People from the U.S. and China think about their personal and collective future differently

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Abstract

We investigated how people think about their personal life and their country by testing how participants in the U.S. and China think about personal and collective events in the past and future. Using a fluency task, we replicated prior research in showing that participants in the U.S. had a positivity bias toward their personal future and a negativity bias toward their country's future. In contrast, participants in China did not display a positivity or negativity bias toward either their personal or collective future. This result suggests that the valence dissociation between personal and collective future thinking is not universal. Additionally, when people considered the past in addition to the future, they displayed similar valence patterns for both temporal periods, providing evidence that people think about the past and the future similarly. We suggest political and cultural differences (such as dialectical thought) as potential explanations for the differences between countries in future thinking and memory.

Keywords Memory · Culture · Collective memory · Autobiographical memory · Emotion

As humans, we regularly make predictions about events that we are excited or worried about. Some are about events in our personal life, such as expecting to graduate from college, getting a raise, or facing a difficult test. But others are about broader events related to our society or country, such as the Olympics, a contentious election, or an epidemic. Szpunar and Szpunar (2016, p. 378) define this kind of prediction about a group as *collective future thought* or "the act of imagining an event that has yet to transpire on behalf of, or by, a group."

In this study, we investigated whether people from different countries differ in how they imagine personal and collective future events. Our predictions are drawn from research showing discrepancies in how people from different countries remember past events and research showing that people predict future events using past memories. We tested (1) the generalizability of past research demonstrating a dissociation between how people imagine their personal and collective futures and (2) extended prior research to examine whether people remember the past in a similar way to how they imagine the future.

People think differently about their personal and collective futures

Shrikanth et al. (2018) were the first to demonstrate a valence dissociation in how people think about their personal and collective futures. In their study, participants had 1 minute to write down as many "things that they were excited/worried about" in the future for both their personal life or their country across different time frames (e.g., the next week, year, and 5–10 years). This adaptation of the future fluency task measures the accessibility of different kinds of events. The rationale is that generating more events for one type of prompt indicates a tendency to anticipate a certain kind of events (e.g., more negative than positive events; MacLeod et al., 1997). Across five experiments, Shrikanth and colleagues found that participants generated more positive personal items than negative ones, showing a positivity bias in imagining their personal future. In contrast, participants generated more negative collective items than positive ones, showing a negativity bias toward their

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collective future. This pattern demonstrated a dissociation between the way people think about their personal and collective futures. Notably, the dissociation was robust across a wide age range (20–69) and occurred in both U.S. and Canadian populations.

Connection between future thinking and memory

Why might people think about their personal and collective futures differently? One explanation involves the idea that remembering the past and imagining the future are intimately related. Tulving (1985) argued that human memory may have evolved to its current form to better equip humans to make concrete predictions about future events based on past experiences (see also Nairne & Pandeirada, 2016), and subsequent research has provided some empirical support for his hypothesis. Research on episodic future thought shows that people use specific past experiences to envision future scenarios (Szpunar & Szpunar, 2016; see also Anderson, 2012; K. Szpunar, 2010; Szpunar & McDermott, 2008). Studies have also found that similar brain areas are involved in remembering the past and imagining the future (Schacter et al., 2007). Thus, it would make sense that people's thoughts about the future are influenced by memories.

Furthermore, there is direct evidence supporting that the valence of people's future thinking is related to their memory. First, Shrikanth and Szpunar (2021) modified the future fluency task to have participants generate memories (instead of future events) for the personal and collective domains. Exactly like their future thoughts, participants showed a positivity bias for their personal past and a negativity bias for their collective past. Second, a recent study had participants generate specific predictions about their country's future and recall important events in their country's past (Öner & Gülgöz, 2020). The valence of the past events correlated with the valence of predicted future events. Thus, when using the future fluency task or other comparable measures, we may see the same valence dissociation between personal and collective memories as we see in future thoughts.

Even though some studies have found a correlation between memories and future thoughts, others have found different patterns. For example, when Asian and Euro-American college students recalled a series of past events and made predictions about the same situations, more than half of the events underwent changes in valence from the past to the future (Wang et al., 2015). In other words, participants often thought that a negative event in the past would take a positive turn in the future or vice versa. Other studies with U.S. participants have demonstrated that future events were rated as more positive than past events (although there was still a correlation between the past and the future) or that the nation is viewed to be in a pattern of decline, with a positive past, a neutral present, and a negative future (Topcu & Hirst, 2020; Yamashiro & Roediger, 2019). In sum, although there is some evidence suggesting a correlation between memory and future thinking, the specific valence patterns have not always been consistent. If people use the past to think about the future, this could explain the dissociation between personal and collective future thinking (Shrikanth et al., 2018). Studies have found that people generally have more positive than negative personal memories (Koppel & Berntsen, 2016; Walker et al., 2003). But when it comes to public events, people see more negative events than positive events in the news and other media (Tekcan et al., 2017).

Differences in personal and collective memories across cultures

One limitation of past research on collective future thinking is that all published studies have tested participants in North America. Researchers have criticized psychologists for making conclusions about human psychology while only relying on Western samples (Henrich et al., 2010). This is partially because certain psychological phenomena that are widely found in certain countries and assumed to be universal may differ across cultures (Nisbett, 2003). Does this valence dissociation generalize to non-Western countries?

One reason to suspect future thought might differ across countries is that past studies have found that people remember the collective past differently across cultures. In one study, participants from 12 countries (East Timor, China, India, Indonesia, Turkey, Russia, Ukraine, Poland, Hungary, Spain, Portugal, and Brazil; Liu et al., 2009) listed the seven most important events of world history. The top 10 most frequently listed events were predominantly negative for the majority of the countries. However, the top 10 events listed by participants from China and Hungary were predominantly positive, demonstrating a more positive bias toward collective memories than other countries.

Corroborating evidence comes from a study with data collected from 39 countries, showing that participants from Western countries reported predominantly negative collective memories (such as terrorism), whereas participants from non-Western countries (China and Malaysia) reported predominantly positive collective memories (such as the founding of the nation; Choi et al., 2021). Another study asked people from 30 countries to rate the valence of historic calamities (e.g., the Holocaust) and historic progress (e.g., decolonization). People from non-Western countries generally rated the calamities less negatively than Westerners (Liu et al., 2012). Participants from China and Tunisia rated progress as more positive but rated the calamities as less negative than participants from Switzerland, Norway,

Australia, and New Zealand. Together, these findings suggest that participants from non-Western countries such as China may report a more positive view of their country's past than Western samples.

