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To cite this article: Angelina R. Sutin, Martina Luchetti, Damaris Aschwanden, Yannick Stephan & Antonio Terracciano (2021) Sense of purpose in life, cognitive function, and the phenomenology of autobiographical memory, *Memory*, 29:9, 1126-1135, DOI: [10.1080/09658211.2021.1966472](https://doi.org/10.1080/09658211.2021.1966472)

To link to this article: <https://doi.org/10.1080/09658211.2021.1966472>

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## Sense of purpose in life, cognitive function, and the phenomenology of autobiographical memory

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### ABSTRACT

There are individual differences in the phenomenological re-experiencing of autobiographical memories. We examine whether sense of purpose in life and cognitive function are associated with the phenomenology of a recent memory related to the coronavirus pandemic. Participants reported on their sense purpose and completed tasks that measured processing speed and visuospatial ability before the pandemic in January-February 2020 and subsequently retrieved and rated a memory related to the pandemic in July 2020 ( $N=796$ ;  $M_{\text{age}}=58.05$ ,  $SD=14.14$ , range 19-85). Participants with a greater sense of purpose reported memories that were more phenomenologically rich (e.g., more vivid, coherent, accessible), whereas cognitive function was primarily related to greater perceived accessibility of the memory but not to most other aspects of phenomenology. The pattern of associations was similar when accounting for depressive symptoms, and none of the associations was moderated by age. The present research suggests that individuals with a higher sense of purpose in life have autobiographical memories with richer phenomenology. To the extent that memories function to sustain well-being, social connections, and cognitive health, rich phenomenology may be one pathway through which purpose leads to these better outcomes.

### ARTICLE HISTORY

Received 10 May 2021  
Accepted 6 August 2021

### KEYWORDS

Memory phenomenology; purpose in life; processing speed; visuospatial reasoning; vividness

Memory phenomenology is the subjective experience of reliving an event (Rubin, 2005). Memories, for example, can be vivid or dull, emotionally intense or blunted, retrieved from the individual's own eyes or through the eyes of an observer (Sutin & Robins, 2007). These phenomenological evaluations have been associated with characteristics of the individual (Rubin & Siegler, 2004) and with downstream outcomes, such as depression (Askelund et al., 2019). Individuals higher in narcissism, for example, tend to retrieve and re-experience memories that are congruent with their grandiose self-concepts (Jones et al., 2017). Individuals suffering from depression and other aspects of distress tend to have deficits in retrieving phenomenologically rich memories (Hallford et al., 2021; Williams et al., 2007) and such deficits are a risk factor for future depressive episodes (Kleim & Ehlers, 2008). The present research addresses the relation between individual differences in two core domains of individual functioning – purpose in life and cognitive function – and the phenomenology of a personally meaningful experience in the context of a major public health crisis, the coronavirus pandemic.

### Phenomenology of autobiographical memory

It has been posited that the subjective re-experiencing of an event is what allows individuals to relive the experience and transport themselves in time (Tulving, 2005). Such phenomenology can help move the individual both forward and backward in time (D'Argembeau & Van der Linden, 2006). Several models have been developed to characterize dimensions of phenomenology (Berntsen et al., 2019; Boyacıoglu & Akfirat, 2015; Johnson et al., 1988; Sutin & Robins, 2007). Although there is some debate over the exact number of dimensions, most models include aspects of phenomenology that reflect the vividness and coherence of the memory, its accessibility, the emotional intensity of reliving the experience, and the visual perspective from which it is retrieved (either through one's own eyes or through the eyes of an observer), as well as the valence of the memory. Some models also include how individuals tend to use the memories, such as the frequency of sharing them with others and psychological distancing oneself from the event in the memory.

Memory phenomenology is a function of both the type of memory retrieved and of the person retrieving it. Recent

memories, for example, tend to have richer phenomenology (e.g., rated higher on vividness) than more remote memories (Luchetti & Sutin, 2018) and emotional memories tend to have stronger phenomenology than memories of more neutral experiences (Maki et al., 2013). However, even when participants are asked to retrieve a similar memory, there are individual differences in the subjective experience of its retrieval (Rubin, 2021). For example, personality traits have been associated with how individuals retrieve their memories (Luchetti et al., 2016; Rubin & Siegler, 2004). Individuals higher in Neuroticism tend to retrieve memories with more negative affect and less positive affect, whereas individuals higher in extraversion tend to retrieve memories that are more positive (Blagov et al., 2020), and individuals higher in conscientiousness tend to retrieve memories that are more vivid, coherent, and structured (Blagov et al., 2020; Sutin, 2008). Individual differences other than personality traits are likely to contribute to how memories are retrieved.

