



Do we perceive the past and the future asymmetrically?

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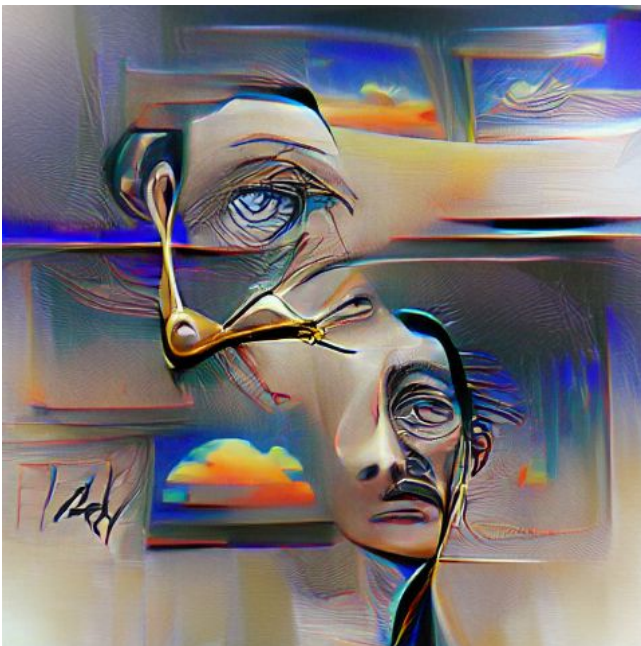
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We strive to remember where we came from and to plan for our future. But do we think asymmetrically about the future compared to the past? In a recent study, we found that we value future events more than past events; we feel closer to how we will be in the future than how we were in the past; and we think about a longer-term future than the past. In short, we represent the past and the future with an asymmetry toward the future, although this asymmetry is very small and barely varies across cultures.



(cc) Carmen Callizo-Romero. Image created using "VQGAN+CLIP neural networks" in response to "time asymmetry", "past", "future" and "Dalí style".

Try to remember what you were doing on the day that occurred exactly one month ago. Now imagine what you think you will be doing on the day that will occur exactly one month from now. Do you feel that the latter is closer to you than the former? In that case, you are thinking asymmetrically into the future, because the temporal distance you perceive into the future is shorter than the one you perceive into the past. In other words: you feel the future event is closer to you than the past one. If the opposite happens to you, you are thinking asymmetrically toward the past.

Temporal asymmetry can exist not only in the perceived temporal distance but also in at least three other aspects of how we think about the past and the future. First, in the subjective valuation of events. One way to study this is to use events that have a clear quantitative economic evaluation such as getting money. For example: would you prefer to get 5€ today or 25€ in a month? This type of trade-off measures time discounting, which refers to how the

value of an event varies as a function of the time that passes until that event or the time that has passed since that event: would you prefer to have been given 5€ today or 25€ a month ago? If you prefer the larger, but more distant in time, future amount but do not opt for the same amount when it is an event in the past, there is an asymmetry towards the future in your economic valuation of time.

Secondly, temporal asymmetry can also be detected in the similarity we perceive between ourselves and the person we will be in the future or we were in the past. In psychology, this is named self-continuity. Thus, you would think with future asymmetry if you feel that the person you will be ten years from now is more similar to the person you are now than the person you were ten years ago.

Finally, there may be temporal asymmetry in what is known as temporal depth. For example, if when you think of a long-term future you imagine a longer period (e.g., 10 years ahead) than when you think of a long-term past (e.g., five years behind), you have greater temporal depth into the future than into the past (and vice versa).

So, do we think asymmetrically toward the future and the past? Caruso et al. (2013) suggested that we do and proposed that this is because we walk forward. When we walk, the things that are in front of us are the things we will encounter in the future, while we are leaving behind the things we have already experienced, the past. Thus, as we walk we may believe that we are getting closer and closer to the future and leaving the past behind. This can make us feel that our distance with respect to the future is compressed, while the distance with respect to the past is lengthened. Ultimately, this process could make us feel the future as if it were closer