In contrast to collective memories, the way people think about their *personal* past appears to be more universal. For example, people from Denmark, Mexico, Greenland, and China all displayed a positivity bias toward past personal events (Scherman et al., 2017; Walker et al., 2003). In another study, college students from both China and the U.S. had more positive than negative ratings for their self-defining memories (Wang & Singer, 2021). Thus, the evidence so far supports the idea that people universally hold a positive view of their personal past regardless of where they are from. However, this evidence is still limited to a handful of studies.

In summary, participants in the U.S. have displayed a positivity bias for their personal past and a negativity bias for their collective past, which correlates to the positivity bias for their personal future and negativity bias for their collective future. In contrast, participants in China have displayed a positivity bias for their personal future and a more positive view of the past than people from other countries. Given the strong evidence that remembering and future thinking are tightly connected, it is likely that the dissociation in future thinking seen in the US will not occur in China because of the differences in collective memory.

The empirical findings mentioned above formed the basis for our predictions about the difference in future thinking between the U.S. and China. However, in the general discussion, we propose some theoretical explanations for why differences in future thinking might occur. Of course, there are a number of sociological differences between China and the U.S.—China is radically different in its political structure (authoritarian vs. democratic government), media, and culture (collectivism vs. individualism; Nisbett, 2003; Pan & Xu, 2018). These large-scale forces could affect the types of narratives people use when thinking about the past and future of their countries. Another reason people from China may not show the same valence dissociation as people in the U.S. is that they think more dialectically. Extensive cross-cultural research comparing Eastern and Western cultures has demonstrated that people in Eastern countries tend to think dialectically (Fang & Faure, 2011; Peng & Nisbett, 1999; Wang et al., 2015)—meaning that they are more likely to perceive the world as changing and to believe that two contradictory ideas can both be true. Eastern countries also tend to be more collectivistic (Chen et al., 2018; Sims et al., 2015; Zhu et al., 2007)—meaning that they are more likely to see groups as the center of their social lives, rather than their individual selves. Taken together, these frameworks suggest that people in China may be less likely to show strong valence biases in either the personal or collective domain and less likely to show a difference between the personal and collective domains.

The present study

The current study had three main goals. First, we wanted to replicate past research demonstrating a valence dissociation between personal and collective future thinking in a U.S. sample. Second, we wanted to test the generalizability of this valence dissociation across cultures. We did this by testing participants from the U.S. and China. Finally, we wanted to test the theory that people draw on past memories to make future predictions by examining whether the valence dissociation (or lack of dissociation) between the personal and collective domains in future thinking also occurs in past memories. This study is one of the few studies to test all four domains together—past, future, personal, and collective.

Experiment 1

In Experiment 1, we investigated collective future thinking in both a Western (the U.S.) and Eastern (China) sample using the future fluency task. We preregistered three hypotheses:

1. We expected that the findings in the U.S. would mirror past research on collective future thoughts (Shrikanth et al., 2018). We hypothesized that participants in the U.S. would list more positive than negative items about their personal future but more negative than positive items about their country's future.
2. Second, we expected that the participants in China would show a similar but slightly different pattern of results. Based on work showing that people from China have a more positive view of the past than people from other countries (Liu et al., 2009), we hypothesized that participants in China would list more positive than negative personal items; however, for the collective future, they would either (a) generate an equal number of positive and negative items or (b) generate more positive than negative items.[1]
3. Finally, we expected to see an interaction between country (U.S. vs. China) and valence (positive vs. negative) for the number of collective future thought items generated. In particular, we expected that the US participants

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[1] We predicted an equal number of positive and negative or more positive collective items for Chinese participants because we were not sure about the effect size for the difference between positive and negative items. A large effect size would be more positive whereas a small effect size would be more neutral.

would display a negativity bias whereas the Chinse participants would not display a negativity bias.

Method

All experiments were preregistered at OSF.IO/C9V78. The link also contains supplemental materials, including data files and analysis scripts. We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

We recruited 40 U.S. participants from Furman University, a small private university in South Carolina (M_{Age} = 21.2 years, SD = 5.25, 90% female) and 38 Chinese participants from Hubei University, a large public university in Wuhan, China (M_{Age} = 22.13, SD = 2.12, 68% female). We preregistered that our goal was to collect data from 100 participants (50–75 people from each country). We based this number on prior research examining collective future thought (Shrikanth et al., 2018) and available funding for the project. Our sample originally had 51 participants from the U.S. and 50 from China, but we excluded 23 participants (11 from the U.S. and 12 from China) for not providing a response to one of the future fluency prompts. We also had a preregistered exclusion criterion for participants who had not spent at least three years in their home country, but no participants fit that criterion. Additionally, we made one post hoc exclusion of a U.S. participant who was an international student from China.

The Furman University IRB approved both studies for data collection in the U.S. and the University of Chicago IRB approved both studies for data collection in China.

Materials and counterbalancing

We adapted the future fluency task from Shrikanth et al. (2018), who in turn adapted the task from MacLeod et al. (1997). The task consisted of a series of 12 prompts in which participants thought about their personal and collective futures in different ways. For each prompt, participants had 60 seconds to type as many events as possible related to the prompt. For example, one prompt asked, "Please list as many things as you can that you are personally *excited* about in the *next week* of your life." Another prompt asked, "Please list as many things that you think your country may be *worried* about in the *next year.*" After 60 seconds, the program automatically advanced to the next prompt. Critically, when responding to personal prompts, participants were told to list events that would occur in their personal lives. When responding to collective prompts, participants were told to list events that would occur in the country's future.

The prompts varied by *domain* (personal vs. collective), *valence* (excited vs. worried), and *time* (week, year, and decade). The prompts appeared in two blocks based on domain (personal vs. collective); the presentation order of the blocks was randomized. Within each block, each valence level was paired with each time level to create six prompts, which appeared in a random order. Thus, participants responded to each of the 12 prompts. Participants also completed demographic questions and the National Identity Scale, which measures identification with one's home country (Zaromb et al., 2018; results are in the supplemental materials).

