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BRIEF REPORT

Do emotional and social primers change the pessimism in collective future thinking? Testing the robustness of the collective negativity bias

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Abstract
People are not optimistic about the future of the USA. When reporting their thoughts about the future, people express more worries than excitement, a phenomenon known as the *collective negativity bias*, and widely replicated among people residing in the USA. However, we do not know whether this bias is malleable. In this study, we tested whether prior exposure to valenced examples of collective future projections – attributed to an unknown source or a social source – shifts the valence of collective future thinking. In Experiment 1, participants completed an unrelated task (standard control condition) or viewed neutral examples (a modified control condition) generated by an unknown source. In Experiment 2, participants viewed neutral examples from an unknown source (as in Experiment 1), *positive* examples from an unknown source, or *positive* examples from their peers. In Experiment 3, participants viewed negative examples instead of positive ones, before reporting future projections. Experiment 4 added more power to detect interactions, using as primers the neutral, negative, and positive unspecified examples. Across all experiments, the *collective negativity bias* persisted and was comparable regardless of the valence or source of primers. This consistency is striking given that collective future projections are unbounded by reality, yet they seem resistant to primers we used. We discuss how these findings may help inform us about the underlying mechanisms of the *collective negativity bias* and guide future research on testing its robustness.

Keywords Collective future thinking · Collective negativity bias · Social source · Valence · Primers

Introduction

> "What we cannot imagine cannot come into being" – bell hooks.

We often think about how our lives may unfold over time (D'Argembeau et al., 2011); for example, we might think about specific personal plans such as retirement, or more broadly, about who will become the next leader of our country. In cognitive-psychological research, the latter type of thinking about future collective events is known as *collective future thinking* (de Saint-Laurent, 2018; Merck et al., 2016; Szpunar & Szpunar, 2016). Interestingly, people are negatively biased for the future of their country such that they report more worries than excitement (Shrikanth et al., 2018). This *collective negativity bias* has been observed in many countries including in Canada, France, Turkey, the UK, and the USA (Burnett et al., 2023; Hacıbektaşoğlu et al., 2022; Ionescu et al., 2024; Öner & Gülgöz, 2020; Shrikanth et al., 2018; Yamashiro et al., 2022; but see studies in China by Deng et al., 2022; Mert et al., 2022). In this study, we asked whether this valence-based bias can be shifted among college-going participants in the USA.

Influence of valence on collective future thinking

Recent work shows that after remembering positive or negative national events, participants in France showed no shift in their negativity for collective future thinking (Ionescu et al., 2023, Experiment 1). We probed this question by providing participants with primers or example responses before they generated their own responses. In some cases, these primers were positive or negative in valence, and in other cases these were social primers, that is, responses

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ostensibly provided by other participants. We investigated whether receiving these primers would facilitate participants to shift their negativity in collective future thinking. Specifically, we tested whether positive examples (from an unspecified source or from peers) promote positivity in collective future projections, and whether negative suggestions amplify the negativity in collective future thinking. Finally, we conducted a highly powered experiment to replicate the patterns observed in these experiments. These questions are critical for better understanding how we can promote optimism in our collective imagination.

Social influences on cognition

In the context of examining the role of valence, we also explored whether the impact of primers would change if their source was presumed to be social. Human cognition is often socially situated (Mead & Schubert, 1934). Our daily interactions with others – whether it is reminiscing about the past with a friend or planning for future retirement with a partner – have profound influences on our cognition. For example, people can simultaneously reinforce some memories and suppress other memories through conversation (Hirst & Echterhoff, 2012; Rajaram & Pereira-Pasarin, 2010). People also conform to others' responses in basic tasks such as judging the length of lines even when they believe their partners' responses were incorrect (Asch, 1956).

People may also rely on others to help form perceived knowledge and opinions on public policy (Sloman & Fernbach, 2017). For instance, researchers have examined how simply knowing the results of a consensus conference can have an impact on participants' opinions on several public policies (Sloman et al., 2021). Consensus conferences are useful tools to disseminate complex information about public policies (Einsiedel & Eastlick, 2000), and involve recruiting a random sample of citizens who are polled on their baseline opinion on an issue and are then educated about that topic over several days. Findings suggest that participants can change their attitudes towards some public policies (e.g., baby bonds, minimum wage) upon hearing that their peers changed their opinions after participating in a consensus conference (Sloman et al., 2021), indicating social shaping of opinions.

These studies show the different ways in which people can impact one another's cognition and suggest that people could also shape each other's future predictions. An unpublished study recently reported that participants who collaborated with a partner to report future projections (compared to participants who worked alone) exhibited an exaggerated *collective negativity bias* (Li, 2021). This amplified negativity in future projections is like reports that people share negative information more than positive or neutral information (Bebbington et al., 2017; Luminet et al., 2000; Rozin & Royzman, 2001) and recall negative information more often when working in collaborative groups than alone (Choi et al., 2017). Given these and other findings showing that social sources tend to be more influential on cognition than nonsocial sources of information (e.g., a computer; Reysen & Adair, 2008), one aim of this study was to test whether receiving valenced primers from social sources can selectively influence collective future thinking compared to nonsocial sources.

The present study

We report four experiments testing whether valenced and/or peer primers can change the *collective negativity bias*. We adapted and modified experimental procedures used in previous collective future thinking studies to implement our manipulations. Typically, participants are provided with a prompt to list things that they were either excited about or worried about concerning the future (Shrikanth et al., 2018; derived from MacLeod et al., 1997). Critical to our aims, in addition to the prompt, we provided participants with "examples" of future projections, that is, primers, before they responded to these worry or excitement prompts, to systematically test the influence of valenced primers. We also tested whether these primers came from nonsocial and social sources to examine whether positive primers (compared to neutral primers), and particularly those from social sources, can reduce the *collective negativity bias.* Next, we tested whether negative primers could amplify the *collective negativity bias*. Finally, we conducted a highly powered experiment to replicate the results from these experiments.

