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Staying Positive in a Dystopian Future: A Novel Dissociation Between Personal and Collective Cognition

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The future of groups of people is a topic of broad interest in society and academia. Nonetheless, relatively little is known about the manner in which people think about the collective future of groups, and whether personal and collective future thinking represent distinct domains of future-oriented cognition. In the present studies ($N = 691$), we used an adapted future fluency task to demonstrate a novel domain-by-valence interaction between personal and collective future thinking, such that U.S.-based participants were positively biased about their personal future while at the same time being negatively biased about the future of their country. We further present evidence that this valence-based dissociation extends into the distant future, emerges in a non-U.S. (Canadian) sample, depends on the individual's relation to the group, and has consequences for how people think about the world around them. Taken together, our findings represent the first behavioral evidence of a dissociation between personal and collective future thinking, and suggest that the study of collective future thinking represents a fruitful endeavor for psychological science.

Keywords: future thinking, collective cognition, positivity bias, negativity bias

The future of groups is a topic of much consideration within political science, communication studies, sociology, and related disciplines (Szpunar & Szpunar, 2016). Nonetheless, little is currently known about the manner in which the sociopolitical future of groups is mentally represented at the level of the individual, and more importantly, whether or not the personal and collective future represent distinct domains of future thinking. This is perhaps somewhat surprising given that cognitive psychologists and neuroscientists have long been interested in illuminating the cognitive and neural mechanisms that support the ability to think about the future (Schacter et al., 2012; Suddendorf & Corballis, 2007; Szpunar, 2010). Much of this attention, however, has focused on the ability to think about the personal future and not the future of the collective or sociopolitical context in which individual lives are embedded (Merck, Topcu, & Hirsh, 2016; Michaelian & Sutton, 2017; Szpunar & Szpunar, 2016).

The few studies that have investigated relations between personal and collective aspects of future-oriented cognition have done

so in the context of neuropsychological investigations of amnesia. Specifically, amnesic patients who are unable to remember details from their past are also often unable to imagine specific experiences that may take place in their future (Hassabis, Kumaran, Vann, & Maguire, 2007; Race, Keane, & Verfaellie, 2011; but see Squire et al., 2010), but are nonetheless able to think about the future of their communities, country, and the world (Andelman, Hoofien, Goldberg, Aizenstein, & Neufeld, 2010; Klein, Loftus, & Kihlstrom, 2002). Recent work suggests that elaborating on detailed scenarios relevant to the collective future may be impaired in amnesia, but the more general ability to identify relevant issues appears to remain intact (Race, Keane, & Verfaellie, 2013).

While the above-noted findings from neuropsychological patients suggest that personal and collective future thinking are indeed dissociable from one another, the study of relations between these constructs remains largely unexplored in the literature. One reason for this state of affairs is the lack of viable paradigms that can demonstrate dissociations between personal and collective future thinking in healthy cognition. Here, we propose that expectations regarding the personal and collective future may differ sharply in terms of their emotional tone, and that tests of the fluency with which associated thoughts come to mind can be used to reveal such a valence-based dissociation. Specifically, we predicted that people should expect a positive personal future despite holding negative expectations for the future of their country. Country was selected as the unit of collective cognition as this level of analysis has often been the focus of interest in past considerations of the topic (e.g., Sani et al., 2007).

Our predictions were motivated by recent work from cognitive psychology and neuroscience that has convincingly demonstrated

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that memories of the past serve as a basis for forming expectations of the future (Schacter & Addis, 2007; Schacter et al., 2012; see also Gilbert & Wilson, 2007). Indeed, prior work has demonstrated that people tend to both remember (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2009; Walker & Skowronski, 2009) and expect more positive than negative experiences in their personal past and future (for recent reviews, see MacLeod, 2016, 2017). Further supporting this close relation between the personal past and future, people who remember their past in a less positive light (e.g., in the context of depression) also imagine a less positive future (e.g., MacLeod & Byrne, 1996).

What about the collective future? To our knowledge, no prior research has systematically assessed the positive and/or negative expectations that people hold regarding the future of their country. However, there does exist relevant work on how people remember national events. For instance, Liu et al. (2009) asked participants from 12 nations to list the most important events from their country's past. Notably, participant responses from most nations (including the U.S.)—whether those responses reflected historical facts or more contemporary occurrences—were dominated by negative relative to positive events (e.g., wars); that is, a negativity bias (see also Liu et al., 2005). One possible account for this phenomenon, particularly in relation to more contemporary events, is that the primary source through which people learn about national issues—namely, the media (McCombs, 2006; Norris, 2000)—tends to present information in a manner that is negatively skewed (e.g., Soroka & McAdams, 2015). Hence, a collective negativity bias in memory may reflect the type of information that people have most typically been exposed to in the past. Importantly, if people tend to remember their nation's past as relatively negative, then expectations for the future of their country should also be negative.

In order to test this hypothesis, we adapted a future fluency task that has previously been used to assess the accessibility of positive and negative events in healthy and mood-disordered populations (MacLeod, Rose, & Williams, 1993). This task typically requires people to list as many things (i.e., events or occurrences that are reasonably likely to occur in the future) that they are excited or worried about in the next week, year, and 5–10 years (MacLeod & Byrne, 1996; MacLeod, Tata, Kentish, & Jacobsen, 1997). In the present study, we asked participants to not only list things that they were excited or worried about across the specified time periods in relation to their personal future, but also to list things that they believed their country may be excited or worried about over those time frames. Experiments 1 and 2 assessed the generalizability of our predicted results, that is, a domain-by-valence interaction reflecting a personal positivity bias and a collective negativity bias, in U.S.-based samples. Experiment 3 assessed the extent to which our hypothesized dissociation extended into the distant (40 years) future. Experiment 4 assessed the generalizability of our predicted results to a non-U.S. (Canadian) sample. Experiment 5 assessed whether cognitions about the future of groups are always negative. Finally, Experiment 6 assessed the impact of adopting a personal or collective perspective on information processing in relation to topics (social media and artificial intelligence) that can have both positive and negative consequences.

