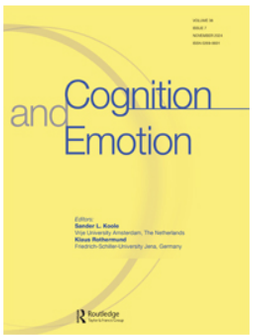

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Emotional aftermath of the 2020 U.S. presidential election: a study of hindsight bias in younger and older adults

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ABSTRACT

Hindsight bias – also known as the knew-it-all-along effect – is a ubiquitous judgment error affecting decision makers. Hindsight bias has been shown to vary across age groups and as a function of contextual factors, such as the decision maker's emotional state. Despite theoretical reasons why emotions might have a stronger impact on hindsight bias in older than in younger adults, age differences in hindsight bias for emotional events remain relatively underexplored. We examined emotion and hindsight bias in younger and older adults ($N = 272$) against the backdrop of the 2020 U.S. presidential election. Participants predicted electoral college votes for the two presidential candidates before the election and were asked to remember their predictions approximately three weeks later, after the election results had been finalised. Republicans, for whom the electoral outcome was negatively tinged, exhibited greater hindsight bias for President Biden's result compared with Democrats, for whom the electoral outcome was positive. The asymmetry in hindsight bias between Republicans and Democrats was similar for younger and older participants. This study suggests that negative emotions may exacerbate hindsight bias, and that adult age differences in hindsight bias observed in laboratory settings may not translate to real-world contexts.

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Aging; hindsight bias; judgment; memory; emotion

On the night of the 2020 United States presidential election, Republican supporter John Doe has his fingers crossed in hopes for a Trump victory. Armed with the historical knowledge that only 10 of the 44 U.S. presidents preceding Trump were not re-elected for a second term, Doe predicts that 55% of the electoral college votes will swing in Trump's favour. However, Trump receives only 43% of electoral college votes. As reality sinks in, Doe shrugs and mutters, "*I figured it would be around 45%.*"

Hindsight bias, the tendency for people to overestimate their ability to have foreseen the outcome of an event (Slovic & Fischhoff, 1977), is prevalent in a range of contexts, from casual bets with friends to medical decision making (Arkes, 2013; Arkes & Schipani, 1994), law (Harley, 2007; Lowe & Reckers, 1994), and finance (Anderson et al., 1997; Peecher & Piercey, 2008). Older adults often exhibit greater susceptibility to hindsight bias compared to younger adults (Bayen et al., 2007; Groß & Pachur, 2019), a finding that has been attributed to age-related decline in memory and inhibitory function (Coolin et al., 2014). Despite the significant impact of emotion on memory, little research has examined the influence of emotion on hindsight bias (but see Groß & Bayen, 2022). A sizable literature demonstrates that emotion modulates memory processes such as information encoding, storage, and retrieval (Kensinger & Ford, 2020), and that the relative memorability of positive (vs. neutral or negative) experiences increases with age (Mather & Carstensen, 2005). It is thus possible that the impact of emotion on hindsight bias differs for younger and older adults. Leveraging a memory paradigm (Erdfelder & Buchner, 1998), the

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current study examined how hindsight bias varied as a function of emotion in younger and older adults within the context of a public event, the 2020 U.S. presidential election. To contextualise the current study, we first review existing research on cognitive and motivational influences on hindsight bias, as well as research on age differences in this phenomenon.

Cognitive and affective influences on hindsight bias

Hindsight bias can be expressed in terms of memory distortion, feelings of inevitability, and feelings of foreseeability (Blank et al., 2008; Groß & Bayen, 2022; Roese & Vohs, 2012). Memory distortion is characterised by an unsuccessful effort to accurately recall a prior judgment. The degree of memory distortion determines the difference between a prior and later judgment. Inevitability refers to the conviction that past events were bound to occur in a certain way. Foreseeability refers to one's perceived capacity to have foreseen or predicted an outcome. Retroactive adjustment of inevitability and foreseeability judgments has been proposed as a psychological strategy for mitigating negative emotions and managing disappointment after undesirable events (Groß & Bayen, 2022).

To date, empirical investigations examining the influence of emotion on hindsight bias have found hindsight bias in response to emotionally neutral stimuli, as well as both positive (e.g. Hölzl et al., 2002) and negative outcomes (e.g. Tykocinski et al., 2002; Wann et al., 2008). A recent study revealed hindsight bias in the context of depressive symptoms, such that individuals exhibiting greater levels of depression also showed more hindsight bias (Groß et al., 2017). Similarly, a study examining hindsight bias in the context of the Covid-19 pandemic, an event that was universally relevant and negative, identified hindsight bias in the form of memory distortion (Giroux et al., 2023). Another study delved into the political realm, observing hindsight bias among individuals who found themselves on the losing side of a political campaign, specifically the 2018 national referendum on abortion in Ireland (Greene et al., 2023). The researchers explained their findings in terms of "retroactive pessimism," a means of mitigating the disappointment associated with an undesirable result.

