Effects of Academic and Social Engagement on Episodic Memory in Young Adults

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ABSTRACT

Research on older adults has shown that those who are busier and live a more engaged lifestyle show cognitive benefits versus those who are less busy. Episodic memory, in particular, tends to show the largest relationship to busyness in older adults. However, whether this relationship exists in young adults is still unknown. In Study 1, college-age participants completed an engagement questionnaire, a word pair association test, a face-name association test, and other measures of stress and busyness. Study 2 replicated the procedure of Study 1 and additionally examined the impact of alcohol use and sleep deprivation. Contrary to hypotheses, both studies indicated that neither academic nor social engagement was significantly related to episodic memory in young adults. We propose that young adults may generally be busier than older adults and therefore less susceptible to the influence of engagement.

1   INTRODUCTION

Busyness, or the state of being busy, can be defined as a great deal of scheduled activity in a short period of time (Levine, 2005). The perceptions and impacts of busyness depend on culture. In the United States and in other "busy," industrialized countries, greater busyness can imply importance or higher social status (Gershuny, 2005) or even cause someone to walk more quickly than their less busy counterparts (Levine, 2005). Similarly, busyness in industrialized nations simultaneously implies that time is being wasted if one is not busy (Levine, 2005) and may create more problems by causing stress (Levine, 2005; McEwen, 2006). Engagement, on the other hand, is the more positive counterpart to busyness. It implies far less stress and often includes social interaction (Festini at el., 2016; Park et al., 2014).

Both busyness and engagement have been found to have cognitive impacts, and research suggests that they could improve cognitive outcomes for aging adults. Festini at el. (2016) found that in adults aged 50–89, greater busyness was associated with faster processing speed, better working memory, better episodic memory, better reasoning, and better crystallized knowledge, even after controlling for age. The largest effect of busyness was on episodic memory specifically. Similarly, in an experimental manipulation, Park et al. (2014) found that, compared to participants that were randomly assigned to complete nonintellectual activities, participants assigned to be productively engaged showed greater improvements in episodic memory, regardless of whether they engaged with other people. Like the Festini at el. (2016) study, the Park et al. (2014) study included older adults ranging from 60 to 90 years of age.

Little research has been conducted on the cognitive impacts of engagement or busyness in young people, however. Studies of engagement in younger adults have primarily focused on factors or programs that can influence or increase student engagement (Brown et al., 2014; Navarro et al., 2019; Wong & Kaur, 2018). The current study seeks to fill the gap in the literature by examining the relationship between engagement/busyness and cognitive performance in undergraduates. We focus on episodic memory specifically due to its prevalence in the older adult engagement literature.

Since a large part of college-age young adults' time is spent in school and otherwise pursuing academic endeavors, in comparison to older adults who spend far less time engaged in academic activities, we examined two types of engagement in the current study. The first, academic engagement, refers to time spent in class, completing classwork, or working towards career-oriented goals. The second, social engagement, refers to time spent with friends, either electronically or in-person, or time spent pursuing non-academic goals (i.e., earning a living). Correspondingly, we examined two types of episodic memory: verbal memory, which is often required for academic learning, and face-name memory, which is often utilized in social settings. Furthermore, the majority of American college students face moderate to high levels of stress (American College Health Association, 2020), a factor of college life that may uniquely affect students' memory (Line at al., 2020), so we examined this construct as well.

We hypothesized that greater academic engagement would be associated with better verbal memory as indicated by higher scores on a word-pair association test, and that conversely, greater social engagement would be associated with greater associative face-name memory as indicated by higher scores on a face-name association test. If there is no relationship between busyness and stress in young adults, then we hypothesized that greater busyness would be associated with higher scores on both tests, similar to what has been found in the research on older adults (Festini at el., 2016; Park et al., 2014). However, if greater busyness is associated with greater stress, we hypothesized that greater busyness would be associated with lower scores on both memory tests.

2   STUDY 1

Method

Participants   A total of 62 undergraduates were recruited through flyers and emails from the University of Tampa (90% female, $M = 20.14$, $SD = 1.52$). Any participants that indicated that they were not enrolled in a college or university, were younger than 18 years of age, or had pre-existing cognitive or learning disabilities that might affect their memory (e.g., Attention Deficit-Hyperactive Disorder) were not allowed to participate in the study. Participants were given a $10 gift card as remuneration for participation.

PROPERTY-SUBJECT

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Fig. 1. Word Pair Association Task Example. Word pair stimulus example (top) and corresponding test example (bottom).