Experiment 1

This experiment was designed to establish and replicate the *collective negativity bias* using a modified procedure for the future fluency task reported previously (Burnett et al., 2023; Shrikanth et al., 2018). We expected the *collective negativity bias* to occur as in previous studies (Shrikanth et al., 2018).

Method

Participants and design

The experiment consisted of a 2 × 2 mixed design, with Prompt (worry, excitement) manipulated within-subject, and Primer (unrelated, unspecified neutral) manipulated between subjects. Here, Prompt refers to instructions to report worry versus excitement regarding the future of the USA in the future fluency task that all participants completed. Primer

refers to the set examples provided to participants (here, unspecified neutral primers constituted a modified control condition we examined for use in the following experiments), or a task they completed (here, an unrelated task, a standard control condition for the fluency task that can serve as a baseline comparison), before performing the main, future fluency tasks.

All participants in this and the following experiments were undergraduates from Stony Brook University, located in the USA, who completed the study for course research credit. In all experiments, participants accessed the study online on their personal devices (Shrikanth et al., 2018, Experiment 2). Of the 103 participants recruited for Experiment 1, 15 (14.56%) participants did not meet our inclusion criteria for the following reasons: Six participants rated neutral stimuli positively, four participants spent longer than the allowed 2 min on the primer task, four participants did not complete the study, and one participant did not report any responses for the future fluency prompts. It is worth noting that such rates of performance-related exclusions are not uncommon in online experiments that allow asynchronous participation (Finley & Penningroth, 2015). Our final sample consisted of 88 participants, meeting the a priori power analysis of 90% (with alpha set at.05, two-tailed) that determined that we needed 44 participants per condition to observe the within-subject *collective negativity bias* (d=.44) in which participants reported more worries than excitement for the future (Shrikanth et al., 2018).

Our final sample (M = 21 years, SD = 5.33 years, range: 17–51 years with 94.45% below 30 years of age) consisted of 63 (71.60%) women, 23 (26.10%) men, and two (2.27%) people who did not report their gender. Forty-nine (55.7%) participants identified as Asian, 30 (34.1%) identified as White, four (4.55%) identified as Black/African American, three (3.41%) identified as "other", one (1.14%) identified as mixed, and one (1.14%) identified as Native Hawaiian or Pacific Islander. Of these participants, eight (9.09%) identified as Latino/Hispanic.

Materials and procedure

Participants provided consent on the form and then began the study administered using the Qualtrics software (Qualtrics, 2024). All participants received general instructions, "*You will be asked to write things you are excited or worried about for the future of the USA."* Underneath those instructions, participants were asked to read instructions to play an unrelated game (*"You will first play the Snake game briefly. Please use your arrow keys to move the snake for it to eat the food on the scene")* or view neutral examples ("*You will first view some examples of things you might report. Please read each statement and rate the emotional valence of each statement on a scale of 1–9 (1 being the most negative, 5 being neutral, and 9 being the most positive)*"). Depending on the condition to which they were assigned, participants then advanced to either play the Snake game or view ten neutral examples for which they rated their emotional valence for 2 min. We obtained these ratings in each experiment to confirm that across experiments participants found the valence of these examples (neutral/positive/negative) to be as we intended, as this was essential for setting up the valence manipulation. The neutral examples that were used in this experiment were statements such as "That 70's show makes a comeback season" and "archaeologists unearth 5,000-year-old Inca gold coin." Additional information about the stimuli developed for the current study as well as manipulation checks conducted to ensure that the valence of the stimuli were perceived as intended can be found in the Online Supplementary Materials (OSM).

After 2 min, participants advanced to the main, future fluency task where they received the first prompt to report as many things as they are worried about (or as many things as they are excited about) for their country's future. As the *collective negativity bias* has been observed across various timelines (e.g., a week, a year, 5–10 years into the future), we did not mention a specific timeline for the future fluency tasks (Burnett et al., 2023; Shrikanth et al., 2018). Participants were given 5 min to complete this prompt (please see the OSM for details on how much participants elaborated in their responses across experiments). Afterward, participants received instructions for the second prompt (i.e., if they were asked to report worries first then they reported excitement) and performed the future fluency task for 5 min again. We randomized the order of the worry/excitement task across participants to prevent order effects from influencing performance (Shrikanth et al., 2018). This procedure enables participants to answer freely to report as many responses as they would like for the collective future. We note that other instructions have been used to promote positivity (e.g., "think of a future event in line with America's goals"; Mert et al., 2022); however, our main goal was to influence participants' open-ended responses instead.

Lastly, participants completed a demographic survey and some exploratory questions and were then debriefed. As these exploratory measures were not planned for current analyses, we do not discuss them further. The entire experimental session lasted approximately 30 min.

Scoring

We adopted a similar coding procedure to previous studies (Burnett et al., 2023; Shrikanth et al., 2018). A total of 1,051 items were reported across all participants. To establish interrater reliability, 20% of these items were coded by two independent raters for coherence and appropriateness as described below. The raters were masked to the experimental

manipulations. Cohen's kappa for interrater agreement was substantial (κ = .97). The remaining items were equally divided and assigned to each coder. Based on the high interrater reliability established in Experiment 1, the same two masked coders scored the response items in Experiment 1b reported in the OSM and Experiment 2.