A possible explanation for this pattern relates to the degree to which negative outcomes are perceived as controllable (Roese & Vohs, 2012). For instance, a romantic breakup, an event that is somewhat controllable, will sting less if one is able to maintain that they *did not see it coming* (adopting low foreseeability). In contrast, in the case of a disappointing political election, an event beyond personal control, individuals may protect their self-esteem by claiming inevitability ("it was bound to happen"). Empirical findings on the cognitive and motivational inputs of hindsight bias would lead to the prediction that events that conflict with one's wishes, and are thus experienced as negative, are likely to inflate hindsight bias.

Political elections provide a rich background for examining hindsight bias in a naturalistic setting. In contrast to personal experiences, such as romantic relationships (Groß & Bayen, 2022), elections are public events with collective impact. Unlike collective events that are universally positive or negative (e.g. the COVID-19 pandemic; Giroux et al., 2023), election outcomes have different emotional qualities for people with different political leanings. Moreover, the limited control individual voters have over election outcomes may impact specific motivational mechanisms involved in hindsight bias. For instance, people may be inclined to believe they predicted the outcome of an election correctly to protect their self-esteem. Along these lines, Tykocinski (2001) found that participants who were political supporters of the losing candidate showed more hindsight bias for their predictions regarding the election outcome. Calvillo and Rutchick (2014) found that the more political knowledge an individual had, the less susceptible they were to hindsight bias when recalling their election predictions, suggesting that domain knowledge plays an important role in hindsight memory distortion. Taken together, these findings highlight the interplay of cognitive and affective influences on hindsight bias, particularly in the context of elections.

Cognitive and motivational changes in aging

In laboratory investigations of hindsight bias, there is a consistent pattern wherein older adults exhibit more pronounced hindsight bias compared to younger adults (e.g. Bayen et al., 2007). A recent meta-analysis (Groß & Pachur, 2019) suggests that the age difference in hindsight bias reflects older adults' greater difficulty with recollecting their original judgments, as well as heightened susceptibility to biased reconstruction of their original judgments. Susceptibility to biased reconstruction may stem

from age-related reductions in inhibitory function (see Campbell et al., 2020 for a review).

In addition to cognitive changes, normal aging is also associated with motivational changes. Socioemotional selectivity theory (Carstensen, 1992) suggests that individuals perceive time as increasingly limited as they age, prompting a transition from future-oriented goals, such as knowledge acquisition, career planning, and new relationships, to goals centred around emotion and meaning. Supporting this theory are empirical studies that demonstrate an age-related positivity effect – greater preference for positive over neutral or negative information in older vs. younger adults (Mather & Carstensen, 2005; for a meta-analysis, see Reed et al., 2014). Whether age-related motivational shifts impact hindsight bias has received little study to date.

Hindsight bias, emotion, and aging

Studies with younger adults have reported a consistent pattern of increased hindsight bias in negative emotional contexts (Giroux et al., 2023; Greene et al., 2023; Groß et al., 2017; Tykocinski et al., 2002; Wann et al., 2008). A recent study by Groß and Bayen (2022) was the first to examine the association between emotion and hindsight bias in younger and older adults. Participants listened to vignettes describing situations in domains such as health, relationships, and travel. Outcomes for these scenarios were neither completely controllable nor uncontrollable. Participants provided pre- and post-estimates of the imaginability of presented scenarios, foreseeability, inevitability, expectations of the outcomes, and affective ratings for the described situation. Compared to younger adults, older adults showed more hindsight bias, particularly for negative (vs. positive) event outcomes. This finding is consistent with the literature on the age-related positivity effect in memory (Mather & Carstensen, 2005). Overall, Groß and Bayen's (2022) study suggests that emotion affects cognitive (i.e. memory-related) mechanisms of hindsight bias but not motivational components such as foreseeability and inevitability impressions. This may be because the cognitive component of hindsight bias heavily relies on memory recall, which is sensitive to emotional states. Positive moods may lead to greater reliance on heuristic processing and anchoring on the actual outcome, thus resulting in greater hindsight bias during recall (Groß & Bayen, 2022). On the other hand, judgements of inevitability and foreseeability are higher-order cognitive processes that involve metacognitive and causal reasoning, which may be less directly influenced by outcome knowledge compared to memory recall. Further, the use of hypothetical scenarios may have limited the emotional arousal evoked by vignettes and consequently, participants' motivation to adjust these judgements. Importantly, the generalizability of these findings to real-world contexts has not been established.