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Fig. 2. Face-Name Association Task Example. Face-name stimulus example (top) and face-name test example (bottom)

Materials Verbal memory was tested with a word-pair association test. Words for the word pairs were generated from the MRC Psycholinguistic Database (`https://websites.psychology. uwa.edu.au/school/MRCDatabase/mrc2.html`). Each word was a noun and had 4–8 letters, 2–4 syllables, a Kucera-Francis written frequency rating from 150 to 300, a familiarity rating from 100–700, and a concreteness rating from 350–700. Using the first 40 words provided by the MRC database, 20 pairs were randomly generated. For any pairs that were semantically related, one word was swapped with the next word from the list (e.g., MILITARY-SOLDIER was switched to MILITARY-ISLAND) to control for the impact of semantic association on memory. Similar verbal paired-associates tasks have been used previously to measure verbal memory (Lau et al., 2018; Tucker & Fishbein, 2008). See Figure 1 for a Task diagram.

Faces came from (Minear & Park, 2004) and were selected to reflect a range of races, ethnicities, and genders, as well as represent an age range similar to that of the participant group. As a result, the faces consisted of three Asian women, three Asian men, three black women, three black men, one Hispanic woman, one Hispanic man (fewer Hispanic faces were selected due to a limited amount available within the desired age range), three white women and three white men, all between the ages of 18 and 30. Similar face-name associate tasks have been used previously to measure face-name memory (Festini et al., 2013).

The corresponding names were the top 10 female and top 10 male names from the Social Security Administration's (2019) list of the most popular baby names of the 1990s. Names were chosen from this decade to match the decade in which participants were most likely to have been born to control for familiarity of names. See Figure 2 for a depiction of the face-name task.

We scored the word pair and face-name association tests by calculating the percentage of words and names correctly recalled. Misspelled words and names were accepted as long as they reasonably approximated the correct answer (i.e., it was apparent that the participant had attempted to spell the answer correctly).

Measures We created an engagement questionnaire to measure the degree to which college students are academically and socially engaged. Beyond collecting basic demographic information about the types and difficulty of classes participants were taking, the questionnaire asked participants to rate the frequency with which they engage in or perform certain activities on a scale from 1, "Never," to 5, "Very Frequently." Each item on the questionnaire was either an academic activity, such as "Attend class" or "Participate in an organization with strict academic requirements (e.g., Honors Program)", or a social activity, such as "Use social media" or "Work at a job not related to your major or academic

interests." Overall, there were 12 academic engagement items, 12 social engagement items, and 6 neutral items not related to either construct that were not included in the analyses (e.g., "Play a collegiate sport," "Relax alone," and "Perform household chores"). Social engagement scores were calculated by adding up ratings for the social engagement questions on the engagement questionnaire and academic engagement scores were calculated by adding up participants' ratings for the academic engagement questions, such that a higher score meant greater engagement in either category. Participants were identified as "socially engaged" if their social engagement score was higher than the median for social engagement, and likewise, participants were identified as "academically engaged" if their academic engagement score was higher than the corresponding median. See Appendix A for full questionnaire.

The Martin-Park Environmental Demands (MPED) Questionnaire (Martin & Park, 2003) was included as a general measure of busyness. Items on the MPED include questions such as "How often are you so busy that you miss your regular meal times?" or "How often do you have too many things to do each day to actually get them all done?" Participants answer the questions on a scale from
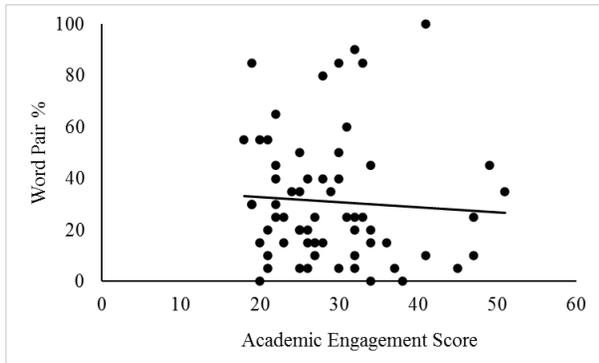
Fig. 3. Academic Engagement and Word Pair Association Scores in Study 1. Nonsignificant correlation between academic engagement and verbal memory in Study 1, $r(62) = -.064$, $p = .623$.
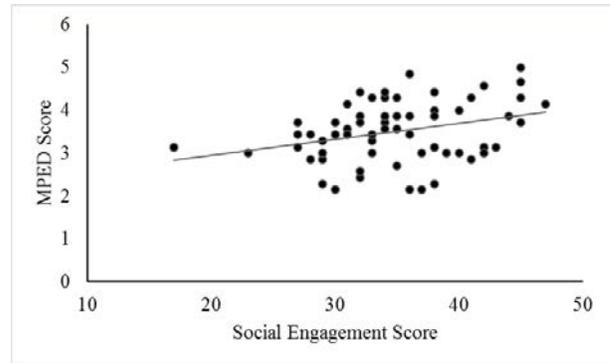

