



The Impact of Note Taking Style and Note Availability at Retrieval on Mock Jurors' Recall and Recognition of Trial Information

Journal:	<i>Memory</i>
Manuscript ID:	MEM-OP 14-207.R1
Manuscript Type:	Original Paper
Date Submitted by the Author:	n/a
Complete List of Authors:	Thorley, Craig; University of Liverpool, School of Psychology Baxter, Rebecca; University of Liverpool, Psychological Sciences Lorek, Joanna; University of Liverpool, Psychological Sciences
Keywords:	Juror, Jury, Note taking, Memory, Recall

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20 The Impact of Note Taking Style and Note Availability at Retrieval on Mock Jurors'

21
22 Recall and Recognition of Trial Information

23
24 Craig Thorley, Rebecca E. Baxter, Joanna Lorek

25
26 University of Liverpool
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Correspondence concerning this article should be addressed to Dr. Craig Thorley,
Psychological Sciences, Eleanor Rathbone Building, University of Liverpool, England,
L69 7ZA. Email: craig.thorley@liverpool.ac.uk

Acknowledgements: We thank Christine L. Ruva for providing us with a copy of the trial
footage used in the study and Mary E. Pritchard for providing us with a copy of the trial
transcript and the 24 questions relating to the trial information. We also thank Qian Su, Jack
Briggs, and Jane L. Sayers for assistance with data collection and data scoring.

Abstract

Jurors forget critical trial information and what they do recall can be inaccurate. Jurors' recall of trial information can be enhanced by permitting them to take notes during a trial onto blank sheets of paper (henceforth called freestyle note taking). Hope, Eales, and Mirashi (2014) developed a trial-ordered-notebook (TON) for jurors containing headings outlining the trial proceedings and space beneath each heading for notes. In a direct comparison, TON note takers recalled more trial information than freestyle note takers. This study investigated whether or not note taking improves recall as a result of enhanced encoding or as a result of note access at retrieval. To assess this, mock jurors watched and freely recalled a trial video with one fifth taking no notes, two fifths taking freestyle notes, and two fifths using TON's. During retrieval, half of the freestyle and TON note takers could access their notes. Note taking enhanced recall, with the freestyle note takers and TON note takers without note access performing equally as well. Note taking therefore enhances encoding. Recall was greatest for the TON note takers with note access, suggesting a retrieval enhancement unique to this condition. The theoretical and applied implications of these findings are discussed.

Keywords: Juror; Jury; Note Taking; Memory; Recall; Recognition

1
2
3 **The Impact of Note Taking Style and Note Availability at Retrieval on Mock Jurors'**
4
5 **Recall and Recognition of Trial Information**
6

7 Many legal systems use jurors to try defendants accused of serious crimes. In England
8 and Wales alone there are almost 18,000 jury trials each year (Ministry of Justice, 2014).
9 Memory plays a crucial role in these trials as jurors need to encode the evidence, legal
10 arguments, and judicial instructions presented to them, store these in memory for the duration
11 of the trial, and recall them during deliberation in order to reach a just verdict. We know little
12 about real jurors' recollection of trial information as deliberations are confidential. To study
13 this issue, researchers typically present mock jurors with a trial video or trial transcript and
14 then assess their recollection of the trial. Mock jurors often forget critical trial information
15 and what they do recollect can be inaccurate (e.g., Bodenhausen, 1988; Bourgeois, Horowitz,
16 ForsterLee, & Grahe, 1995; Fitzgerald, 2000; Kassin & Wrightsman, 1979; Pennington &
17 Hastie, 1988; Pritchard & Keenan, 1999; 2002). Costabile and Klein (2005, Experiment 3)
18 provide a compelling demonstration of how a memory failure can negatively impact a
19 verdict. In their study, mock jurors read a summary of a murder trial. The critical evidence in
20 the trial was a wiretap confession to the murder by the defendant. Subsequent memory testing
21 revealed some mock jurors forgot about the confession and these same jurors were less likely
22 to convict the defendant as a consequence of this.
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42

43 An effective means of enhancing mock jurors' recollection of trial information, and
44 one that is adopted by some courts, is to allow jurors to take notes during trials (e.g.,
45 Rosenhan, Eisner, & Robinson, 1994). Access to notes when recollecting trial information
46 during deliberation, however, is not always permitted. The present experiment compares the
47 effectiveness of two different note taking styles at enhancing mock jurors' free recall and
48 recognition of trial information and examines whether or not the beneficial effects of note
49
50
51
52
53
54
55
56
57
58
59
60