Raters coded responses for coherence and appropriateness such that responses that were incomplete, incoherent, duplicated, or inappropriate (e.g., reporting a personal future worry) were removed from the analyses. This scoring was used in all reported experiments to ensure only the task-appropriate responses were included in the analyses.

Results

For all analyses reported in this article, we removed outliers below the first quartile or above the third quartile (Field et al., 2012; Peña et al., 2023; also see *Acknowledgements*). We chose this approach because this experimental series was conducted asynchronously online where participants completed the tasks unsupervised. Therefore, it was not possible to ensure that participants were putting a similar effort across conditions and throughout the testing period. In this experiment, we removed seven outliers from the analyses. Across all analyses, alpha was set at.05 (two-tailed).

We conducted a 2 × 2 mixed analysis of variance (ANOVA) to compare the number of reported future fluency responses (Table 1). We observed a significant main effect of Prompt. Participants reported more worry (unrelated primer: $M = 5.79$; $SD = 3.43$; unspecified neutral primer: $M = 5.60$; $SD = 2.75$) than excitement (unrelated primer: $M = 4.47$; $SD = 2.85$; unspecified neutral primer: $M = 3.88$; $SD = 1.90$) responses. This difference was statistically marginal for the unrelated primer, $t(37) = -1.89$, $p = .066$, $d = -0.31$, 95% CI [−2.73, 0.94], and statistically significant for the unspecified neutral primer, $t(42) = -3.94$, $p < .001$, $d = -0.60$, 95% CI [−2.60, −0.84] (Fig. 1).

Experiment 2

Experiment 2 was designed to examine the influence of positive primers on collective future thinking. In two new conditions, participants received positive primers prior to performing the fluency tasks. In one condition, the positive primers were attributed to a nonsocial source (the *unspecified positive primer* condition) and in another condition to a social source (the *social positive primer* condition). A comparison between the latter two conditions made it possible to isolate the extent to which social sources have a unique influence (Maswood et al., 2019; Reysen & Adair, 2008).

Method

Participants and design

The experiment consisted of a 2 × 3 mixed design, with Prompt (worry, excitement) manipulated within-subject and Primer (unspecified neutral, unspecified positive, social positive) manipulated between subjects. We now used

Table 1 Omnibus tests across Experiments 1—4

Effect	Degree of Freedom (Between)	Degree of Freedom (Within)	*F*-value	*p*-value	η_p^2
Experiment 1					
Primer	1	79	0.689	.409	.009
Prompt	1	79	14.340	<.001	.154
Primer*Prompt	1	79	0.615	.615	.003
Experiment 2					
Primer	2	83	0.964	.386	.023
Prompt	1	83	17.339	<.001	.173
Primer*Prompt	2	83	0.321	.726	.008
Experiment 3					
Primer	2	81	2.815	.066	.065
Prompt	1	81	30.546	<.001	.274
Primer*Prompt	2	81	0.382	.684	.009
Experiment 4					
Primer	2	415	3.097	.046	.015
Prompt	1	415	39.597	<.001	.087
Primer*Prompt	2	415	0.926	.397	.004

The highlighted rows represent statistically significant effects

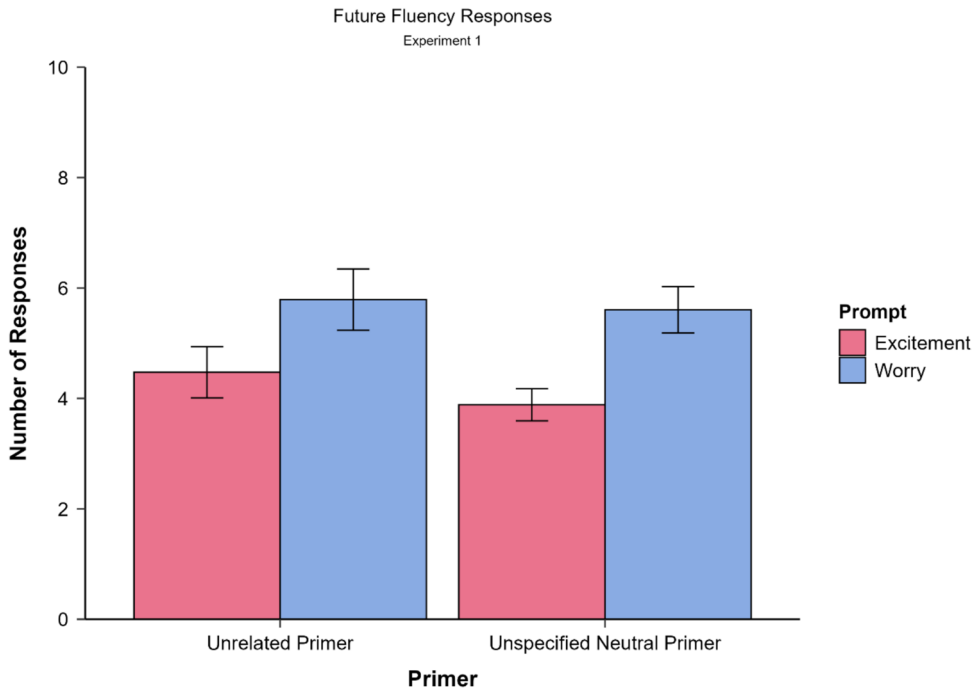

Fig. 1 Experiment 1: Future fluency responses. Bars are at mean level performance and error bars are standard error of the means

unspecified neutral primers as our baseline condition. This modified control condition yielded a *collective negativity bias* in Experiment 1. We note that this condition did not yield a statistically significant *collective negativity bias* in our Experiment 1b (see OSM), but it offered the advantage of primers that were like the two new conditions of interest while being neutral in valence.

