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Memorising Milton's *Paradise Lost*: A study of a septuagenarian exceptional memoriser

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At age 58, JB began memorising Milton's epic poem *Paradise Lost*. Nine years and thousands of study hours later, he completed this process in 2001 and recalled from memory all 12 books of this 10,565-line poem over a 3-day period. Now 74, JB continues to recite this work. We tested his memory accuracy by cueing his recall with two lines from the beginning or middle of each book and asking JB to recall the next 10 lines. JB is an exceptional memoriser of Milton, both in our laboratory tests in which he did not know the specific tests or procedures in advance, and in our analysis of a videotaped, prepared performance. Consistent with *deliberate practice theory*, JB achieved this remarkable ability by deeply analysing the poem's structure and meaning over lengthy repetitions. Our findings suggest that exceptional memorisers such as JB are made, not born, and that cognitive expertise can be demonstrated even in later adulthood.

Keywords: Exceptional memory; Prose memory; Age and memory.

John Milton, the English poet born 400 years ago on 9 December 1608, is best remembered as the author of the epic poem *Paradise Lost*, first published in 10 books in 1667 and later published as a second edition in 12 books in 1674. Through Adam and Eve's expulsion from the Garden of Eden, Milton describes the conflict between good and evil, between God and Satan, to reveal God's ways to man (Hawkes, 2004). The 12 books that comprise *Paradise Lost* range in length from 640 lines (Book VI) to 1189 lines (Book IX), with a brief summary, called *The Argument*, preceding each book. Together the 12 books, comprising 10,565 lines of four to nine words each, yield a word count (approximately six words per line) of over 60,000 words. The sheer enormity of this poem is noteworthy because on the 400th anniversary of Milton's birth, 9 December 2008, John Basinger (JB), recited *Paradise Lost* from memory. Our research will examine how this exceptional memoriser accomplished this remarkable feat and how accurately he recalled *Paradise Lost* during an unprepared laboratory test and a prepared performance before an audience.

THE MEMORISER

JB is an active, articulate septuagenarian who began memorising *Paradise Lost* at the age of 58 in 1993 as a form of mental activity to accompany his physical exercise at the gym. Although he had memorised various poems in earlier years, he never attempted anything of this magnitude. JB stated that he wanted to do something special to commemorate the then-upcoming millennium. ''*Why not something really challenging like, oh, 'Paradise Lost'?*'' he said. He began by walking on a treadmill one day while trying to memorise the opening lines of the poem. After those lines were committed to memory, he extended the task over successive sessions to see how far he could

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go. JB, who regards himself as a theatre person, reflected on this process this way:

> *The real challenge was just not to memorise it, but to know it deeply enough to really tell Milton's story. As I finished each book, I began to perform it and keep it alive in repertory while committing the next one to memory. . . . The goal eventually became not just a series of performances, but to do all twelve books on the same occasion.*

Nine years later, JB achieved his goal. He recited *Paradise Lost* in its entirety over a 3-day weekend. Since that 2001 performance JB has given numerous public recitations, although for many of these performances, due to the time it takes to recite the poem (approximately 3 hours for Books I and II), he limits his performance to several books, rather than all of the books in their entirety. Typically, he moves and expresses emotion during a performance to help signify changes in characters, and he gives copies of the poem to the audience so that they can follow his memorised recitation.

In our interview with JB before formal testing, he described his everyday memory, and his responses were typical of others his age (see Craik, 2008). For example, he sometimes forgets future dates if they are not written down, he makes notes as reminders for appointments, he finds names difficult to remember at times, and he will occasionally misplace objects such as his keys. Although JB has considerable experience in remembering acting lines and story telling, he considers his memory for *Paradise Lost* not to be based on any special memory talent or the use of any mnemonic techniques. Indeed, Milton's poem is a meaningful story that does not require mnemonic devices to render it meaningful. Rather, JB attributes his mastery of Milton to his sheer determination to memorise this poem by thoroughly understanding it and repeatedly practising it over a period of 9 years.