Juror Memory

4

1
2
3 taking occur due to enhancements at encoding, meaning note access at retrieval has no impact
4
5 upon recollection, or whether note access at retrieval is required for enhancements to occur.
6

7 **Freestyle Note Taking and Juror Memory**

8
9
10 Jurors are permitted to take notes during trials in a number of judicial systems
11 including those of England and Wales, Scotland, Ireland, and Canada. Variations in practice
12 do, however, exist. The US legislates note taking on a state-by-state basis with some states
13 requiring courts to allow note taking (e.g., Arizona) and others only permitting it at the
14 judge's discretion (e.g., Alabama). In Australia and New Zealand, however, note taking is
15 only permitted at the judge's discretion but a survey of judges in both countries suggests the
16 vast majority permit it (Ogloff, Clough, Goodman-Delahunty, & Young, 2006). When jurors
17 can take notes, the materials and guidance given is similar across judicial systems. Jurors are
18 provided with blank sheets of paper, a pen, and no instructions with regards to what they
19 should write down. Jurors can therefore decide upon the structure and content of any notes
20 they make. This style of note taking will henceforth be called freestyle note taking.
21
22
23
24
25
26
27
28
29
30
31
32
33

34 The impact of freestyle note taking on juror memory can be studied in individuals,
35 whereby single participants make notes during a trial and then recollect it, or in collaborative
36 groups, whereby several participants make notes during a trial and then work together to
37 jointly recollect it. Researchers have tended to favour the former approach and it is
38 established that individual freestyle note takers have more complete and accurate¹ free recall
39 of trial information than non-note takers (e.g., Fitzgerald, 2000; ForsterLee & Horowitz,
40 1997; Rosenhan et al., 1994). Individual freestyle note takers also provide more complete and
41 accurate responses when answering cued recall questions about trial evidence (Hope, Eales,
42 & Mirashi, 2014). When freestyle note takers collaborate in groups of 5 or 6 (ForsterLee,
43 Kent, & Horowitz, 2005) or groups of 12 (Horowitz & Bordens, 2002) to freely recall as
44 much trial information as possible then they also outperform similar sized groups of non-note
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 takers. Similarly, when freestyle note takers collaborate in groups of 5 or 6 to complete a
4
5 recognition test that requires them to discriminate between true and false trial information
6
7 then they are also more accurate than equivalent sized groups of non-note takers (Horowitz &
8
9 ForsterLee, 2001). Note taking therefore offers a robust general memory enhancement.
10

11 **Freestyle Note Taking and Encoding Enhancements**

14 A shared feature of the aforementioned studies is that the freestyle note takers were
15
16 able to consult their notes during retrieval. It is therefore impossible to tell whether or not
17
18 freestyle note taking improved recollection as a result of enhancements to jurors' encoding of
19
20 trial information, as a result of jurors being able to refer to their notes during retrieval, or a
21
22 combination of the two. Whilst it is of theoretical interest to determine the stage (or stages) at
23
24 which freestyle note taking enhances recollection, it is also important to understand this from
25
26 an applied perspective as jurors' notes are sometimes confiscated prior to deliberation (e.g., R
27
28 vs. Rayment & Others, see Lloyd-Bostock, 2007). If freestyle note taking only enhances
29
30 recall when jurors can consult their notes at retrieval then judges should be encouraged to
31
32 permit note access during deliberation. Only ForsterLee, Horowitz, and Bourgeois (1994)
33
34 have examined the stage at which freestyle note taking enhances recall. In their study, they
35
36 compared the free recall completeness of non-note takers and freestyle note takers who either
37
38 did or did not have access to their notes during retrieval. Those note takers without note
39
40 access at retrieval recalled more trial information than the non-note takers, confirming that
41
42 note taking enhances encoding. There was also no difference in the volume of trial
43
44 information recalled by the 'notes accessible' and 'no notes accessible' groups, suggesting
45
46 note access provides no additional retrieval enhancement. ForsterLee et al. did not consider
47
48 why freestyle note taking enhances encoding but potential insights can be obtained from the
49
50 educational psychology literature.
51
52
53
54
55
56
57
58
59
60