All materials were written in English and translated to Chinese with the help of two researchers who speak both languages fluently. Qualtrics was used to present the materials.

Design

Experiment 1 used a 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (country: U.S. vs. China) mixed-model design. We manipulated domain, valence, and time within participants. Country was a between-participants factor. To be consistent with prior research, and to allow us to gather more observations, we included the manipulation of time (week vs. year vs. decade), but as we had no strong predictions about this variable, we collapsed across it for the main analyses.

Procedure

Participants in the US and China completed the task individually or in small groups on a computer in the summer of 2019, at their respective institutions. The introduction to the task read, "Sometimes, the questions will be about you personally—for example, things that you are excited about or worried about in your own life. Other times, the questions will be about 'your country,' by which we mean the United States of America/China. For these questions, we want you to think about the country as a whole, rather than the people who live in your country." After completing the future fluency task, participants completed the National Identification Scale and answered demographic questions.

Results and discussion

In line with prior studies, we excluded responses where participants listed a personal item for a collective prompt or vice versa, along with repeated items, incomplete, or nonsensical items. We only marked responses as "repeated" if a participant listed the same item twice within the same prompt. Our rationale was that some events, such as starting a new class or worrying about a health issue, could be relevant at more than one time frame. Two trained coders examined all of the

responses and had high agreement ($r > 95\%$) for both data sets. Significance of all analyses were the same regardless of whether we included or excluded those items.

Preregistered analyses

We originally preregistered running three separate ANOVAs: one testing for a Domain × Valence interaction in the U.S. sample, one looking for a Domain × Valence interaction in the Chinese sample, and one looking for a Valence × Country interaction within the collective domain in both countries. At the request of reviewers, instead of running three separate ANOVAs, we ran a single 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (country: U.S. vs. China) ANOVA, with valence and domain treated as within-subjects variables and country treated as an observed between-subjects variable. We report and discuss the main effects and interactions that are consistent with our preregistered analysis plan (Cramer et al., 2016). As seen in Fig. 1, there was a significant three-way interaction between domain, valence, and country, $F(1, 76) = 28.22$, $p < .001$, $\eta_G^2 = .021$.[2] This interaction suggests that the U.S. sample displayed a Valence- × Domain Crossover interaction, whereas the Chinese sample did not. We unpacked this three-way interaction via simple effects tests, running a 2 (domain) × 2 (valence) repeated-measures ANOVA for each country's data. [3]

The U.S. ANOVA revealed that participants listed more personal than collective items, $F(1, 39) = 55.93$, $p < .001$, $\eta_G^2 = .20$, $M_{diff} = 9.55$, 95% CI [6.97, 12.13], and more negative than positive items, $F(1, 39) = 12.02$, $p = .001$, $\eta_G^2 = .02$, $M_{diff} = -2.90$, 95% CI [−4.59, −1.21]. Most importantly, there was a Valence- × Domain interaction, $F(1, 39) = 49.21$, $p < .001$, $\eta_G^2 = .09$ (Fig. 1, top panel). For personal items, U.S. participants listed more positive than negative items ($M_{diff} = 1.63$, 95% CI [0.50, 2.75]). But for collective items, U.S. participants listed more negative than positive items ($M_{diff} = -4.53$, 95% CI [−5.85, −3.20]). Thus, the data replicated the personal versus collective dissociation shown in prior studies.

The Chinese ANOVA revealed that participants listed more personal than collective items, $F(1, 37) = 16.47$, $p < .001$, $\eta_G^2 = .08$, $M_{diff} = 5.05$, 95% CI [2.53, 7.58], and listed a similar number of positive and negative items, $F(1, 37) = 1.20$, $p = .280$, $\eta_G^2 = .003$, $M_{diff} = -0.89$, 95% CI [−2.55, 0.76]. Critically, they did not display a Valence

× Domain interaction, $F(1, 37) = 0.48$, $p = .494$, $\eta_G^2 < .001$. They listed similar numbers of positive and negative items for both the personal ($M_{diff} = -0.24$, 95% CI [−1.31, 0.84]) and the collective ($M_{diff} = -0.66$, 95% CI [−1.65, 0.33]) domains. In other words, participants in China did not display a valence bias for personal or collective items in contrast to participants in the U.S. The lack of interaction supported our prediction that Chinese participants would not show a valence difference in collective future thought. However, we were surprised to also find that Chinese participants did not show a valence difference for personal future thoughts.

Experiment 1 made two contributions. First, it replicated the valence dissociation between personal and collective future thoughts seen in prior research with Western samples (Shrikanth et al., 2018). Second, it found that this valence dissociation did not occur in a sample from East Asia. We initially predicted that people in China would display either a positive or neutral outlook toward the collective future. Our results clearly demonstrated that for people in China, the future of China is neither strongly good nor bad. One exploratory analysis, reported in the supplemental materials, revealed that national identification was correlated with the proportion of positive events generated in the collective domain, $r(76) = .27$, $p = .015$, whereas there was no such correlation in the personal domain.

Time-frame analyses

One post hoc exploratory question was whether people would be more optimistic about the far future, as opposed to the near future. On one hand, US participants' negative bias toward the future may be partially based on the valence of current and past events (see Shrikanth & Szpunar, 2021; Shrikanth et al., 2018). Thus, it should be easier for U.S. participants to dissociate from the negative events or to expect improvement in a more remote (10 years) compared with a near (1 week) or intermediate (1 year) future (Spronken et al., 2016). This would result in higher optimism about events in the remote future compared with the more recent future (though one may also argue that the events can be expected to get worse; Wang et al., 2015). On the other hand, because the Chinese participants had an equal number of positive and negative items in the future fluency task, we expected the valence to remain relatively stable into the remote future (no interaction between time frame and valence).

To investigate our predictions, we ran a 3 (time frame: 1 week vs. year vs. decade) × 2 (valence: positive vs. negative) × 2 (domain: personal vs. collective) repeated-measure ANOVA, with a Holm correction to control the Type I error rate (Cramer et al., 2016), for just the U.S. responses. We replicated our main analysis, showing a Valence × Domain

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[2] Additionally, there were main effects of country, valence, and domain, and significant country-by-domain and Valence × Domain two-way interactions (all Fs > 6.33; see supplemental materials for details).

[3] Note that these simple effects tests are comparable to two of our preregistered ANOVAs.