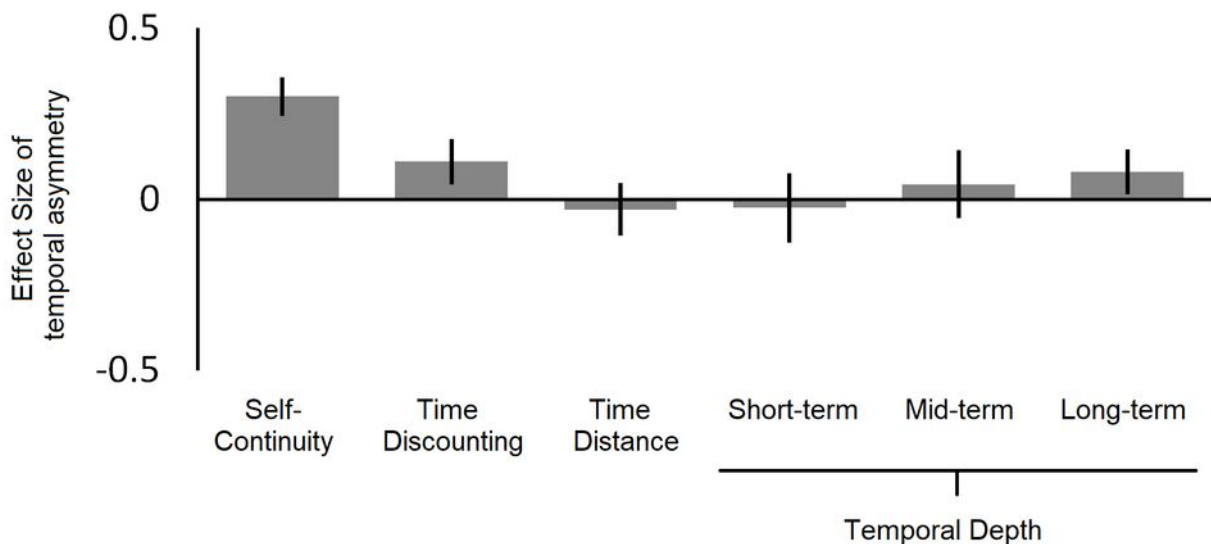


Figure 1. Temporal asymmetry in self-continuity, time discounting, distance, and temporal depth. This plot represents the size of the temporal asymmetry on a scale ranging from -1 to 1 for each task, taking all cultures together. Positive effect sizes (upward bars) indicate asymmetries toward the future. Negative effect sizes (downward bars) indicate asymmetry toward the past. We can only be statistically confident of the existence of future asymmetries when the black line (the effect size's confidence interval) on each bar excludes zero. As shown, the size of the asymmetries toward the future is larger as the period over which participants had to think in each task increases: the largest future asymmetry is shown in self-continuity, where participants had to think 10 years ahead or back; the second in temporal discounting, in which temporal periods up to two and a half months were considered; and the third in temporal depth in the long term, but not in the mid or the short term. In contrast, in the temporal distance task, where only one-month periods were asked to be considered, we did not find asymmetry, but instead temporal symmetry.



to us than the past and, in turn, could produce other future asymmetries concerning economic valuation, self-continuity, and temporal depth.

However, not all published studies indicate that there is a future asymmetry. For example, Guo et al. (2012) suggested that in cultures that give more importance to the past, such as Asian cultures, the asymmetry may be toward the past (perceiving the past as psychologically closer or more valuable than the future). On the other hand, other studies such as those of Yi and colleagues (2006) found that we perceive the past symmetrically to the future. Therefore, as we can see, there is no agreement among previous studies on whether we perceive the past and the future symmetrically or asymmetrically and, if so, towards which temporal pole is such asymmetry directed.

In a recent study (Callizo-Romero et al., 2022) we tried to clarify this question. To do so, we studied whether there is temporal symmetry or asymmetry in tasks that measure time distance, discounting, and depth, as well as self-continuity. In addition, we investigated whether or not the possible temporal asymmetry depends on the importance that people from each culture give to cultural values related to the past (tradition) versus the future (progress), as measured by a temporal focus questionnaire. Our study included 1075 participants from cultures that vary in their temporal focus (from greater future focus to greater past focus): Spanish, Chinese, Turkish, American, Moroccan, Bosnian, Croatian, and Serbian.

The results showed the existence of future asymmetry in all tasks except temporal distance (where there was symmetry). However, this asymmetry was, in general, small, only appeared clearly when thinking about long periods (see Figure 1), and was barely affected by the importance given to the past and the future in each culture.

In short, in contrast to some previous proposals, our data suggest that we are slightly biased toward the future, projecting where we are going, but being, at the same time, aware of where we come from.

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