An a priori power analysis (90%, two-tailed, alpha at.05) based on the unspecified neutral primer condition from Experiment 1 ($d = 0.601$) yielded a sample size of 32 participants per condition for this experiment. We recruited a total of 149 Stony Brook undergraduates of whom 53 (35.57%) had to be removed for not meeting the inclusion criteria for the online asynchronous testing environment: 22 participants rated positive statements as either neutral or negative contrary to our intended experimental manipulation, 16 participants rated neutral statements as positive also contrary to our intended experimental manipulation, four participants did not complete the study, four participants spent more than the allowed 2 min on the primer task, four participants did not provide ratings during the primer task, and three participants did not provide responses for the future fluency task. The final sample consisted of 96 participants, with 32 participants in each condition, in line with the power analysis.

Our final sample ($M = 20$ years; $SD = 1.64$ years; range: 17–25 years) consisted of 65 (67.70%) women, 28 (29.20%) men, two (2.08%) people who identified as "other," and one (1.04%) person who did not report their gender. Of these participants, 46 (47.90%) identified as Asian, 28 (29.20%) identified as White, nine (9.38%) identified as mixed, five (5.21%) identified as Black/African American, and five (5.21%) and three (3.12%) people did not report their race. Eighteen (18.80%) participants identified as Latino/Hispanic.

Materials and procedure The procedure and materials were identical to Experiment 1, except the primers and instructions provided before the future fluency tasks. In line with the goals of this experiment, the primers provided before the future fluency task in two of the three conditions were positive in valence. See OSM for more information about the norming procedure for selecting these stimuli.

Underneath the general instructions, the instructions to participants appeared as follows in the unspecified neutral or unspecified positive conditions: "*You will first view some examples of things you might report. Please read each statement and rate the emotional valence of each statement on a scale of 1–9 (1 being the most negative, 5 being neutral, and 9 being the most positive)*"). In the social positive condition, the instructions were as follows: "*You will first view some examples of things that your peers, that is, other Stony Brook students, have previously reported. Please read each statement and rate the emotional valence of each statement on a scale of 1–9 (1 being the most negative, 4 being neutral, and 9 being the most positive).*" The positive primers in this experiment included statements such as "significant decreases in suicide rates" and "improvement in healthcare initiatives" (see OSM for the complete list of primers).

Scoring Once again, the same pair of coders used the same scoring scheme as in Experiment 1. Participants reported a total of 1,273 items across conditions.

Results

Ten outliers were removed using the a priori criteria outlined in Experiment 1. A 2 × 3 mixed ANOVA yielded a main effect of Prompt (Table 1) such that participants reported significantly more worry (unspecified neutral primer: $M = 5.78$, $SD = 3.24$; unspecified positive primer: $M = 6.24$, $SD = 3.20$; social positive primer: $M = 6.57$, $SD = 2.85$) than excitement (unspecified neutral primer: $M = 4.15$, $SD = 1.99$; unspecified positive primer: $M = 5.14$, $SD = 3.14$; social positive primer: $M = 4.80$, $SD = 2.09$) responses. Replicating Experiment 1, this *collective negativity bias* was significant in the unspecified neutral primer, $t(26) = -2.36$, $p = .026$, $d = -0.45$, 95% CI [−3.05, −0.21]. This pattern did not reach significance in the unspecified positive primer condition, $t(26) = -1.73$, $p = .094$, $d = -0.32$, 95% CI [−2.41, 0.20], and was significant in the social positive primer conditions, $t(29) = -3.22$, $p = .003$, $d = -0.59$, 95% CI [−2.89, −0.65] (Fig. 2). There was no significant main effect of Primer or an interaction.

Experiment 3

Given the overall patterns of persistent negativity in collective future thinking in our previous experiments, we designed Experiment 3 to test whether negative primers can shift the bias such that an exaggerated *collective negativity bias* would emerge, with even more negativity expected in the social condition (Li, 2021; Reysen & Adair, 2008).

Method

Participants and design

This experiment consisted of a 2 × 3 mixed design, with Prompt (worry, excitement) manipulated within-subject and Primer (unspecified neutral, unspecified negative, social negative) manipulated between subjects. The unspecified neutral primers once again served as baseline, and we once again recruited 32 participants per condition following an a priori power analysis (90%, two-tailed, alpha at.05) based on the unspecified neutral condition from Experiment 1 ($d = 0.601$). We recruited a total of 136 Stony Brook undergraduates of whom 40 (29.41%) had to be removed for not meeting the inclusion criteria: 13 participants rated negatives statements as either neutral or positive contrary to our intended experimental manipulation, nine participants did not complete the study, seven participants rated neutral statements as positive, seven participants did not complete the primer task, and four participants spent longer than two minutes on the primer task due to an error. The final sample consisted of 96 participants, with 32 participants in each condition, in line with the power analysis.