Experiment 1

Method

Participants. Forty-eight undergraduate students were recruited through the University of Illinois at Chicago Psychology Subject Pool (female = 33; $M_{Age} = 19.1$ years). Half of our participants completed the experiment before and the other half completed the experiment after the 2016 United States Presidential election (i.e., either prior to the nomination of Presidential candidates in February 2016 or following the election of a new President in January 2017). Given that the University of Illinois at Chicago is a commuter school located in a county that voted nearly 75% in favor of the Presidential candidate who lost the 2016 general election (Leip, 2016), this aspect of our design allowed us to assess whether expectations about the future of the country were influenced by the outcome of the recent election. A power analysis of a prior study showing valence differences in a personal future fluency task (MacLeod et al., 1997) revealed that eight participants would have been needed to give us a statistical power of 80% (with alpha .05, two-tailed) to detect a within group difference with an effect size of $d = 1.25$ (the estimated effect size). Because we were interested in identifying a possible interaction between valence and domain of future thinking (i.e., personal vs. collective), coupled with assessing the nature of this interaction before and after the 2016 United States Presidential election, we decided a priori that a larger sample size ($N = 48$) than indicated by our power analysis would be desirable. Written consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received course credit for their participation.

Materials and procedure. In order to ascertain cognitions about the personal and collective future, we adapted the future fluency task (MacLeod et al., 1997). For the personal future, participants were asked to list things that they were excited or worried about in the next week, year, and 5–10 years. Participants were given 1 min to complete each of the six response prompts (e.g., list as many things you are excited about in the next year, list as many things you are worried about in the next year). For the collective future, participants were asked to list things that they thought their country (the U.S.) might be excited or worried about in the next week, year, and 5–10 years. Participants were also given 1 min to complete each of these six response prompts (e.g., list as many things the country is excited about in the next year, list as many things the country is worried about in the next year). The personal and collective thinking tasks were presented in a blocked fashion that was counterbalanced across participants. Within each block, the six response prompts were presented in random order. This latter portion of the design deviates from prior work using the future fluency task, wherein valence (excitement, worry) is typically counterbalanced and time period (week, year, 5–10 years) is typically presented in chronological order (MacLeod, 2016, 2017). Pilot testing revealed that participants had little trouble shifting between response prompts in a random fashion, and this approach allowed us to assess whether past observations of a lack of difference in the number of responses generated across time periods was possibly the result of the chronological order in which time periods were presented.

All stimuli were presented using E-Prime 2.0 software on a Dell desktop computer. Participants entered their responses using a

computer keyboard. Following the 1 min that was allotted for each response prompt, the computer program automatically advanced to the next prompt. Finally, after completing the personal and collective future fluency tasks, participants also completed the Identification With All Humanity Scale (McFarland, Brown, & Webb, 2013), which contained statements regarding one's affinity toward their community, country, and the world at large. This scale was utilized for exploratory purposes, and responses were not analyzed for the purposes of the present study. The experiment lasted approximately 25 min. Participants were thanked for their involvement and fully debriefed at the conclusion of the study.

Scoring. As per the scoring procedure described elsewhere (MacLeod et al., 1997), the total number of responses to each prompt was summed. Incomplete, incoherent, and repeated responses were excluded. Additionally, given the focus of the present study, we considered the possibility that some collective future events might be listed in response to personal future prompts (e.g., when asked to list things people were worried about in the next 5–10 years, some listed global warming). These responses were excluded from analysis of personal future prompts in order to provide a more pure comparison of the personal and collective future. Nonetheless, for all analyses, inclusion of collective events that were listed as part of responses to personal future prompts did not change the observed pattern of results.

Results

All data for this experiment, and additional experiments presented below, are freely available online through the Open Science Framework (<https://osf.io/nszgu/>). We conducted a 2 (Domain: Personal and Collective) \times 2 (Valence: Positive and Negative) \times 3 (Time: Week, Year, and 5–10 Years) \times 2 (Order: Personal first or Collective first) \times 2 (Election: Preelection or Postelection) mixed ANOVA, with domain, valence, and time serving as within-subjects factors and order and election serving as a between-subjects factors. We begin by focusing our analyses on the predicted domain-by-valence interaction. The mixed ANOVA revealed a main effect of domain, $F(1, 44) = 56.05, p < .001, \eta_p^2 = 0.56$, and a marginally significant effect of valence, $F(1, 44) = 3.74, p = .06, \eta_p^2 = 0.078$, that were qualified by a significant domain-by-valence interaction, $F(1, 44) = 37.07, p < .001, \eta_p^2 = 0.457$. Pairwise comparisons revealed our predicted pattern of results. Replicating prior work with healthy adult populations (MacLeod, 2016, 2017), participants indicated more things they were personally excited about ($M = 14.04, SE = 0.73$) than they were personally worried about ($M = 10.73, SE = 0.60$), $t(47) = 4.76, p < .001, 95\% CI = [1.91, 4.71], d = 0.69$. Conversely, the same participants indicated more things that their country was worried about ($M = 9.21, SE = 0.62$) than their country was excited about ($M = 7.69, SE = 0.53$), $t(47) = 3.07, p = .004, 95\% CI = [0.52, 2.52], d = 0.44$ (see Figure 1).

The mixed ANOVA further revealed a main effect of time, $F(1, 44) = 10.42, p < .001, \eta_p^2 = 0.192$. Post hoc comparisons revealed that participants listed more items 5–10 years into the future ($M = 3.93, SE = 0.20$) as compared with 1 week into the future ($M = 3.29, SE = 0.20$), $t(47) = 3.34, p = .002, 95\% CI = [0.25, 1.02], d = 0.48$, and 1 year into the future ($M = 3.20, SE = 0.17$), $t(47) = 3.88, p < .001, 95\% CI = [0.35, 1.11], d = 0.56$. No other comparisons across time frames were significant. Notably, there

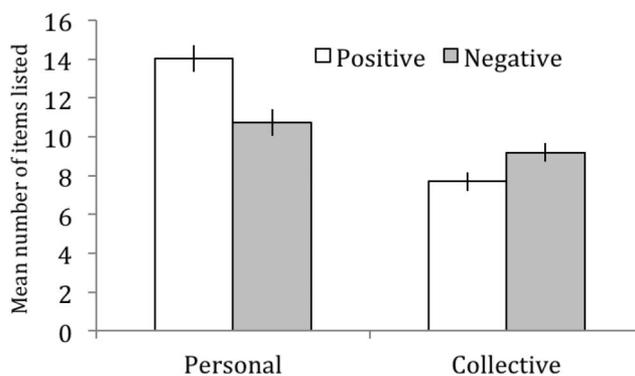


Figure 1. Mean number of unique things undergraduates indicated they were excited (positive) or worried about (negative) in relation to their personal future or the collective future of their country. Error bars represent 95% confidence intervals.

were no effects of order and election, $F_s < 1$, and no other interactions among our factors of interest.