### Sense of purpose in life and phenomenology

Purpose in life is an aspect of eudaimonic well-being that reflects a life that is goal-oriented and driven (Ryff, 1995). Purpose in life is associated consistently with positive outcomes, including both physical and mental health outcomes (Czekierda et al., 2017). Although purpose has not been examined yet in the context of memory phenomenology, it has been associated consistently with better episodic memory, as measured by immediate/delayed word recall tasks (Sutin et al., 2021). Purpose may be associated with better episodic memory because individuals with a greater sense of purpose have healthier behavioral and clinical profiles that support better cognition (Kim et al., 2019; Kim et al., 2020), because they have better executive control (Lewis et al., 2017) that facilitates storing and retrieving information, and/or because they tend to have greater engagement in activities that supports better memory (e.g., variety of hobbies, physical activity) (Chun et al., 2016). This association demonstrates the memory abilities associated with higher purpose. This association, however, does not reflect the quality of remembered experiences.

Other aspects of psychological distress and well-being have been associated with memory phenomenology. Perhaps most work in this area has been on depression and over general memories. Individuals suffering from depression and other aspects of distress tend to retrieve memories that are general rather than specific (i.e., they refer to a summary of events instead of specific events; Williams et al., 2007). Some aspects of psychological well-being have also been associated with memory phenomenology. Individuals with higher life satisfaction, for example, report that their memories are accessible and often shared with others (Luchetti & Sutin, 2016). Further, individuals who show evidence of meaning-making within their self-defining memories have greater self-esteem one year

later (Liao et al., 2018), and memories higher in need satisfaction are likewise associated with greater well-being over time (Philippe et al., 2012). Phenomenology also has implications for interpersonal well-being. Individuals who experience their memories of relationship-related experiences as vivid, positive and emotionally intense, for example, report greater marital satisfaction (Alea & Vick, 2010). Memory phenomenology thus both reflects psychological distress and well-being and contributes to mental health. Autobiographical memories may be one window into how individuals high in purpose process their experiences.

### Cognitive function and phenomenology

Phenomenology is considered a cognitive aspect of memory retrieval (Sutin & Robins, 2007). The work on the cognitive correlates of phenomenology, however, has focused primarily on the neural underpinnings of remembrance (Folville et al., 2020) and the cognitive correlates of phenomenology among individuals with severe cognitive impairments, such as Alzheimer's disease and dementia (El Haj et al., 2019). Less work has addressed how performance on basic cognitive tasks is associated with cognitive evaluations of memories, especially among healthy individuals. One exception is the role of executive function in the retrieval of autobiographical memory with age (Piolino et al., 2010). There is evidence, for example, that better performance on executive function tasks is associated with the recall of more detailed self-defining memories (El Haj & Gallouj, 2019). This work has been done primarily in the context of aging to identify how executive function underlies memory phenomenology with age (e.g., Piolino et al., 2010; El Haj & Gallouj, 2019).

More basic cognitive functions may also contribute to phenomenology across adulthood. Processing speed is the speed at which an individual can react to information (Sweet, 2011). It is among the most basic cognitive processes that underlie more complex functions (Sheppard & Vernon, 2008). There is reason to suspect that a faster processing speed may be associated with memory phenomenology. Individuals with greater speed of processing are able to process information more quickly, an ability that may extend to the retrieval of autobiographical memory. In addition, because they react faster, they may have more cognitive capacity to retrieve greater details with their memories. Further, given that processing speed declines with increasing age (Salthouse, 2019), there may be differences in the association between processing speed and memory phenomenology across adulthood.

Visuospatial ability is another cognitive function relevant to memory phenomenology. It is the ability to manipulate mental images to draw meaningful connections between pieces of visual information (Irani, 2011). Given that the retrieval of personally meaningful memories includes a large visual component (Thakral et al., 2019), it is possible that better visual abilities would be

associated with richer phenomenology. Visual reasoning also tends to be lower at older ages (Salthouse, 2010; Van der Elst et al., 2013), and, thus, like processing speed, the associations with phenomenology may differ by age across adulthood.