Fig. 5. Social Engagement and MPED Scores (Busyness) in Study 1. Significant correlation between social engagement and busyness in Study 1, $r(62) = .297$, $p = .020$.
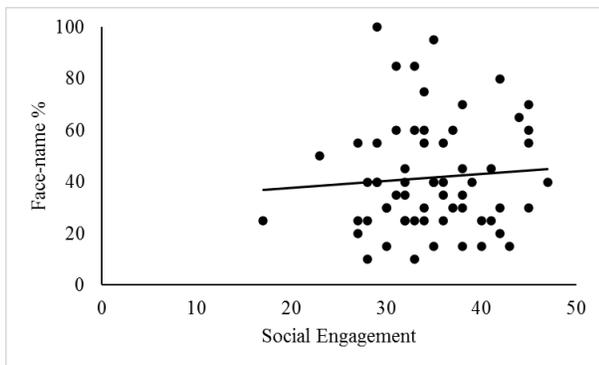

Fig. 4. Social Engagement and Face-Name Association Scores in Study 1. Nonsignificant correlation between social engagement and face-name memory in Study 1, $r(62) = .074$, $p = .568$.
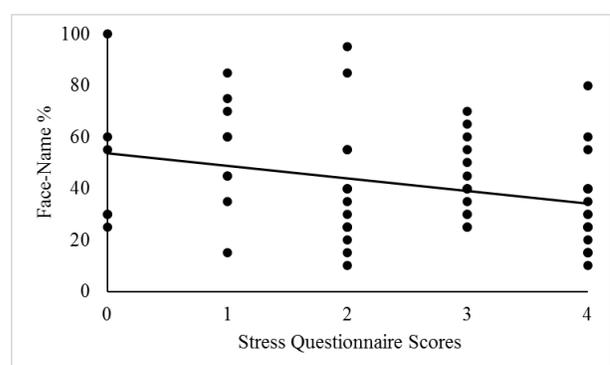

Fig. 6. Stress Questionnaire and Face-Name Association Test Scores in Study 1. Significant correlation between stress and face-name memory in Study 1, $r(62) = -.302$, $p = .017$.

1, "Never," to 5, "Very Often," such that a higher overall score indicates greater busyness.

In addition, the Perceived Stress Questionnaire (PSQ) (Levenstein et al., 1993) and the Physical Symptoms of Stress section of the Stress Questionnaire (Schneider et al., 1995) were included. For both, a higher overall score indicates greater stress. The PSQ includes statements such as "You feel frustrated" and "You are full of energy," and it is scored on a scale from 1, "Almost Never," to 4, "Usually." The items that we used from the Stress Questionnaire included questions such as "Are you having trouble concentrating or getting organized?" or "Do you get tired easily?" These questions were yes-no questions, with yes scored as "1" and no scored as "0."

Procedure The study was administered electronically via Qualtrics. Participants provided informed consent as approved by University of Tampa IRB and were instructed to move to a quiet location to complete the study. To familiarize them with the task, participants were presented with instructions, sample word pairs, and an example of how they should input their answers. For the study itself, twenty word pairs were then presented one at a time for eight seconds each, in a randomized order. After seeing all word pairs,

participants were presented with a list of the first words of each pair (one-at-a-time) and given the chance to type the associated word. Face-name pairs were then presented in a similar manner, with participants seeing the faces at test and being given the chance to type in the corresponding name. Participants were then prompted to complete the engagement questionnaire, the MPED, the PSQ, and Stress questionnaire. Basic demographic information (e.g., age, GPA) was collected before debriefing.

Results

To test our hypotheses, we calculated correlations among all of the variables of interest (i.e., both types of memory, both types of engagement, and stress). Significance was based on an alpha level of .05. See Table 1.

Scores on the word-pair association test were significantly positively correlated with scores on the face-name association test, $r(62) = .536$, $p < .001$, such that participants with better verbal memory tended to have better face-name memory. This indicated that certain participants showed better episodic memory in general, regardless of the type of test. Similarly, participants who were

more academically engaged tended to be more socially engaged, $r(62) = .326$, $p = .010$, showing a pattern of general engagement, regardless of engagement type.

Academic engagement was not correlated with word pair association scores, $r(62) = -.064$, $p = .623$ (see Figure 3), or face-name association scores, $r(62) = -.004$, $p = .976$. Likewise, social engagement was not correlated with face-name association scores, $r(62) = .074$, $p = .568$ (see Figure 4), or word pair association scores, $r(62) = -.183$, $p = .154$. Thus, in younger adults, engagement was not related to episodic memory.

