# Do Emotional and Social Primers Change the Pessimism in Collective Future Thinking?: Testing the Robustness of the Collective Negativity Bias

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## Author Note

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**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 OSF at https://osf.io/vcpf9/?view_only=0de23d709e034687a13a84085e6ddf09. Data processing and analyses were not preregistered online but were determined before data processing for the doctoral dissertation proposal (Peña, 2023).

**Abstract**

People are not optimistic about the future of the United States. 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 United States. 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

# Do Emotional and Social Primers Change the Pessimism in Collective Future Thinking?: Testing the Robustness of the Collective Negativity Bias

"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 United Kingdom, and the United States (Burnett et al., 2023; Hacıbektaşoğlu et al., 2022; Ionescu et al., 2022; Öner & Gülgöz, 2020; Shrikanth et al., 2018; Yamashiro et al., 2022; but see studies in China, 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 United States.

## 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 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 (Meade & 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 (Bebington 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 to test 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 prompt, 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 2x2 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 United States 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 United States, 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 two minutes 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 United States."* 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 10 neutral examples for which they rated their emotional valence for two minutes. 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 5000-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 Supplementary Materials.

After two minutes, 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 five minutes to complete this prompt (please see the Supplemental Materials 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 five minutes 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 minutes.

**Scoring.** We adopted a similar coding procedure as previous studies (Burnett et al., 2023; Shrikanth et al., 2018). A total of 1051 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 (Experiments 1b reported in Supplemental Materials 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**

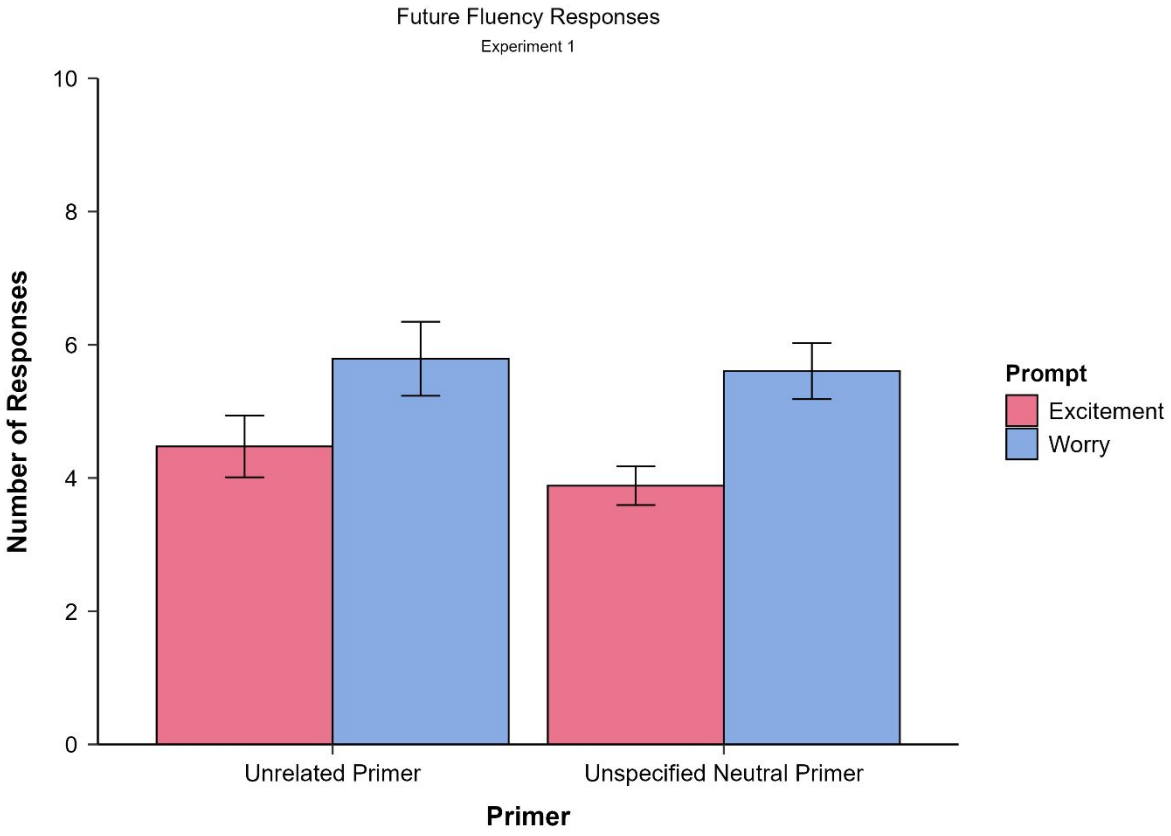
For all analyses reported in this manuscript, we removed outliers below the first quartile or above the third quartile (Field, 2012; Peña et al., 2023; also see Author Note). We chose this approach because this experimental series was conducted asynchronously online where participants completed the tasks 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 2x2 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] (Figure 1).

**Figure 1**

***Experiment 1 Future Fluency Responses***




*Note.* Bars are at mean level performance and error bars are standard error of the means.

## 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 2x3 mixed design, with Prompt (worry, excitement) manipulated within-subject and Primer (unspecified neutral, unspecified positive, social positive) manipulated between subjects. We now used 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 Supplemental Materials), 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 which 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 two minutes 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", one (1.04%) person 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, 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 Supplementary Materials 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 Supplement for the complete list of primers).