1
2
3 Using methods similar to ForsterLee et al. (1994), educational psychologists have
4
5 demonstrated that freestyle note taking can offer a modest enhancement to students encoding
6
7 (and therefore subsequent retrieval) of lecture materials (see Kobayashi, 2005, for a meta-
8
9 analysis)². Whilst trials and lectures are different types of to-be-remembered stimuli, the
10
11 experience of mock jurors and students overlap as both sit and listen to the oral presentation
12
13 of new, often complex, information for extended periods of time whilst taking notes and both
14
15 are expected to remember this information. Freestyle note taking is believed to enhance
16
17 encoding as it encourages generative processing of the presented information (e.g., Bretzing
18
19 & Kulhavy, 1979; DiVesta & Gray, 1972; Peper & Mayer, 1978, 1986). Generative
20
21 processing involves actively creating connections between diverse parts of new information
22
23 (or between the new information and one's own prior knowledge, if appropriate) so that it is
24
25 stored in memory in a meaningful and organised way (Wittrock, Marks, & Doctorow, 1975;
26
27 Wittrock, 1992). There are a number of generative processing techniques that note takers can
28
29 use such as grouping related ideas together under headings, summarising sections of the
30
31 presentation, and creating concepts maps (see Grabowski, 2004). When these techniques are
32
33 employed, they result in a more elaborate and deeper encoding of the presented information
34
35 and durable memory traces are created (Craig & Lockhart, 1972; Craig & Tulving, 1975;
36
37 Kiewra, 1985; Wittrock & Carter, 1975). The benefits of generative processing, however, are
38
39 not restricted to deeper encoding. New information that is stored in memory in a meaningful
40
41 and organised way is easier to retrieve, as retrieval of one piece of information can cue the
42
43 recall of other related pieces of information (Mayer, 1984, 1996; Tulving, 1983). Not all
44
45 freestyle note takers engage in generative processing, however, with many often copying
46
47 presented information verbatim and failing to connect related concepts together (Bretzing &
48
49 Kulhavy, 1981; Kiewra, 1989). The lack of spontaneous generative processing can therefore
50
51
52
53
54
55
56
57
58
59
60

Juror Memory

1
2
3 result in shallower encoding and may explain why the encoding enhancements observed are
4
5 often modest.
6

7 8 **Trial Ordered Notebooks and Juror Memory**

9
10 Despite evidence suggesting that freestyle note taking enhances jurors' recall of trial
11 evidence, interviews with real jurors suggests they may not all benefit from it. When
12 Matthews, Hancock, and Briggs (2004) examined the experience of real jurors, a large
13 number indicated after the trial that they were confused about whether or not they should
14 have taken notes and revealed that they '*had a problem knowing what to write down, and*
15 *how much to write down*' (p. 40). To try and address this problem, Hope et al. (2014) created
16 a trial-ordered-notebook (TON) for jurors that contains organisational cues in the form of
17 headings that outline the trial proceedings (e.g., Opening Statement, First Witness, Second
18 Witness, Closing Statements) and subheadings beneath each of these main headings for jurors
19 to make specific notes on the evidence, arguments, statements, and responses generated by
20 both the Prosecution and Defence. In a direct comparison between individual freestyle note
21 takers and the TON note takers, both of whom had notes accessible at retrieval, Hope et al.
22 found the latter noted more legally relevant details during the trial and had more a complete,
23 but not more accurate, recall of trial information during a subsequent cued-recall test. As
24 TON note takers in Hope et al.'s study had access to their notes during retrieval, it is not
25 possible to determine the stage at which memory was enhanced. Once again, however,
26 insights can be obtained from the educational psychology literature.
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

47 **Trial Ordered Notebooks and Encoding and Retrieval Enhancements**

48
49 In the educational psychology literature, researchers have examined whether or not
50 providing students with pre-prepared lecture notes that contain organisational cues can
51 increase note taking and subsequent recollection of lecture information. These organisational
52 cues are often in the form of headings that outline the lecture topics and each has space
53
54
55
56
57
58
59
60

Juror Memory

8

1
2
3 beneath it for notes. Cued lecture notes therefore contain the same elements as the TON.
4
5 Consistent with the findings of Hope et al. (2014), students using cued lecture notes record
6
7 more presented information than freestyle note takers (e.g., Cohn, Cohn & Bradley, 1995;
8
9 Kiewra et al., 1991; Kiewra, Benton, Christensen, Kim, & Risch, 1989; Kiewra, Benton,
10
11 Kim, Risch, & Christensen, 1995). Kiewra et al. (1991) argued that organisational cues
12
13 increase note taking as they focus attention on the lecture and the spaces provided for note
14
15 taking beneath each heading entices them to make notes (see also Hartley, 1976).
16
17