The current study

In this study, we sought to examine hindsight bias for emotional information in younger and older adults. In contrast to Groß and Bayen's (2022) laboratory study, the current study focused on an emotionally-charged real-world event – the 2020 U.S. presidential election. With a positive outcome for Democrats and a negative one for Republicans, the election provided the opportunity to explore the impact of positive and negative emotions on hindsight bias for a single event. We evaluated participants' predictions of electoral college votes for each candidate before the election and later examined their recall of those original judgments post-election, comparing hindsight bias among supporters of the two major parties. We also collected affective ratings to test the assumption of differences in the emotional experiences of Democratic and Republican participants.

Although past laboratory studies (e.g. Bayen et al., 2007; Groß & Pachur, 2019; Pohl et al., 2018) had reported greater hindsight bias in older vs. younger adults, we made the more conservative prediction that hindsight bias would be at least as pronounced in older adults as in younger adults. This conservative prediction was based on prior observations of diminished or reversed age differences in studies of episodic memory conducted online (e.g. Swirsky & Spaniol, 2023). Additionally, guided by socioemotional selectivity theory (Carstensen et al., 1999), we predicted an Age x Political Identity interaction on hindsight bias, such that negative emotion at retrieval would lead to greater hindsight bias than positive emotion, and that this difference would be greater for older adults. Socioemotional selectivity theory posits that older adults prioritise positive information, leading to the age-related positivity effect. We expected this preference to result in stronger hindsight bias for negative information for older adults, as their poorer memory for judgments associated with negative events may lead to greater reliance on new knowledge available at retrieval.

Method

Participants

We conducted a power analysis (via G*Power 3.1.9.7; Faul et al., 2009) to determine the required sample size. To detect a medium interaction effect of Political Identity x Age Group, $f = .25$, assuming 90% power and a significance level of .05, we required 172 participants. To account for the potential exclusion of over 50% of participants due to inattention, invalid responses, or failure to return at Time 2, we recruited a sample of 400 U.S. MTurk participants (200 older adults and 200 younger adults) with a HIT approval rate of 90% or greater. We aimed to recruit equal numbers of younger and older adults who identified as moderate, conservative/liberal, very conservative/very liberal in their MTurk profiles, using the inclusion/exclusion criterion interface. Only when data recruitment began to slow down significantly did we lift these criteria, allowing individuals who had not identified their political affiliation on the MTurk platform to participate as well. Data collection took place in October and November 2020, prior to and following the U.S. presidential election. Participants received a total of $5.00 for their participation ($3.00 for Part 1 and $2.00 for Part 2, respectively). This project was pre-registered on Open Science Framework (OSF; https://osf.io/86hp5).

A total of 326 participants completed both parts of the study. We removed participants who failed the first ($n = 1$) and second ($n = 4$) bot checks, which involved categorising five film names in alphabetical order and writing the phrase "bot a not am I" backwards (i.e. "I am not a bot"). We removed duplicate response IDs from the Time 1 ($n = 16$) and Time 2 datasets ($n = 21$). We also excluded participants who were missing age data ($n = 1$), indicated they were not comfortable reading or writing English, and did not consent to having their data used ($n = 11$), leaving a total of 272 participants. The proportion of excluded responses was consistent with studies recruiting MTurk samples (Chandler et al., 2014). Refer to Table 1 for more information about the participant sample.

Materials

Emotion ratings

Participants rated the quality of their emotions about the 2020 U.S. election at Time 1 and Time 2 (see Chiew et al., 2021). They indicated their degree of positive affect (i.e. happy, excited) and negative affect (i.e. afraid, sad, angry) regarding the election night on a Likert scale of 1 (not at all) to 7 (extremely).

Political identity

Participants selected which political party they identified with most strongly from three choices, including Democrat, Republican, or Third Party. The chosen political identity served as a proxy for emotional valence. Democratic Party supporters (henceforth referred to as Democrats) were expected to have experienced positive emotion about the outcome of the election, whereas Republican Party supporters (henceforth referred to as Republicans) were expected to have experienced negative emotion. Third party supporters were expected to have relatively neutral emotions about the election outcome.

Health and demographics questionnaire

Participants completed a questionnaire regarding their health history (e.g. stroke, tumour, vision, etc.) and demographic information (e.g. age, sex, ethnicity, languages, education). In addition to the main variables of interest, we gathered information on participants' political affiliations, partisanship, and expectations about the election, encompassing aspects such as certainty, intensity, anticipation, and the perceived personal and broader importance of the election outcome. However, this supplementary data falls outside the scope of the present study and thus will not be reported.

Table 1. Demographic Characteristics of Study Sample.