## The present study

The present research sought to examine the prospective association of purpose in life and cognitive function (processing speed, visual reasoning) with memory phenomenology within the context of a significant public health crisis, the coronavirus pandemic. During the pandemic in the United States (July 2020), participants were asked to retrieve a relevant memory related to the pandemic and rate its affect and phenomenology. We examine how pre-pandemic purpose in life and cognition are associated prospectively with the phenomenology of the COVID-related memory. Given that depressed affect is associated with purpose in life (Hartanto et al., 2020), cognition (McDermott & Ebmeier, 2009), and memory phenomenology (Yeung & Fernandes, 2020), we further address whether the associations between purpose/cognition and memory phenomenology can be accounted for by depressed affect. Finally, we also test whether the associations between purpose/cognition and phenomenology vary by age across adulthood in a sample that ranges from 19 to 89 years old at baseline.

## Method

### Participants and procedure

Participants were part of a longitudinal online study of psychological, social, and behavioral factors and the coronavirus pandemic (Aschwanden et al., 2021; Sutin et al., 2020). The original design was a cross-sectional study of psychological factors and health but was reconceptualized to be longitudinal when the coronavirus pandemic hit the United States. There were four waves of data collection in total: Wave 1 was collected between January 31 and February 10, 2020 (pre-pandemic in the United States), Wave 2 was collected between March 18-29, 2020 (during the White House's 15 Days to Slow the Spread guidance), Wave 3 was collected between April 23-29, 2020, and Wave 4 was collected between July 9-22, 2020. Data for the present analyses were drawn from Wave 1 (pre-pandemic purpose in life, cognition, and covariates) and Wave 4 (collection of the self-defining memory). The original sample was stratified to be about 50% male/female and to have roughly equal numbers of participants in each of seven age bands (18-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70+). Participants were excluded from the sample if there was evidence of speeding (<5 min to complete the survey), careless responding (e.g., demographics did not match across waves), and straightlining (giving the same answers across items). There were 3,827 participants with

valid data at Wave 1. Note that the self-defining memory was collected only at Wave 4. The surveys were approved by the Institution Review Board at the Florida State University, and participants consented to participate before completing the survey. Data and syntax are available at [https://osf.io/mf7d2/?view\\_only=806bd4d6ceca46aeb0d5c5c4cc3c82d8](https://osf.io/mf7d2/?view_only=806bd4d6ceca46aeb0d5c5c4cc3c82d8).

Participants were recruited and compensated through Dynata (dynata.com) at each wave. Participants were directed to complete a Qualtrics survey administered by the Florida State University College of Medicine. Participants were included in the analytic sample if they had valid data from Wave 1 and provided a valid self-defining memory at Wave 4 (i.e., a written narrative relevant to the pandemic that was not blank or contained nonsense words). A total of 796 participants met these criteria (40.7% female;  $M_{\text{age}}=58.04$   $SD=14.14$ , range=19-85; see Table 1 for more participant characteristics). Participants with valid data at Wave 1 but without data at Wave 4 ( $n=3,031$ ) were younger ( $d=1.11$ ,  $p<.01$ ), more likely to be female ( $\chi^2=75.42$ ,  $p<.01$ ), African American ( $\chi^2=75.81$ ,  $p<.01$ ), Latinx ethnicity ( $\chi^2=59.20$ ,  $p<.01$ ), have less education ( $d=.53$ ,  $p<.01$ ), reported a lower sense of purpose in life ( $d=.42$ ,  $p<.01$ ), and scored lower on the processing speed task ( $d=.14$ ,  $p<.01$ ) and the visuospatial ability task ( $d=.28$ ,  $p<.01$ ).