18
19 Importantly, students using cued lecture notes also remember more about their
20
21 lectures than freestyle note takers when their memory is tested via free recall (Kiewra et al.,
22
23 1995) and cued recall (Austin, Lee, Thibeault, Carr, & Bailey, 2002; Kiewra, DuBois,
24
25 Christian, & McShane, 1988; Morgan, Lilley, & Boreham, 1988). They are also more
26
27 accurate on recognition tests (Cohn et al., 1995; Kiewra et al., 1988). Kiewra et al. (1991)
28
29 suggest that the organisational cues facilitate recollection of studied information as a result of
30
31 enhancements to both encoding and retrieval. During encoding the organisational cues
32
33 encourage generative processing, which results in a more elaborate and deeper level of
34
35 encoding and makes the studied information more memorable (Craik & Lockhart, 1972,
36
37 Craik & Tulving, 1975; Kiewra, 1985; Wittrock & Carter, 1975). As discussed, freestyle note
38
39 takers do not always engage in generative processing (Bretzing & Kulhavy, 1981; Kiewra,
40
41 1989) meaning information is encoded at a shallower level and is less memorable. At
42
43 retrieval, cued note takers have access to more studied information than freestyle note takers
44
45 and can use this additional information to provide more complete (or accurate, for recognition
46
47 tests) responses during memory tests. Moreover, the information in these more detailed cued
48
49 notes has been encoded in a highly organised fashion with individual pieces of information
50
51 connected to the topic headings. In line with the encoding-specificity principle, which states
52
53 that successful retrieval depends on the overlap of information available at retrieval and the
54
55
56
57
58
59
60

Juror Memory

information in the memory trace (see Thomson & Tulving, 1970; Tulving, 1983), these topic headings can act as powerful retrieval cues for to-be-remembered information and recall is facilitated by their presence in the cued lecture notes.

Aims, Rationale, and Hypotheses

The principle aim of the present experiment is to compare the impact of no note taking, freestyle note taking, and TON note taking on jurors' recall and recognition of trial information when note takers either do or do not have access to their notes at retrieval. As discussed, freestyle note takers have more complete and accurate recall of trial information than non-note takers (e.g., Rosenhan et al., 1994). ForsterLee et al. (1994) demonstrated that freestyle note taking enhances encoding only and that note access at retrieval offers no additional benefit. More recently, Hope et al. (2014) demonstrated that TON note takers recall more trial evidence than freestyle note takers. As note takers in Hope et al.'s study had access to their notes at retrieval, it is impossible to determine whether or not TON's enhanced encoding only or whether note access at retrieval also enhanced recall. Research on student's recall of lectures by Kiewra et al. (1991) suggests that TON-style note taking enhances encoding and that note access at retrieval offers additional recall enhancements. Whilst it is of theoretical interest to determine the stage (or stages) at which TON note taking enhances recollection, it is also important to understand this from an applied perspective as jurors' notes are sometimes confiscated prior to deliberation. As demonstrated earlier, memory lapses during retrieval can lead to unsafe verdicts (Costabile & Klein, 2005). If TON note access at retrieval can enhance the recollection of trial information then it would be useful for courts adopting TON's to be aware of these retrieval benefits so that jurors can be permitted access to their notes during deliberation.

The focus on free recall and recognition in the present study differentiates it from the work of Hope et al. (2014). In their study, Hope et al. provided participants with specific cued

Juror Memory

10

1
2
3 recall questions about the trial (e.g., “At what time did the suspect leave his girlfriend’s house
4 to go to the convenience store?”) and recall completeness and accuracy was examined. In the
5 present experiment, participants will first be asked to freely recall as much trial information
6 as possible and recall completeness and accuracy will be assessed. Free recall is favoured
7 over cued recall as it more closely represents the type of retrieval engaged in by real jurors.
8 Participants will be then provided with a recognition test that assesses ability to discriminate
9 between true and false trial information. The ability is important given that real jurors can be
10 exposed to the inaccurate notes or recall of others during deliberation and this could
11 potentially result in them contaminating each other’s memory of trial information (e.g.,
12 Wright, Self, & Justice, 2000; Gabbert, Memon, & Allan, 2003; Thorley, 2013).
13
14
15
16
17
18
19
20
21
22
23
24