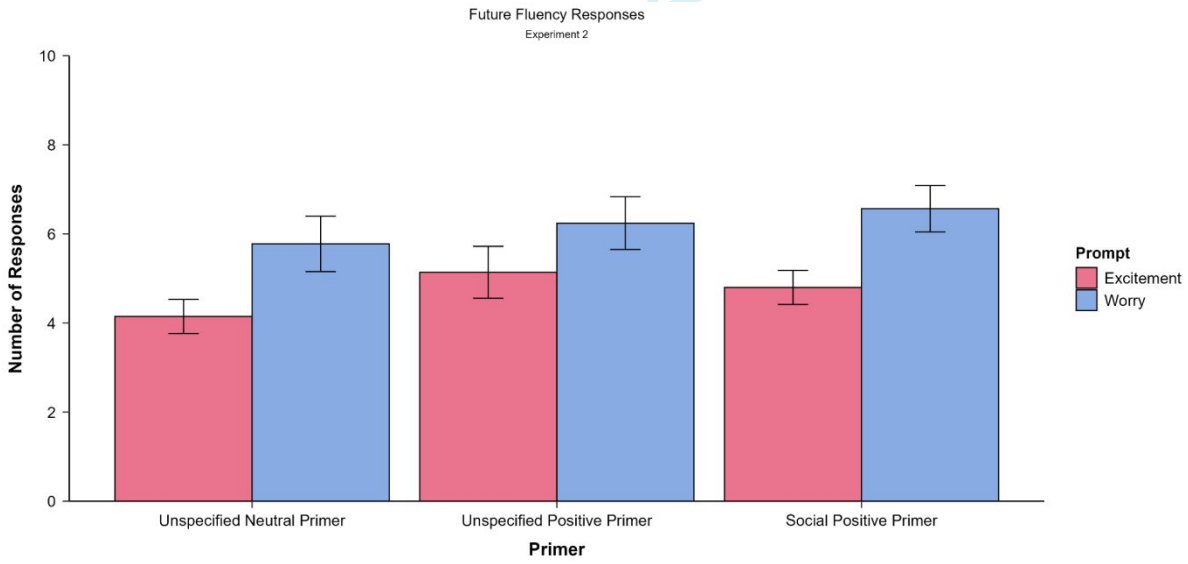
**Scoring**. Once again, the same pair of coders used the same scoring scheme as in Experiment 1. Participants reported a total of 1273 items across conditions.

**Results**

Ten outliers were removed using the a-priori criteria outlined in Experiment 1. A 2x3 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] (Figure 2). There was no significant main effect of Primer or an interaction.

**Figure 2**

*Experiment 2 Future Fluency Responses*




*Note.* Bars are at mean level performance and error bars are standard error of the means.

## 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 2x3 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 which 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”, one (1.04%) person did not report their gender. Of these participants, 47 (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 Supplementary Materials 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 (κ=.973). The remaining items were equally divided and assigned to each coder. Participants reported a total of 1170 items across conditions.

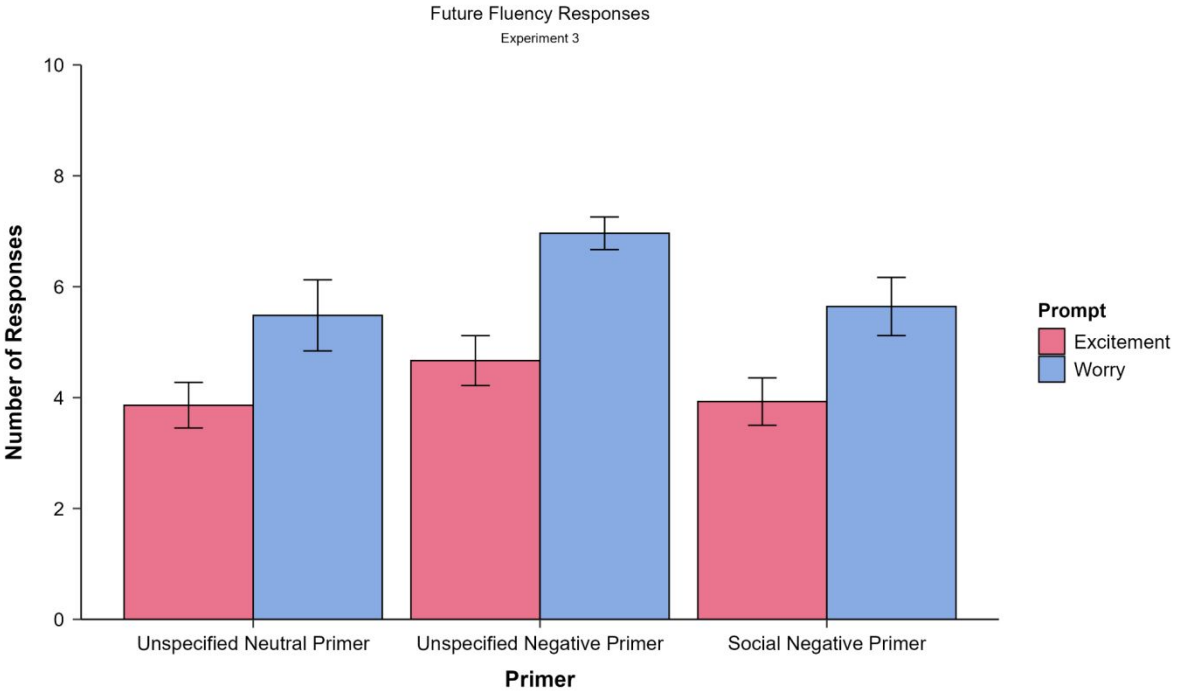
**Results**

Thirteen outliers were removed a-priori from analyses using the criteria established in Experiment 1. A 2x3 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] (Figure 3). There was no main effect of Primer or an interaction, indicating a comparable *collective negativity bias* across conditions.

**Figure 3**

*Experiment 3 Future Fluency Responses*




*Note.* Bars are at mean level performance and error bars are standard error of the means.

## 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 2x3 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 2x3 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 which 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 two minutes 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", six (1.20%) person 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.

[1] The INTxPower tool is designed to test 2x2 interactions. We consulted one of the authors to apply their tool to our 2x3 design for which they recommended powering for two 2x2 interactions (see here). The result suggested 332 participants (or 166 per between subjects condition) for 498 total participants.

**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 (κ=.975). The remaining items were equally divided and assigned to each coder. Participants reported a total of 5710 items in this experiment.