Characteristic	Older Adults	Younger Adults
N	134	138
Sex		
Female	80	80
Male	54	52
Other	0	5
Age, years *M* (*SD*)	65.88 (4.84)	28.58 (4.05)
Age, range	59–84	19–34
Education *n*		
Less than 10 years	0	0
Between 11 and 16 years	78 (58%)	90 (65%)
17 years and above	56 (42%)	45 (33%)
Political Identity *n* (%)		
Democrat	66 (49%)	80 (58%)
Republican	56 (42%)	34 (25%)
Third Party	12 (9%)	24 (17%)
Ethnicity *n* (%)		
White/European/Caucasian	127 (95%)	112 (81%)
African American or Black	6 (4%)	11 (8%)
Other	1 (1%)	14 (10%)

Design and procedure

This was a two-part study, with approximately three weeks between Time 1 and Time 2. At Time 1, participants estimated the number of electoral college votes they believed would be allocated to the Democratic, Republican, and Third Party candidates, with their estimations having to sum to 538 (i.e. the total number of electoral votes available; see Figure 1). Next, they responded to a variety of questions examining their emotional expectations regarding the election as well as political leanings. They then completed a health and demographic questionnaire and received a partial debriefing.

Three weeks later, participants were invited to complete Part 2 of the study. They were asked to recall the number of votes they had allocated to each of the candidates two weeks prior (see Figure 1). Next, they provided ratings of their emotions on election night (or were asked to recall their predicted magnitude for *certainty in expected outcome* and *valence of anticipation*) by responding to the same questionnaires presented at Time 1. The study ended with a full debriefing.

Hindsight bias measure

Hindsight bias was measured using the proximity index (Pohl, 2007), which compares two distances: the absolute distance between participants' Time 1 judgment and the feedback value (i.e. the correct answer), and the absolute distance between the Time 2 judgment and the feedback value. A negative score indicates that the participant has shifted farther away from the feedback value at Time 2 as compared to Time 1. Conversely, a positive hindsight bias value indicates that the participant has shifted closer to the feedback value at Time 2. A hindsight bias value of 0 suggests that the participants' distance from the feedback value is equal at Time 1 and Time 2. See proximity index formula below:

$$\text{Hindsight Bias}_{\text{proximity}} = |J1-F\ |-|J2-F\ |$$

Where:

J1 = Time 1 judgment
F = Feedback value
J2 = Time 2 judgment

Results

Analyses were conducted using *R* v. 4.2.0. For all analyses, we tested for main effects and interactions using the Anova function from the car package (Fox & Weisberg, 2019), and report these as F-tests. If higher-order interactions were nonsignificant, we reported the results using type II sum of squares.

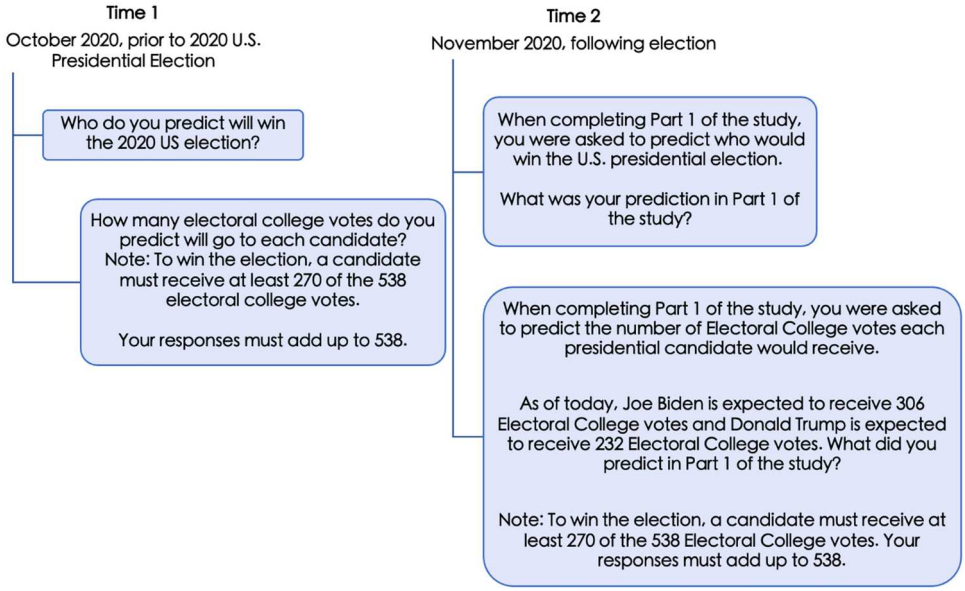

Figure 1. Overview of Election Estimation Prompts for Time 1 and Time 2.

Note. Participants indicated the number of electoral college votes they believed would be allocated to each candidate, with estimates summing 538 votes (i.e. number of votes available).

Follow-up comparisons were conducted using the emmeans package (Lenth et al., 2024), using the Tukey method of *p*-value adjustment for multiple comparisons. The reported degrees of freedom were derived using the Kenward-Roger method.

Emotion ratings

We examined participants' emotional experiences as a function of political identity, age group, and timepoint. This served as a manipulation check for using political identity as a proxy for emotion with regard to the election outcome. Refer to Table 1 for descriptive statistics and Figure 2 for data visualisation.