Our final sample ($M = 19.50$ years; $SD = 1.90$ years; range: 17–31 years, with 99% below 30 years of age) consisted of 78 (81.20%) women, 15 (15.60%) men, two (2.08%) people who identified as "other," and one (1.04%) person who did not report their gender. Of these participants, 47

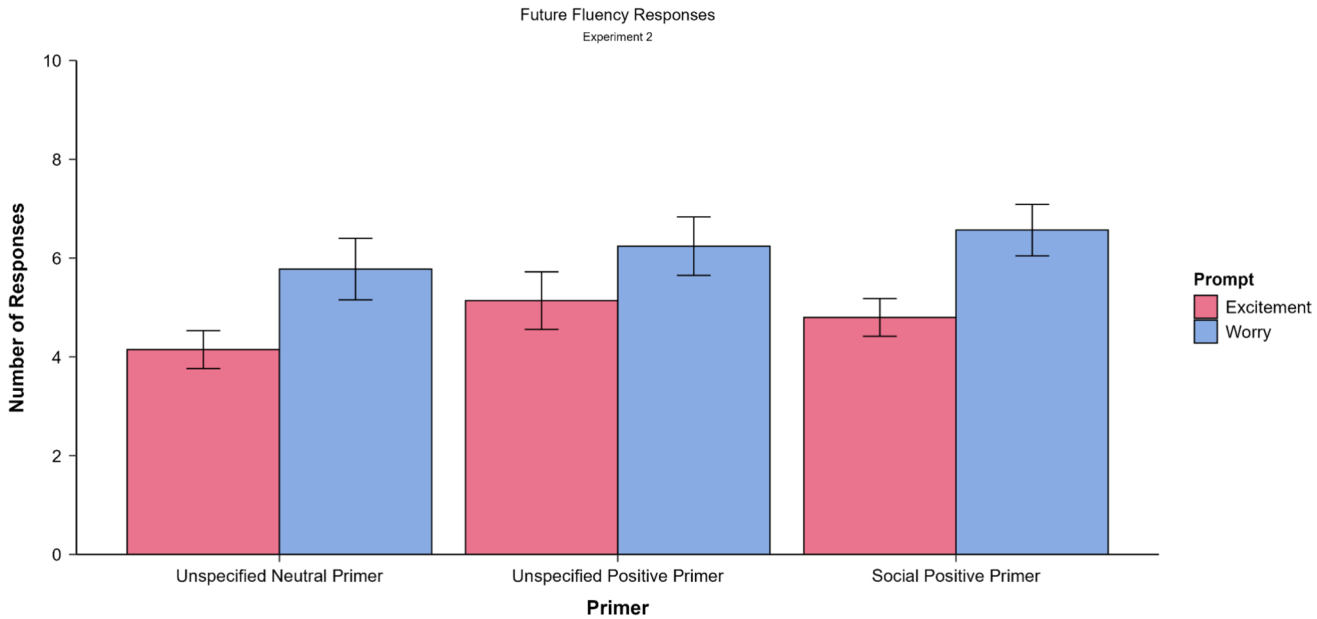

Fig. 2 Experiment 2: Future fluency responses. Bars are at mean level performance and error bars are standard error of the means

(49%) identified as Asian, 30 (31.20%) identified as white, nine (9.38%) identified as Black/African American, six (6.25%) identified as "other", two (2.08%) people did not identify their race, one (1.04%) person identified as multiracial, and one (1.04%) person identified as Native American or Alaskan Native. Sixteen (16.70%) participants identified as Latino/Hispanic.

Materials and procedure

The procedure, instructions, and materials were similar to Experiment 2. The only difference in this experiment was that the primers provided before the future fluency task in two (unspecified negative and social negative) of the three conditions were negative in valence. The negative primers were items such as "food shortage" and "increased natural disasters." See OSM for more information about the norming study conducted to develop these stimuli as well as for the full stimulus set.

Scoring

We used the same scoring scheme as the previous two experiments. One of the masked coders from the previous experiments was replaced, and, therefore, we gave the two coders for this experiment 20% of the data from this experiment to establish high interrater reliability. Cohen's kappa for interrater agreement was substantial ($\kappa = .973$). The remaining items were equally divided and assigned to each coder. Participants reported a total of 1,170 items across conditions.

Results

Thirteen outliers were removed a priori from analyses using the criteria established in Experiment 1. A 2×3 mixed ANOVA once again yielded a main effect of Prompt (see Table 1) such that participants reported significantly more worries (unspecified neutral primer: $M = 5.48$, $SD = 3.45$; unspecified negative primer: $M = 6.96$, $SD = 1.53$; social negative primer: $M = 5.64$, $SD = 2.78$) than excitement (unspecified neutral primer: $M = 3.86$, $SD = 2.22$; unspecified negative primer: $M = 4.67$, $SD = 2.34$; social negative primer: $M = 3.93$, $SD = 2.26$) responses. The *collective negativity bias* was significant in all three conditions – the unspecified neutral primer, $t(28) = -2.45$, $p = .021$, $d = -0.45$, 95% CI [−2.97, −0.27] that replicated Experiments 1 and 2, the unspecified negative primer condition, $t(26) = -4.59$, $p < .001$, $d = -0.88$, 95% CI [−3.32, −1.27], and the social negative primer conditions, $t(27) = -2.96$, $p = .006$, $d = -0.56$, 95% CI [−2.90, −0.53] (Fig. 3). There was no main effect of Primer or an interaction, indicating a comparable *collective negativity bias* across conditions.