25 In line with the findings from the juror memory and note taking literature (e.g.,
26 ForsterLee et al., 1994; Hope et al., 2014), and in keeping with the suggestion that note takers
27 can engage in generative processing that results in a more elaborate and deeper encoding of
28 information (e.g., Bretzing & Kulhavy, 1979; DiVesta & Gray, 1972; Peper & Mayer, 1978,
29 1986), it is anticipated that freestyle takers and TON note takers (irrespective of note access)
30 will have more complete and accurate free recall of the trial information than non-note takers.
31
32
33
34
35
36
37

38 Consistent with the findings of ForsterLee et al. (1994) it is also expected that note
39 access at retrieval will offer no additional benefit to freestyle note takers recall. In keeping
40 with past research suggesting that TON-style cued note access can offer additional retrieval
41 enhancements as note takers have a larger pool of information to refer to during testing and
42 that topic headings provide powerful retrieval cues (Kiewra et al. 1991), it is also anticipated
43 that TON note access at retrieval will further enhance the recall completeness and accuracy.
44
45
46
47
48
49
50
51

52 Recognition test performance has received little attention in the juror memory and
53 note taking literature to date. Kobayashi (2005) however, has demonstrated that freestyle note
54 taking during lectures can sometimes provide a small enhancement to the subsequent
55
56
57
58
59
60

1
2
3 recognition of presented materials. TON-style cued note taking during lectures has also been
4
5 found to offer a small recognition enhancement (Cohn et al., 1995; Kiewra et al., 1988).
6
7 Kobayashi suggests such small effects are consistent with the encoding-specificity principle
8
9 (e.g., Thomson & Tulving, 1970; Tulving, 1983) as recognition tests provide participants
10
11 with questions/statements/ response options that overlap with information presented at
12
13 encoding and this overlapping information acts as a powerful retrieval cue for non-note takers
14
15 that enhances their performance so that it is almost at the level of note takers. It is therefore
16
17 possible that note taking in the present experiment, irrespective of type, will have a small
18
19 positive impact of upon recognition test performance.
20
21

22
23 Finally, the completeness and accuracy of the notes taken will be examined.
24
25 Consistent with Hope et al. (2014), and in keeping with the suggestion TON-style
26
27 organisational cues focus attention on the presented materials, encourage note taking about
28
29 each topic the cues relates to, and the spaces provided for notes encourage note taking
30
31 (Kiewra et al., 1991), it is anticipated that TON note takers will have more complete and
32
33 accurate notes than freestyle note takers.
34
35

36 Method

37 Participants

38
39 There were 130 adults (97 females, 33 males) aged 18 - 47 ($M = 21.23$, $SD = 5.33$)
40
41 who were a combination of students ($n = 119$) and community members who were former
42
43 students ($n = 11$). All were required to be jury eligible in England and Wales, meaning they
44
45 had to be between 18 and 70 years of age, on the electoral register, and have lived in the UK
46
47 for a period of at least 5 years since the age of 13. They could also not be on bail, have served
48
49 a prison or youth custody sentence of more than five years, have been in prison or youth
50
51 custody for any amount of time in the last ten years, or have suffered from a mental health
52
53 condition or mental illness at any point in their lives.
54
55
56
57
58
59
60

Design

This study had one IV with five conditions manipulated between-subjects. The five conditions included a control condition where no note taking was permitted during the trial (NN), two freestyle noting taking conditions that differed according to whether the notes were accessible during retrieval (FS+Access) or not (FS-Access), and two TON note taking conditions that also differed according to whether the notes were accessible during retrieval (TON+Access) or not (TON-Access). 26 participants were assigned to each of five conditions in a quasi-random fashion whereby testing for each condition took place on pre-determined day of the week (e.g., all participants who attended on a Monday were in the NN condition) and participants (unaware of what conditions were being tested each day) picked a testing session to attend based upon their availability.

The primary dependent variables were the completeness of the notes made (i.e., the proportion of all trial information correctly noted), the accuracy of these notes (i.e., the proportion of all trial information noted down that is correct), the completeness with which participants freely recalled the trial information (i.e., the proportion of all trial information correctly recalled), the accuracy of this free recall (i.e., the proportion of all trial information recalled that is correct), and the proportion of hits and false alarms on a true/false recognition test. Additional secondary dependent variables are described in the Stimuli section.

