The effects of age and political engagement on COVID-19 pandemic metamemory

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Published by Psychreg Ltd
ISSN: 2515-138X

While several recent studies have demonstrated that political attitudes can influence human behaviour during the COVID-19 pandemic, few studies have examined its role in emotion and cognition. In the present study, we examined the effects of age and political attitudes on participants' judgment of memory clarity for events related to COVID-19 in a sample of 189 MTurk participants aged 18–72. Our results showed that adults over 50 years old rated their memory for the shelter-in-place order with higher clarity than the middle (aged 30–49) and young adult groups (aged 18–29). We also found that although political beliefs (e.g., liberal vs conservative) were well represented throughout the age range of our participants, political engagement increased with age. Multiple regression analysis showed that for adults aged 30–49, the self-reported importance of mask usage significantly predicted judgement of memory clarity. However, the judgement of memory clarity for older participants was significantly driven by the perceived realness and danger of COVID-19. Judgement of memory clarity did not differ based on political beliefs. Our results, therefore, suggest that metamemory for events related to the COVID-19 pandemic may be driven by different motivational factors based on age and political engagement but not political beliefs.

Keywords: age; emotion; metamemory, pandemic; political engagement

The SARS-CoV-2 virus, which causes the novel coronavirus disease COVID-19, has created a public health crisis of epic proportions, touching almost all nations worldwide. This pandemic has resulted in an economic landscape reminiscent of the Great Depression of 1929. For this particular reason, young and older populations may react differently to the pandemic due to differences in life experiences, emotional responses, and time left to live perspectives (Carstensen, 2006). People's reactions to this pandemic have also been controversially mediated by a political atmosphere divided along traditional party lines. Therefore, we decided to take advantage of this unique opportunity to examine the effects of age and political attitudes on emotionality and people's judgement of memories related to the pandemic.

Emotion and memory

A robust body of research has demonstrated the effect of strong emotion on memory formation, with the activation of the amygdala playing a critical role in both the memory encoding and the memory consolidating phases of memory formation (LaBar & Cabeza, 2006). Strong, emotionally reinforced, flashbulb memories often form in response to public sociopolitical events, famous examples of which include the assassination of John F. Kennedy (Brown & Kulik, 1977), the death of Princess Diana (Hornstein et al., 2003), the terrorist attacks on 11th September 2001 (Conway et al., 2009; Pezdek, 2003), and the announcement of the US Presidential election results on 8th November 2016 (Krackow et al., 2019). The COVID-19 pandemic is an exciting sociopolitical event because, unlike other flashbulb memory events that predominantly occurred at a specific date, the COVID-19 pandemic has resulted in multiple consecutive events that all could have elicited emotional and flashbulb memories. These were spread over divergent dates depending on municipal leaders' political motivations to sociocultural factors such as population density, accessibility, and perceived COVID-19 risk. Therefore, in this study, we had participants rate their emotion and memory clarity for a series of shared events related to COVID-19, regardless of the time point they occurred in their local community.

Socioemotional selectivity theory and memory

Many past studies documented evidence of an age-related positivity effect in cognition; namely, older adults display a cognitive preference for positive over negative information compared to young adults (see Mather & Carstensen, 2005 for a review). For example, Charles et al. (2003) found that older adults recalled significantly fewer negative pictures than young adults in a picture memory task, while Chung (2010) found an enhanced negativity bias in young adults compared to older adults in another picture memory task. Similar positivity effects have been found in other areas such as attention, perception, and decision making (Carstensen et al., 2011). Socioemotional selectivity theory (SST) explains these results by positing that older adults are more motivated and experienced than young adults in regulating their emotional states, i.e., when time is limited, one is more likely to devote limited resources to process meaningful (often positive) information (Carstensen, 1995; Lo¨ckenhoff & Carstensen, 2004; Reed & Carstensen, 2012). Meaningfulness could differ across cultures, although research has shown that positive information is preferred over negative information primarily in Western, individualistic cultures (Chung & Lin, 2012; Fung et al., 2019; Reed & Carstensen, 2012). In the present study, we were interested in understanding how adults across the lifespan may react to the pandemic using this SST framework.