## Measures

*Purpose in life.* Purpose in life was measured with the 7-item version of the Purpose in Life subscale from the Ryff

**Table 1.** Descriptive Statistics for All Study Variables

Variable	Mean (SD)/% (N)
Age (years)	58.04 (14.14)
Gender (female)	40.7% (324)
Ethnicity (Latinx)	7% (56)
Race (African American)	9.7% (77)
Education <sup>a</sup>	4.52 (1.39)
Purpose in Life <sup>b</sup>	3.78 (.74)
Processing Speed <sup>c</sup>	16.75 (6.37)
Visual Reasoning <sup>d</sup>	4.64 (2.23)
Depressive symptoms	.83 (1.32)
Memory characteristics	
Positive Affect <sup>e</sup>	2.18 (1.02)
Negative Affect <sup>e</sup>	1.94 (.88)
Vividness <sup>b</sup>	3.85 (.79)
Coherence <sup>b</sup>	3.66 (.73)
Accessibility <sup>b</sup>	4.03 (.76)
Time Perspective <sup>b</sup>	3.75 (.82)
Sensory Detail <sup>b</sup>	3.43 (.63)
Visual Perspective <sup>b</sup>	3.58 (.77)
Emotional Intensity <sup>b</sup>	3.22 (1.02)
Sharing <sup>b</sup>	3.10 (.97)
Distancing <sup>b</sup>	1.97 (.82)
Valence <sup>b</sup>	2.69 (1.32)

Note.  $N=796$ . <sup>a</sup> Education was reported on a scale from 1 (*less than high school*) to 7 (*PhD or equivalent*). <sup>b</sup> Reported on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). <sup>c</sup> Processing speed was the number of correct responses out of a total of 50.  $n=766$  due to missing data. <sup>d</sup> Visual reasoning was the number correct out of a total of 8. <sup>e</sup> Reported on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*).

Measures of Psychological Well-being (Ryff, 1989). Participants rated items (e.g., “I have a sense of direction and purpose in my life.”) on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Items were reverse-scored when necessary and the mean taken across items in the direction of greater purpose ( $\alpha=.76$ ).

**Cognitive function.** Participants completed two cognitive tasks online through the Qualtrics platform. The first task was a matching task similar to the Symbol Digit Substitution Task (Lezak, 2004). Participants were given a key that matched nine symbols with a number. Participants were then given a long list of symbols and had two minutes to match as many symbols to numbers as they could out of a total possible of 50. The score was the correct number of symbols matched in two minutes. The second task was a visuospatial ability task. Participants were given a figure with a missing piece and had to choose from a number of options to identify the correct missing piece. The score was the number of correct items out of a total possible of eight. Both tests have adequate reliability and validity (Feenstra et al., 2018; Scott et al., 2019). Participants completed these measures on a laptop computer (43.5%), desktop computer (37.6%), mobile devices (9.5%), or tablet (9.4%). There was no difference in performance on the visuospatial tasks across devices, but participants who completed the processing speed task on a laptop computer performed slightly worse ( $d=-.17$ ) and participants who completed the processing speed task on a tablet performed slightly better ( $d=.27$ ) than participants who completed the task on either a desktop computer or mobile device (no difference in performance on desktop versus mobile).

**Self-defining memory.** Participants were asked to retrieve one self-defining memory in the context of COVID-19. Specifically, participants were asked, “Please describe a memory of an experience related to COVID-19. It can be a memory of any kind of experience related to the pandemic (e.g., it can be related to health, work, relationships, education, etc.), and it can be positive or negative. It should convey an important experience that happened to you during the pandemic and something that you have thought about many times since it happened. Please write a few sentences about the experience: what happened and when, whom you were with (if anyone), and how you felt or reacted.” Participants were given a text box to write about the experience in the memory.

After writing about the experience, participants were asked to rate their affect and phenomenology associated with the memory. For affect, participants were asked, “Think about how you feel now about the experience. Please rate the extent to which the following words and phrases describe those feelings and emotions.” Participants rated 10 items for positive affect (e.g., excited, interested strong) and 10 items for negative affect (e.g., nervous, irritable, scared) from the Positive and Negative Affect Schedule (Watson et al., 1988). Items were rated

on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*) and the mean taken for positive affect and negative affect. Participants also completed the Memory Experiences Questionnaire-Short Form (Luchetti & Sutin, 2016), a 31-item measure of 10 dimensions of phenomenology: Vividness (“My memory for this event is very vivid.”), Coherence (“This memory is of an event that occurred once at a particular time and place, not a summary or merging of many similar or related events.”), Accessibility (“This memory was easy for me to recall.”), Time perspective (“My memory for the hour when the event took place is clear.”), Sensory detail (“As I remember the event, I can hear it in my mind.”), Visual perspective (“I see the experience in the memory through my own eyes.”), Emotional intensity (“My emotions are very intense concerning this event.”), Sharing (“I frequently think about or talk about this event with others.”), Distancing (“I feel like the person in this memory is a different person than who I am today.”), and Valence (“The overall tone of the memory is positive.”). All items were rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*), reverse scored when necessary, and the mean taken in the direction of the scale label.