According to his notes, JB began studying this poem on 30 January 1993 and made his first complete performance of it on the weekend of 7, 8, and 9 December 2001. He reported that he typically studied the poem for approximately 1 hour a day, often reciting verse in chunks of seven lines at a time ("*I followed my life-dictum, do as little as you can as often as you can.*"). JB's self-adopted practice of studying seven lines of verse at a time closely matches the general capacity limitation for processing information (Miller, 1956). He estimated that he devoted between 3000 and 4000 hours of study to memorising this massive poem, and although retrospective estimates can overestimate study time for various skilled performances (Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005), even the lower bound of JB's estimate is consistent with prior research demonstrating that years of practice are necessary for expert performance (Ericsson, 2005; Ericsson & Charness, 1994). What began simply as mental exercise grew into memory virtuosity.

METHOD

We approached JB, now 74, with the idea of formally testing his memory of *Paradise Lost* after one of us (JS) saw his recitation of Books I and II on 9 December 2008. JB was enthusiastic about the prospect of testing, and he provided an unedited videotape of a previous performance for our analysis. At no time was JB informed of the specific tests or procedures that we would employ during the lab testing or the analysis of the videotape.

We decided on a series of cued recall tests that sampled all 12 books of this epic poem. Following an opening interview in which JB answered questions about his everyday memory, prior memorisation experience, reason for selecting *Paradise Lost* ("*It was difficult and long.*"), and procedure for memorisation (repeated recitation), we gave two oral cued recall tests for each of the 12 books, or 24 test trials in all. For each test trial, one of us read two successive lines from Milton and asked JB to recall the next 10 lines verbatim. All spoken cues and recalls were recorded on audiotape for analysis. For each of the 12 books, one of the two-line cues came from the opening of a book (Cue 1) and the second came from the approximate middle of a book (Cue 2). As in the following example from the opening of Book X, the two-line cues always began a verse:

Cue read to JB:
Meanwhile the heinous and despiteful act
Of Satan done in Paradise, and how
To be recalled by JB:
He in the serpent had perverted Eve,
Her husband she, to taste the fatal fruit,
Was known in heaven; for what can scrape the eye

Of God all-seeing, or deceived his heart
Omniscient? Who, in all things wise and just
Hinder'd not Satan to attempt the mind
Of man, with strength entire, and free-will armed
Complete to have discover'd and repuls'd
Whatever wiles of foe or seeming friend.
For still they knew, and aught to have remember'd,

The memory test was done in two parts, and the memory cues were divided into two groups of 12. In the first part, prior to each cue, JB was told the book number and whether the cue was from the beginning or approximate middle of that book. Moreover, he was told that if the first two lines were insufficient for recall, an additional word or words from that verse would be provided. The first 12 cues followed in sequential order the six odd-numbered books with the cue from the opening of a book always preceding the cue from the middle (*1*: Book I, Cue 1; *2*: Book I, Cue 2; *3*: Book III, Cue 1, *4*: Book III, Cue 2; *5*: Book V, Cue 1; *6*: Book V, Cue 2; *7*: Book VI, Cue 1; *8*: Book VI, Cue 2; *9*: Book IX, Cue 1; *10*: Book IX, Cue 2; *11*: Book XI, Cue 1; *12*: Book XI, Cue 2).

Following a short break, the remaining 12 cues for the six even-numbered books were given in a single random order (*13*: Book VI, Cue 2; *14*: Book XII, Cue 2; *15*: Book IV, Cue 1; *16*: Book IV, Cue 2; *17*: Book X, Cue 1; *18*: Book II, Cue 1; *19*: Book X, Cue 2; *20*: Book II, Cue 2; *21*: Book VIII, Cue 2; *22*: Book XII, Cue 1; *23*: Book VI, Cue 1; *24*: Book VIII, Cue 1). For these test trials JB was simply given a two-line cue and asked to recall the next 10 lines from that verse. He was not told the cue's book number and whether it was from the beginning or middle of a book. We anticipated that the removal of this sequential organising information would make the recall task more difficult for the final set of recall trials than the first set of trials. Together, the 12 cues from the odd-numbered books and the 12 cues from the even-numbered books helped to ensure that any performance differences due to study differences between books (e.g., early books were practised more than later books) and overall serial position of the books would be minimised over the two sets of test trials.

The 24 cues elicited recall of 10-line passages of verse that ranged in length from 70 to 132 words (mean length was 86.79 words) or 2083 words in all. Following approximately 2.5 hours of testing, including short breaks, we debriefed JB and told him that we would analyse his videotaped live performance for the same material tested in the lab. That analysis would correspond most closely to our first set of cued recall test trials because JB always recalled *Paradise Lost* in an orderly, sequential manner.