US Future Thoughts

Chinese Future Thoughts
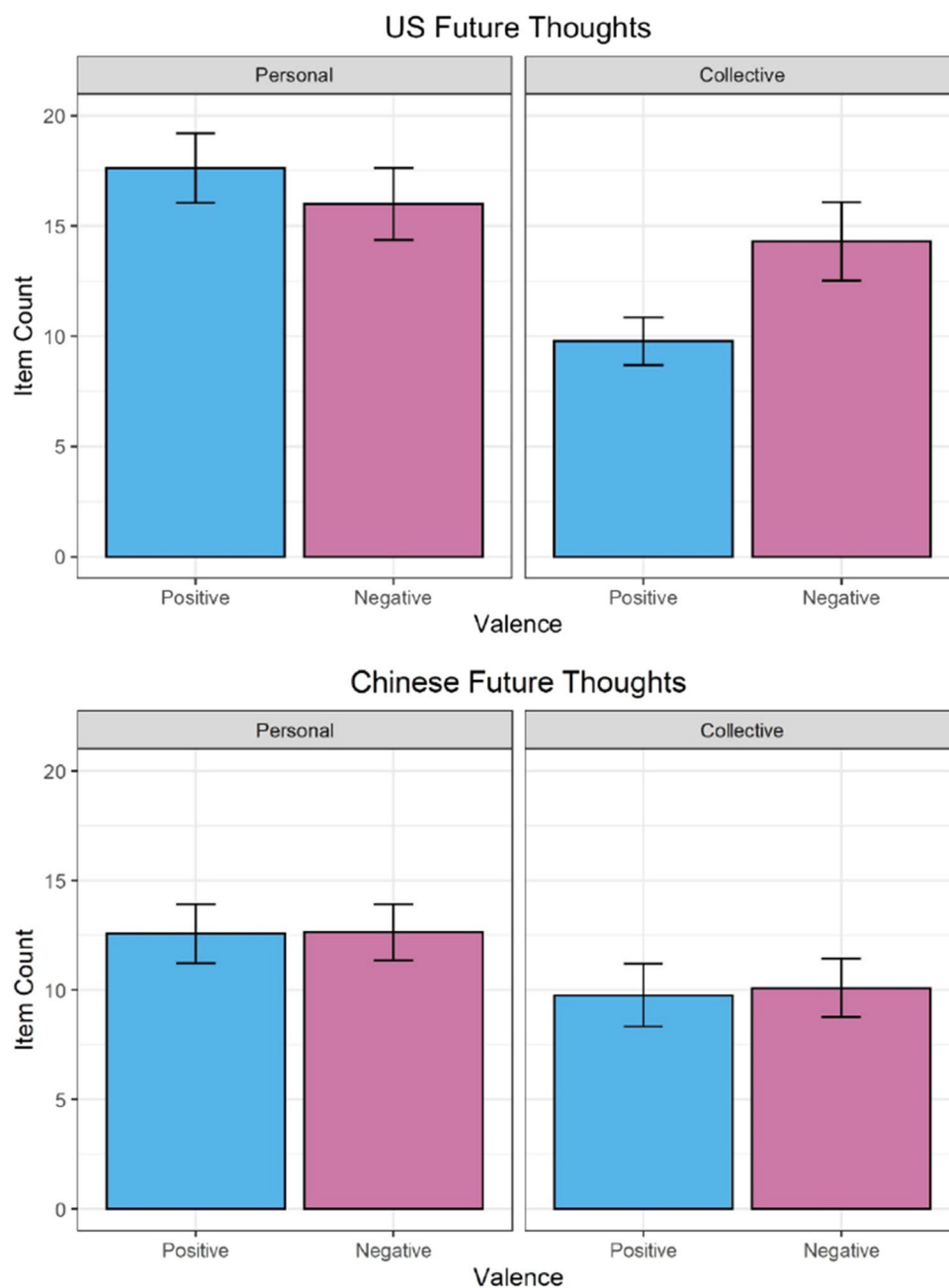
Fig. 1 Mean numbers of personal and collective future items listed by U.S. (top) and Chinese (bottom) samples. Error bars represent 95% confidence intervals

interaction, $F(1, 39) = 49.21$, $p < .001$, $\eta_G^2 = .069$. In addition, there was a main effect of time frame, $F(1.72, 67.22) = 14.86$, $p < .001$, $\eta_G^2 = .030$. Post-hoc tests (with Holm adjustment) indicate that participants listed the fewest items for the future week ($M = 17.52$, 95% CI [15.86, 19.19]), more items for the future year ($M = 19.42$, 95% CI [17.65, 21.20]), and the most items for the future decade ($M = 20.75$, 95% CI [18.76, 22.74]). This outcome is unsurprising given that more remote time frames cover larger periods of time.

There was also a Time Frame × Domain interaction, $F(1.94, 75.69) = 4.73$, $p = .037$, $\eta_G^2 = .008$, but no time Frame × Valence interaction, $F(1.99, 77.78) = 2.07$, $p = .266$, $\eta_G^2 = .004$. The lack of interaction between time frame and valence did not support our prediction that U.S. participants would be more optimistic about the remote future compared with the more recent future.

We also ran a 3 (time frame: 1 week vs. year vs decade) × 2 (valence: positive vs. negative) × 2 (domain: personal

vs. collective) repeated-measure ANOVA, with Holm correction, for just the Chinese responses. Replicating the main analyses, there was a main effect of domain, $F(1, 37) = 16.47$, $p = .001$, $\eta_G^2 = .058$. More importantly, there was a main effect of time frame, $F(1.98, 73.16) = 10.63$, $p < .001$, $\eta_G^2 = .023$. Post-hoc tests (with Holm adjustment) indicate that participants listed a similar number of items for the future decade ($M = 15.95$, 95% CI [14.23, 17.67]) and the future year ($M = 14.92$, 95% CI [13.39, 16.45]), but fewer items for the future week ($M = 13.39$, 95% CI [11.73, 15.06]). The lack of interaction between time frame and valence supports our prediction that valence would remain relatively stable into the remote future for Chinese participants.

In sum, the valence pattern did not vary between near and remote future for either the U.S. or the Chinese participants.