To further examine this effect, independent samples t-tests were run comparing memory in participants with high engagement scores to those with low engagement scores, based on median splits. For social engagement, an independent sample t-test showed no significant difference in scores between participants that were socially engaged (by having a score higher than the median) and those that were not on the word pair test, $t(55) = 1.219$, $p = .228$, or the face-name test, $t(55) = -.197$, $p = .845$. Similarly, there was not a significant difference in scores between participants that were academically engaged (by having a score higher than the median) and those that were not on the word pair test, $t(60) = -.638$, $p = .526$, or the face-name test, $t(60) = -.059$, $p = .953$. Hence, there was no observed relationship between engagement and episodic memory in younger adults.

Social engagement scores were significantly positively associated with busyness, $r(62) = .297$, $p = .020$, such that participants that were more socially engaged were busier. Academic engagement scores were marginally associated with busyness, $r(62) = .246$, $p = .056$. When academic scores were split relative to the median, the academically engaged group showed higher levels of busyness, $r(62) = .259$, $p = .044$.

Participants that reported more busyness also reported more stress. Busyness was significantly positively associated with both stress questionnaires, PSQ: $r(61) = .609$, $p < .001$; SQ: $r(61) = .304$, $p = .017$. However, busyness was not significantly associated with scores on the word pair association test, $r(61) = -.071$, $p = .585$, or scores on the face-name association test, $r(61) = .037$, $p = .777$. Less stress (as indicated by lower scores on the Stress Questionnaire) was associated with superior face-name memory, $r(62) = -.302$, $p = .017$ (see Figure 5), but not with greater verbal memory, $r(62) = -.196$, $p = .189$. Scores on the PSQ were not significantly correlated with face-name memory, $r(62) = -.081$, $p = .53$, or verbal memory, $r(62) < .001$, $p = .997$.

Discussion

Our main hypotheses were not confirmed in Study 1. Greater academic engagement was not associated with greater verbal memory, nor was greater social engagement associated with greater face-name memory. Participants instead seemed to show a general level of engagement in that those who were academically engaged were socially engaged and vice versa, and those who were not academically engaged were also not socially engaged and vice versa. They also seemed to show a general level of memory accuracy, in that those who scored well on the word pair test scored well on the face-name test and vice versa, and those who scored poorly on the word pair test also scored poorly on the face-name test and vice versa.

The results of Study 1 demonstrated several patterns regarding stress, busyness, and memory. Undergraduates that were busier were also more stressed, and those that were more stressed showed worse face-name memory. Furthermore, participants who were more socially engaged were busier, but this busyness was not related to face-name memory scores. This result is contrary to what is seen in older adults, who experience improvements in memory due to greater social interaction (Festini at el., 2016; Park et al., 2014).

The present study demonstrated that the relationship between social engagement and episodic memory is different in young adults than in older adults. In young adults, engagement is not related to better memory, as it is in older adults. Instead, in younger adults, engagement is associated with greater busyness, and greater busyness is associated with greater stress.

t is possible that young adults show different patterns than older adults because younger adults may perform other behaviors that reduce the benefits of engagement. For instance, social engagement could be related to higher levels of alcohol use and sleep deprivation in young adults. Greater alcohol use and sleep deprivation, which are well-known to have negative cognitive impacts (Acheson et al., 2006; Kim et al., 2011), may be preventing social engagement from having the positive influence that is seen in older adults. We examine this possibility in Study 2.

3 STUDY 2

Although young people in college do not generally experience the negative impacts of aging on their cognitive performance, they may experience unique life stressors that could exert influence on their memory, such as sleep deprivation and alcohol use. Based on the results of Study 1, we questioned whether social engagement may be related to higher levels of alcohol use and sleep deprivation in young adults, which can have effects on memory. Research with medical students suggests that greater sleep deprivation is associated with greater stress and impaired learning (Ding et al., 2019; Kim et al., 2011). A study by Acheson et al. (2006) found that college-age young adults (age 21–24) experience greater memory impairments due to alcohol use than adults aged 25–29 years, a finding that has been similarly observed in experimental studies on adolescent rats (Pyapali et al., 1999). This indicates that memory in adolescents and young adults may be more susceptible to the effects of alcohol than older adults.

Study 2 seeks to replicate the findings of Study 1, as well as explore whether sleep deprivation and alcohol use are related to social engagement and episodic memory in undergraduates. We hypothesized that both greater sleep deprivation and greater alcohol use would be associated with greater social engagement and worse memory.