**Results**

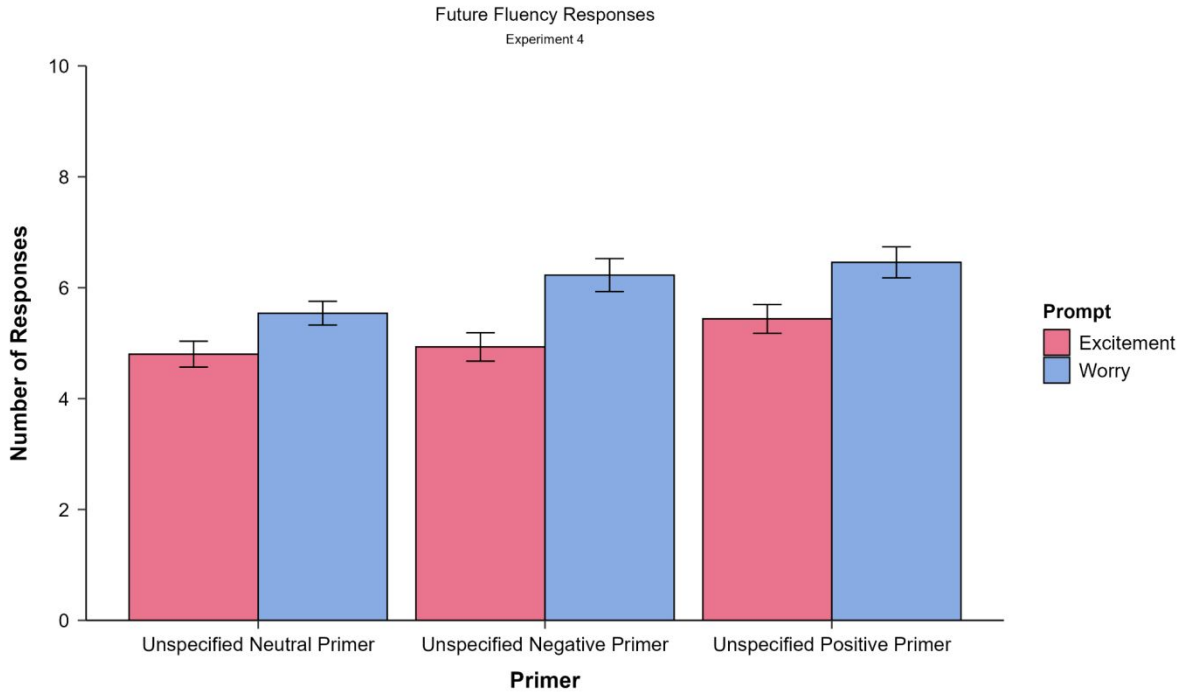
Thirty-seven outliers were removed from analyses using the criteria established in previous experiments. A 2x3 mixed ANOVA once again yielded a main effect of Prompt (see Table 1) such that participants reported significantly more worries (unspecified neutral primer: $M$=5.54, $SD$=2.41; unspecified 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] (Figure 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, relevant to the main hypothesis, it did not modulate the *collective negativity bias*.

**Figure 4**

*Experiment 4 Future Fluency Responses*




*Note.* Bars are at mean level performance and error bars are standard error of the means.

## 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 United States 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 et al., 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) 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 U.S. 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 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 United States 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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**Table 1**

*Omnibus Tests Across Experiments 1 - 4*

| Effect | Degree of Freedom (Between) | Degree of Freedom (Within) | *F*-value | *p*-value | $\eta_p^2$ |
|---|---|---|---|---|---|
| *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 |

*Note.* The highlighted rows represent statistically significant effects.

*Supplementary Materials*

# Do Emotional and Social Primers Change the Pessimism in Collective Future Thinking?: Testing the Robustness of the Collective Negativity Bias

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**Contents:**

## Norming Study 1

### Method

**Participants.** We recruited 50 Stony Brook undergraduate students who were compensated with course credit ($M$ = 19.5 years, $SD$ = 1.74 years, *Range* 17 - 24 years). Participants reported that 33 (66%) were women, 14 (28%) were men, two (4%) did not report their gender, and one (2%) was non-binary. Moreover, 22 (44%) participants identified as white, 16 (32%) identified as Asian, six (12%) identified as "other", three (6%) identified as Black/African American, two (4%) did not report their race, and one (2%) person identified as mixed. Of these participants, 15 (30%) identified as Hispanic/Latino.

**Stimuli.** We drew inspiration from the de-identified responses provided by the participants in the Burnett et al. (2023) study where they were asked to report their projections for positive and negative future events for the United States. We adapted positive and negative responses from those data to create potentially positive and negative collective future projections for the United States. We also created potentially neutral responses similar in length. See Table 1 for our full list of projections.

**Procedure.** We adapted the norming procedure from Kensinger et al. (2016) where they used emotionally valenced photo objects. In our norming study, participants completed all tasks asynchronously from their personal computers via Qualtrics. After consenting to participate in the study, participants received instructions to read the statements and rate the statements on a valence scale. The stimuli shown in Table 1 consisted of were presented in a random order with respect to valence, and participants were asked to rate the valence of each item on a scale of 1 – 9 (1 being the most negative, 5 being neutral, and 9 being the most positive). After participants provided valence ratings, they received another set of instructions to rate statements on an arousal scale of 1 – 9 (with 9 being the highest arousal). The same set of statements were presented, this time in a different random order, for this ratings task.

Participants then completed a demographics survey (see Appendix A). Finally, participants were debriefed. The entire norming study session was self-paced and took about 30 minutes.

**Results**

We categorized the statements into valence categories based on their average rating across participants. Specifically, all statements that received a six or higher on the valence and arousal scales were categorized as positive whereas all neutral statements were those that were rated between three and six on valence and lower than five on arousal. Out of the 52 projections, we ended up with 15 neutral statements and 11 positive statements. Before conducting analyses here and in the following experiments, we tested the homogeneity of variance assumption with a Levene's test. The homogeneity of variance assumption was violated only in the Norming Study, and this was the case for both valence and arousal ratings. Therefore, we report Welch's *t*-tests to compare differences in emotional valence and arousal ratings between the positive and neutral statements for data in the Norming Study.

Our positive statements were rated more positively ($M = 6.78$, $SD = 2.42$) than our neutral statements ($M = 4.89$, $SD = 2.03$), $t(1{,}046.14) = -14.88$, $p < .001$, $d = -0.85$, 95% CI [-2.14, -1.65]. Additionally, our positive statements were rated as more arousing ($M = 6.58$, $SD = 2.28$) than neutral statements ($M = 4.48$, $SD = 2.32$), $t(1{,}190.90) = -16.21$, $p < .001$, $d = -0.91$, 95% CI [-2.35, -1.84]. From this set of stimuli, we selected the top 10 positive and 10 neutral statements for our experiment series.