**Covariates.** Covariates were self-reported age in years, gender identity (male versus female/transgender/other; the latter two options were separate options that were combined with female), race (African American versus other), ethnicity (Latinx ethnicity versus other) and education reported on a scale from 1 (*less than high school*) to 7 (*Ph.D. or equivalent*). Some analyses also included depressive symptoms that were measured with the two-item version of the Patient Health Questionnaire (Kroenke et al., 2003). The two items (e.g., “Over the last TWO WEEKS, how often have you been bothered by any of the following problems? - Little interest or pleasure in doing things.”) were rated on a scale from 0 (*not at all*) to 3 (*nearly everyday*) and the sum taken.

## Statistical approach

We used linear regression to examine the association between purpose in life and memory ratings. Specifically, we predicted each rating at Wave 4 from purpose in life reported at Wave 1, controlling for age, gender, race, ethnicity, and education (Model 1). We then reran the regressions controlling for depressive symptoms to determine whether depressed affect concurrent with purpose accounted for the associations (Model 2). We used the same approach to examine the association between the two cognitive measures and the memory ratings. We ran these two analyses separately for purpose in life and cognition because they are two separate domains that are likely to be of interest to researchers in different subfields. We also consider a fully adjusted model that included all of the predictor variables. Finally, we tested whether the associations varied by age by testing an interaction between age and purpose (i.e., an interaction between mean-centered age and mean-centered



purpose) and age and cognition (i.e., an interaction between mean-centered age and mean-centered cognition), controlling for the covariates. Interactions were tested separately for each dimension of phenomenology and separately for purpose and cognitive function and included the main effects as well as the interactions and covariates. Across all analyses,  $p$  was set to  $<.01$  because of the large sample size and exploratory nature of the research.

## Results

Descriptive statistics for all study variables are in Table 1. Correlations among all study variables are in Supplemental Table S1. The associations between purpose in life and phenomenology are in Table 2. Purpose in life was associated with most ratings of the memory related to the coronavirus pandemic (Model 1): Participants who were higher in purpose in life reported more positive affect and less negative affect when retrieving their memory and reported that the memory was more vivid, coherent, and accessible, with a clear time perspective and many sensory details, retrieved more from a first-person perspective, that it was shared with others, and that they did not distance themselves from it than participants who were lower in purpose in life. Purpose was unrelated to emotional intensity and overall valence. The pattern of associations was nearly identical controlling for depressive symptoms (Model 2), except that the association between purpose and less negative affect was reduced to non-significance, and the association between purpose and visual perspective was also reduced somewhat. Notably, for the other memory dimensions, accounting for depressive symptoms had little effect on the relation with purpose. In addition, depressive symptoms were largely unrelated to the phenomenology of the memory.

Table 3 shows the associations between cognition and phenomenology. There were fewer associations between the two cognitive functions and the memory ratings than for purpose in life (Model 1). Specifically, both processing speed and visuospatial ability were associated with less positive affect and greater subjective accessibility to the memory. Processing speed was also associated with less negative affect, and visuospatial ability was associated with retrieving the memory from a more first-person perspective and with less distancing from the experience in the memory. Processing speed and visuospatial ability were unrelated to other dimensions. The pattern of association was the same for processing speed if type of device used was either included as a covariate or when the sample was limited to participants who completed the task on a desktop computer or mobile phone. Adjusting for depressive symptoms did not change the pattern of associations (Model 2). Further, the pattern of associations was identical for both purpose in life and cognition when all factors were included in the same model (Supplemental Table S2).

As expected, age was associated with several dimensions of phenomenology: Relatively older individuals reported less negative affect and distancing from the event in the memory and that the memory was more vivid, coherent, accessible, and with a clear time perspective than relatively younger individuals (Table 2). Age did not, however, moderate the association between purpose and phenomenology or the association between either of the cognitive domains and phenomenology (all interaction terms *non-significant*).