Experiment 2

In Experiment 2, we aimed to replicate Experiment 1 and to investigate the hypothesis that future thinking is connected to memory. To do so, we used the fluency task again but had participants generate events about both the past and the future. We preregistered three specific hypotheses:

1. We expected to replicate Experiment 1 in showing a valence dissociation in future thinking in the U.S. but not China.
2. Second, we expected to find the same valence patterns in participants' memories as we did in future thinking.
3. Third, we expected that temporal period (past vs. future) would not affect the valence pattern in either country.

Method

Participants

We recruited 81 U.S. participants from Furman University ($M_{Age} = 19.32$ years, $SD = 1.20$, 68% female) and 95 Chinese participants from Hubei University ($M_{Age} = 19.55$ years, $SD = 2.49$, 85% female).

We originally aimed to recruit 100 participants from each country, doubling our sample size from Experiment 1 to account for an additional independent variable. Our original sample for Experiment 2 consisted of 296 participants, but we excluded participants who did not meet preregistered criteria: 69 participants for providing no response to any questions in the survey, 50 participants for not having a single response to three or more future fluency prompts, and one participant for not being a fluent English speaker (from the U.S. site). Our exclusion criteria in Experiment 2 were more lenient than in Experiment 1 (not responding

to three or more prompts instead of just one) because we excluded more participants than expected in E1 and because the results were similar regardless of whether we excluded or kept those participants in our analyses.

Materials and counterbalancing

The materials for Experiment 2 were generally the same as in Experiment 1 with three key differences. First, there were only two levels of time frame variable (1 week vs. 5–10 years). Second, the fluency task included an additional variable, *temporal period*, in which participants generated items for either the future (as seen in Experiment 1) or from the past, resulting in 16 total prompts. Third, we administered an exploratory Locus of Control Scale instead of the National Identification Scale.[4]

The prompts for the fluency task were presented in a hierarchical blocked pattern, with each blocking level counterbalanced across participants (Fig. 2). The highest level of blocking was temporal period, so participants responded to all of the past prompts and then all of the future prompts. The next levels of blocking were domain (personal vs. collective) and valence (positive vs. negative). Time frames were always presented with the 1-week prompts followed by the 5–10 years prompts.

Design

Experiment 2 used a 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (temporal period: past vs. future) × 2 (country: the U.S. vs. China) mixed-model design. Domain, valence, and temporal period were manipulated within participants, whereas country was treated as a between-participants factor. Note that because the additional manipulation of time frame (1 week vs. 5–10 years) was only relevant for exploratory analyses, we collapsed across this variable for the main analyses.

Procedure

We collected data during the late fall and winter of 2020. The procedure was similar to Experiment 1, except for the differences described in the materials section above and that participants completed the experiment online from their own computers rather than coming to the laboratory due to social distancing requirements. After completing the fluency task, participants completed the Locus of Control scale and answered demographic questions.

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[4] The locus of control analyses are reported in the supplemental materials.
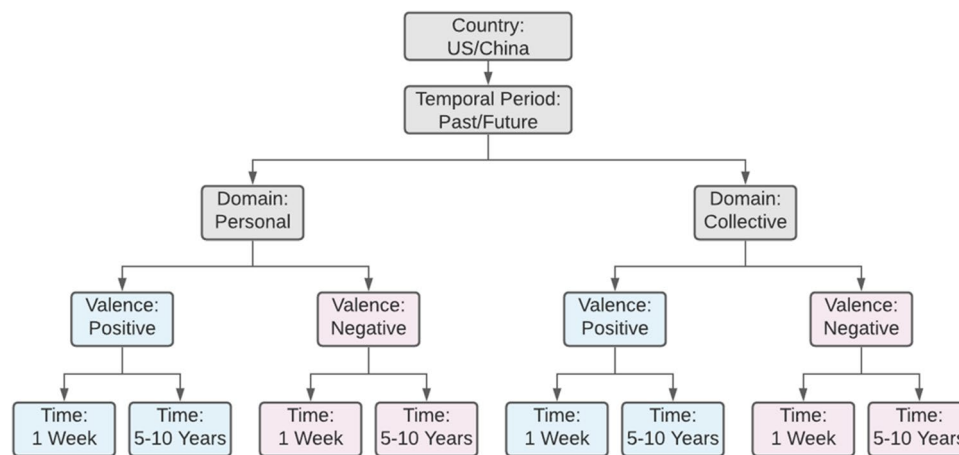
Fig. 2 Flow chart of the hierarchical blocked pattern for the fluency task

Results and discussion

Two trained coders examined all of the responses as in Experiment 1 and had high agreement ($r > 93\%$) for both the U.S. and Chinese data sets. All analyses were the same regardless of whether we included or excluded those items.

Preregistered analyses

In our preregistration we identified a series of ANOVAs that addressed three questions: whether responses to the future prompts replicated Experiment 1, whether each country showed the same valence pattern in past memories as in future thinking, and whether temporal period affected valence pattern. Here we report a 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (temporal period: past vs. future) × 2 (country: U.S. vs. China) mixed-model ANOVA, with country treated as a between-subjects factor and all other variables treated as within-subjects factors. We interpret the effects that line up with our preregistered ANOVAs.[5]

First and most importantly, there was a three-way interaction between country, valence, and domain (plotted in Fig. 3), $F(1, 174) = 75.28$, $p < .001$, $\eta_G^2 = .02$. Simple effects tests revealed there was a significant domain-by-valence interaction in the U.S. sample, $F(1, 80) = 108.56$, $p < .001$, $\eta_G^2 = .055$. US participants listed more positive than negative personal items ($M_{diff} = 2.37$, 95% CI [0.93, 3.81]) but more negative than positive collective items (M_{diff}

= −5.49, 95% CI [−6.71, −4.27]). In contrast, there was no domain-by-valence interaction in the Chinese sample, $F(1, 94) = 0.03$, $p = .872$, $\eta_G^2 < .001$. Chinese participants listed an equal number of positive and negative items for both personal ($M_{diff} = 0.18$, 95% CI [−0.58, 0.94]) and collective domains ($M_{diff} = 0.09$, 95% CI [−0.70, 0.89]).[6]

Notably, the interaction above included responses to both the past and future prompts. There was a main effect of temporal period, indicating that participants listed more future items than past items, $F(1, 174) = 5.98$, $p = .015$, $\eta_G^2 = .003$, $M_{diff} = −1.63$, 95% CI [−2.88, −0.38]. However, the ANOVA failed to find any significant interactions involving temporal period, (all $Fs < 2.47$). The lack of interactions suggests that the overall pattern of responses (and in particular the lack of presence of a Valence × Domain interaction for each country) is similar for the past and future.