**Table 1**

*List of Normed Future Projections from Norming Study 1*

| Projection | Character Length | Neutral | Valence | Intensity |
|---|---|---|---|---|
| *COVID-19 becoming a non-issue* | *29* | · | *6.51 (2.54)* | *6.20 (2.43)* |
| *economic stability is achieved* | *30* | · | *6.36 (2.45)* | *6.32 (2.08)* |
| *improvement in healthcare initiatives* | *37* | · | *6.69 (2.09)* | *6.39 (2.16)* |

| | | | | |
|---|---|---|---|---|
| improved foreign relations achieved | 35 | · | 6.42 (2.24) | 5.82 (2.21) |
| vaccination rates increasing constantly | 39 | · | 6.22 (1.91) | 5.78 (1.98) |
| **health policy changes turning epidemic tide** | **43** | **·** | **4.88 (1.83)** | **4.80 (1.91)** |
| *COVID-19 pandemic comes to an end* | *33* | · | *7.69 (1.85)* | *7.35 (2.01)* |
| *united people rebuild together* | *30* | · | *7.02 (2.21)* | *6.12 (2.22)* |
| **presidential inauguration takes place** | **37** | **·** | **4.52 (1.73)** | **4.25 (1.73)** |
| *a better society emerges in the world* | *37* | · | *6.58 (2.55)* | *6.54 (2.26)* |
| *significant decrease in suicide rates* | *37* | · | *7.22 (2.48)* | *6.76 (2.21)* |
| stock market shows growth | 25 | · | 5.70 (1.97) | 4.94 (1.96) |
| social injustices continue to fall | 34 | · | 5.04 (2.67) | 5.46 (2.57) |
| *immigrants don't have to go to ice camps anymore* | *48* | · | *6.76 (2.40)* | *6.50 (2.33)* |
| U.S. will invest in the various humanitarian crises | 51 | · | 5.62 (2.18) | 5.70 (2.18) |
| *more representation in the government* | *37* | · | *6.32 (2.22)* | *6.10 (2.36)* |
| *more LGBT+ rights and policies to protect them* | *46* | · | *6.31 (2.56)* | *6.57 (2.48)* |
| *all wars across the nation come to an end* | *41* | · | *7.04 (2.96)* | *7.50 (2.26)* |
| mass shooting events increasing | 31 | · | 2.40 (2.31) | 4.28 (3.28) |
| election turmoil continues to rise | 34 | · | 3.26 (1.89) | 4.48 (2.10) |
| lack of prosecution for former administration | 45 | · | 3.68 (2.08) | 4.16 (2.19) |
| ongoing poverty due to economy collapse | 39 | · | 2.67 (2.11) | 4.41 (2.69) |
| the steady rise of nationwide PTSD | 34 | · | 2.59 (1.81) | 4.02 (2.41) |
| a general decline in economic activity | 38 | · | 3.12 (1.33) | 3.76 (1.82) |
| vaccine disparities continue to rise across the nation | 54 | · | 2.86 (1.47) | 4.37 (2.12) |
| travel restrictions continue to remain in place | 47 | · | 2.68 (1.49) | 3.36 (1.66) |
| the nationwide steady rise in taxes | 35 | · | 3.12 (1.89) | 4.06 (2.32) |
| decreases in the employment-to-population ratio | 47 | · | 3.52 (1.55) | 4.04 (2.04) |

| | | | | |
|---|---|---|---|---|
| the steady rate of loss of jobs | 31 | · | 2.46 (1.43) | 3.50 (2.20) |
| less food available as days pass by | 35 | · | 2.26 (1.88) | 4.36 (3.12) |
| fights between countries nuclear ones | 37 | · | 2.10 (1.87) | 4.26 (3.10) |
| politicians announce pandemic never going away | 46 | · | 2.55 (1.53) | 3.98 (2.63) |
| new resistant COVID-19 variants | 28 | · | 3.22 (2.29) | 4.29 (2.47) |
| never-ending stay at home order | 31 | · | 1.98 (1.02) | 3.96 (2.83) |
| asian hate crimes increase | 26 | · | 2.08 (1.74) | 4.02 (3.07) |
| more antidemocratic laws are put in place | 41 | · | 2.96 (1.72) | 4.20 (2.45) |
| homeless rate continues to rise | 31 | · | 2.54 (2.09) | 4.10 (2.38) |
| COVID-19 cases remain the same | 27 | ✓ | 3.10 (1.22) | 3.70 (2.03) |
| unemployment rates have a slightly decrease | 43 | ✓ | 5.22 (2.06) | 5.04 (2.06) |
| housing market slightly improves | 32 | ✓ | 5.31 (1.67) | 4.80 (1.62) |
| **Supreme Court does not overturn any federal laws** | **48** | ✓ | **4.10 (1.80)** | **4.20 (2.03)** |
| economy remains the same | 24 | ✓ | 3.19 (1.16) | 3.92 (1.41) |
| FIFA hosts one event in the United States | 41 | ✓ | 5.24 (2.15) | 4.32 (2.70) |
| **U.S. President has dinner with UK Prime Minister** | **48** | ✓ | **4.49 (1.63)** | **3.84 (2.10)** |
| **Elon Musk plans a crewed mission to Mars** | **40** | ✓ | **4.88 (2.21)** | **4.40 (2.52)** |
| Taylor Swift performs at Superbowl | 34 | ✓ | 5.24 (2.57) | 4.92 (3.01) |
| **archeologists unearth 5000-year-old Inca gold coin** | **51** | ✓ | **5.12 (1.83)** | **4.84 (2.42)** |
| **federal government removes the 1-cent coins permanently** | **55** | ✓ | **4.02 (2.01)** | **4.27 (2.23)** |
| fossil of previously unknown species of insect found | 53 | ✓ | 5.76 (2.05) | 4.88 (2.44) |
| **Facebook shuts down** | **42** | ✓ | **4.32 (1.77)** | **3.90 (2.29)** |
| **Rowan Atkinson makes another Mr. Bean movie** | **43** | ✓ | **5.06 (2.15)** | **4.52 (2.76)** |
| **That 70's Show makes a comeback season** | **36** | ✓ | **4.63 (2.08)** | **4.31 (2.62)** |

*Note.* All stimuli were derived from responses reported in Burnett et al. (2023). We also indicated which items are potentially neutral with "✓" that were created from scratch. Bold statements were used as neutral examples in Experiments 1 - 4. Italicized statements were used as positive examples in Experiments 2 and 4.

## Norming Study 2

The stimuli from our first Norming Study did not yield any negative stimuli which we needed for Experiment 3. Therefore, we conducted another Norming Study with more negative responses reported in Burnett et al. (2023).

### Method

**Participants.** We recruited 50 Stony Brook undergraduate students who were compensated with course credit ($M$ = 19.80 years, $SD$ = 1.83 years, *Range* 17 - 25 years). Participants reported that 39 (78%) were women, 7 (14%) were men, three (6%) reported "other", and one (2%) person did not report their gender. Moreover, 25 (50%) participants identified as white, 19 (38%) identified as Asian, five (10%) identified as Black/African American, and one (2%) person identified as mixed. Of these participants, three (6%) identified as Hispanic/Latino.