RESULTS

The cued recall responses were analysed for proportion correct recall (number of words correctly recalled divided by the number of words in a 10-line segment of verse), the frequency of errors (missed words, word substitutions, or extra words), and the number of times additional cues beyond the two-line cue were necessary. Overall, JB's verbatim cued recall of those portions of *Paradise Lost* that we tested yielded an impressively high proportion correct (.88), especially so considering that he came to the lab unprepared and without foreknowledge of our tests. Yet, his performance did show some variation over books and cues. Table 1 shows that cues from the opening of a book yielded high cued recall for virtually all books, regardless of whether those books were tested in a sequential (.98) or random (.92) order.

However, contrary to our initial expectations, cues from the approximate middle of a book, with two notable exceptions (Books VII and XI), did not yield poorer recall than cues from the beginning of a book, and presenting the cues in a sequential order did not produce greater recall than presented them in a random order, presumably due to overall ceiling effects in JB's performance. Aside from the lower recall for cues from the middle of Books VII and XI, JB produced uniformly high cued recall across all book and cue conditions. Interestingly, in a follow-up interview in which we asked JB (without identifying any books) whether all books were comparable in their level of difficulty or whether some posed special problems, he stated that he thought that Books XI and XII were harder to retrieve than earlier ones, perhaps because they had the least amount of practice, and that his least favourite book was VII because it was the hardest to execute. Our finding of poorer cued recall of the middle verses from these books than other books is consistent with his impressions.

In addition, our analysis of JB's errors revealed that his relatively poor performance on the middle verses of Books VII and XI was due primarily to errors of omission that far exceeded his errors of commission. Over all of the 24 test

TABLE 1
Proportion correct cued recall from lab tests

Test 1: Odd-numbered books in sequential order Book	I	III	V	VII	IX	XI	Mean
Beginning cue	.98	.99	1.00	1.00	.99	.90	.98
Middle cue	.99	.97	.80	.42	.95	.24	.73
Test 2: Even-numbered books in random order Book	II	IV	VI	VIII	X	XII	Mean
Beginning cue	.99	.96	1.00	.83	.91	.82	.92
Middle cue	.99	.94	.94	.92	.89	.72	.90

trials, the mean rate of commission errors (altered or added words) was 1.42 words per 10 lines of verse, whereas the mean rate of omission errors was 5.25 words (but only 1.73 if Books VI and XI are excluded as outliers). These low error rates indicate a high level of verbatim accuracy in JB's recall, and his infrequent commission errors are consistent with previous research showing few intrusions when people recall familiar poems or songs such as *The 23rd Psalm* or *The Star Spangled Banner* (Rubin, 1977). Finally, when extra cue words were needed beyond the original two-line cue to trigger recall, JB required an average of 3.5 words to recall a verse, although for 11 of the 24 trials no additional cue words were necessary.

Our analysis of JB's live recitation of *Paradise Lost* was limited to videotapes for Books I–V from a performance on 1 January 2000, before JB had completed his memorisation of the entire poem. For this analysis, we analysed his correct recall and errors for the same passages that we tested in the memory lab. Unlike the lab tests, JB had prepared for this performance by rehearsing the material over a period of time, and he only recalled the material sequentially as Milton wrote it. Table 2 presents these results. Recall was uniformly high for all five books and both of the now self-cued conditions (each book's beginning and middle lines of verse). Errors occurred infrequently, with omissions (1.0 words) and commissions (1.1 words) comparable for the different book/cue conditions. When JB would occasionally draw a blank or realise that he stumbled during his recital, the videotape showed that he accessed a copy of the poem that he kept nearby and quickly re-cued his recall from memory.

DISCUSSION

Our analysis of JB's recall reveals a person with exceptional memory for *Paradise Lost*. Although rare, reports of exceptional memorisers of prose are not unique. For example, J. Langdon Down, in describing savant syndrome in 1887, reported that one person could recite Gibbon's *The Decline and Fall of the Roman Empire* from memory (Treffert & Christensen, 2006), and Stratton (1917) found Hebrew scholars in Poland who had memorised the entire Talmud. Still earlier, the Homeric epics, the *Iliad* and the *Odyssey*, comprising approximately 27,000 lines, were part of the ancient Greek oral tradition (Rubin, 1995). However, these historical accounts rest more on anecdotal evidence than objective measures, such as those we employed with JB. Even so, research on individuals with reportedly remarkable memory accomplishments has not had much influence on memory researchers (Neisser, 1982/2000). The one notable exception comes from the field of skilled performance where research indicates that expertise always requires extensive practice over a period of years. For example, studies of chess players, musicians, and marathon runners show that approximately 10 years, corresponding to several thousand hours of practice, are necessary to reach an elite level of performance (Charness et al., 2005; Ericsson, Krampe, & Tesch-Romer,