Positive and negative affect

We conducted two repeated measures ANOVAs with political identity and age group as the between-subjects factors, timepoint as the within-subject factor, and positive affect and negative affect as the dependent variables.

Positive Affect. There was a main effect of political identity, $F(1, 2) = 14.61$, $p < .001$, $\eta^2_p = 0.10$ and a Political Identity x Age Group interaction, $F(1, 2) = 4.97$, $p < .01$, $\eta^2_p = 0.04$. Among older adults, Democrats reported higher positive affect ($M = 4.26$, $SE = 0.19$) compared to Republicans ($M = 3.48$, $SE = 0.20$), $t(266) = 2.86$, $p = .013$ and Third Party supporters ($M = 1.79$, $SE = 0.44$), $t(266) = 5.21$, $p < .001$. Republicans reported higher positive affect than Third Party supporters, $t(266) = 3.51$, $p = .002$. All other contrasts were nonsignificant, $p \geq .13$.

Further, there was an interaction of Political Identity x Timepoint, $F(1, 2) = 11.28$, $p < .001$, $\eta^2_p = 0.08$. At Time 1, Democrats ($M = 3.57$, $SE = 0.15$) reported higher positive affect regarding election night compared to Third Party ($M = 2.17$, $SE = 0.31$) supporters, $t(266) = 4.17$, $p < .001$. Republicans ($M = 3.09$, $SE = 0.19$) likewise gave higher positive affect ratings than Third Party supporters, $t(266) = 4.16$, $p < .001$. However, Democrats and Republicans did not differ in their positive affect, $t(266) = -0.41$, $p = .912$. At Time 2, Democrats ($M = 4.08$, $SE = 0.14$) reported having higher positive affect during election night compared to Republicans ($M = 3.09$, $SE = 0.19$), $t(266) = 4.24$, $p < .001$ and Third Party supporters ($M = 2.17$, $SE = 0.31$), $t(266) = 5.22$, $p < .001$. There was no difference between Republicans and Third Party supporters, $t(266) = 2.12$, $p = .089$.

There was no main effect of age group, $F(1, 2) = 0.05$, $p = .822$, $\eta^2_p = 0.00$ or timepoint, $F(1, 2) = 0.05$, $p = .819$, $\eta^2_p = 0.00$. We found no interaction of Age Group x Timepoint, $F(1, 2) = 0.81$, $p = .369$, $\eta^2_p = 0.00$, or of Political Identity x Age Group x Timepoint, $F(1, 2) = 0.14$, $p = .869$, $\eta^2_p = 0.00$.

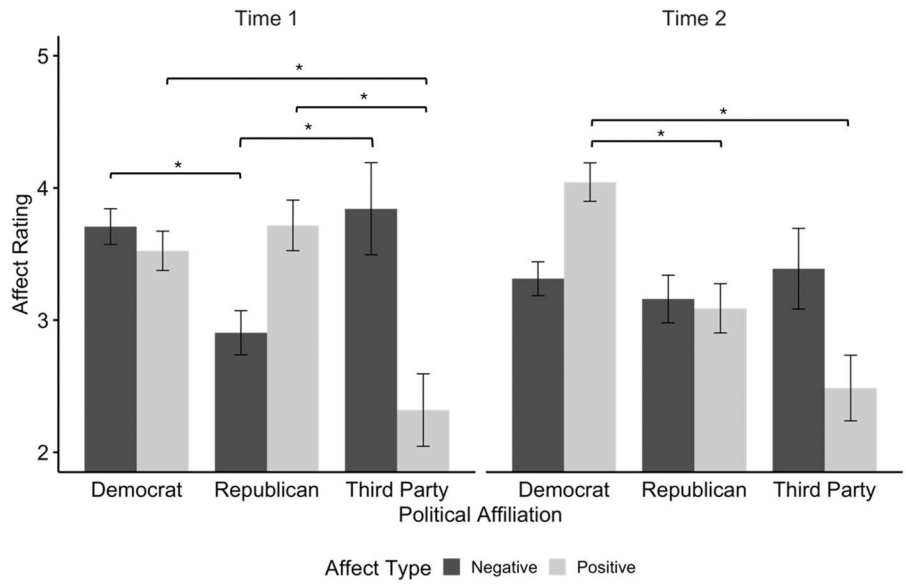

Figure 2. Positive and Negative Affect at Time 1 and Time 2.

Note. Means for positive and negative affect at Time 1 and Time 2. Error bars indicate +/ – 1 standard error of the mean. Affect ratings ranged from 1 (not at all) to 7 (extremely).