Summary and Discussion

As predicted, we observed a dissociation between personal and collective future thinking such that people reported more positive expectations relative to worries about their personal futures and more worries than positive expectations for the future of their country. Notably, this pattern of data was not related to the outcome of a recent election that likely did not favor the preferences of our sample. In addition, we found that people reported more positive expectations and worries about the distant as compared with the near future, personal or collective, when order of time periods was randomized. In order to further establish the reliability and generalizability of our findings, we carried out a second experiment that drew participants from the general population of the U.S. using Amazon Mechanical Turk, a popular crowdsourcing platform (Buhrmester, Kwang, & Gosling, 2011).

Experiment 2

Method

Participants. Two-hundred and fifty individuals from across the U.S. were recruited through Amazon Mechanical Turk (female = 168; $M_{Age} = 41.8$ years). This large sample size, decided upon prior to carrying out the experiment, was collected in an effort to gather enough data to assess whether any observed effects held across demographic characteristics of our sample (see below). Seven participants were excluded because they did not properly follow instructions. Written consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received \$0.50 for their participation.

Materials and procedure. Materials and procedures were identical to Experiment 1, with the following exceptions. The study was programmed using Qualtrics survey software and run through Amazon Mechanical Turk. Participants completed the study remotely. The personal and collective future thinking tasks were also identical to Experiment 1, except that participants were

required to indicate which domain of future thinking they were about to engage in following the accompanying instructions for the task. This attention check ensured that participants were following instructions. Following the completion of the personal and collective future thinking tasks, participants completed the Identification With All Humanity Scale, and also a series of questions related to their news consumption behavior: (a) how many minutes a day they spent consuming news from various media outlets (e.g., TV, Internet); (b) what sources they typically relied on (e.g., *New York Times*, *Fox News*); (c) their level of trust in the media; and (d) any miscellaneous information they wanted to report about their consumption or views on the media. These questionnaires were collected for exploratory purposes and were not analyzed for the purposes of this study. Finally, participants completed a demographic survey, which included questions about age, gender, and political affiliation (variables that were analyzed for the purposes of this study) and ethnicity, years lived in the U.S., and state of residency (variables that were not analyzed for the purposes of this study).

Results

We conducted a 2 (Domain: Personal and Collective) \times 2 (Valence: Positive and Negative) \times 3 (Time: Week, Year, and 5–10 Years) \times 2 (Order: Personal first or Collective first) mixed ANOVA, with domain, valence, and time serving as within-subjects factors and order serving as a between-subjects factor. As above, we begin by focusing our analyses on the predicted domain-by-valence interaction. The results of the mixed ANOVA revealed main effects of domain, $F(1, 241) = 37.66, p < .001, \eta_p^2 = 0.135$, and valence, $F(1, 241) = 13.69, p < .001, \eta_p^2 = 0.054$, that were qualified by a significant domain-by-valence interaction, $F(1, 241) = 261.41, p < .001, \eta_p^2 = 0.520$. Pairwise comparisons revealed our predicted pattern of results. Replicating our findings from Experiment 1, participants indicated more things they were personally excited about ($M = 10.24, SE = 0.31$) than they were personally worried about ($M = 8.06, SE = 0.28$), $t(242) = 8.83, p < .001, 95\% CI = [1.69, 2.66], d = 0.57$. Conversely, the same participants indicated more things that their country was worried about ($M = 9.32, SE = 0.30$) than their country was excited about ($M = 5.85, SE = 0.24$), $t(242) = 14.08, p < .001, 95\% CI = [2.98, 3.95], d = 0.90$.

Further replicating the results of Experiment 1, the mixed ANOVA revealed a main effect of time, $F(1, 241) = 58.37, p < .001, \eta_p^2 = 0.195$. Post hoc comparisons revealed that participants listed more items 5–10 years into the future ($M = 3.20, SE = 0.09$) as compared with 1 week into the future ($M = 2.36, SE = 0.08$), $t(243) = 10.13, p < .001, 95\% CI = [0.68, 1.00], d = 0.65$, and 1 year into the future ($M = 2.81, SE = 0.09$), $t(243) = 5.11, p < .001, 95\% CI = [0.24, 0.55], d = 0.33$. Participants also listed more items 1 year into the future than 1 week into the future, $t(243) = 6.11, p < .001, 95\% CI = [0.30, 0.59], d = 0.39$.

Notably, these effects were further qualified by a three-way interaction between domain, valence, and time. While the interaction between domain and valence was evident at all three time frames, smallest $F(1, 242) = 73.58, p < .001, \eta_p^2 = 0.233$, the three-way interaction was driven by the fact that participants were more negatively biased about the collective future, that is, they indicated more things that elicited worry than excitement, 1 year

from the present ($M_{diff} = 1.60$) as compared with 1 week from the present ($M_{diff} = 0.74$), $F(1, 242) = 19.30, p < .001, \eta_p^2 = 0.074$.

In contrast to the results obtained in Experiment 1, we observed an effect of order, $F(1, 241) = 8.35, p = .004, \eta_p^2 = 0.034$, such that participants reported more items when asked about the personal future first ($M = 36.1, SE = 1.30$) as compared with being asked about the collective future first ($M = 31.0, SE = 1.16$). This effect was qualified by an interaction between domain and order, $F(1, 241) = 53.41, p < .001, \eta_p^2 = 0.181$. This interaction was driven by the fact that participants listed more collective items when they were asked about the future of the country before ($M = 18.3, SE = 0.69$) as compared with after ($M = 12.2, SE = 0.58$) being asked about their personal future. Importantly, the interaction between domain and valence, which was of particular interest to this study, was robustly present regardless of task order, smallest $F(1, 116) = 127.66, p < .001, \eta_p^2 = 0.524$.