**Stimuli.** We extracted more de-identified responses provided by the participants in the Burnett et al. (2023) study where they were asked to report their projections for positive and negative future events for the United States. We drew only negative responses given that we had successfully normed positive and neutral responses from Norming Study 1.

**Procedure.** The procedure was identical to Norming Study 1 except for the materials we extracted for norming (see Table 2).

**Table 2**

*List of Normed Future Projections from Norming Study 2*

| Projection | Character Length | Valence | Intensity |
|---|---|---|---|
| **asian american hate crimes still being ignored** | **46** | **3.29 (2.23)** | **6.38 (1.91)** |
| boycot of olympics | 18 | 4.67 (1.56) | 3.63 (1.85) |
| crash of the housing market | 27 | 3.81 (1.62) | 6.00 (1.80) |

| | | | |
|---|---|---|---|
| **food shortage** | **13** | **2.75 (1.76)** | **6.44 (2.39)** |
| **Forest fires in the West coast** | **30** | **2.98 (1.79)** | **6.40 (1.66)** |
| **hate crimes & violence** | **22** | **2.53 (2.21)** | **7.09 (1.76)** |
| Housing losses due to COVID | 27 | 3.00 (1.60) | 5.58 (1.84) |
| huge corruption/scandal in the US | 33 | 3.13 (1.81) | 5.91 (2.12) |
| **Increased natural disasters** | **27** | **3.28 (2.30)** | **6.50 (2.07)** |
| many antivaxxers | 16 | 4.05 (2.11) | 5.30 (1.92) |
| **more division** | **13** | **3.24 (1.85)** | **6.02 (1.88)** |
| **more irreversible climate crisis impacts** | **40** | **2.87 (2.32)** | **7.08 (2.02)** |
| **More school/mass shootings** | **26** | **2.70 (2.29)** | **7.21 (2.00)** |
| more white supremacy riots | 26 | 2.84 (1.68) | 5.93 (2.20) |
| partisan divide continues | 25 | 3.60 (1.72) | 5.65 (2.11) |
| People file bankruptcies | 24 | 3.83 (1.53) | 5.94 (1.52) |
| **police brutality** | **16** | **2.93 (2.05)** | **6.41 (1.98)** |
| Possibly more anti lgbtq laws | 29 | 3.11 (2.01) | 5.89 (2.41) |
| resurgence of COVID | 19 | 2.94 (1.54) | 5.68 (2.35) |
| rising interest rates | 21 | 4.15 (2.08) | 5.60 (1.74) |
| rocky employment figures | 24 | 3.79 (1.93) | 5.55 (1.82) |
| stock market tanks | 18 | 3.59 (1.38) | 5.43 (2.05) |
| **United States becomes a dictatorship** | **36** | **2.04 (1.35)** | **6.23 (2.96)** |

*Note.* All stimuli were derived from responses reported in Burnett et al. (2023). Bolded statements were used as negative examples in Experiments 3 and 4.

## Results

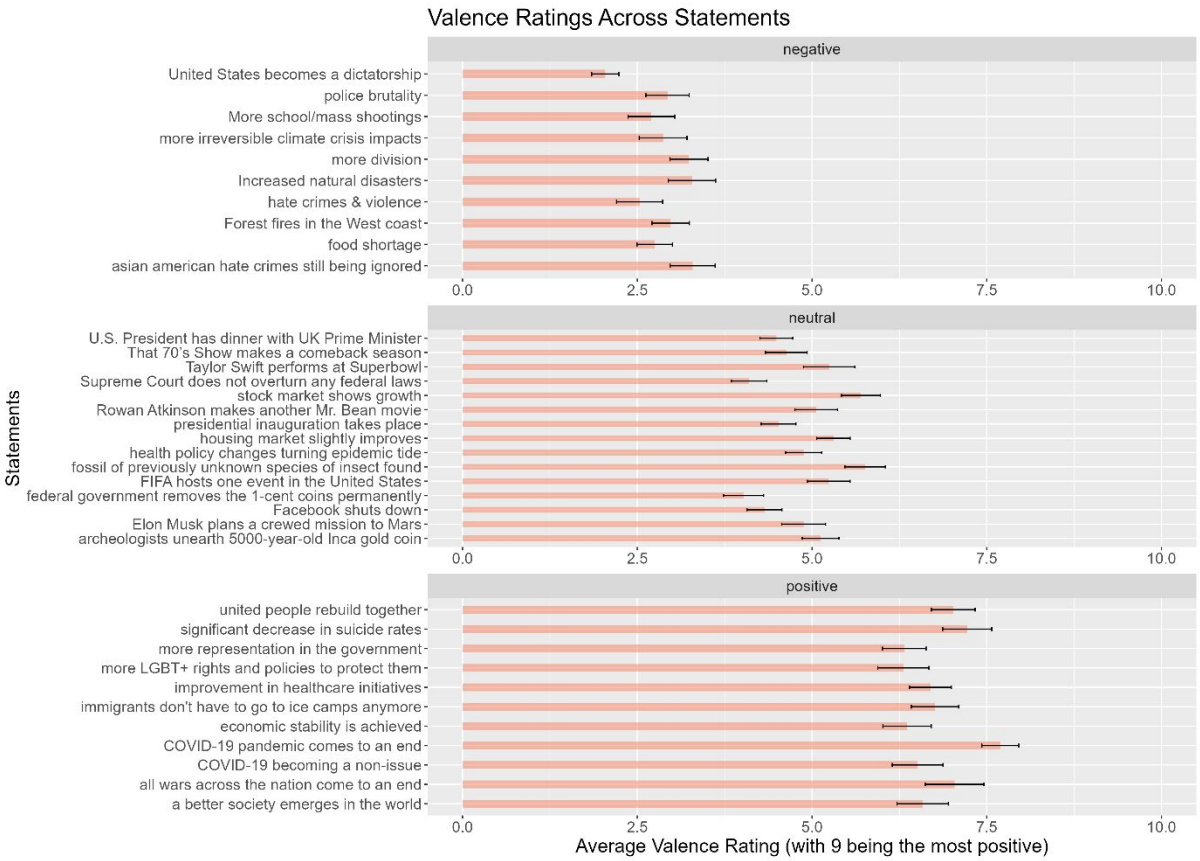
We categorized the statements into valence categories based on the valence and intensity ratings much like the previous Norming Study such that statements were categorized as negative if they were rated with a four or lower on valence and six or higher on arousal.