We conducted the present study in June/July 2020 and recorded participants' emotionality and judgement of their memory toward COVID-19 related events around two to three months after shelter-in-place (or stay-at-home) orders were first announced in the US. Because the shelter-in-place orders were rolled out on a state-by-state basis and the timing of such notices varied widely among states, memory for dates and details surrounding such events may not be effectively tested and compared with a national sample. Thus, we felt that it was more appropriate to evaluate participants' judgement of memory, or metamemory, rather than their actual memory of the events in the present study. There is a growing literature on the effects of age and emotion on metamemory (Castel et al., 2016; Hertzog & Dunlosky, 2010), but the literature on metamemory in applied settings is still relatively limited. The COVID-19 pandemic provides a unique opportunity to investigate this topic, especially considering the immense negative impact that the disease has had on the older population. In lab settings, both young and older adults have demonstrated an emotional salience effect, where they judge their memory for emotional information to be better than neutral information. This effect has been observed in many different paradigms, for example, ones that utilised single words (Hourihan et al., 2017), images (Tauber et al., 2016), and facial expressions (Nomi et al., 2013). Studies like these are often conducted by asking participants to judge learning (JOL) for each item in the study phase by predicting how likely they were to remember that stimulus (0 to 100%). Participants then complete a recall test, and their JOLs are evaluated against their actual memory performance. While age has a negative effect on recall, memory judgements do not seem to differ as a function of age. Tauber and Dunlosky (2012) investigated young and older adults' ability to evaluate their memory recall using JOLs for positive and negative words.

They found that ageing largely spared metamemory abilities, especially for negatively charged words. This suggests that young and older adults accurately predicted the emotional enhancement effect in the actual recall of emotional information (Tauber & Dunlosky, 2012). This finding is especially relevant, as the COVID-19 pandemic is generally perceived as a negative and traumatic global phenomenon. The similarity between meta and actual memory performance suggests that an examination of metamemory will shed light on the actual memory processing of events during this pandemic.

Political beliefs and COVID-19

Another fascinating aspect of the COVID-19 pandemic is the immense political polarisation that has characterised the responses to this crisis. Whereas the JFK assassination, 9/11, and even the 2016 Presidential election were collectively perceived as significant events by the vast majority of Americans, the COVID-19 pandemic has split along party lines, with conservatives often perceiving the event as less severe than liberals (Painter & Qui, 2020). The politicisation of the COVID-19 response may have resulted in a heightened public mood, especially regarding political beliefs (or party affiliations) and scepticism of information shared by the sources perceived as 'in the league' with the opposing party (Kawachi & Berkman, 2000; Rahn et al., 1996). Political beliefs may well inform the perceived realness of the COVID-19 threat. Information processed in relation to survival has a higher retention rate than other encoded information (Nairne et al., 2007). Therefore, political beliefs may affect stress, emotionality, and thus judgment of memory for the various collective experiences associated with COVID-19. Compliance with shelter-in-place orders was also split along party lines.

Painter et al. (2020) used geolocation data to track compliance with COVID-19 restrictions and found that residents in Republican counties are less likely to completely stay at home in compliance with lockdown orders relative to those in Democratic counties. These differences in political behaviour motivate to investigate whether the perceived realness and threat imposed by the SARS-CoV-2 virus predicts emotionality and, subsequently, judgment of memory clarity.

Political beliefs and ageing

Past studies have documented a significant positive relationship between chronological age and political engagement, in that older adults are more likely to show a higher interest in political events (Lupfer & Rosenberg, 1983). This age-related increase in political interest was attributed to variations in the information environment rather than ageing. However, although significant advances have been made in the study of emotion and ageing in the past 20 years, little has been done to investigate the influence of age-related changes in political interests or the emotional and cognitive consequences of such changes. In the present study, we investigated the effects of age and political attitudes on emotionality and judgment of memory for events related to the COVID-19 pandemic by combining theories from ageing, emotion, memory, and political influence. First, following Lupfer & Rosenberg's (1983) findings, we hypothesized that political engagement would increase across the lifespan. Second, building on the SST and metamemory literature, we predicted that memory clarity would increase with chronological age as motivation to remember events should increase with higher political engagement. Third, we explored the basis for any differences in the judgment of memory clarity for pandemic-related events among age groups.