Negative Affect. There was a main effect of political identity, $F(1, 2) = 4.20$, $p = .016$, $\eta^2_p = 0.03$, and an interaction of Political Identity x Timepoint, $F(1, 2) = 5.29$, $p < .01$, $\eta^2_p = 0.04$. At Time 1, Democrats reported more negative affect ($M = 3.69$, $SE = 0.14$) compared to Republicans ($M = 2.90$, $SE = 0.18$), $t(266) = 3.46$, $p < .01$. As well, Third Party supporters reported more negative affect than Republicans, $t(266) = -3.35$, $p < .01$. All other contrasts were nonsignificant, $p \geq .49$. Further, there was an interaction of Political Identity x Age Group, $F(1, 2) = 3.12$, $p = .046$, $\eta^2_p = 0.02$. Among older adults, Third Party supporters reported higher negative affect ($M = 4.38$, $SE = 0.42$) compared to Republicans ($M = 3.00$, $SE = 0.19$), $t(266) = -3.00$, $p < .01$. All other contrasts were nonsignificant, $p \geq .07$.

There was no main effect of age group, $F(1, 2) = 1.51$, $p = .220$, $\eta^2_p = 0.01$, or timepoint $F(1, 2) = 2.81$, $p = .095$, $\eta^2_p = 0.01$. Lastly, there was no interaction of Political Identity x Age Group x Timepoint, $F(1, 2) = 0.68$, $p = .510$, $\eta^2_p = 0.01$.

In summary, the analysis of affect ratings confirms that participants' feelings about the elections depended on political identity and timepoint. Critically, before the election, Democrats and Republicans did not differ in their positive feelings regarding the election. However, at Time 2, Democrats had more positive feelings than Republicans. While age group did not moderate this effect, there was evidence for more pronounced positive and negative affect among older Democrats than among older Republicans, both before and after the election.

Hindsight bias

Hindsight bias was examined separately for each political candidate. We analyzed hindsight bias scores for Biden's and Trump's election outcomes as a function of age group, political identity, and their interaction (see Figure 3).

Biden's Outcome. We examined a scatterplot of participants' mean hindsight bias scores for Biden's election outcome, and visually identified extreme values. We removed 10 observations with a hindsight bias score of less than – 197 or greater than 200. These values fell beyond three standard deviations of the mean. The excluded participants provided Time 1 and Time 2 estimates that showed implausible differences (e.g. 500 electoral college votes predicted at Time 1, and 0 votes recalled at Time 2). The remaining participants had hindsight bias scores ranging from – 134 to 142. There was no main effect of age group, $F(1, 2) = 2.40$, $p = .123$, $\eta^2_p = 0.01$, but there was a main effect of political identity, $F(1, 2) = 3.52$, $p = .031$, $\eta^2_p = 0.02$. Republicans ($M = 11.90$, $SE = 4.03$) showed more hindsight bias than Democrats ($M = -1.39$, $SE = 3.00$), $t(256) = 2.64$, $p = .024$. However, there was no difference between Third Party supporters ($M = 7.73$, $SE = 6.56$) and Democrats, $t(256) = 1.27$, $p = .417$, or

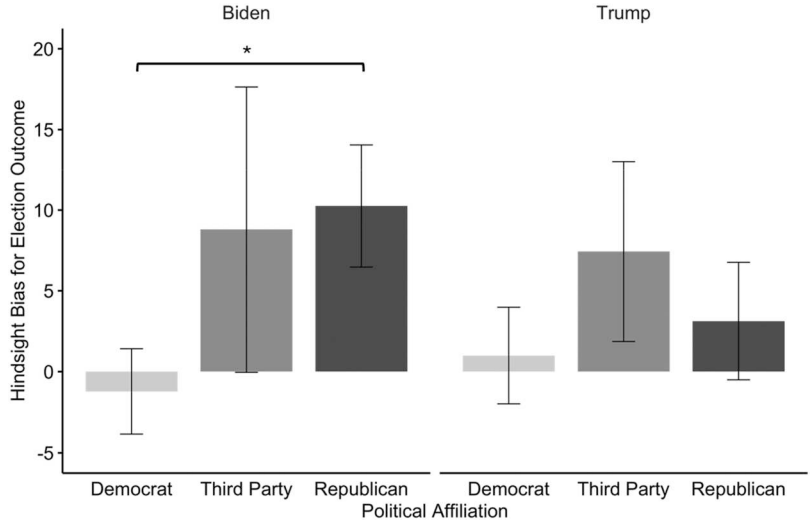

Figure 3. Hindsight Bias for Biden's and Trump's Election Outcomes.

Note. Association between political identity and hindsight bias for Biden and Trump's number of electoral college votes. Y-axis reflects hindsight bias for electoral college votes, with each unit corresponding to 1 vote. Error bars indicate +/ – 1 standard error of the mean.