## Discussion

The present research examined whether two individual difference characteristics – sense of purpose in life and cognitive function – are associated with how recent memories of a public health crisis, the coronavirus pandemic, are re-experienced. Participants higher in purpose in life retrieved memories that were generally more phenomenologically rich than participants lower in purpose, and accounting for depressive symptoms largely did not change the pattern of correlates. Somewhat surprisingly, there were fewer associations between the two cognitive functions and phenomenology. Finally, although age was associated with some dimensions of phenomenology, neither the association between purpose and phenomenology nor cognition and phenomenology varied by age.

Purpose in life has been associated consistently with better episodic memory, when measured as the number of words retrieved correctly on a memory task (Sutin et al., 2021). The present research indicates that, in addition to scoring better on objective measures of episodic memory, individuals with higher purpose in life also tend to retrieve personal memories that are phenomenologically rich. In particular, they perceive their memories to be vivid, coherent, and accessible with a clear time perspective. Such phenomenological characteristics are associated with maintaining well-being over time (Liao et al., 2018; Philippe et al., 2012) and may thus be one mechanism through which purpose sustains well-being. Memories also serve an identify function and help provide a foundation for one's knowledge about themselves (Conway & Pleydell-Pearce, 2000; Demblon & D'Argebeau, 2017). Individuals higher in purpose have a well-developed sense of self (Diehl & Hay, 2011) and strong phenomenology of important experiences in their lives may contribute to it. That is, memories are often used to give examples to the individual of themselves in the past. Strong, coherent memories that are easily accessible may provide the individual with this information quickly.

An interesting pattern emerged for the association between purpose and affect and valence of the memory. Purpose in life was associated with feeling more positive affect and less negative affect during retrieval of the memory. This pattern is consistent with both general feelings of positive and negative affect associated with

**Table 2.** Associations Between Purpose in Life and Memory Affect and Phenomenology

Predictor	Affect		Phenomenology									
	Positive	Negative	Vivid	Cohere	Access	Time	Sensory	VP	Intensity	Sharing	Distance	Valence
	Model 1											
Age	.02	-.16*	.14*	.13*	.10*	.12*	.02	.07	.03	.02	-.15*	.07
Gender	-.04	.02	.08	.02	.05	.08	.12*	.12*	.12*	.06	-.08	-.03
Ethnicity	.05	-.01	-.03	-.07	-.07	.01	.00	-.05	.05	-.02	.04	.06
Race	.15*	.03	.00	-.02	-.06	.01	-.01	-.09	-.02	-.07	.13*	.05
Education	.02	-.03	.01	-.01	.01	.02	.03	.01	-.01	.04	-.03	-.02
Purpose in life	.13*	-.10*	.19*	.13*	.18*	.20*	.10*	.11*	.06	.13*	-.15*	.01
	Model 2											
Age	.03	-.13*	.15*	.14*	.09	.13*	.03	.07	.05	.02	-.15*	.06
Gender	-.04	.01	.08	.02	.06	.07	.11*	.12*	.11*	.06	-.07	-.02
Race	.06	-.02	-.03	-.07	-.08	.02	.01	-.05	.05	-.02	.04	.07
Ethnicity	.15*	.01	.00	-.03	-.06	.01	-.01	-.08	-.03	-.07	.13*	.06
Education	.02	-.04	.01	-.01	.00	.02	.04	.00	-.01	.04	-.03	-.02
Depressive symptoms	.05	.19*	.06	.04	-.05	.05	.07	-.04	.14*	.04	-.01	-.06
Purpose in life	.15*	.00	.22*	.15*	.15*	.22*	.14*	.09	.13*	.14*	-.15*	-.02

Note. *N* = 796. Coefficients are standardized beta coefficients from linear regression. Vivid = Vividness. Cohere = Coherence. Access = Accessibility. Time = Time Perspective. Sensory = Sensory Detail. VP = Visual Perspective. Intensity = Emotional Intensity. \* *p* < .01.

purpose (Scheier et al., 2006) and that subjective well-being tends to be related to greater retrieval of positive emotions and less retrieval of negative emotions in memory retrieval (McFadden & Siedlecki, 2020). Purpose, however, was unrelated to the valence of the experience in the memory. The non-relation indicates that individuals higher in purpose were equally likely to retrieve a negative event as a positive one. This pattern suggests that regardless of the type of event retrieved, individuals higher in purpose currently feel more positively and less negatively about the experience. Purpose is associated with emotion regulation mechanisms (Stevenson et al., 2019) that help regulate their emotional lives, which may be another way in which purpose helps sustain greater subjective well-being over time.

