biased toward a randomly determined target by manipulating the timing of decision prompts alone. When participants were prompted to make their choice they chose the randomly predetermined target alternative in 58.21% of the trials.

Experiment 2 tested this causal hypothesis that decisions can be biased toward a randomly determined target by manipulating the timing of decision prompts alone.

We biased participants’ moral decisions toward randomly set targets by manipulating the moment at which they made their choice. Our results demonstrate that gaze reveals developing preferences for moral choices and indicate that current gaze direction plays an important role for this. Crucially, this means that knowing when participants are looking at alternatives gives sufficient information to change the course of their decisions. Not only does this extend previous work on the causal role of eye gaze in settling on a decision, but these findings are to our knowledge the first to establish such effects for moral questions.