Method

Participants   A total of 49 undergraduates were recruited through flyers and emails from the University of Tampa (87.8% female, $M = 21.78$, $SD = 5.68$). The same exclusion criteria from Study 1 applied to Study 2 that disqualified certain individuals from participating. Any participants that had participated in Study 1 were asked to refrain from participating in Study 2. Participants were given a $10 gift card as remuneration for participation.

Variables	Word-pair association	Face-name association	Academic Engagement	Social Engagement	Busyness	PSQ	SQ	Sleep Deprivation
Word-pair association	1.000 1.000							
Face-name association	.536** .541**	1.000 1.000						
Academic Engagement	-.064 -.057	-.004 .013	1.000 1.000					
Social Engagement	-.183 -.117	.074 .061	.326** .424**	1.000 1.000				
Busyness	-.071 -470**	.037 -.272	.246 .108	.297* .206	1.000 1.000			
PSQ	<.001 -.361*	-.081 -.174	.102 -.088	.210 .206	.609** .626**	1.000 1.000		
SQ	-.169 .158	-.302* .247	.188 -.223	.161 -.032	.304* .171	.579** .248	1.000 1.000	
Sleep deprivation	– -.080	– -.135	– -.396**	– -.187	– .411**	– .475**	– .544**	– 1.000
Attitude towards alcohol	– .067	– -.096	– -.270	– -.059	– .111	– .062	– .223	– .295*

Table 1.

Materials Study 2 utilized the exact same word pairs and face-name pairs as Study 1.

Measures The engagement questionnaire, MPED, PSQ, and Stress Questionnaire were used in Study 2 just as they were used in Study 1. In addition, the Perceived Peer Drinking Norms Questionnaire (PPDN) (Park et al., 2009) was administered to measure alcohol use. We measured peer norms and permissiveness towards drinking as a way of approximating alcohol use due to some participants' being younger than the legal drinking age, as permissiveness predicts alcohol use (Sheppard et al., 2016). The PPDN includes questions like, "How do most of your friends feel about drinking?" which was measured on a scale from 1, "Very Negatively," to 5, "Very Positively," and questions like, "How many of your close friends drink alcohol?" which was measured on a scale from 1, "None," to 4, "All." A high score on the PPDN indicates more permissiveness towards alcohol use. We used the Sleep Questionnaire to measure sleep deprivation (Kim et al., 2011). The Sleep Questionnaire includes questions like, "Do you think your sleep is sufficient?" which is answered on a scale from 1, "Completely Sufficient," to 5, "Highly Insufficient," or "How often do you feel tired during the day at work?" which is answered on a scale from 1, "Never," to 5, "Almost Always or Every day." A high score indicates worse sleep.

Procedure Study 2 followed the same procedure as Study 1, with the addition of the PPDN and the Sleep Questionnaire after the stress questionnaires and before the collection of demographic information. Study 2 was also administered via Qualtrics.

Results

Statistical analyses for Study 2 were conducted in a manner similar to Study 1, with the addition of sleep scores and permissiveness towards alcohol added to the correlational analyses. See Table 1.
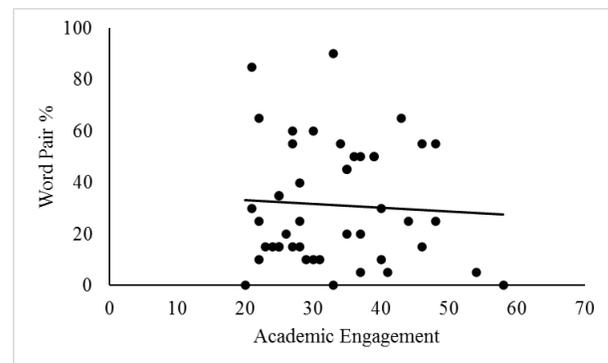

Fig. 7. Academic Engagement and Word Pair Association Scores in Study 2. Nonsignificant correlation between academic engagement and verbal memory in Study 2, $r(46) = -.057$, $p = .704$.

Several of the findings from Study 1 were replicated in Study 2. Participants in Study 2 also exhibited similar episodic memory performance across both assessments, in that greater scores on the word pair test were associated with greater scores on the face-name test, $r(46) = .541$, $p < .001$. Further, general engagement scores were concordant, in that greater academic engagement was associated with greater social engagement, $r(46) = .424$, $p = .003$.

As with Study 1, in Study 2 academic engagement was not correlated with word pair association scores, $r(46) = -.057$, $p = .704$ (see Figure 6), or face-name association scores, $r(46) = .013$, $p = .934$. Social engagement was not correlated with face-name association scores, $r(46) = .061$, $p = .686$ (see Figure 7), or word pair association scores, $r(46) = -.117$, $p = .440$.