Of note, we found a positive association between purpose and sharing. One of the basic functions of

autobiographical memories is a social one – sharing important memories helps to create intimacy and connection with others (Beike et al., 2017). This function may be one mechanism that accounts for the greater social integration of individuals higher in purpose. That is, individuals higher in purpose tend to have more social connections and are less likely to feel lonely (Steptoe & Fancourt, 2019). Their readiness to share memories of past events with others may facilitate intimacy and help forge bonds with other people (Bluck & Alea, 2011). This process may be particularly important during the time when many people are struggling with the pandemic. Such sharing may promote social connection (in person or remotely) and greater intimacy when social distancing is keeping individuals physically apart.

It is also of note that accounting for depressive symptoms had little effect on the overall pattern of association

**Table 3.** Associations Between Processing Speed and Visual Reasoning and Memory Affect and Phenomenology

Predictor	Affect		Phenomenology									
	Positive	Negative	Vivid	Cohere	Access	Time	Sensory	VP	Intensity	Sharing	Distance	Valence
	Model 1											
Age	.01	-.21*	.19*	.19*	.16*	.16*	.03	.10	.02	.04	-.20*	.07
Gender	-.03	.04	.09	.02	.06	.09	.12*	.14*	.13*	.07	-.09*	-.04
Ethnicity	.04	-.01	-.04	-.07	-.08	.00	.00	-.04	.04	-.02	.03	.05
Race	.12*	.00	.03	.01	-.01	.02	.00	-.05	-.03	-.07	.07	.04
Education	.08	-.04	.04	-.01	.02	.06	.05	.01	.00	.08	-.03	-.01
Processing speed	-.10*	-.14*	.03	.09	.11*	.03	.00	.00	-.06	-.02	-.09	.00
Visual reasoning	-.16*	-.02	.02	.05	.11*	-.03	-.02	.12*	-.02	-.02	-.18*	-.07
	Model 2											
Age	.00	-.16*	.18*	.18*	.13*	.14*	.03	.08	.04	.03	-.19*	.06
Gender	-.03	.03	.09	.02	.07	.09	.12*	.14*	.13*	.07	-.10*	-.04
Race	.05	-.01	-.04	-.07	-.08	.01	.01	-.05	.04	-.02	.03	.06
Ethnicity	.12*	.00	.03	.01	-.01	.02	.00	-.05	-.03	-.07	.07	.04
Education	.08	-.02	.03	-.01	.00	.06	.05	.00	.01	.07	-.02	-.01
Depressive symptoms	-.04	.19*	-.04	-.02	-.12*	-.06	.00	-.08	.07	-.04	.05	-.05
Processing speed	-.11*	-.12*	.03	.09	.11*	.02	.00	-.01	-.06	-.02	-.08	-.01
Visual reasoning	-.17*	-.01	.02	.05	.11*	-.04	-.02	.13*	-.02	-.02	-.18*	-.08

Note. *N* = 766 due to missing data on processing speed. Coefficients are standardized beta coefficients from linear regression. Vivid = Vividness. Cohere = Coherence. Access = Accessibility. Time = Time Perspective. Sensory = Sensory Detail. VP = Visual Perspective. Intensity = Emotional Intensity. \* *p* < .01.

between purpose and memory phenomenology. This pattern suggests that the relation between purpose and phenomenology is not due to the fewer depressive symptoms among individuals higher in purpose. Interestingly, in contrast to purpose, there were only weak associations between depressive symptoms and phenomenology. Not surprisingly, individuals with more depressed affected reported feeling more negative emotions as they retrieved the memory, and that the memory was more emotionally intense. Notably, however, depressive symptoms were not related to vividness, coherence, or accessibility. These non-relations are surprising because depression is often implicated in over-general memories and diminished phenomenology (Hallford et al., 2021; Williams et al., 2007). It might be the case that either depressive symptoms are not severe enough to interfere with phenomenology during retrieval and/or that the specific domain and time of the event reported in the memory were restrictive enough to limit the role of depressive symptoms in the phenomenology.