Stimuli

The trial footage was taken from Court TV and was of a 1992 murder re-trial with the case name *New Jersey v. Daniel Bias*. The trial centred on the death of a woman, Lise Bias, who was shot in the head and killed inside the home she shared with her husband, Daniel Bias. The prosecution argued that Daniel Bias murdered his wife. The defence argued that Lise Bias was threatening to commit suicide in front of her husband, was holding a gun to her own head, he tried to wrestle the gun away from her and she accidentally shot herself. The

1
2
3 trial footage was edited so that it was 30 min in length and featured the opening arguments of
4
5 the prosecution and defence, the direct and cross-examination of nine witnesses (including
6
7 expert witnesses and Daniel Bias), two recordings (one video and one audio) that were played
8
9 to the jurors during the trial, both attorneys' closing arguments, and the judicial instructions.
10
11 The jury's verdict is not shown, allowing participants to reach their own verdict. Past
12
13 research using this same trial footage shows that participants are equally split on the verdict
14
15 (e.g., Pritchard & Keenan, 1999, 2002; Ruva & McEvoy, 2008).
16
17

18
19 Participants who were eligible to take freestyle notes were provided with a blank lined
20
21 notepad and pen. Participants who were eligible to take trial-ordered notes were provided
22
23 with a copy of the TON that was adapted from Hope et al. (2014). The notebook was printed
24
25 on A4 sized paper. The front page provided a brief paragraph outlining the order of the trial
26
27 proceedings. Within the notebook, there were separate sections for the opening statements,
28
29 each of the 9 witnesses, the two recordings, and the closing arguments. Each section
30
31 contained a heading at the top of the page (e.g., Witness 1) so that participants knew who the
32
33 notes in that section should relate to. Next to this heading was the term "*Name:*" which
34
35 prompted participants to write the name of the person the notes in this section related to (e.g.,
36
37 Officer Thomas Walsh). If both the Prosecution and Defence spoke during the same section
38
39 (e.g., when Witness 3 provided a testimony) then section sub-headings entitled "Prosecution
40
41 Questions and Answers" and "Defence Questions and Answers" were provided to enable the
42
43 jurors to make specific notes on the evidence, arguments, statements, and responses
44
45 generated by both sides. Each section contained either one or two pages for notes, depending
46
47 on the amount of information conveyed in the trial footage.
48
49
50

51
52 A booklet with plain lined paper was provided for the free recall test. For the
53
54 recognition test, 24 true-false statements about the trial evidence and legal arguments were
55
56 created. These were modelled upon the 24 cued-recall questions used by Pritchard and
57
58
59
60

Juror Memory

14

1
2
3 Keenan (2002). Only 12 of the statements were true. For counterbalancing purposes there
4
5 were two versions of the recognition test, with the true statements in one version being turned
6
7 into false statements in the other. For example, in Version 1 a true statement was '*the gun*
8
9 *used in the shooting was a .357 Magnum*', whereas in Version 2 the false statement
10
11 equivalent was '*the gun used in the shooting was a .357 Colt*'.

12
13
14 A single questionnaire was adapted from Hope et al. (2014) to collect data regarding
15
16 the participants' age and gender, their verdict (guilty or not guilty), their confidence and
17
18 satisfaction with their verdict (both measured from 0 – 100% with a high score indicating
19
20 complete confidence/satisfaction), and the percentage of information they believed they could
21
22 remember from the trial. A two-item questionnaire was also created for note takers only and
23
24 this was appended to the 24 item recognition test. These two questions assessed note takers
25
26 thoughts on the benefits of note taking during the trial. The first question asked "*If you took*
27
28 *notes, do you think they helped you remember the trial?*" and the second asked "*If you took*
29
30 *notes, do you think they helped you reach a verdict?*". The response options to both questions
31
32 were either '*yes*' or '*no*'.