Out of the 23 projections, we obtained 10 negative statements. We compared the emotional valence and intensity from these statements to our positive and neutral statements from Norming Study 1.

Our negative statements were rated more negatively ($M$ = 2.91, $SD$ = 2.06) than our neutral statements ($M$ = 4.89, $SD$ = 2.03), $t$(994.88) = -16.43, $p$ < .001, $d$ = -0.97, 95% CI [-2.21, -1.74] and positive statements ($M$ = 6.78, $SD$ = 2.42), $t$(1,017.60) = -27.59, $p$ < .001, $d$ = -1.72, 95% CI [-4.15, -3.60]. Additionally, our negative statements were rated as more arousing ($M$ = 6.56, $SD$ = 2.09) than neutral statements ($M$ = 4.48, $SD$ = 2.32), $t$(1,117.04) = 16.34, $p$ < .001, $d$ = 0.94, 95% CI 1.83, 2.33] but not more arousing than positive statements ($M$ = 6.58, $SD$ = 2.28), $t$(1,033.23) = -0.14, $p$ = .89, $d$ = -0.009, 95% CI [-0.29, 0.25]. This total set of stimuli yielded the top 10 negative, 10 positive, and 10 neutral statements for our experiment series, and these are stimuli are shown in Figure 1 for valence ratings and Figure 2 for arousal ratings of the statements.

**Figure 1**

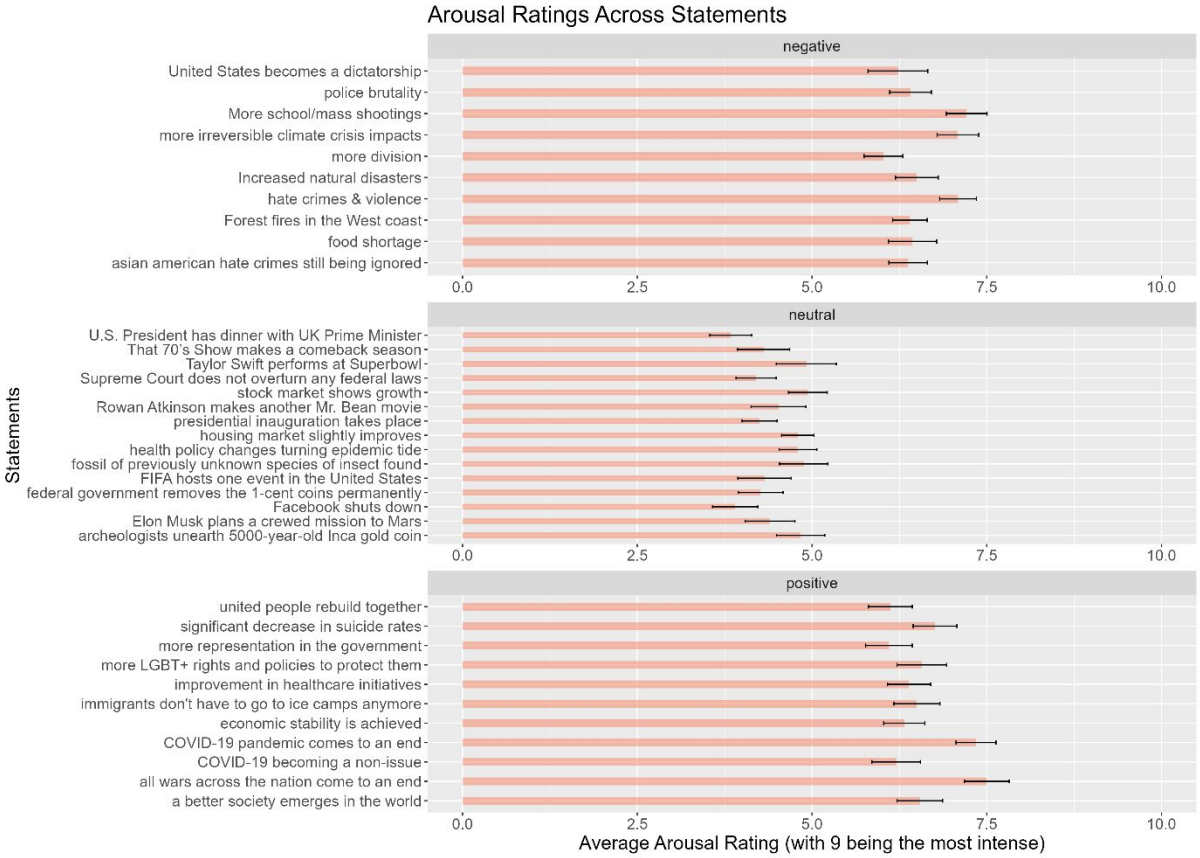
*Valence Ratings for Selected Stimuli*




*Note.* The pink bars represent mean valence for each statement whereas the error bars depict standard error of the mean.

**Figure 2**

*Arousal Ratings for Selected Stimuli*




*Note.* The pink bars represent mean valence for each statement whereas the error bars depict standard error of the mean.

## Manipulation Checks

### Experiment 1

We ensured that participants in the unspecified neutral primer condition perceived the future projection examples as neutral which was the case ($M$ = 5.20; $SD$ = 0.58).

### Experiment 1b

We examined whether there were differences in the valence ratings between the unspecified neutral and social neutral conditions in Experiment 1. As we expected, we found that participants in both the unspecified neutral condition ($M$ = 5.17; $SD$ = 0.60) and the social neutral condition ($M$ = 5.20; $SD$ = 0.64) viewed the primer examples as neutral and rated them equivalently, $t(226) = 0.43$, $p = .67$, $d = 0.06$, 95% CI [-0.13, 0.20]. This pattern of results confirmed that our participants viewed the primers as neutral and that there was no difference between the two neutral conditions in perceived valence.