Finally, in order to further assess the generalizability of the domain-by-valence interaction, we tested for the presence of the interaction as a function of key demographic classifications. Specifically, we examined whether the interaction was present irrespective of the age, gender, and political affiliation of our participants. With regard to age, we found a significant domain-by-valence interaction for participants aged 20–29 years ($N = 56$), 30–39 years ($N = 69$), 40–49 years ($N = 42$), 50–59 years ($N = 43$), and 60–69 years ($N = 27$), smallest $F(1, 26) = 23.72, p < .001, \eta_p^2 = 0.477$ (see Figure 2). With regard to gender, we found a significant domain-by-valence interaction for both women, $F(1, 167) = 164.40, p < .001, \eta_p^2 = 0.496$, and men, $F(1, 74) = 109.20, p < .001, \eta_p^2 = 0.596$ (see Figure 3). Lastly, with regard to political affiliation, we found a significant domain-by-valence interaction for Democrats ($N = 89$), Republicans ($N = 51$), and Independents ($N = 61$), smallest $F(1, 50) = 45.90, p < .001, \eta_p^2 = 0.479$ (see Figure 4).

Summary and Discussion

The results of Experiments 1 and 2 suggest that U.S.-based participants are generally positive about their personal future and negative about the future of their country. One possible concern regarding the future fluency task is the extent to which participants actually prospect about the *distant* future. That is, the most distant temporal cue asks about events that might take place 5–10 years

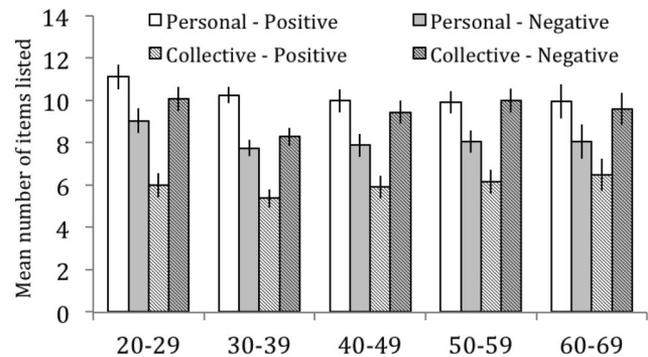


Figure 2. Mean number of unique things members of the general public indicated they were excited (positive) or worried about (negative) in relation to their personal future or the collective future of their country as a function of age. Error bars represent 95% confidence intervals.

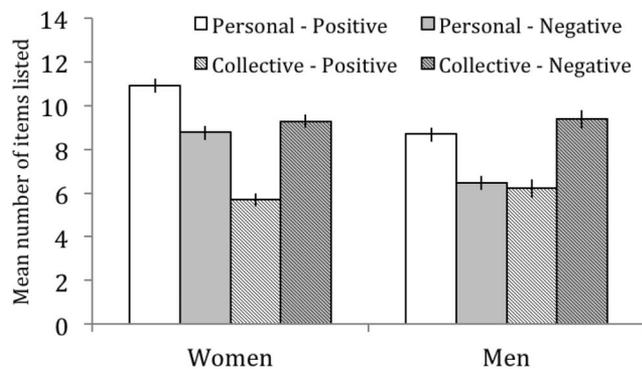


Figure 3. Mean number of unique things members of the general public indicated they were excited (positive) or worried about (negative) in relation to their personal future or the collective future of their country as a function of gender. Error bars represent 95% confidence intervals.

from the present, and it is possible that participants do not project beyond 5 years. In order to address this concern, we set out to assess whether the observed pattern of data emerges when participants are asked to think about the more distant (40 years) future.

Experiment 3

Method

Participants. Fifty 25- to 30-year-olds from across the U.S. were recruited through Amazon Mechanical Turk (female = 31; $M_{Age} = 27.9$ years). We selected this age range because it allowed us to compare the distant personal and collective future. Specifically, given that the average life expectancy in the U.S. is approximately 78.8 years (Arias, Heron, & Xu, 2017), we reasoned that 25- to 30-year-olds would still expect to be alive 40 years from now, allowing for meaningful comparisons between the personal and collective future. We decided to collect data from 50 participants so as to approximate the average number of participants in our analyses of age groups in Experiment 2 ($M = 47.4$). Written

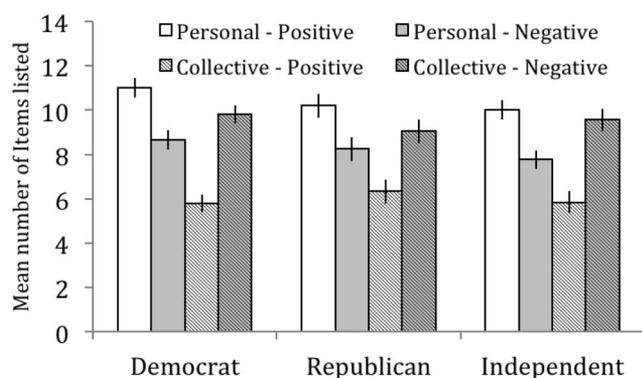


Figure 4. Mean number of unique things members of the general public indicated they were excited (positive) or worried about (negative) in relation to their personal future or the collective future of their country as a function of political affiliation. Error bars represent 95% confidence intervals.

consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received \$0.25 for their participation.

Materials and procedure. Materials and procedures were similar to Experiment 2, with the following exception. Participants were only asked to list what they or their country were excited or worried about 40 years from now. As before, information related to news consumption was collected for exploratory purposes and was not analyzed for the purposes of this study. Demographic classifications were also collected, but not analyzed given the reduced sample size that focused on one specific age group.