Republicans and Third Party supporters, $t(256) = 0.54$, $p = .851$. The Age Group x Political Identity interaction was nonsignificant, $F(1, 2) = 0.30$, $p = .740$, $\eta^2_p = 0.00$.[1] These findings did not change when we controlled for participants' years of education.

Trump's Outcome. We examined a scatterplot of participants' mean hindsight bias scores for Trump's election outcome to identify extreme values. We removed 9 observations with a hindsight bias score of less than – 200 or greater than 170 which fell outside three standard deviations of the mean; three of these overlapped with observations removed from Biden's analyses. Remaining hindsight bias scores ranged from – 142 to 117. There was no main effect of age group, $F(1, 2) = 1.73$, $p = .190$, $\eta^2_p = 0.01$, or of political identity, $F(1, 2) = 0.46$, $p = .632$, $\eta^2_p = 0.00$. The Age x Political Identity interaction was nonsignificant, $F(1, 2) = 0.22$, $p = .799$, $\eta^2_p = 0.00$. Controlling for years of education did not affect these results.

Discussion

To our knowledge, this study was the first to investigate hindsight bias and emotion in younger and older adults in the context of a real-world event – the 2020 U.S presidential election. Republicans, experiencing negative emotions following a political loss, demonstrated more hindsight bias than Democrats when remembering their predictions for President Biden's electoral college outcome. In contrast, the two groups did not differ with respect to hindsight bias for Trump's electoral college result. Contrary to our expectation of differential effects of emotion on hindsight bias in younger and older adults, there were no significant age differences in hindsight bias.

Previous inquiries into the association between emotion and hindsight bias have yielded mixed results. Some studies have documented inflated hindsight bias for positive outcomes (e.g. Hölzl et al., 2002), while others have identified the opposite trend, with heightened hindsight bias for negative outcomes (Giroux et al., 2023; Greene et al., 2023; Groß et al., 2017; Tykocinski et al., 2002; Wann et al., 2008). The current study revealed greater hindsight bias among Republicans for President Biden's electoral college result, which represented a negative outcome for them. One potential explanation for this finding could be that Republican participants exhibited poorer memory for their own predictions following the negative election outcome (Groß & Bayen, 2022). Another plausible explanation could relate to Republican participants' motivation to safeguard self-esteem by asserting a high level of foreseeability over an uncontrollable event (i.e. the election; Roese & Vohs, 2012). While the current data are ambiguous regarding mnemonic vs. motivational contributions to hindsight bias, they suggest that negative emotions, reflecting the political leanings of individual participants, were associated with hindsight bias in the context of the 2020 U.S. presidential election.

The asymmetry in hindsight bias for Biden's and Trump's outcomes may be explained by Biden's win being the focal event, with media coverage centring on the critical cut-off of 270 votes. The media, rather than framing the presidential outcomes in terms of winners and losers, tends to singularly spotlight the elected president, rendering the losing candidate comparatively irrelevant in public discourse. Thus, although Biden's win was the flip side of Trump's loss, these two aspects of the election may not have received equal attention.

Interestingly, the current results did not reveal evidence supporting a differential impact of emotion on hindsight bias for younger and older adults. This absence of an age-related effect contradicts documented age differences in hindsight bias reported in numerous studies (e.g. Groß & Pachur, 2019). Notably, this finding diverges from Groß and Bayen's (2022) recent study which demonstrated that, compared to younger adults, older adults exhibited more hindsight bias, particularly in response to negative (vs. positive) event outcomes. The researchers explained this result in terms of the age-related positivity effect in memory, wherein older adults demonstrate enhanced memory for positive (vs. neutral) stimuli (see Reed et al., 2014).

The discrepancies between the current findings and those of Groß and Bayen (2022) may be due to methodological differences. The 2020 U.S. presidential election was a public event that held significant collective importance and attracted extensive media coverage. In contrast, the scenarios in Groß and Bayen's (2022) study related to hypothetical personal events. Participants likely retrieved their own election-related memories repeatedly in the days and weeks following the election. Socioemotional selectivity theory predicts that older adults are more likely to engage with positively-valenced information, and to disengage from negatively-valenced information. In

the context of a major public event such as a national election, selective (dis)engagement may be difficult to achieve. Similarly, the predictions individuals make in an election context are relatively public to the extent that they are shared with friends and family, making it difficult to adjust predictions post hoc. Overall, this high degree of rehearsal and exposure may have "leveled the playing field" for younger and older participants in the current study, such that age-related differences in cognitive and affective processes may have been less influential than would be the case under controlled laboratory conditions. These factors may also help explain why the current results do not align with those of most studies comparing younger and older adults' hindsight bias for numerical estimates given in response to almanac items (see Groß & Pachur, 2019). Future research should incorporate self-reported exposure to news media as a potential confounder.