In sum, our central analyses in Experiment 2 revealed three findings. First, we replicated Experiment 1 in showing a valence-by-domain interaction for U.S. participants, but not Chinese participants in thinking about the future. Second, we also showed that U.S. participants displayed a Valence × Domain interaction for thinking about the past, whereas Chinese participants did not. Third, we showed that the pattern displayed by each country for the past mirrored the pattern seen for the future.
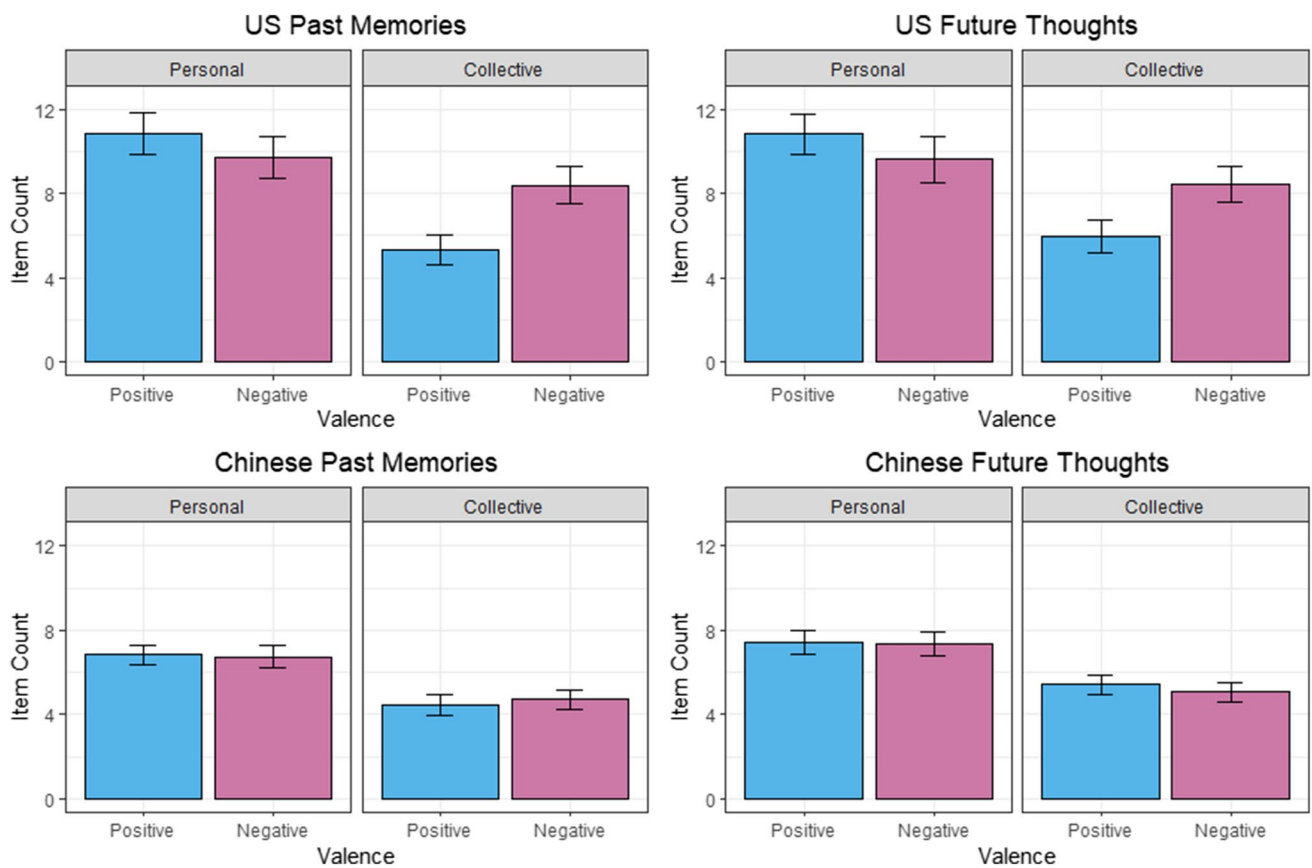
Counterbalancing analyses

In Experiment 2, participants were randomly assigned to complete either the past or future prompts first. Did the order in which participants completed the task influence performance on the task? Would the main analyses

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[5] The preregistered analyses are reported in the supplemental materials and are consistent with those reported here. Additionally, in the following paragraph, we report significant effects from the large ANOVA that are consistent with our preregistered research questions. Other significant effects are reported in the supplemental materials.

[6] Note that these simple effects tests yielded identical outcomes to our preregistered focused ANOVAs.

Fig. 3 Mean numbers of personal and collective past (left) and future (right) items listed by U.S. (top) and Chinese (bottom) participants. Error bars are 95% confidence intervals

described above hold when we include counterbalancing order in the analyses? Given the different valence patterns for the two countries, we analyzed the effects of counterbalancing order separately.

For the U.S., we conducted a 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (temporal period: past vs. future) × 2 (counterbalance order: past-first vs. future-first) mixed-model ANOVA with a Holm correction. We first examined the significant effects related to counterbalancing. There was a significant counterbalancing-by-temporal period interaction, $F(1, 79) = 15.53$, $p = .002$, $\eta_G^2 = .016$. Simple effects tests revealed that U.S. participants who completed the future prompts first generated more future items than past items ($M_{\text{diff}} = 4.89$, 95% CI [1.98, 7.80]), whereas participants in the U.S. who listed past items first generated more past items than future items ($M_{\text{diff}} = 3.27$, 95% CI [0.29, 6.27]). Thus, U.S. participants were showing a fatigue effect. No other effects involving counterbalancing order or temporal period were significant (all Fs < 4.74). Second, even when including counterbalancing in the model there was still a Valence × Domain interaction, $F(1, 79) = 110.35$, $p < .001$, $\eta_G^2 = .054$, suggesting that the key results from Experiment 2

are consistent even when accounting for counterbalancing order.