There were few associations between the two cognitive functions and memory phenomenology. Interestingly, both processing speed and visuospatial ability were associated with greater perceived accessibility of the memory. Processing speed, in particular, is the speed at which information can be understood and acted upon (Sweet, 2011). It is thus of note that an objective measure of processing speed was associated with the subjective perception that the memory was readily available for retrieval. Interestingly, processing speed was unrelated to the vividness of the memory. As such, individuals with faster processing speeds perceive their memories to be highly accessible, but those memories are not necessarily more vivid. This pattern is surprising considering that accessibility and vividness tend to be highly correlated (Sutin & Robins, 2007). It was also surprising that processing speed was related to feeling less of both positive and negative affect during retrieval. Individuals who can process information quickly may be less emotional when retrieving autobiographical memories.

In addition to accessibility, visuospatial ability was associated with retrieving the memory from more of a first-person perspective and distancing oneself less from the experience. Visual perspective in particular involves visual flexibility in changing the vantage point from which the event is observed (St. Jacques, 2019; Sutin & Robins, 2008). That is, in most circumstances, it is not possible to see oneself as an event is happening; the change of perspective happens in the reconstruction of the event during memory retrieval. Individuals with greater visuospatial ability appear to be more likely to correctly place themselves in the memory, much like they correctly choose the right piece to complete the missing visual image.

Similar to prior research (Luchetti & Sutin, 2018), age was associated with stronger perceived vividness, coherence, accessibility, and time perspective. There are age

differences in the neural regions that process encoded information in memory (Folville et al., 2020). Such differences may have led to differences in how purpose and particularly cognitive function is associated with phenomenology. Age did not, however, moderate the association between either purpose in life or cognition and any of the dimensions of phenomenology. Purpose in life is emerging as a strong protective factor for cognitive health (Sutin et al., 2021), particularly lower risk of dementia and other severe cognitive impairments in older adulthood (Boyle et al., 2010; Sutin et al., 2018). Stronger phenomenology may be one mechanism that protects cognitive health across adulthood. The retrieval of autobiographical memories that are vivid and accessible may help preserve memory function and reduce dementia risk.

It is important to note that participants in this study reported on a specific memory about the coronavirus pandemic. This constraint on the domain of the content may have had an effect on the pattern of associations for several reasons. First, it is a very specific memory in time and is relatively recent. Second, while all memories were related to the pandemic, there was a wide range of experiences reported in the memory, from mild annoyance for having to wear a mask to the loss of a loved one from COVID-19. Third, it was about an experience that participants may or may not have chosen to write about if the domain had been more open. The correlates may or may not have been different if a more open memory prompt had been used. For example, we had expected that processing speed and visuospatial ability would have stronger associations with more dimensions of phenomenology. Given that very few studies have examined the association between aspects of cognitive function and phenomenology, and most have examined the association with executive function (e.g., Piolino et al., 2010; El Haj & Gallouj, 2019), it is difficult to determine whether the lack of association was due to the specificity of memory or to the possibility that processing speed and visuospatial ability are less relevant to phenomenology. It is worth noting that the few associations that did emerge were theoretically meaningful – both aspects of cognitive function were associated with greater accessibility to the memory and visuospatial ability was associated with the two dimensions that have the greatest spatial elements to them (i.e., visual perspective, distancing). It will be important to extend these findings in future work to memories of more diverse experiences to determine whether the patterns for sense of purpose and cognitive function extend to phenomenology of memories of other important experiences.

The present research has several strengths, including a prospective design, a relatively large sample with a wide age range, a comprehensive measure of phenomenology, and the inclusion of cognitive tasks. There are also some limitations to consider. First, we only asked participants to recall one autobiographical memory, so we could not examine whether there were similarities or differences



across domains. Second, attrition between wave 1 and wave 4 was relatively high. This attrition is due, in part, to the change in study design from cross-sectional to longitudinal (i.e., participants agreed originally to a short, one-time only survey, they did not commit to longitudinal participation). Third, we only had measures of two basic cognitive functions. Although we consider the cognitive measures a strength, it is likely that other more complex cognitive functions, such as executive function, may have more consistent correlates with phenomenology. Future research would benefit from a more comprehensive measurement of cognition. Despite these limitations, the present research indicates that a greater sense of purpose in life is associated with retrieving phenomenologically rich memories of a recent experience, whereas the association of cognitive function and phenomenology is theoretically meaningful but more limited.

### Disclosure of interest

The authors have no conflicts of interest to report.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

### Funding

Research reported in this publication was supported by the National Institute On Aging of the National Institutes of Health under Award Number [R01AG074573]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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