Results

We conducted a 2 (Domain: Personal and Collective) \times 2 (Valence: Positive and Negative) \times 2 (Order: Personal first or Collective first) mixed ANOVA, with domain and valence serving as within-subjects factors and order serving as a between subjects factor. We begin by focusing our analyses on the predicted domain-by-valence interaction. The results of the mixed ANOVA revealed no effect of domain, $F(1, 48) = 1.12, p = .295$, and a main effect of valence, $F(1, 48) = 8.16, p = .006, \eta_p^2 = 0.145$, that were qualified by a significant domain-by-valence interaction, $F(1, 48) = 10.50, p = .002, \eta_p^2 = 0.180$. Interestingly, pairwise comparisons revealed that participants listed slightly more things they were personally excited about in 40 years ($M = 3.90, SE = 0.30$) than they were worried about in 40 years ($M = 3.56, SE = 0.33$), although this difference was not significant, $t(49) = 1.05, p = .297, 95\% CI = [0.31, 0.99], d = 0.15$. We consider this lack of significance below. Importantly, the same participants indicated more things that their country was worried about in 40 years ($M = 4.68, SE = 0.33$) than their country was excited about in 40 years ($M = 3.20, SE = 0.23$), $t(49) = 3.88, p < .001, 95\% CI = [0.71, 2.25], d = 0.55$ (see Figure 5). There was no effect of order, $F < 1$.

Summary and Discussion

The findings of Experiment 3 were notable in two regards. First, the personal positivity bias was largely attenuated when partici-

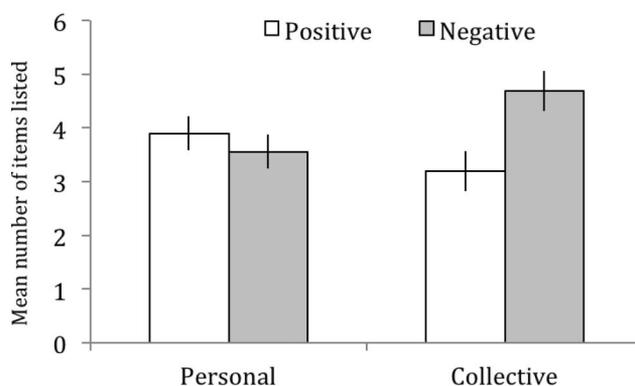


Figure 5. Mean number of things 25- to 30-year-old members of the general public indicated they were excited (positive) or worried about (negative) in relation to their distant (40 year) personal future or the distant (40 year) collective future of their country. Error bars represent 95% confidence intervals.

pants prospected about their distant future. We believe that this aspect of the results can be accounted for by prior findings regarding cultural life scripts (Rubin & Berntsen, 2003). Specifically, considerable work on cultural life scripts indicates that while people tend to anticipate positive milestones over the course of their lives (e.g., getting married, buying a home), the end of life is typically characterized by more negative expectations (e.g., death of self and/or loved ones). Indeed, a content analysis of our participant responses indicated that 32% of participants in the study explicitly listed worries associated with either their own or a loved one's death (in addition, 66% listed worries associated with declining health). Notably, we observed that the negativity bias that U.S.-based participants hold about the future of their country extended into the distant (40 year) future, suggesting that this negativity bias is not limited in scope (at least not 40 years into the future).

Having established the robustness of the personal positivity bias and to a greater extent the collective negativity bias, we set out to ascertain the extent to which this dissociation between the personal and collective future extends to participants outside of the U.S.

Experiment 4

Method

Participants. Seventy individuals from across Canada were recruited through Amazon Mechanical Turk (female = 37; $M_{Age} = 34.2$ years). One participant was excluded because they did not properly follow instructions. We note that our initial goal had been to collect data from 250 Canadians (in order to have enough participants to examine similarities/differences across demographic categorizations; as with Experiment 2). However, after sampling data from Amazon's Mechanical Turk for a period of 2 months (August 1, 2017–October 2, 2017), we were only able to accrue responses from 70 participants. Nonetheless, a power analysis using G*Power 3 of our online U.S. sample (Experiment 2) revealed that only eight participants would be needed to demonstrate the domain-by-valence interaction of interest. Hence, we report data from the sample we were able to attain, but note that future studies of Canadian participants using Amazon's Mechanical Turk may be limited depending on the sample size required. Written consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received \$0.50 for their participation.

Materials and procedures. Materials and procedures were identical to Experiment 2. As before, information related to news consumption was collected for exploratory purposes and not analyzed for the purposes of this study. In addition, demographic classifications were also collected, but not analyzed given the limitations noted in collecting a large sample size.

Results

We conducted a 2 (Domain: Personal and Collective) \times 2 (Valence: Positive and Negative) \times 3 (Time: Week, Year, and 5–10 Years) \times 2 (Order: Personal first or Collective first) mixed ANOVA, with domain, valence, and time serving as within-subjects factors and order serving as a between-subjects factor. We begin by focusing our analyses on the predicted domain-by-

valence interaction. The results of the mixed ANOVA revealed a main effect of domain, $F(1, 67) = 23.83, p < .001, \eta_p^2 = 0.195$, and no effect of valence, $F < 1$, that were qualified by a significant domain-by-valence interaction, $F(1, 67) = 29.85, p < .001, \eta_p^2 = 0.308$. Pairwise comparisons supported our predicted pattern of results. Replicating our findings from Experiments 1 and 2 (U.S. participants), Canadian participants reported more things they were personally excited about ($M = 7.81, SE = 0.50$) than they were personally worried about ($M = 6.49, SE = 0.50$), $t(68) = 2.97, p = .004, 95\% CI = [0.43, 2.21], d = 0.36$. Conversely, the same Canadian participants reported more things that their country was worried about ($M = 6.28, SE = 0.42$) than their country was excited about ($M = 4.42, SE = 0.30$), $t(68) = 5.22, p < .001, 95\% CI = [1.15, 2.56], d = 0.63$ (see Figure 6).

Further replicating the results of Experiments 1 and 2, the mixed ANOVA revealed a main effect of time, $F(1, 67) = 18.09, p < .001, \eta_p^2 = 0.213$. Post hoc comparisons revealed that participants listed more items 5–10 years into the future ($M = 2.39, SE = 0.14$) and 1 year into the future ($M = 2.20, SE = 0.14$) as compared with 1 week into the future ($M = 1.66, SE = 0.11$), $t(68) = 6.29, p < .001, 95\% CI = [0.50, 0.97], d = 0.76$ and $t(68) = 4.63, p < .001, 95\% CI = [0.31, 0.77], d = 0.56$, respectively. No other comparisons across time frames were significant. Finally, there was no effect of order, $F < 1$.