Greater busyness was associated with greater stress, similar to Study 1, but only the PSQ was significant this time. That is,
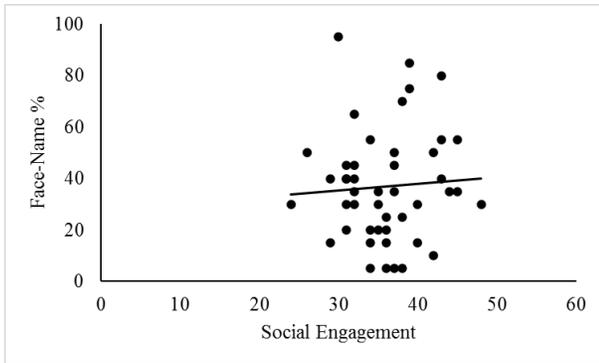
Fig. 8. Social Engagement and Face-Name Association Scores in Study 2. Nonsignificant correlation between social engagement and face-name memory in Study 2, $r(46) = .061$, $p = .686$.
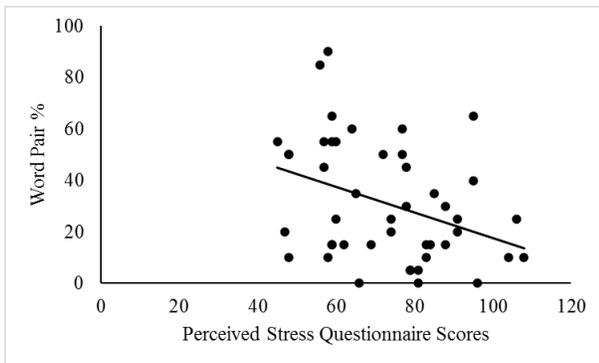

Fig. 9. Perceived Stress Questionnaire and Word Pair Association Scores in Study 2. Significant correlation between perceived stress and verbal memory in Study 2, $r(46) = -.361$, $p = .014$.

higher levels of busyness were significantly positively associated with higher scores on the PSQ, $r(46) = .626$, $p < .001$, but not the Stress Questionnaire, $r(46) = .171$, $p = .257$. Busyness was not significantly associated with face-name memory, $r(46) = -.272$, $p = .067$.

Study 2 also showed a few patterns that were contrary to what was seen in Study 1. Greater busyness was associated with worse verbal memory, $r(46) = -.470$, $p < .001$, which was not observed in Study 1. Furthermore, less perceived stress was associated with greater verbal memory, $r(46) = -.361$, $p = .014$ (see Figure 8), whereas Study 1 showed greater face-name memory in the presence of less stress. Social engagement was not associated with busyness, $r(46) = .206$, $p = .170$, unlike Study 1, which showed that social engagement was associated with greater busyness.

Sleep deprivation (worse sleep) was not associated with social engagement, $r(46) = -.187$, $p = .214$, word pair association scores, $r(46) = -.080$, $p = .597$, or face-name association scores $r(46) = -.135$, $p = .372$. Likewise, more permissive attitudes towards alcohol were not associated with social engagement, $r(46) = -.059$, $p = .696$, word pair association scores, $r(46) = .067$, $p = .657$, or face-name association scores, $r(46) = -.096$, $p = .527$. Worse sleep

was associated with less academic engagement, $r(46) = -.396$, $p = .006$, but greater permissiveness towards alcohol was not associated with academic engagement, $r(46) = -.270$, $p = .069$.

Intuitively, worse sleep was associated with greater busyness, $r(46) = .411$, $p = .005$, greater stress, PSQ: $r(46) = .475$, $p = .001$, SQ: $r(46) = .544$, $p < .001$, and more permissive attitudes towards alcohol, $r(46) = .295$, $p = .047$.

Discussion

Study 2 replicated many of the findings from Study 1 that showed that engagement, both social and academic, is not associated with episodic memory in young adults. In Study 2, however, social engagement was no longer correlated with busyness, as it was in Study 1, and busyness was associated with worse verbal memory in Study 2 but not Study 1.

Greater stress as measured by the PSQ was once again associated with greater busyness, but the association between busyness and scores on the Stress Questionnaire was no longer significant. There is an association between stress and busyness, and it seems that in general, less stress is associated with better memory. Study 1 found that less stress was associated with greater face-name memory, whereas Study 2 found that less stress was associated with greater verbal memory.

Contrary to our hypothesis, Study 2 found that although worse sleep was associated with lower academic engagement, social engagement was not associated with worse sleep or permissiveness towards alcohol. Furthermore, neither sleep deprivation nor permissiveness towards alcohol were associated with memory.