For China, we also conducted a 2 (domain: personal vs. collective) × 2 (valence: positive vs. negative) × 2 (temporal period: past vs. future) × 2 (counterbalance order: past-first or future-first) mixed-model ANOVA with a Holm correction. Critically, there were no main effects or interactions involving counterbalancing order (all Fs < 3.88), suggesting that responses were similar regardless of which order participants completed the tasks. Additionally, there was a main effect of domain, suggesting that Chinese participants listed more personal items ($M = 28.39$, 95% CI [26.76, 30.02]) than collective items ($M = 19.65$, 95% CI [18.31, 21.00]), $F(1, 87) = 151.24$, $p < .001$. $\eta_G^2 = .174$, and a marginal main effect of temporal period, suggesting that Chinese participants listed more future items ($M = 25.29$, 95% CI [23.73, 26.86]) than past items ($M = 22.75$, 95% CI [21.36, 24.14]), $F(1, 87) = 8.36$, $p = .068$, $\eta_G^2 = .010$. No other main effects or interactions were significant (all Fs < 4.27). The lack of other effects is consistent with the main analyses that failed to show a domain-by-valence interaction for the past or the future and failed to show any interactions involving temporal period. Thus, the main conclusions of

Table 1 Average number of items listed as a function of time frame, valence and domain for U.S. and Chinese participants in Experiment 2

Time frame	Positive	Negative	Overall
US 1 week	7.44 (3.75)	8.79 (4.20)	16.23 (6.98)
5–10 years	9.36 (3.56)	9.25 (4.23)	18.60 (7.03)
Overall	16.80 (6.75)	18.04 (7.88)	
China 1 week	5.56 (2.47)	5.67 (2.03)	11.23 (3.96)
5–10 years	7.31 (2.29)	6.76 (2.48)	14.06 (4.32)
Overall	12.86 (4.27)	12.43 (4.03)	

Note: Standard deviations are in parentheses.

our central analyses are supported even when counterbalancing order is accounted for.

Does time frame predict optimism toward the future?

We ran a 2 (time frame: 1 week vs. 5–10 years) × 2 (valence: positive vs. negative) × 2 (domain: personal vs. collective) repeated-measure ANOVA, with a Holm correction, for just the U.S. responses to the future prompts. Replicating the main analyses, we found a main effect of domain, $F(1, 80) = 66.58$, $p < .001$, $\eta_G^2 = .097$, and a valence-by-domain interaction, $F(1, 80) = 57.07$, $p < .001$, $\eta_G^2 = .038$. More important for the current analyses, as shown in Table 1 there was a main effect of time frame, $F(1, 80) = 26.18$, $p < .001$, $\eta_G^2 = .016$, indicating that participants listed fewer items for the future week ($M = 16.23$, 95% CI [14.69, 17.78]) than for the future 5–10 years ($M = 18.60$, 95% CI [17.05, 20.16]), and a time Frame × Valence interaction, $F(1, 80) = 10.34$, $p < .008$, $\eta_G^2 = .006$. Across both the personal and collective domains, U.S. participants listed more negative than positive items for the next week ($M_{\text{diff}} = -1.35$, 95% CI [−2.20, −0.50]) but an equal number of positive and negative items for the next 5–10 years ($M_{\text{diff}} = 0.11$, 95% CI [−0.65, 0.87]). This suggests that U.S. participants had a negative bias about the near future but no bias toward the far future, which supports our initial prediction that U.S. participants would be more optimistic about the remote future compared with the near future. This outcome is different from Experiment 1, where time frame did not influence responses. One potential explanation is that Experiment 2 was conducted during the height of the COVID-19 pandemic, whereas Experiment 1 was conducted before the pandemic. Living during the height of a pandemic may have influenced the responses such that participants might expect significant improvement as the pandemic dies down further into the future. We return to this idea in the general discussion.

We also ran a 2 (time frame) × 2 (valence) × 2 (domain) repeated-measure ANOVA, with Holm correction, for just the Chinese responses to the future prompts. Replicating the main analyses, there was a main effect of domain, $F(1, 94) = 87.20$, $p < .001$, $\eta_G^2 = .123$. Additionally, as shown in Table 1, there was a main effect of time frame, $F(1, 94) = 76.72$, $p < .001$, $\eta_G^2 = .057$, indicating that participants listed fewer items for the future week ($M = 11.23$, 95% CI [10.43, 12.04]) than for the future 5–10 years ($M = 14.06$, 95% CI [13.18, 14.94]). Finally, there was a Time Frame × Domain interaction, $F(1, 94) = 6.72$, $p = .011$, $\eta_G^2 = .005$. Chinese participants listed more personal items at 5–10 years than one week ($M_{\text{diff}} = 1.02$, 95% CI [.052, 1.52]), and more collective items at 5–10 years than one week, ($M_{\text{diff}} = 1.81$, 95% CI [1.43, 2.19]). The lack of interaction between time frame and valence supports our initial prediction that valence would remain relatively stable into the remote future for Chinese participants.

In sum, the increased optimism toward the remote future compared with the near future was shown only in the U.S. (negative toward recent future and neutral toward remote future) but not in China (no Valence × Time Frame interaction).

General discussion

The current studies make three contributions. First, we replicated past work demonstrating a personal/collective valence dissociation in future thoughts for Western samples (Shrikanth et al., 2018). Second, we showed that this personal/collective dissociation was not universal across cultures, a possibility acknowledged by Shrikanth and colleagues. Participants in China displayed no valence bias for either their personal or collective future. Finally, Experiment 2 demonstrated that people's valence patterns for the past mirrored their valence patterns for the future. This was true in both the U.S. and Chinese samples.

U.S. participants replicated past research showing a dissociation between personal and collective future thought

To our knowledge, no researchers have successfully replicated the specific pattern of valence dissociation between personal and collective future thoughts seen in prior work using the future fluency task (Shrikanth et al., 2018; but see Yamashiro & Roediger, 2019, for a partial replication). By successfully replicating the pattern, this study contributes to the generalizability of this dissociation in the U.S. given recent calls for direct replications in psychology (Chambers, 2017). The results suggest that the way people in the U.S. think about the future of their personal life is different from way they think about the future of their country.

Chinese participants think about the future differently than U.S. participants

The major finding of our study is that participants in China thought about the future differently than participants in the U.S. in two ways: (1) Chinese participants' valence for their personal future did not differ from the valence for their collective future, and (2) people in China were neutral toward both their personal and collective futures. Why might these patterns occur?