Summary and Discussion

The results of Experiment 4 indicate that the personal positivity bias and collective negativity bias observed in U.S. participants extended to a Canadian sample. Next, we set out to assess whether expectations for the collective future of groups are always negative. Brewer and Gardiner (1996) proposed an important distinction between groups with whom people can have tangible experiences (i.e., relational groups) and groups with whom people cannot have tangible experiences and with whom they hold a more impersonal sense of membership (i.e., collective groups). A common example of a relational group is one's family whereas a common collective/impersonal group is one's country or nation. That is, one can have tangible experiences with their family but not with their country. Based on this distinction, we hypothesized that because

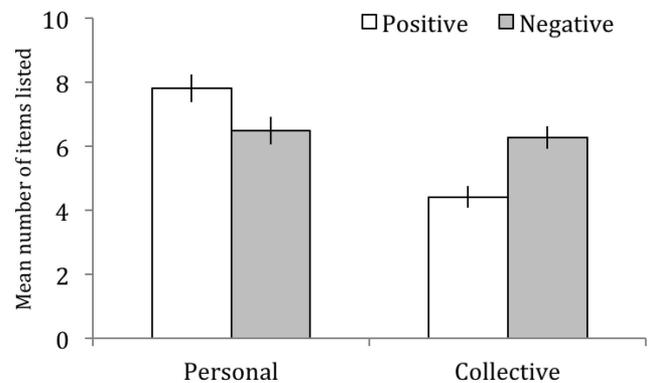


Figure 6. Mean number of unique things members of the general Canadian public indicated they were excited (positive) or worried about (negative) in relation to their personal future or the collective future of their country. Error bars represent 95% confidence intervals.

the tangible experiences that one has with relational groups (e.g., family) can be incorporated into their autobiographical past, which is known to be generally positive (Walker & Skowronski, 2009) and a basis for simulating the future (Schacter & Addis, 2007), expectations for relational groups should be positively biased. On the other hand, we hypothesized that expectations for collective groups other than country, such as one's state of residence, should be based on information that is derived from external sources (e.g., history texts and news media), and so exhibit a negativity bias (cf. Liu et al., 2009). We tested these specific predictions below.

Experiment 5

Method

Participants. Twenty-three undergraduate students were recruited through the University of Illinois at Chicago Psychology Subject Pool (female = 16; $M_{Age} = 19.1$ years). The sample size was chosen to reflect the size of our Experiment 1 studies (for which there was no effect of completing the experiment before or after the 2016 United States Presidential election). Written consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received course credit for their participation.

Materials and procedure. The procedure was identical to that of Experiment 1, with the following exception. Participants answered questions about the future of their family (e.g., list as many things your family is excited about in the next year, list as many things your family is worried about in the next year) and the future of their state of residence (e.g., list as many things the state is excited about in the next year, list as many things the state is worried about in the next year).

Results

In line with our predictions, we found that a positivity bias emerged for cognitions about the future of an individual's family, such that participants indicated more things that their family was excited about ($M = 9.26$, $SE = 0.76$) than their family was worried about ($M = 7.22$, $SE = 0.73$), $t(22) = 2.83$, $p = .01$, 95% CI = [0.55, 3.54], $d = 0.59$. Conversely, the same individuals held a negativity bias for the future of their state of residence, such that they indicated more things that their state was worried about ($M = 7.43$, $SE = 0.72$) than their state was excited about ($M = 4.57$, $SE = 0.66$), $t(22) = 4.03$, $p < .001$, 95% CI = [1.39, 4.35], $d = 0.84$.

Summary and Discussion

Across five experiments, we have demonstrated that people tend to hold a positivity bias about their personal future and a negativity bias about the future of groups, the latter of which depends on the nature of one's relation to the group. Moreover, this valence-based dissociation extends into the distant future, and emerges in both U.S. and Canadian samples. Having established the reliability and generalizability of this domain-by-valence interaction, we set out to assess the extent to which this phenomenon may have consequences on information processing. That is, if people tend to think about their personal future in a positive light and the collective

future in a negative light, will the manner in which they think about the world around them change depending on the perspective (i.e., personal or collective) they adopt? To test this question, we conducted a final set of experiments in which participants were asked to adopt a personal and collective perspective about topics that can have positive and negative consequences. In Experiment 6a, participants thought about the positive and negative consequences of social media. In Experiment 6b, participants thought about the positive and negative consequences of artificial intelligence. We hypothesized that participants would think of more positive than negative consequences, in both experiments, when adopting a personal perspective, but that they would list more negative than positive consequences when adopting a collective perspective.

Experiments 6a and 6b

Method

Participants. Two-hundred and fifty individuals from across the U.S. were recruited through Amazon Mechanical Turk (female = 160; $M_{Age} = 38.9$ years). One-hundred and twenty-five individuals participated in Experiment 6a (consequences of social media) and 125 participated in Experiment 6b (consequences of artificial intelligence). Given that there exist no prior studies assessing the influence of adopting a personal versus collective perspective on information processing, we reasoned a priori that the relatively large sample sizes would be appropriate. Seven participants were excluded from Experiment 6a and six participants were excluded from Experiment 6b because they did not properly follow instructions. Written consent was obtained in a manner approved by the UIC Institutional Review Board. Participants received \$0.25 for their participation.

Materials and procedure. We asked participants to think about social media and artificial intelligence because both topics are commonly discussed in terms of their benefits and drawbacks. Moreover, we selected two topics in order to ensure that any significant pattern of results that was obtained was not limited to one context.

The procedure was based on the future fluency task used in our previous experiments. Specifically, participants were asked to list as many positive and negative consequences of social media or artificial intelligence for themselves and their country, resulting in a total set of four cues: positive-self, negative-self, positive-country, and negative-country. The personal and collective (i.e., country) cues were counterbalanced across participants such that half of the participants completed the personal fluency task first, whereas half of the participants completed the collective fluency task first. Positive and negative prompts were presented in a random order within the context of each fluency task. Participants were given 2 min to provide as many consequences in response to each cue. As before, information related to news consumption was collected for exploratory purposes, and was not analyzed for the purposes of this study. Demographic classifications (e.g., age, gender, and political affiliation) were also collected. Given that our earlier analyses did not reveal any meaningful differences across demographic classifications, these data were also not analyzed for the purposes of this study.