METHODS

Participants

Participants were 181 adults, aged 18 to 72, recruited from the online survey platform Amazon Mechanical Turk (MTurk). They were 66 women (M age = 35.69) and 115 men (M age = 39.06). All participants filled out the survey on 22nd June 2020 and 1st July 2020 and were compensated $1.50 for their participation.

Materials

A survey was designed that included standard demographics questions and measured judgments on emotion and memory for the following commonly experienced COVID-19 related events: 1) shelter-in-place orders, 2) known COVID-19 infections, 3) school closures, 4) grocery shopping experience, and 5) work changes. A 1 to 7 Likert scale was used for all COVID-19 items. Participants' political attitudes were gauged using questions that measured political engagement and beliefs. Information was also collected regarding the news sources participants trusted and used.

RESULTS

We first examined bivariate correlations among variables related to participants' self-reported clarity of shelter-in-place memory because this was an event experienced by all participants in our study. As shown in Table 1, participants' self-reported clarity of this memory was significantly positively correlated with age, the impact that the order had on their lives, perceived realness of COVID-19, the perceived danger of COVID-19, their attitude toward mask usage, and their reported frequency of mask use. We found a significant negative correlation between surprise and emotionality when participants first heard of the shelter-in-place order, but a significant positive correlation between surprise and participants' ranking on the political spectrum, with higher numbers representing more right-leaning/conservative perspectives. It is important to note that we found a significant positive correlation between age and political engagement, but no significant relationship between age and ranking on the political spectrum (1 = very liberal to 7 = very conservative; see Table 1). An independent samples *t*-test revealed that participants aged 50 and above were significantly more politically engaged than participants below 50 years of age, $t(179) = 2.011$, $p = .046$, $d = 0.40$ (Figure 1). We then conducted a multiple linear regression analysis with the judgment of shelter-in-place memory clarity as to the dependent variable, and the following variables as predictors: age, emotion when participants first heard about the order, current emotion, surprise feeling when first heard about the order, participants' opinion of the US President before COVID-19, current opinion of the President, the trustworthiness of their primary news outlet, perceived realness of COVID-19, the perceived danger of COVID-19, their attitudes toward mask usage, and mask usage frequency. The model was significant, $F(15, 117) = 2.73$, $p = .001$, $R^2 = .51$. Age was found to be a significant predictor, $b = .03$, $t = 2.80$, $p = .006$, while attitudes toward mask usage was a marginally significant predictor, $b = .28$, $p = .053$. We then subset our database into three age groups to further examine the data: Young (18–30 years old, $n = 48$), middle group (31–49 years old, $n = 102$), and older group (over 50 years old, $n = 31$) and repeated our regression analysis in each age group. Participants′ judgment for shelter-in-place memory clarity differed significantly by age group, $F(2, 168) = 3.50$, $p = .03$ (Figure 2). Tukey HSD post hoc tests revealed a significant difference in the judgement of memory clarity between the young and the older groups, p = .03. All predictors mentioned above, except age, collectively predicted clarity of memory judgment for shelter-in-place for the middle group, $F(15, 60) = 2.64$, $p = .004$, $R^2 = .63$; and the older group, $F(15, 10) = 3.05$, $p = .04$, $R^2 = .91$.

Table 1
Descriptive Statistics and Correlations for Variables in Relation to the Shelter-in-Place (SIP) Order

Variable	*n*	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
Age	181	36.9	11.4	--										
SIP memory clarity	171	6.00	1.26	.213**	--									
Initial emotion about SIP	171	4.02	1.80	.073	0.34	--								
Impact of SIP	171	4.39	1.58	.028	.292**	-.079	--							
Current emotion about SIP	171	4.83	1.69	.126	.124	.500**	.011	--						
Surprise at SIP	171	3.84	2.06	-.049	.023	-.297**	.132	-.062	--					
Realness of COVID-19	181	6.35	1.32	-.058	.232**	.106	.085	.185*	-.033	--				
Danger of COVID-19	181	5.61	1.68	.031	.263**	.266**	.207**	.383**	-.071	.604**	--			
Attitude toward mask usage	143	6.19	1.55	-.075	.393**	.203*	.308**	.308**	-.084	.396**	.567**	--		
Frequency of mask usage	143	6.04	1.65	-.064	.349**	.124	.331**	.260**	-.082	.255**	.428**	.839**	--	
Political engagement	181	3.42	1.84	.144*	.070	.072	.149	.134	-.033	.037	.087	.103	.097	--
Rank on political spectrum	181	4.60	1.73	.095	-.005	-.084	-.009	-.094	.186*	-.301**	.209**	-.256**	-.257**	-.001