TABLE 2
Proportion correct cued recall from taped live performance

Recall from Books I–V in sequential order Book	I	II	III	IV	V	Mean
Beginning cue	1.00	.94	1.00	1.00	.94	.98
Middle cue	1.00	–	.93	.99	.96	.97

An incomplete recording of Book II did not include the verse for the two lines used for the middle cue.

1993). Although we do not equate the attainment of master status in chess, for instance, with the memorisation of *Paradise Lost*, it is clear from JB's conservative estimate of 3000 hours of study that he, like other elite performers, has devoted numerous hours of deliberate practice to attaining his special skill.

According to Ericsson's deliberate practice theory, practice is a highly structured activity that requires effort, is not inherently enjoyable, and is expressly designed to improve performance (Ericsson & Charness, 1994; Ericsson et al., 1993). Ericsson et al. (1993) further report that studies of individuals engaged in deliberate practice typically show that they adopt a routine of daily sessions, but they will often limit the length of their sessions to approximately 1 hour to minimise potential effects of mental and/or physical fatigue. The central thesis of this theory is that expert performance is a time-extended process of skill acquisition that is only achieved after numerous, but not lengthy, daily sessions of deliberate practice (Ericsson & Charness, 1994). Although this theory was formulated to account for elite performance in chess, music, and sports, it provides a reasonable basis for interpreting JB's procedure for memorising *Paradise Lost*. He too, in daily short sessions, devoted thousands of hours of study over a period of years to achieve his mastery of Milton. When viewed in the context of deliberate practice theory, we believe that our findings are in agreement with other research on world-class memory performers, which indicates that exceptional memorisers are made, not born (Ericsson, 2003).

Our study of JB's memory of *Paradise Lost* also demonstrates that cognitive expertise in memorisation remains possible even in later adulthood, a time period in which cognitive researchers have typically focused on memory decline (Hertzog, Kramer, Wilson, & Lindenberger, 2009; Luo & Craik, 2008; Salthouse, 2006). Yet, as Ericsson and Charness (1994) note, the elite performance of elderly performers appears limited to their particular area of expertise, and this observation applies to JB. His memory of *Paradise Lost* is exceptional, but as we previously noted, his memory for everyday tasks appears entirely normal for someone his age.

However, we also believe that it would be a mistake to minimise JB's achievement by interpreting his performance as simply a remarkable demonstration of brute force, rote memorisation. JB was deeply cognitively involved in learning this epic poem. He said, ''*During the incessant repetition of Milton's words, I really began to listen to them, and every now and then as the whole poem began to take shape in my mind, an insight would come, an understanding, a delicious possibility.*'' This comment, in particular, captures the essence of JB's approach to the material. Based perhaps on his previous work in theatre, where actors learn the lines of a play not by trying to memorise them, but by analysing the lines to determine the needs, desires, and motivations of the characters (Noice & Noice, 1996), JB has coupled repetition (because verbatim recall is required) with a deep, conceptual understanding of the poem. Acting researchers Noice and Noice (1996) add that this strategy of deep encoding requires actors to attend to the exact wording of lines, and it is this focus on exact wording to gain an understanding of the characters that yields verbatim memory, instead of merely the retention of gist. Interestingly, while testing JB in the lab or watching him in a videotape of a performance, we found that he often became animated and visibly expressed strong emotion as he recalled the lines of the poem (interested readers can view him on www.paradiselostperformances.com). His use of action is unsurprising, as previous research has shown a beneficial effect of movement on actors' memory for lines (Noice & Noice, 2001; 2006). Actors master their lines in the context of assuming a specific role. JB has done the same with *Paradise Lost*, and he expressed it best this way:

> *I think of the poem in various ways. As a cathedral I carry around in my mind, a place that I can enter and walk around at will. . . . Whenever I finish a ''Paradise Lost'' performance I raise the poem and have it take a bow.*

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