Results

We conducted a 2 (Domain: Personal and Collective) \times 2 (Valence: Positive and Negative) \times 2 (Order: Personal first or Collective first) \times 2 (Experiment: Social Media or Artificial Intelligence) mixed ANOVA, with domain and valence serving as within-subjects factors and order and experiment serving as between-subjects factors. We begin by focusing our analyses on the predicted domain-by-valence interaction, collapsing across Experiments 6a and 6b. The results of the mixed ANOVA revealed no main effect of domain, $F < 1$, and a main effect of valence, $F(1, 233) = 10.29, p = .002, \eta_p^2 = 0.042$, that were qualified by a significant domain-by-valence interaction, $F(1, 233) = 71.22, p < .001, \eta_p^2 = 0.234$. Pairwise comparisons supported our predicted pattern of results. Participants listed more positive ($M = 3.19, SE = 0.12$) than negative ($M = 2.42, SE = 0.09$) consequences when adopting a personal perspective, $t(236) = 7.09, p < .001, 95\% CI = [0.55, 0.98], d = 0.46$. Conversely, the same participants listed more negative ($M = 2.88, SE = 0.10$) than positive ($M = 2.62, SE = 0.09$) consequences when adopting a collective perspective, $t(236) = 2.86, p = .005, 95\% CI = [0.08, 0.45], d = 0.19$.

Notably, these effects were qualified by a three-way interaction between domain, valence, and experiment, $F(1, 233) = 6.13, p = .014, \eta_p^2 = 0.026$. While the interaction between domain and valence was evident in both Experiments 6a and 6b, smallest $F(1, 118) = 23.50, p < .001, \eta_p^2 = 0.166$, the three-way interaction was driven by the fact that participants listed more personal positive consequences of social media ($M = 3.86, SE = 0.19$) than personal positive consequences of artificial intelligence ($M = 2.51, SE = 0.14$), $t(235) = 5.80, p < .001, 95\% CI = [0.89, 1.81], d = 0.75$, and more personal negative consequences of social media ($M = 2.83, SE = 0.15$) than personal negative consequences of artificial intelligence ($M = 2.01, SE = 0.11$), $t(235) = 4.54, p < .001, 95\% CI = [0.47, 1.18], d = 0.59$, while not exhibiting any difference in the number of collective positive or negative consequences across experiments, largest $t(235) = 1.32, p = .189$ (see Figure 7).

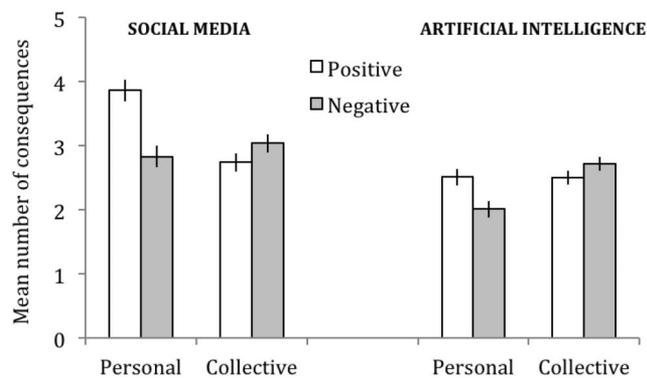


Figure 7. Mean number of positive and negative consequences of social media (Experiment 6a) and artificial intelligence (Experiment 6b) listed by members of the general public in relation to their personal future or the collective future of the country. Error bars represent 95% confidence intervals.

Summary and Discussion

In Experiments 6a and 6b, we set out to assess whether people may think differently about the consequences of topics that can have both positive and negative implications as a function of whether they adopt a personal or collective perspective. Indeed, we found that people were more likely to think of positive consequences when adopting a personal perspective, and slightly but reliably more likely to think of negative consequences when adopting a collective perspective. We interpret these findings as demonstrating that the personal positivity and collective negativity biases identified in Experiments 1 through 5 may have important implications for how people think about the world.

General Discussion

People are generally optimistic about their future (Newby-Clark & Ross, 2003; Weinstein, 1980). Here we show that this optimism bias persists in the face of a negative outlook for the country in which people reside. To our knowledge, our findings represent the first behavioral demonstration of a dissociation between personal and collective future thinking in healthy cognition. This domain-by-valence interaction appears to be robust. We observed the interaction in college undergraduates; people drawn from the general public who varied in terms of age, gender, and political affiliation; in the distant (40 years) future; and in a non-U.S. (Canadian) sample. Importantly, we further highlighted that the collective negativity bias tends to only emerge under conditions wherein people cannot have tangible experiences with the group in question (e.g., state of residence, country). Finally, we showed that these personal positivity and collective negativity biases have implications for how people think about the world. Specifically, people were more likely to think of positive than negative consequences of social media and artificial intelligence when adopting a personal perspective, whereas they were more likely to think of negative than positive consequences when adopting a collective perspective. Next, we provided additional discussion regarding the possible basis of the observed domain-by-valence interaction between personal and collective cognition, and concluded by considering further the practical implications of this phenomenon.

We interpret our findings as reflecting the impact of past experience on expectations for the future. People tend to experience and subsequently remember more positive than negative experiences from their personal past (Kahneman et al., 2009; see also MacLeod & Byrne, 1996; MacLeod et al., 1997), and this positive personal past likely biases people to expect that their future will also be positive. Conversely, people tend to be exposed to negatively skewed media coverage of national events (Soroka & McAdams, 2015), and also remember more negative than positive national events (Liu et al., 2005, 2009). Accordingly, this negative collective past likely biases people to expect that the future of their country will also be negative. However, precisely how positive personal and negative collective past experiences impact expectations of the future remains to be worked out.

One possibility is that relatively accessible past instances related to a positive personal past or a negative collective past serve as a basis for the construction of possible future occurrences (cf. Tversky & Kahneman, 1973). Indeed, considerable evidence suggests that this is the case in the context of expectations related to the personal future (e.g., Gilbert, & Wilson, 2007; Pillemer, 2003).