Different recruitment methods may also play a role. There is accumulating evidence of systematic discrepancies in age differences from cross-sectional studies that are conducted in-person vs. online (Greene & Naveh-Benjamin, 2022). Participants in online studies are often recruited via crowdsourcing platforms, and older adults contacted through these platforms may be younger and more high-performing than older adults recruited from the community. Indeed, in the current study, there was a mean age difference of 37.3 years between the younger and older samples, whereas the mean age difference in the studies meta-analyzed by Groß and Pachur (2019) was 51.4 years. In summary, both the focus on a public event and the use of crowdsourced samples may help explain the lack of age differences in hindsight bias in the current study.

Strengths and limitations

A key strength of the current study lies in its use of a naturalistic context – the 2020 U.S. election – which enhanced personal relevance and external validity relative to laboratory studies employing fictitious and personally irrelevant vignettes or general-knowledge questions. An important take-away is that age differences in hindsight bias for emotional events, previously documented for laboratory stimuli (Groß & Bayen, 2022) and interpreted with reference to socioemotional selectivity theory, may not generalise to other types of emotional events. More broadly, the age-related positivity effect (Reed et al., 2014) may not affect judgments of public events that constrain individuals' opportunities for selective engagement. As previously noted, however, even the younger-adult literature is mixed with respect to emotion effects on hindsight bias, and the current study further contributes to this mosaic of findings. Future meta-analyses could leverage the growing literature on this topic to identify theoretically-relevant moderators of emotion effects on hindsight bias.

Given the restrictions imposed by the COVID-19 pandemic, in-person data collection was not feasible during participant recruitment. Online studies, while providing a practical alternative, introduce conditions that limit experimenter control over the study session, among other concerns. For instance, participants may search for electoral projections, potentially basing their responses on external information and thereby reducing the cognitive engagement needed to provide independent estimates. Further, younger and older adults were relatively well-matched on demographic factors (e.g. education, sex, ethnicity), but it is important to note that participants were not randomly assigned to age groups or to political groups. As such, causal conclusions about the effects of age or emotion on hindsight bias should be drawn with caution.

Emotional responses to the election were not experimentally controlled or induced, but rather assessed via participants' alignment with one of the two major political parties (i.e. Republican or Democratic party). Although an analysis of affect ratings confirmed that the two groups had different emotional experiences at Time 2 (higher positive affect among Democrats vs. Republicans), it is likely that the two groups differed on characteristics other than emotion that may have impacted their hindsight bias. For example, one study reported that expectancy violating information increases arousal, as measured with pupillometry, and that arousal in turn is associated with more hindsight bias (Sleegers et al., 2021). However, when controlling for intensity ratings (at both Time 1 and Time 2) in the analyses of hindsight bias, the pattern of results remained unchanged,[2] suggesting that arousal did not play an influential role in the current study.

The demographic composition of the sample (i.e. Western, Educated, Industrialised, Rich, and Democratic; predominantly White) limits the generalizability of the findings. Because we were prioritising the recruitment of approximately equal numbers of Republican, Democrat and Third Party supporters in

both age groups, it was challenging to impose additional demographic criteria. Political affiliation is strongly associated with race and gender in the U.S. For example, 85% of Republican supporters are White and 51% of women lean Democratic compared to 44% who support Republican (Hartig et al., 2024; Pew Research Center, 2024). Furthermore, the MTurk population leans more liberal than the general U.S (see Paolacci & Chandler, 2014). Future studies can consider recruiting more demographically representative samples to further enhance the external validity of findings.

We recruited a sample of healthy younger and older adults who did not endorse a significant health history (e.g. tumour, stroke, dementia) impacting cognition. However, the current study did not measure cognitive ability, which may influence susceptibility to hindsight bias. Individual differences in hindsight bias are an important avenue for future research.

Lastly, we did not measure facets of hindsight bias (i.e. inevitability, foreseeability and memory distortion) separately, and thus cannot speak to the strength of their respective influences on hindsight bias. As a result, the interpretation of Republicans' greater hindsight bias stemming from increased foreseeability to protect self-esteem remains speculative.

Conclusion

This study examined the associations between age, emotion, and hindsight bias in the context of the 2020 U.S. presidential election. Participants' political beliefs were related to the emotions they experienced in response to the election. Those with more negative emotions (i.e. Republicans) exhibited more hindsight bias when recalling their own predictions regarding the electoral outcome. Furthermore, this pattern was consistent across both younger and older adults. These findings contribute to the literature on affective influences in memory and judgment, suggesting that negative emotion may render people particularly susceptible to hindsight bias. The current results also suggest that laboratory findings of age differences in hindsight bias may not mirror hindsight bias for real-world events.

Notes

1. Bayesian analysis indicated that the Age x Political Identity interaction on hindsight bias supports the null hypothesis at $BF_{inc} = 0.119$.
2. Effect of political affiliation does not change when controlling for intensity, $F(1, 2) = 3.11$, $p < .05$.

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