One factor may be the differences across cultures in how people remember the past. Because people draw on their memories to imagine the future, and because studies have found that people from China often express a more positive view of history than people from other countries (Choi et al., 2021; Liu et al., 2009), it makes sense that people from China were less negative toward the collective future than Americans. This was our main hypothesis for the study.

Additionally, we were surprised to find that Chinese participants did not show a positivity bias in the personal domain. However, this outcome is consistent with two previous studies. One study on autobiographical memory found that European Americans evaluated the recent personal past more positively than people in East Asia (Oishi, 2002). Another study found that Americans may be driven to evaluate themselves in more positive terms overall (Heine, 2005). Thus, differences in future thinking in both the personal and collective domains may be the result of the types of memories people have for the past.

A second explanatory factor may be cultural differences in self-construal. Past studies have suggested that people in collectivistic countries consider themselves as more interdependent with their society and environment compared with people in individualistic countries (S. X. Chen et al., 2018; Sims et al., 2015). In other words, participants in China may not have differentiated their personal and collective future to the same extent as did U.S. participants (for a related idea, see Y. Zhu et al., 2007). Future studies can try to pull apart this explanation by putting people into a holistic or analytic thinking style (Talhelm et al., 2015) or priming individualism and collectivism (Oyserman & Lee, 2008).

Additionally, a third factor, dialectical thinking, may explain the lack of valence bias in both domains (Fang & Faure, 2011; Peng & Nisbett, 1999). Dialectical thinking is characterized by three fundamental beliefs: that the world is constantly changing, that two contradictory ideas can both be true at the same time, and that it is difficult to understand a specific event without examining its place in a larger context. For example, one study found that people from China were more likely than people from the U.S. to expect change in the future and to expect the direction of change to shift over time—a positive event may eventually become negative and vice versa (Ji et al., 2001). If people in China tend to think dialectically (as has been demonstrated in cross-cultural research; Peng & Nisbett, 1999; Spencer-Rodgers et al., 2009; Spencer-Rodgers et al., 2004; Schimmack et al., 2002), this could explain the more balanced view of the personal and collective future displayed by people from China.

Of course, the above factors are all psychological variables, yet economic and sociological variables could provide alternative explanations. For example, China's tremendous economic growth of the past decades could be causing people in China to have a more positive view of both history and the future (Zhu, 2012). State-run media in China is another potential cause since state-run media often focus on positive events. Indeed, many Chinese participants listed phrases from Chinese Communist propaganda such as "the belt and road" and "build a community with a shared future for mankind" (D. Chen, 2019). Alternatively, restrictions on free speech might have caused participants to withhold negative future thoughts or listing positive future thoughts to be consistent with the official narrative of the Chinese government (Huang & Cruz, 2021; Wang & Mark, 2015; Yang & Vicari, 2021).

Taken together, there a number of potential frames for understanding cultural differences in collective future thinking. Our goal in the current paper was to examine whether cultural differences in collective thinking exist. A promising direction for future research is to begin testing some of these specific frameworks, and to begin connecting cultural forces to psychological processes.

Memory may be related to future thinking within both the personal and collective domains

Experiment 2 showed that memories and future thinking had a similar valence pattern (for both the personal and collective). This outcome fits with research that proposes that people draw on memories to imagine the future (Schacter et al., 2007; Szpunar & Szpunar, 2016; Topcu & Hirst, 2020). It is important to note that this study is the first to use the fluency task for both the personal and collective past and future in a single experiment. Past studies have either examined past memories and future thoughts for personal and collective domains in separate experiments (Shrikanth & Szpunar, 2021; Shrikanth et al., 2018) or used different tasks to examine memories and future thoughts (Öner & Gülogöz, 2020; Yamashiro & Roediger, 2019). Using the same task to examine the past and the future in the same study provides stronger evidence that people use similar processes in memory and prospection.

Of course, the relationship between memory and future thinking is complex. For example, Yamashiro and Roediger (2019) demonstrated that people may show implicit trajectories of decline, where nations are moving away from a golden era, and Topcu and Hirst (2020) showed a slight

positive trajectory between the past and future for collective events. Both trajectories imply a shift in emotional valence between the past and future. Likewise, scholars have argued that envisioning future scenarios may shape how people remember the collective past, perhaps by activating certain schemas or narrative templates (Szpunar & Szpunar, 2016). Further research can begin to unravel precise relationships between the past and the future.

Effects of COVID-19

It is important to note that Experiment 1 was conducted in 2019 and Experiment 2 was conducted in late 2020, during the middle of the COVID-19 pandemic. Did the pandemic affect future thinking? In the supplemental materials, we report an analysis comparing Experiment 1 and Experiment 2 that revealed two main results. First, participants in Experiment 1 generated more items than participants in Experiment 2. Second, there was an Experiment × Valence × Time Frame three-way interaction. Unpacking this interaction suggested that in Experiment 1 participants did not show a Valence × Time Frame interaction. In contrast, in Experiment 2 participants had a negativity bias when considering the next week, but a neutral (or very slight positive) perspective when considering the next five to ten years. This outcome suggests that for participants who completed our study during the pandemic, the far future was rosier than the immediate future, likely because they were envisioning a postpandemic future. Notably, this pattern occurred when collapsing across country.

Limitations

There are two key limitations in our studies. The first is that samples used in this study limit the conclusions we can draw concerning larger cultural differences. Our samples came from single universities (one in South Carolina, USA, and one in Hubei, China), so various factors, such as the specific geographical region or the types of students at each institution may not be representative of the rest of each country. Given the similarity of our American results to other results with Western samples we feel confident about the replicability of that result. However, future research may wish to explore collecting data from other institutions or regions within China. Exploring collective future thinking in other cultures aside from China may also be a powerful way to determine the key factors that influence collective future thinking. Finally, because the future fluency task used in our study only accounts for the number of items generated (a relatively coarse index), it is inadequate at addressing qualitative characteristics. Future studies could address qualitative components of future thinking.

Conclusion

In sum, this study found that people think about the future of their own life and the future of their country differently. At the same time, this dissociation appeared in the U.S. but not in China. This highlights the importance of accounting for culture when studying cognitive processes.

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Open practices statement

OSF.IO/C9V78 contains the data and materials for all experiments and preregistrations for both experiments.