### Experiment 2

We examined differences in the valence ratings provided during the primer task in Experiment 2. As expected, we observed differences in valence ratings across our three conditions, $F(2, 93) = 78.79$, $p < .001$, $\eta_p^2 = .63$, where participants in the unspecified positive condition gave higher valence ratings ($M$ = 7.82, $SD$ = 0.98) than the participants the unspecified neutral condition ($M$ = 5.40, $SD$ = 0.43), $t(62) = -12.84$, $p < .001$, $d = -3.21$, 95% CI [-2.80, -2.05]. Similarly, participants in the social positive condition gave higher valence ratings ($M$ = 7.91, $SD$ = 1.15) than participants in the unspecified neutral condition, $t(62) = 11.53$, $p < .001$, $d = 2.88$, 95% CI [2.07, 2.94]. As also expected, there was no difference in valence rating between the unspecified positive and social positive conditions, $t(62) = 0.31$, $p = .759$, $d = 0.08$, 95% CI [-0.45, 0.62]. Overall, we were able to confirm that the participants in the neutral condition viewed the primers as neutral and the participants in the positive conditions viewed the stimuli as positive.

**Experiment 3**

We conducted an ANOVA on valence ratings for primers in Experiment 3 which revealed differences across the three conditions, $F(2, 93) = 136.28$, $p < .001$, $\eta_p^2 = .74$. Participants in the unspecified neutral condition reported higher valence ($M = 5.18$, $SD = 0.55$) than participants in both the unspecified negative condition ($M = 2.22$, $SD = 0.91$), $t(62) = -15.74$, $p < .001$, $d = -3.93$, 95% CI [-3.35, -2.59], and the social negative condition ($M = 2.28$, $SD = 0.94$), $t(62) = -15.05$, $p < .001$, $d = -3.76$, 95% CI [-3.28, -2.51]. Participants' ratings did not differ between the unspecific negative and social negative conditions, $t(62) = 0.30$, $p = .765$, $d = 0.08$, 95% CI [-0.39, 0.53]. Together, these patterns confirm that participants in Experiment 3 perceived the valence of the primers as we intended.

**Experiment 4**

We conducted an ANOVA on valence ratings for primers in Experiment 4 which revealed differences across the three conditions, $F(2, 495) = 2083$, $p < .001$, $\eta_p^2 = .89$. Participants in the unspecified neutral condition rated the stimuli as neutral ($M = 5.17$, $SD = 0.61$) and the participants in the unspecified negative condition rated the stimuli as negative ($M = 2.15$, $SD = 0.87$), $t(330) = -36.49$, $p < .001$, $d = -4.00$, 95% CI [-3.18, -2.85]. The neutral participants also significantly differed in their valence ratings compared to the unspecified positive condition ($M = 7.83$, $SD = 0.89$), $t(330) = -31.70$, $p < .001$, $d = -3.48$, 95% CI [-2.82, -2.49]. As expected, participants' ratings also differed between the unspecified negative and unspecified positive conditions, $t(330) = -58.68$, $p < .001$, $d = -6.44$, 95% CI [-5.86, -5.48].

## Experiment 1b

Experiment 1b tested the influence of a novel, social condition compared to the two baseline conditions that produced the *collective negativity bias* in Experiment 1. We expected to replicate the bias in the baseline conditions, and the key question was whether the social primer condition would shift the negativity in collective future thinking. Nonetheless, given that the social primers were also neutral in valence we expected the *collective negativity bias* to be present.

### Method

**Participants and Design.** The experiment consisted of a 2 x 3 mixed design, with Prompt (worry, excitement) manipulated within-subject and Primer (unrelated, unspecified neutral, social neutral) manipulated between subjects. We conducted a power analysis of 90% based on the effect size in the unrelated primer task condition from Experiment 1 ($d$=0.307). We selected the unrelated task condition for this purpose because it is most similar to the published studies on the *collective negativity bias* whereas the unspecified neutral primer condition in Experiment 1 was the first implementation of its kind to our knowledge. Using this analysis, we arrived at a sample of 114 participants per condition, for a total of 342 participants, to observe the *collective negativity bias*. To meet this sample size requirement, we recruited a total of 433 Stony Brook undergraduates who completed the study for course credit. Of these, 91 (21.02%) participants did not meet our inclusion criteria for the following reasons: 58 participants rated neutral examples as positive, 19 participants did not complete the study in its entirety, 11 participants spent longer than the allowed two minutes on the primer task, and three participants did not report any responses in the future fluency tasks. This process yielded the 342 participants in our final sample as per the power analysis.

Our final sample, like Experiment 1, consisted of mostly young adults ($M$=20.20 years, $SD$=3.05 years, *Range:* 17 – 45 years; 98.54% of these participants were below 30 years of

age). Of these participants, 216 (63.20%) identified as women, 119 (34.80%) identified as men, four (1.17%) did not report their gender, and three (0.88%) identified as "other." One hundred and thirty-nine (40.60%) participants identified as Asian, 117 (34.20%) identified as white, 33 (9.65%) identified as Black/African American, 25 (7.31%) identified as mixed race, 22 (6.43%) identified as "other", five (1.46%) did not report their race, and one person (0.29%) identified as Native Hawaiian or Pacific Islander. Sixty-four participants (18.70%) identified as Latino/Hispanic.

**Materials and Procedure.** We used the same stimuli and procedure in Experiment 1b as in Experiment 1 with the modifications noted below. Participants once again completed all tasks asynchronously at the time of their choosing via Qualtrics. After consenting, participants read general instructions, "*You will be asked to write things you are excited or worried about for the future of the United States."* Underneath those instructions, participants read instructions for the unrelated primer condition and the unspecified neutral condition as in Experiment 1; in the novel, social neutral condition the participants received the following instructions - "*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).*" Depending on the condition to which participants were assigned, they completed an unrelated task, viewed neutral examples from an unspecified source, or viewed neutral examples from their social peers. Again, the 10 most neutral examples from our norming stimuli were used here. Participants then had five minutes to complete each prompt (worry/excitement) condition that was presented in a random sequence across participants. Afterwards, participants completed the same exploratory measures as in Experiment 1 (that once again will not be considered further) and, lastly, completed

demographic questions. As before, participants were debriefed upon finishing the tasks. The entire experiment lasted about 30 minutes.

**Scoring**. Experiment 1b responses were coded by the same coders in the same manner as Experiment 1. A total of 4117 responses were coded for this experiment.