With regard to the collective future, participant responses in our studies certainly indicated that recently acquired information was being used to guide expectations as to what the country should be worried about in the future (i.e., topical news media items related to government leadership, immigration, and so on). Nonetheless, studies are needed to more directly demonstrate the role of accessible past instances in guiding expectations of the collective future. One possibly useful approach would be to require participants to complete fluency tasks that probe accessible representations regarding the collective past *and* future (cf. MacLeod et al., 1997), and to compare and contrast the content that is evoked in the context of these tasks.

It will also be important for future work to hash out the representational nature of past instances that may serve as a basis for generating expectations of the future. Specifically, are these instances based on recollections of specific experiences (i.e., episodic) or general knowledge that has been extracted from past experience (i.e., semantic)? Prior work from neuropsychology (Andelman et al., 2010; Klein et al., 2002; Race et al., 2013) and neuroimaging (Abraham, Schubotz, & von Cramon, 2008) has spurred conclusions that episodic memory may enable thoughts about the personal future, whereas as semantic memory may play a more central role in enabling thoughts about the collective future (e.g., Klein et al., 2002). Although our data cannot speak directly to this system-based distinction, it is certainly possible that memories of personal experiences—our proposed basis of expectations for the personal future—are more likely to be sourced from episodic than semantic knowledge as compared with memories for information learned through the media—our proposed basis of expectations for the collective future.¹ More work is needed to directly test this assertion. For instance, additional studies employing methods that require participants to more fully elaborate on what they or their country are excited and worried about should help to further disentangle the relative contributions of episodic and semantic memory to personal and collective cognitions about the future. Another advantage of such an approach would be to further enhance the ability of the experimenter to determine the importance and perhaps validity of the responses that participants offer in relation to the personal and collective future. For instance, when a participant states that they are excited about traveling or that the country is worried about war with another country, it would help to have more detailed descriptions, and perhaps ratings, to aid in gauging how likely it is that participants think that these events are to occur, and—if likely—how excited or worried they or the country might be.

In addition to the possible role that past instances may play in guiding the generation of expectations for the future, we propose that extensive experience thinking about the personal past as positive and the collective past as negative may give rise to more general schema-based biases that guide expectations of the future. The results of Experiments 6a and 6b lend some support to this conjecture. Participants in those experiments were presented with topics that are commonly associated with benefits and drawbacks (i.e., social media and artificial intelligence). Notably, participants listed more positive than negative consequences when adopting a personal perspective, but more negative than positive consequences when adopting a collective perspective, suggesting that distinct schemas were being adopted depending on context (i.e., personal vs. collective). Clearly, more work is needed to distin-

guish between the possible influence of accessible instances in memory and more general schema-based processes as candidate mechanisms that may give rise to a positive view of the personal future and a negative view of the collective future. For instance, one possibly interesting avenue of research in relation to collective cognition might be to teach participants about the history and current events associated with a country that they are relatively unfamiliar with, and to manipulate the extent to which the historical and topical information is characterized as positive and/or negative. To the extent that schema-based processing impacts cognitions about the future of countries, people should expect a negative collective future regardless of the amount of positive historical and topical content they are exposed to in the context of such an experiment.

The influence of episodic and/or semantic instances in memory and more schema-based processes in guiding positive personal and negative collective biases are likely not mutually exclusive. Cognitions about the future, whether personal or collective, are likely to be based on several interacting factors (i.e., the future is multiply determined). Indeed, some of our data speak directly to this point. For instance, in Experiment 3 we found that the personal positivity bias was largely attenuated when people projected into their distant future. This pattern of results likely reflects the fact that people hold more general expectations about milestones that they may achieve over the course of their lifetime (Rubin & Berntsen, 2003), and that later life tends to be characterized by more negative general milestones (e.g., death) than earlier life.² While the collective future appeared to be more stable over time (i.e., the negativity bias was persistent), it is certainly possible that expectations of the near and distant future of groups differ in ways that may require more detail-oriented response criteria to illuminate.

Finally, we conclude our discussion by highlighting that it will be important to assess the generalizability of our findings in additional cultural contexts (Markus & Kitayama, 1991). For instance, Liu et al. (2009) found that people from some countries (e.g., China and Hungary) nominated more positive than negative events as best representing the history of their country. One intriguing prediction that can be made on the basis of our findings is that people in China and Hungary may, by virtue of having positive memories of their nation's past, also expect the future of their respective countries to be positive. Related to this point, it will be important for studies of this sort to more clearly pinpoint the source of collective biases (whether negative or positive). While we hypothesize that media exposure likely plays an important role, more work is needed to determine the manner in which media exposure gives rise to collective cognitions. One possibly fruitful approach may be the adoption of longitudinal studies that

¹ Of course, information learned from the media is done so in the context of personal experiences. Our point is that people may be less likely to remember the context in which they learn this information as compared with experiences that are relevant to the personal future (i.e., those related to considerations about one's social relationships, family, education/career, and so on).

² It is noteworthy to point out that although 25- to 30-year-olds did not exhibit a positivity bias about their distant (40 year) future (Experiment 3), older adults in that age range (i.e., 60-year-olds) did nonetheless exhibit a strong positivity bias extending into the following week, year, and 5–10 years (Experiment 2).

track changes in media coverage and collective cognition over time. In addition to media coverage, we suspect that other sources of collective knowledge, such as history texts (e.g., Liu et al., 2005, 2009) and group interaction (e.g., Choi, Kensinger, & Rajaram, 2017), among others, will also be important to consider.

Context of the Research

The work presented here represents a novel extension of our contributions to the study of the cognitive and neural mechanisms that support the ability to simulate or imagine the future (Schacter, Benoit, & Szpunar, 2017; Szpunar, Spreng, & Schacter, 2014). Specifically, whereas much of the extant research on future-oriented cognition has focused on how people simulate the personal future, relatively little attention has been devoted to how people think about the future of groups. Our findings provide evidence for a valence-based dissociation between personal and collective future thinking that has implications for information processing. Notwithstanding, we acknowledge that the present findings may pose more questions than they necessarily answer. For instance, in addition to the need to more systematically assess the generality of this phenomenon across cultural contexts, it will also be important to assess what variables might moderate the personal positivity and collective negativity biases within cultural contexts. Do constructs such as self-enhancement, group identification, and perceived control impact the pattern of results? Each of these future directions highlights the current dearth of research on collective future thinking and its relation to personal future thinking, and also its potential as a novel direction in psychological research.

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