*$p < 0.05$, ** $p < 0.01$

Figure 1
Mean Ratings of Political Engagement in Participants Below and Above 50 years old. Error Bars Represent Standard Errors

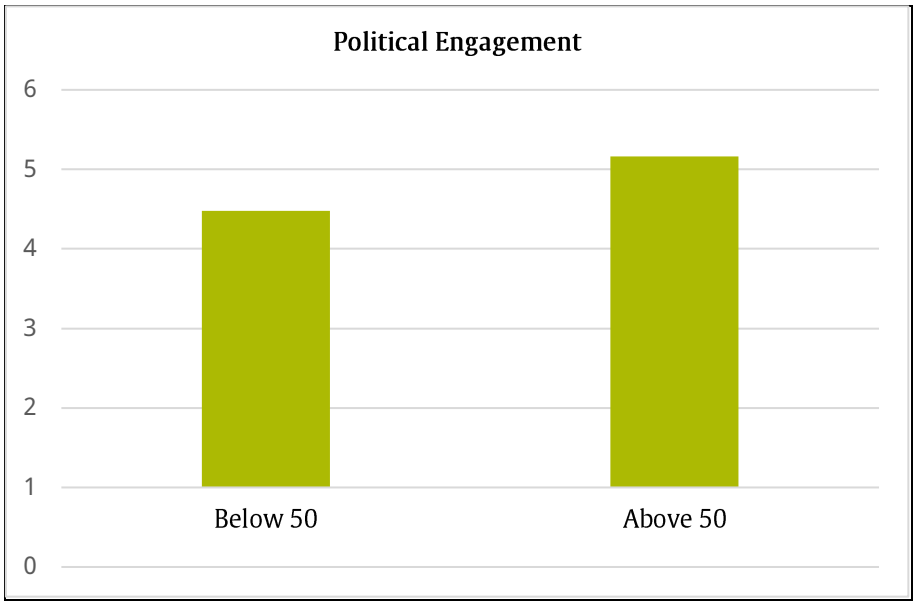
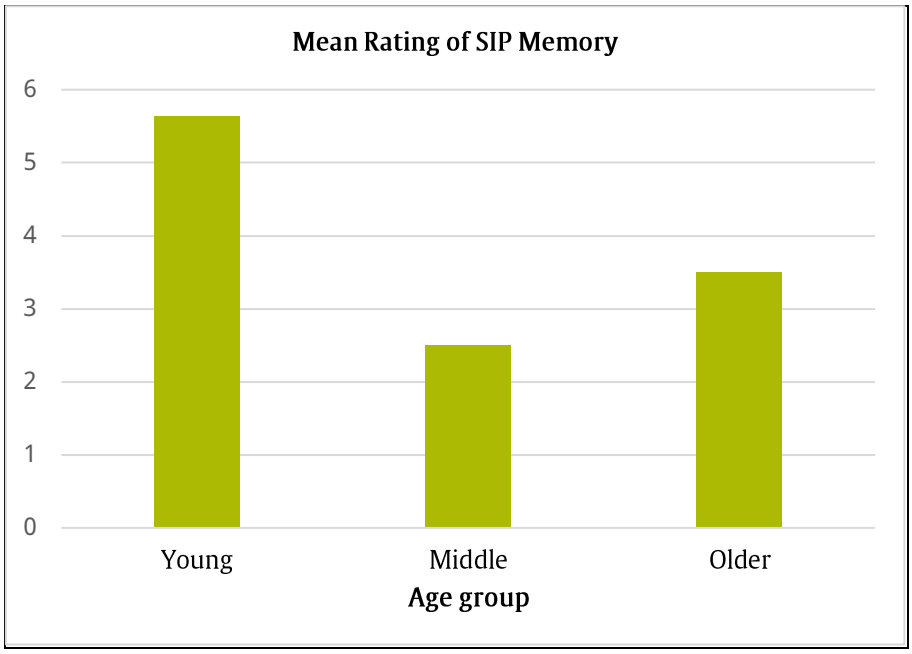