4   GENERAL DISCUSSION

The overall purpose of the current project was to examine whether greater engagement was associated with better episodic memory in young adults, based on findings of cognitive benefits in busy older adults (Festini at el., 2016; Park et al., 2014). Across two studies, participants completed an engagement questionnaire, a word pair association test, and a face-name association test, among other measures. Results indicated that, unlike their older counterparts, in college-age younger adults, engagement was unrelated to episodic memory. Less stress was associated with better memory overall; however, the specific association between stress and memory was inconsistent across both studies. Although both studies found that less stress was associated with better episodic memory; Study 1 showed a negative correlation between stress and face-name memory, whereas Study 2 showed a negative correlation between tress and verbal memory. Overall, higher levels of engagement were not related to better episodic memory in young adults, and more research will be needed to explore why this may be the case.

One potential explanation is that because, on average, younger adults have been found to be busier than older adults (Festini et al., 2019), the impact of engagement on memory in young adults was minimal due to a limited range of busyness in younger adults as compared to older adults. That is, because young people tend to show greater busyness and engagement than older adults (Festini et al., 2019), the effects of engagement will be weaker in young adults because high levels of engagement are observed in most young participants. Engaged students were engaged in both academic and

social activities and did not seem to show a preference for one form of engagement over the other.

Although the present study included two independent samples of participants, there were several limitations. For instance, both studies used relatively small, mostly female convenience samples from one university, and therefore, the results should be interpreted cautiously. Furthermore, the data were analyzed using correlations to determine whether experimental work is warranted, so causal or predictive conclusions cannot be drawn.

Future experimental research could consider manipulating college students' sleep and analyzing whether academically engaged students respond differently when their memory is tested. The impact of other variables on episodic memory, such as major, year in school, or academic and social performance (e.g., other students' perceptions of a participant), as well as different measures or types of memory should be considered.

5 CONCLUSION

Engagement was not related to episodic memory in younger adults, which is contrary to findings in older adults (Festini at el., 2016; Park et al., 2014). Nevertheless, the current study revealed interesting associations between several variables, indicating that busyness, engagement, and cognition have a more complicated relationship in young people than in older adults. Engagement does not seem to have an impact on episodic memory in young adults. One possible explanation is that young adults are generally busier than older adults (Festini et al., 2019), and as a result, engagement has less influence on their memory. However, stress does appear to impact memory in young adults. Future research into this relationship could potentially help guide college students, who are already very busy, in improving their memory by lowering their stress.

REFERENCES

Acheson, S. K., Stein, R. M., & Swartzwelder, H. S. 2006. Alcoholism: Clinical and Experimental Research, 22(7)

American College Health Association. 2020. American College Health Association-National College Health Assessment II: Undergraduate Student Reference Group Data Report Fall 2019. Accessed at `https://www.acha.org/documents/ncha/NCHA-III_FALL_2019_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf`

Brown, A., Rich, M., & Holtham, C. 2014. Journal of Management Development, 33(6), 603–619

Ding, M. E., Mbekeani, J. N., Ahmed, Y., Conigliaro, R., Delphin, E., Durstenfeld, A., . . . Rosenberg, J. B. 2019. Journal of the Neurological Sciences, 397, 117–122

Festini, S. B., Hartley, A. A., Tauber, S. K., & Rhodes, M. G. 2013. Memory, 21(6), 657–667

Festini, S. B., McDonough, I. M., & Park, D. C. 2016. Frontiers in Aging Neuroscience, 8(98)

Festini, S. B., Hertzog, C., McDonough, I. M., & Park, D. C. 2019. Journal of General Psychology, 146(2), 111–133

Kim, H. J., Kim, J. H., Park, K. D., Choi, K. G., & Lee, H. W. 2011. Sleep Medicine, 12, 390–396

Lau, E. Y. Y., McAteer, S., Leung, C. N. W., Tucker, M. A., & Li, C. 2018. Journal of Adolescence, 67, 77–84

Levenstein, S., Prantera, C., Varvo, V., Scribano, M. L., Berto, E., Luzi, C., & Andreoli, A. 1993. Journal of Psychosomatic Research, 37(1), 19–32

Levine, R. 2005. Social Research, 72(2), 355–370

Lin, L., Zhang, J., Wang, P., Bai, X., Sun, X., & Zhang, L. 2020. Stress, (23)3, 256–264

Martin, M., & Park, D. C. 2003. Aging Clinical and Experimental Research, 15, 77–82

McEwen, B. S. 2006. Annals of the New York Academy of Sciences, 840(1), 33–44

Minear, M., & Park, D. C. 2004. Behavior Research Methods, Instruments & Computers, 36(4), 630–633

Navarro, R. L., Flores, L. Y., Legerski, J. P., Brionez, J., May, S. F., Na Suh, H., . . . Zhu, J. 2019. Journal of Counseling Psychology, 66(2), 170–183