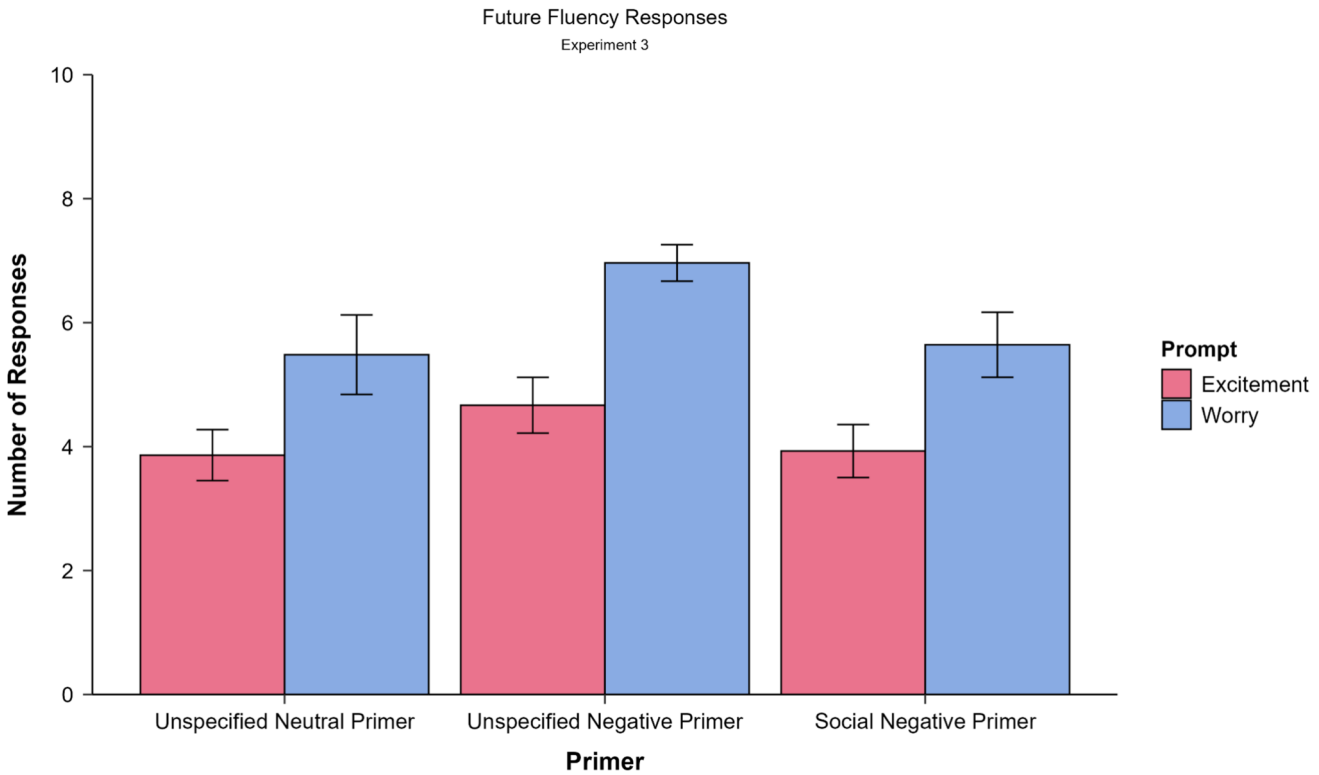

Fig. 3 Experiment 3: Future fluency responses. Bars are at mean level performance and error bars are standard errors of the mean

Experiment 4

The aforementioned experiments found a consistent *collective negativity bias* regardless of whether valenced and social primers were presented to participants prior to the fluency tasks. This experiment was designed to test whether the previous experiments were potentially underpowered to observe an interaction across primer type and the magnitude of the *collective negativity bias*. To test this, we focused on the impact of valence by comparing neutral, positive, or negative unspecified primers using a different power analysis (Sommet et al., 2023).

Method

Participants and design

The experiment consisted of a 2×3 mixed design, with Prompt (worry, excitement) manipulated within-subject and Primer (unspecified neutral, unspecified positive, unspecified negative) manipulated between subjects. We took the conservative approach of powering for a fully attenuated 2×3 interaction (Sommet et al., 2023),[1] as well as simple interactions, for a power of approximately.80^(1/2) ≈ 0.89. Based on this approach, we aimed to recruit 498 participants (i.e., 166 participants per primer condition).

We recruited a total of 731 Stony Brook undergraduates of whom 233 (31.87%) had to be removed for not meeting the inclusion criteria that were set up the same way as the previous experiments: 87 participants started the experiment but left before completing it; 49 rated the negative primers as neutral or positive; 44 participants rated positive primers as neutral or negative; 30 participants did not rate the neutral primers as neutral; 19 participants spent longer than 2 min on the primer task due to an error; and four participants did not make any valid responses in the future fluency task. The final sample consisted of 498 participants, with 166 participants in each condition, in line with the new power analysis.

Our final sample ($M = 19.40$ years; $SD = 2.27$ years; range: 17–38 years, with 99% below 30 years of age) consisted of 331 (66.50%) women, 155 (31.10%) men, six (1.20%) people who identified as "other," and six (1.20%) people did not report their gender. Of these participants, 230 (46.20%) identified as Asian, 141 (28.30%) identified as White, 41 (8.23%) identified as Black/African American, 40 (8.03%) identified as multiracial, 34 (6.83%) identified as "other," 11 (2.21%) people did not identify their race, and one (0.20%) person identified as Native American or Alaskan Native. Additionally, 73 (14.70%) participants identified as Latino/Hispanic.

Materials and procedure

The procedure, instructions, and materials were identical to our previous experiments where the unspecified neutral, unspecified positive, and unspecified negative conditions were used.

Scoring

We used the same scoring scheme as the previous experiments, and two new coders implemented this scheme. We gave these codes 20% of the data from this experiment to establish the interrater reliability, and Cohen's kappa for interrater agreement was substantial ($\kappa = .975$). The remaining items were equally divided and assigned to each coder. Participants reported a total of 5,710 items in this experiment.