Figure 2
Mean Ratings of Shelter-in-Place (SIP) Memory Clarity for Young, Middle, and Older Groups of Participants



We found that for the middle group, attitude toward mask usage significantly predicted their judgment of shelter-in-place memory clarity, $b = .73$, $t = 3.08$, $p = .003$. However, for the older group, perceived realness and danger of COVID-19 significantly predicted judgment of this memory clarity, $b = .63$, $t = 2.86$, $p = .02$; b = −.49, $t = -2.66$, $p = .02$, respectively. We also examined our data by dividing our participants into three groups based on political beliefs: liberal, moderate, and conservative. We designated responses from 1 to 2 on the 7-point scale as liberal ($n = 70$), 3 to 5 as moderate ($n = 79$), and 6 to 7 as conservative ($n = 32$). We then conducted regression analyses with the variables mentioned above and found that the predictors collectively predicted judgment of memory clarity for moderate participants, $F(13, 58) = 2.55$, $p = .008$, $R^2 = .60$. Specifically, we found perceived realness of COVID-19 as a significant predictor of memory clarity judgment, $b = .37$, $t = 3.01$, $p = .004$. The other two regression analyses conducted with liberal and conservative participants did not yield significant models. These three groups did not differ in age, $F(2, 178) = .54$, $p = .58$, or judgement in memory clarity, $F(2, 168) = .236$, $p = .80$. Other correlation analyses showed significant negative correlations between emotion and judgement of memory clarity for grocery shopping experience, $r = -.29$, $p < .001$; experience of learning about the diagnosis of COVID-19, $r = .54$, $p = .002$; and work disruption, $r = -.41$, $p < .001$.

DISCUSSION

In the present study, we examined the effects of age and political attitudes on participants' self-reported memory clarity of the shelter-in-place order and several other COVID-19 pandemic-related events. Our results showed a significant positive correlation between age and judgement of memory clarity for the shelter-in-place order, which suggests that judgment of memory clarity increased with chronological age in our sample of adults aged 18–72. We, therefore, divided our sample into three age groups for further analyses: young group (18–30 years old), middle group (31–49 years old), and old age (over 50 years old). In subsequent multiple regression analyses, we found that their attitude toward mask usage significantly predicted our middle group's judgement of memory clarity. This suggests that participants who believed that masks were essential in preventing the spread of COVID-19 were more likely to report higher judgment of memory clarity for the shelter-in-place order. However, in the older group, perceived realness and danger of COVID-19 were significant predictors of memory clarity judgement.

Interestingly, the more real participants believed COVID-19, the higher their memory clarity rating; but the less dangerous they viewed COVID-19, the higher their memory clarity judgement. Participants who perceived COVID-19 as less dangerous might have found the shelter-in-place order to be more surprising and less consistent with their expected course of action from the government. Evidence points to surprise being a significant mediating factor of emotionality and memory clarity; for example, Chiew et al. (2020) examined participants' reactions to the 2016 US Presidential election result and found that participants who were more surprised by the outcome (both positively and negatively) showed more robust emotional responses to the event.

Overall, our data suggest that emotionality is an essential factor to consider when examining memory clarity judgment. Past research has shown a robust relationship between emotional valence and metamemory (Hourihan et al., 2017; Tauber & Dunlosky, 2012; Tauber et al., 2016). Tauber and Dunlosky (2012) found that participants rated emotional words as more likely to be remembered in a recall test than neutral words. Similar findings have been found with other stimuli such as images (Tauber et al., 2016). Our study extends these past findings by applying the phenomenon to an applied setting. Although we did not have a control event to compare our memory clarity ratings against, the significant correlations between emotionality and memory clarity judgment for different types of events demonstrate a similar conclusion as the lab-based studies cited above.