Park, A., Sher, K. J., Wood, P. K., & Krull, J. L. 2009. Journal of Abnormal Psychology, 118(2), 241–255

Park, D. C., Lodi-Smith, J., Drew, L., Haber, S., Hebrank, A., Bischof, G. N., & Aamodt, W. 2014. Psychological Science, 25(1), 103–112

Pyapali, G. K., Turner, D. A., Wilson, W. A., & Swartzwelder, H. S. 1999. Alcohol, 19(2), 107–111

Schneider, S. J., Schwartz, M. D., & Fast, J. 1995. Computers in Human Behavior, 11(2), 205–214

Sheppard, M. E., Usdan, S. L., Higginbotham, J. C., & Cremeens-Matthews, J. L. 2016. Journal of Alcohol and Drug Education, 60(1), 30–46

Social Security Administration. 2019. Top names of the 1990s. Accessed at `https://www.ssa.gov/oact/babynames/decades/names1990s.html`

Tucker, M. A., & Fishbein, W. 2008. Sleep, 31(2), 197–203

Wong, Z. Y., & Kaur, D. 2018. Counselling Psychology Quarterly, 31(3), 294–316

APPENDIX A

Demographic

1. Age:
2. Gender:
3. GPA:
4. Major:
5. Are you currently attending/enrolled in a college or university?
6. What is your current credit status (freshman, sophomore, junior, senior, graduate, etc.)?
7. Do you currently suffer from a learning, memory, cognitive, or other disability that may affect your attention or ability to remember information?

Survey

1. How many credit hours are you currently taking?
2. How many of your classes are classified as 200-level?
3. How many of your classes are classified as 300-level?
4. How many of your classes are classified as 400-level?
5. How many of your classes are classified as graduate level?
6. How many classes, on average, do you miss each week?
7. Please rate the degree of your academic engagement (1-Very low amount of engagement, 2-Low amount of engagement, and 3-Moderate amount of engagement, 4-High amount of engagement, 5-Very high amount of engagement).
8. Please rate the degree of your social engagement (1-Very low amount of engagement, 2-Low amount of engagement, and 3-Moderate amount of engagement, 4-High amount of engagement, 5-Very high amount of engagement).
9. Please indicate how often you perform each of the following activities by choosing the corresponding number (1-Never, 2-Rarely, 3-Sometimes, 4-Frequently, 5-Very Frequently). Consider your involvement on- and off-campus.
   a. Attend class
   b. Perform coursework outside of class (e.g., reading, homework, studying, etc.)
   c. Participate in an organization WITH strict academic requirements (e.g., Honors, President's Leadership Fellows etc.)
   d. Hold a leadership position in an organization WITH strict academic requirements
   e. Participate in an honor society (e.g., Phi Kappa Phi-general, Psi Chi-psychology, Pi Mu Epsilon-mathematics, National Society for Collegiate Scholars, etc.)
   f. Hold a leadership position in an honor society
   g. Participate in an organization related to your major or academic interests (e.g., Speech and Debate, Student Government, Model UN, etc.)
   h. Hold a leadership position in an organization related to your major or academic interests
   i. Work at an internship related to your major or academic interests
   j. Work at a job related to your major or academic interests
   k. Participate in academic research
   l. Participate in a sorority or fraternity related to your major or academic interests (e.g., Delta Sigma Pi-business, Phi Mu Alpha-music, etc.)
   m. Play a collegiate sport
   n. Participate in an organization not related to your major or academic interests (e.g., Intervarsity, Caribbean Student Association, etc.)
   o. Hold a leadership position in an organization not related to your major or academic interests
   p. Work at an internship not related to your major or academic interests
   q. Work at a job not related to your major or academic interests
   r. Play an intramural/club sport
   s. Participate in a sorority or fraternity not related to your major or academic interests (e.g., Tau Kappa Epsilon, Delta Zeta, etc.)
   t. Volunteer
   u. Socialize
   v. Relax with friends or family
   w. Relax alone
   x. Use social media (e.g., Facebook, Instagram, Snapchat etc.)
   y. Exercise alone
   z. Exercise with friends or family
   aa. Perform household chores
   ab. Participate in extracurricular activities (on- or off-campus)
   ac. Communicate with other people in a manner that is not face-to-face (e.g., FaceTime/video chatting, texting, calling, online messaging, etc.)
10. On average, how many different extracurricular activities do you regularly participate in (In other words, please count/estimate the number of different organizations/activities you are involved with)?
11. Please list some of your extracurricular activities that you would consider "academic."
12. Please list some of your extracurricular activities that you would consider "social."