Results

Thirty-seven outliers were removed from analyses using the criteria established in previous experiments. A 2×3 mixed ANOVA once again yielded a main effect of Prompt (see Table 1), such that participants reported significantly more worries (unspecified neutral primer: $M = 5.54$, $SD = 2.41$; unspecified negative primer: $M = 6.23$, $SD = 3.41$; unspecified positive primer: $M = 6.46$, $SD = 3.54$) than excitement (unspecified neutral primer: $M = 4.80$, $SD = 2.63$; unspecified negative primer: $M = 4.93$, $SD = 2.93$; unspecified positive primer: $M = 5.44$, $SD = 3.28$) responses. The *collective negativity bias* was significant in all three conditions – the unspecified neutral primer, $t(125) = -3.47$, $p < .001$, $d = -0.31$, 95% CI [−1.16, −0.32], the unspecified negative primer condition, $t(131) = -4.04$, $p < .001$, $d = -0.35$, 95% CI [−1.93, −0.66], and the unspecified positive primer conditions, $t(159) = -3.64$, $p < .001$, $d = -0.29$, 95% CI [−1.57, −0.47] (Fig. 4).

We also observed a main effect of Primer. Participants in the neutral unspecified condition ($M = 5.17$, $SD = 2.54$) reported fewer items compared to the positive unspecified condition ($M = 5.58$, $SD = 3.24$), $t(285) = -2.48$, $p = .014$, 95% CI [−1.39, −0.159]. This difference did not emerge between the unspecified neutral primer and unspecified negative primer, $t(256) = -1.36$, $p = .18$, 95% CI [−1.00, 0.18]. In brief, the main effect of Primer seems to be driven by fewer responses reported in the unspecified neutral condition compared to the unspecified positive condition. However,

[1] The INTxPower tool is designed to test 2×2 interactions. We consulted one of the authors to apply their tool to our 2×3 design for which they recommended powering for two 2×2 interactions (see here). The result suggested 332 participants (or 166 per between-subjects condition) for 498 total participants.

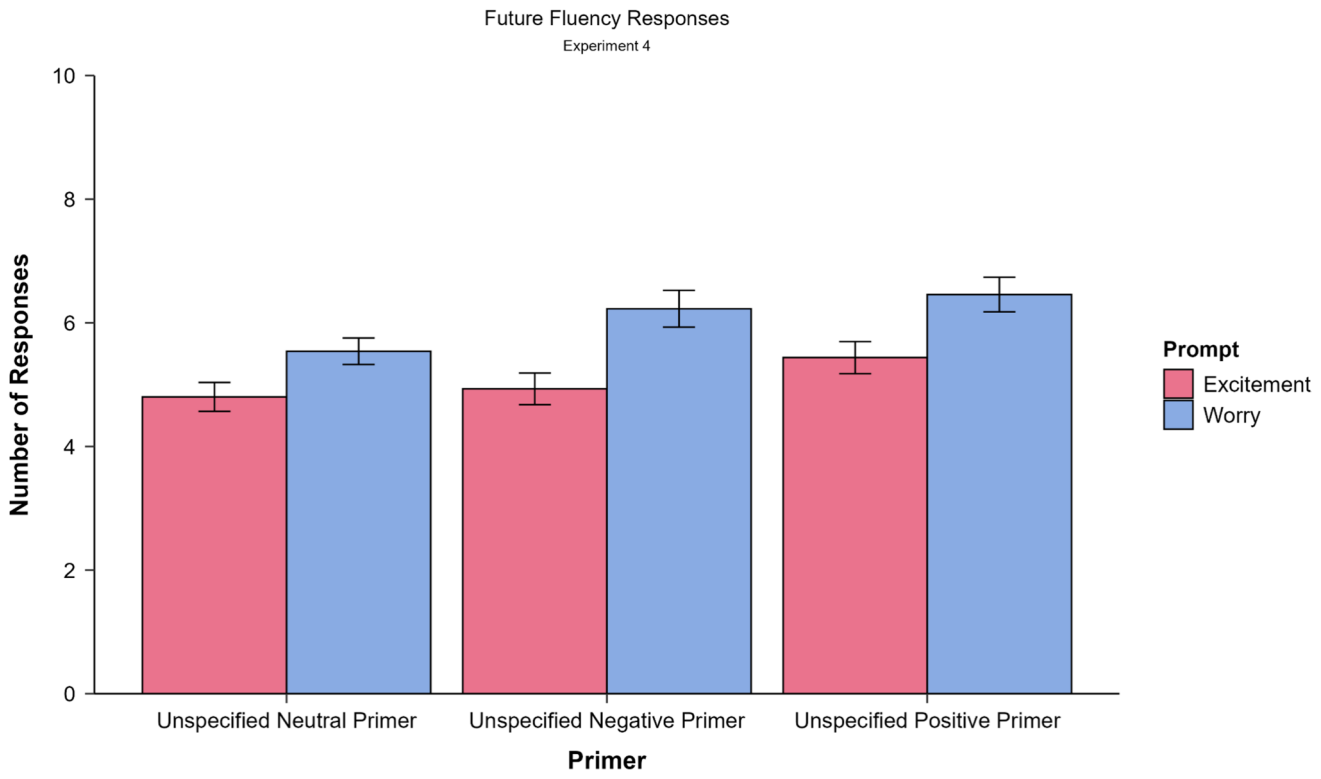

Fig. 4 Experiment 4: Future fluency responses. Bars are at mean level performance and error bars are standard error of the means

relevant to the main hypothesis, it did not modulate the *collective negativity bias*.