**Results**

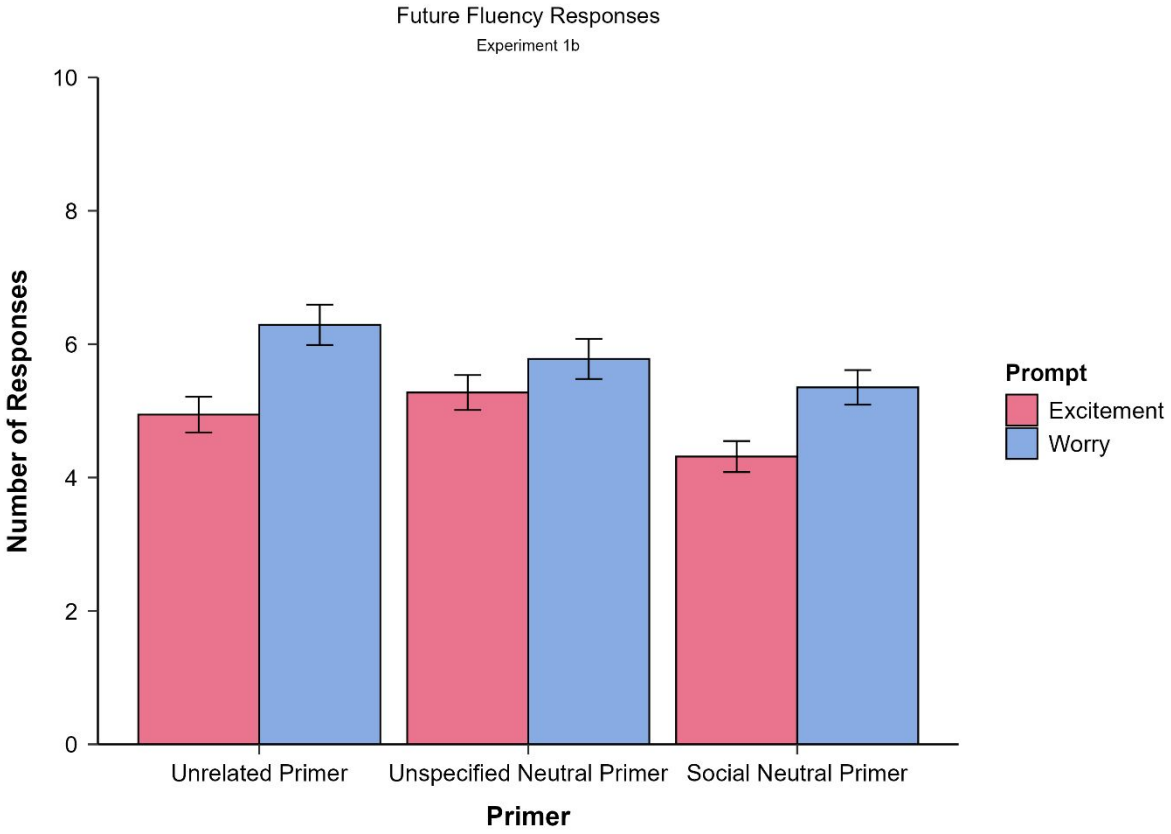
We removed 17 outliers using the same criteria as Experiment 1 and then conducted a 2 x 3 mixed ANOVA. Once again, we observed a significant main effect of Prompt (see Table 1). Participants reported more worries (unrelated primer: $M$=6.29; $SD$=3.13; unspecified neutral primer: $M$=5.78; $SD$=3.20; social neutral primer: $M$=5.35; $SD$=2.70) than excitement (unrelated primer: $M$=4.94; $SD$=2.76; unspecified neutral primer: $M$=5.27; $SD$=2.79; social neutral primer: $M$=4.31; $SD$=2.43) responses. The *collective negativity bias* was significant in the unrelated primer task condition, $t(106)$=-3.62, $p$<.001, $d$=-0.35, 95% CI [-2.08, -0.61], the numerical difference in the unspecified neutral primer condition was not significant, $t(112)$=-1.49, $p$=.139, $d$=-0.14, 95% CI [-1.18, 0.17], and the difference in the novel condition that presented social neutral primers was significant, $t(107)$=-4.12, $p$<.001, $d$=-0.40, 95% CI [-1.54, -0.54] – see Figure S1.

We also observed a main effect of Primer. Participants in the social neutral primer condition ($M$=4.83, $SD$=2.21) reported fewer total responses than those in the unrelated primer condition ($M$=5.62, $SD$=2.24), $t(213)$=2.59, $p$=.01, $d$=0.36, 95% CI [0.18, 1.38]. This difference did not emerge between the unspecified neutral primer ($M$=5.53, $SD$=2.40) and unrelated task conditions, $t(218)$=0.29, $p$=.77, $d$=0.04, 95% CI [-0.53, 0.71]. In brief, the main effect of Primer seems to be driven by fewer responses reported in the social neutral condition compared to the unrelated primer condition. However, relevant to the main hypothesis, it did not modulate the collective negativity bias.

One possibility for this pattern is that participants in the social neutral condition attempted to generate unique responses unrelated to what their peers generated. This pattern is similar to memory studies on part-list cueing where receiving some studied items as "cues" can hurt performance of remaining items (e.g., Slamecka, 1968; Pepe et al., 2023). However, this drop did not occur in Experiment 2 or Experiment 3. Regardless, the consistent pattern across all experiments centered on the persistence of the *collective negativity bias*.

**Figure S1**

*Experiment 1b Future Fluency Responses*




*Note.* Bars are at mean level performance and error bars are standard error of the means.

**Table S1**

| Effect | Degree of Freedom (Between) | Degree of Freedom (Within) | $F$-value | $p$-value | $\eta_p^2$ |
|---|---|---|---|---|---|
| Primer | 1 | 325 | 3.814 | .023 | .023 |
| Prompt | 1 | 325 | 26.313 | <.001 | .075 |
| Primer*Prompt | 1 | 325 | 1.734 | .178 | .011 |

Note. The highlighted rows represent statistically significant effects.

## Words per Future Fluency Response

We calculated the average number of words per response across all five experiments in our series. On average, participants reported four words per response in both the worry and excitement prompts.

*Number of Words per Response*

| Experiment | Worry | Excitement |
|---|---|---|
| Experiment 1 | 4.35 (3.78) | 4.33 (3.36) |
| Experiment 1b | 4.36 (3.92) | 4.49 (3.68) |
| Experiment 2 | 4.78 (3.70) | 4.48 (3.29) |
| Experiment 3 | 4.41 (3.58) | 4.11 (3.15) |
| Experiment 4 | 4.36 (3.81) | 4.24 (3.31) |

*Note.* Means and (standard deviations) are presented.