Consistent with the literature on metamemory, emotion, and ageing, our results showed a significant positive correlation between the judgment of memory clarity for the shelter-in-place order and age. For example, Tauber and Dunlosky (2012) showed that older adults showed similar judgement of learning for negative words compared to young participants, which was reflective of an emotional enhancement effect, i.e., higher memory rating negative information relative to neutral information. Furthermore, we noticed that age was significantly correlated with political engagement, suggesting that older adults were more likely to find the COVID-19 pandemic, a highly politicised phenomenon, more meaningful. According to the Socioemotional Selectivity Theory (SST), adults are more likely to process and remember meaningful information (Fung et al., 2019; Reed & Carstensen, 2012;). Therefore, our findings can also be explained by the SST framework.

We examined our results based on three age groups, keeping in mind the different cohorts that these adults represent. The youngest group, aged 18–30, did not have any significant predictors for their memory clarity judgment. This could be because of their lower rate of political engagement (see a significant positive correlation between age and political engagement in Table 1). Also, COVID-19 has been described as an illness that affected the older population more than other age groups, especially in the early months of the pandemic. This description could have potentially increased older adults' anxiety level and attention to the pandemic overall and might have had less of an effect on younger individuals.

We then found that judgment for memory clarity for participants in our middle group, aged 31–49, was mainly driven by their beliefs in mask usage in public. As mask usage is a much more practical behavioural factor than the other factors we examined in this study, this finding suggests that our middle group was the most concerned about practical changes in their lives about their cognitive processing of the pandemic. Although the frequency of mask usage was not a significant predictor, we believe that this was mainly because our study was conducted in late June/early July 2020, slightly before mask usage was strongly encouraged or even required in many cities. Our older group (aged 50 and above) found that the perceived realness and danger of COVID-19 significantly predicted their memory judgment. This finding suggests that older participants were more concerned with the mental representation of the pandemic rather than the practical changes in behaviours.

Normal fear memory consolidation is an essential component of survival that allows people to associate specific environmental cues with physical danger (Johnson et al., 2012). This has obvious survival benefits and given that the pandemic overwhelmingly adversely affects older adults, a possible explanation for the high ratings of memory clarity in older participants emerges: the older group could have experienced more significant fear-memory consolidation compared to younger participants, who might have perceived the pandemic as less threatening. Future studies may be designed to examine the influence that perceived fear of COVID-19 has on metamemory and actual memory recall of pandemic-related events.

We then examined the impact of political beliefs on metamemory and emotion by categorising our sample into three groups: liberals, moderates, and conservatives. It is important to note that the distribution of political beliefs did not differ by age, which means that our database had a good representation of people along the entire political spectrum in each age group. We conducted multiple regression analyses and only found a significant model for moderate participants, where the perceived realness of COVID-19 was a significant predictor of reported memory clarity for the shelter-in-place order. These findings suggest that perhaps judgment of memory clarity was not necessarily driven by the factors examined in this study for liberal and conservative participants. However, Table 1 clearly shows that rank on the political spectrum significantly correlated with many variables. More conservative participants were more surprised about the shelter-in-place order and rated COVID-19 to be more dangerous.

This finding is supported by both the motivated social cognition and negativity bias perspectives, which posit that conservatives are more sensitive to the threat – particularly physical threat (Crawford, 2017; Jost et al., 2003). However, negative correlations suggest that they were less likely to believe COVID-19 to be accurate, acknowledge the importance of mask usage, and wear a public mask. There was, however, not a significant correlation between these variables and judgment of memory for the shelter-in-place order. This suggests that political beliefs may not necessarily directly affect the judgement of pandemic-related memory throughout the age span we examined (ages 18–72).

CONCLUSION

Taken together, our results suggest that political beliefs may be less important than age and political engagement in predicting participants' judgement of memory clarity. Liberal and conservative participants showed similar levels of memory clarity judgement, but older adults who were more politically engaged appeared to display the highest judgement of memory clarity in our participant sample. Our findings also showed that different motivational factors drove metamemory judgements; adults aged 31-49 were more concerned about mask usage, and adults over 50 years old paid more attention to the perceived realness and danger of COVID-19. Future studies should build on these findings by examining the relationship between memory recall performance, emotionality, and metamemory measures. It would also be beneficial to examine further the underlying basis of increased political engagement with age and how this effect might differ based on sociocultural factors such as age, gender, and race.

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