General discussion

In this study, we investigated the *collective negativity bias*, a phenomenon where Westerners tend to report more worry than excitement for their country's future (e.g., Shrikanth et al., 2018). We asked whether people would show a shift in the *collective negativity bias* after viewing valenced primers and when these primers are attributed to their peers. Specifically, across four experiments we investigated whether being primed by valenced or neutral statements and whether learning that one's peers (as opposed to a nonsocial source) are relatively optimistic or pessimistic about the future of the USA can modify the *collective negativity bias*. Across all experiments, the *collective negativity bias* remained robust; it was also comparable across conditions despite exposure to primers that were emotionally valenced and, in some cases, were attributed to social sources.

The comparable patterns of *collective negativity bias* across conditions in our study are striking given collaborators' influence on remembering (Weldon & Bellinger, 1997) and peers' opinions on public policy (Sloman et al., 2021). To our knowledge, only one study has reported social influence to shift the *collective negativity bias*, but that procedure differed in important respects (Li, 2021). Participants who collaborated with a partner to produce future projections about one's country showed an amplified *collective negativity bias*. In the current procedure, instead of asking participants to engage with each other, we provided participants with examples of others' future projections to structure peers' influence on valence. While peers' opinions provided to participants are effective for influencing public policy opinions (e.g., Sloman et al., 2021), we found that future projections about one's country are resistant to valenced primers from nonsocial sources or peers. This robustness of the *collective negativity bias* calls for future work to test different ways of structuring emotional and social influence to reduce the *collective negativity bias*.

Theoretical implications

Two theoretical accounts have been proposed for the *collective negativity bias* (Liu & Szpunar, 2023). The first account, based on accessibility bias (Tversky & Kahneman, 1973), suggests that negative events are readily accessible for participants while completing the future fluency tasks simply because the news cycles are filled with tragic events (Soroka & McAdams, 2015). This accessibility account cannot completely explain the *collective negativity bias* in our study in

that, under this account, we would expect that our primers would have had some influence on the phenomenon by providing an immediate shift in valence.

Another account is based on the idea of cultural scripts and posits that people usually do not have direct experiences with national events and rely mainly on cultural scripts to imagine the future (Liu & Szpunar, 2023). As such, people might simply believe that wars and conflict are inevitable parts of being a member of a nation (Hirst & Topçu, 2023). While people might hope for a better future and this may manifest in envisioning one's personal future over which one has more control, they may see conflict at the collective level (national, global) as being able to arise at any time, a possibility over which one does not have much control (Topcu & Hirst, 2020). Our data align with this explanation to a greater extent as participants were exposed to items such as "all wars across the nation come to an end" which historically has only happened in rare and short intervals of time, especially in US history.

It is also worth considering the dominance of negative news cycles (noted above) may also contribute to cultural scripts, making it difficult to disambiguate the roles of these two explanations under some circumstances. Our participants were mainly young, college-going adults who had recently lived through the COVID-19 pandemic, the political turmoil of the 2020 Presidential Election, and other significant experiences such as the tragedies that sparked the Black Lives Matter movement through their formative adulthood. At this point in history, it is possible that our participants could not imagine an end in sight for the turmoil and conflict as they had been experiencing these events themselves (Yamashiro & Pashkov, 2023).

In this line of thought, emerging evidence suggests that the way people perceive the present is associated with the valence of collective future thinking (Ionescu et al., 2023). For example, people who perceived their current French government as dysregulated reported enhanced negativity in collective future thinking (Ionescu et al., 2023). While our findings suggest that the primers we implemented did not influence collective future thinking, it could be that other manipulations such as informational sources (e.g., news) or repeated exposure of positive information can influence the *collective negativity bias* (e.g., Mert & Wang, 2023). Future work on the specificity of the type of primers that challenge or oppose schemas – for example, positive events are happening in the present – would help specify further the contexts when negativity persists or can be reduced.

Limitations and future directions

We recruited undergraduates, primarily young adults, limiting the generalizability of our findings to the broader community. Recruiting college students was an intentional decision as the collective negativity bias is robust among young adults (Burnett et al., 2023), making it particularly interesting to see if this bias can be shifted. Future research with other community members would broaden a test of this question. Additionally, while our sample was racially diverse in some ways, groups such as Black and Latine participants were not well represented. We did not aim to examine racial/ethnicity differences, but we note this limitation as race might play a role in collective cognition (Cyr & Hirst, 2024). Similarly, it would be interesting to examine whether valenced and social primers can influence participants living in other countries (Deng et al., 2022). The current work offers a pathway to explore these questions in future research.

Conclusion

Our findings and the backdrop of the events just noted suggest that young adults in the USA collectively have a negative narrative for how the future of their country will unfold, and this downcast orientation is not easy to overturn. Positive examples of future projections, including those attributed to peers, did not seem to persuade our participants to report more positive future events. This raises questions about the extent to which the cultural narratives are impermeable against external influences and news cycles dominate future thinking. In other words, can people begin to think about a brighter future and, perhaps, learn from our dark past or a troubled present? These are powerful questions to consider as a better view of the collective future can potentially motivate citizens to become more civically engaged, especially given empirical support for optimism evoking trust and civic engagement (Uslaner, 1998).

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Declarations

Competing interest The authors declare no competing interests.

Ethics approval Procedures were reviewed and approved by the Stony Brook Institutional Review Board.

Open practices An overview of the data analysis script and processed data file are available on the Open Science Framework (OSF) at: https://osf.io/vcpf9/?view_only=0de23d709e034687a13a84085e6ddf

09. Data processing and analyses were not preregistered online but were determined before data processing for the doctoral dissertation proposal (Peña, 2023).

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