33 34 35 36 **Procedure**

37
38 Participants were tested in a quiet classroom in groups of up to 8. Participants in each
39
40 session were always in the same experimental condition. All participants were sat at
41
42 individual desks and were asked to refrain from speaking to each other for the duration of the
43
44 study. They were asked to act as mock jurors in this study by watching a 30 min recording of
45
46 a real murder trial and reaching a verdict. Participants were also informed that they may be
47
48 asked some questions about the trial at the end but no explicit reference to the subsequent free
49
50 recall and recognition tests was made. They were then informed that some participants would
51
52 be permitted to take notes during the trial should they wish to do so. Those participants in the
53
54 FS+Access and FS-Access conditions were then provided with the blank notepad and pen to
55
56
57
58
59
60

1
2
3 make notes. Participants in the TON+Access and TON-Access conditions were given a copy
4
5 of the TON, asked to read the paragraph on the front page that outlined the trial proceedings,
6
7 and were given were a few moments to familiarize themselves with the notebook. All
8
9 participants then watched the trial on a large projector screen at the front of the room. Once
10
11 the trial had finished, participants in the FS-Access and TON-Access conditions had their
12
13 notes confiscated, whereas participants in the FS+Access and TON+Access conditions were
14
15 allowed to keep their notes and informed that they could refer to them to during all
16
17 subsequent tasks. All participants then completed the demographic, verdict, and
18
19 metacognitive questionnaire. They then completed the free recall test. For the free recall test,
20
21 they were instructed to write down as much trial information as they could remember in any
22
23 order they wished, focussing upon the trial evidence and legal arguments offered. It was
24
25 emphasised that there was no time limit for this free recall. Participants were also instructed
26
27 to turn their free recall sheets upside down once they had finished and that they would then
28
29 be given a second questionnaire (the recognition test). For those participants in the note
30
31 taking conditions, the recognition test had the two-item note taking questionnaire appended.
32
33 Upon completing this final test, the study ended and participants were debriefed. The study
34
35 took approximately 60 minutes to complete.
36
37
38
39
40

41 Coding

42
43 The participants' notes and free recall were scored for completeness and accuracy. To
44
45 do this, a coding scheme of all evidence and legal arguments conveyed during the course of
46
47 the trial was created. First, the three authors and a student intern who was blind to the aims of
48
49 the experiment independently read a trial transcript (taken from Pritchard & Keenan, 1999,
50
51 2002) and identified all words, phrases, or sentences that could be counted as a discrete, non-
52
53 overlapping, piece of trial information relating to the evidence or legal arguments. For
54
55 example, the prosecution statement '*The bullet that entered the left side of his wife's head*
56
57
58
59
60

Juror Memory

16

1
2
3 enters 2.5 inches behind the left ear” contains two discrete pieces of information. The first is
4
5 that the bullet entered 2.5 inches behind an ear and the second is that it was on the left hand
6
7 side of the head. Another example of a single piece of information is the prosecutor’s
8
9 question to Police Officer Thomas Walsh ‘*Did he (Mr. Bias) describe the weapon to you?*’
10
11 together with Walsh’s answer ‘*no*’. Here the single piece of information conveyed is that Mr.
12
13 Bias did not describe the weapon to Officer Walsh. In total, 210 discrete pieces of
14
15 information relating to trial evidence and legal arguments were identified.
16
17

18
19 The participants’ notes and the free recall statements were scored against the coding
20
21 scheme by the second author (REB) and third author (JL) respectively in order to identify
22
23 how many how many pieces of trial information were correctly and incorrectly noted down or
24
25 recalled. Correct information was identified as that present in the trial and correctly noted or
26
27 recalled (e.g., Lise was right handed), incorrect information was identified as that present in
28
29 the trial but incorrectly noted or recalled (e.g., Lise was left handed) or information that was
30
31 not present in the trial at all (e.g., Lise was wearing gloves at the time of the shooting).
32
33 Subjective remarks, vague remarks, and opinions were not scored. Similarly, any information
34
35 that was not directly related to trial evidence or legal arguments (e.g., the colour of the
36
37 prosecutor’s suit; what that courtroom looked like) was not scored. Occasionally in trials, the
38
39 same evidence or legal argument is produced by several individuals. For example, two
40
41 coroners in the present study affirmed that Lise Bias’s hair was rinsed prior to autopsy. When
42
43 making freestyle notes, participants often write down the correct information (e.g., Lise’s hair
44
45 was rinsed) but fail to specify the source of this information (e.g. one coroner or both
46
47 coroners). This problem does not occur when TON notes are made as the source of the
48
49 information can be identified from the heading it relates to (e.g., Witness 1). Irrespective of
50
51 the note taking condition, participants can also fail to attribute the source of trial information
52
53 during free recall. For parity purposes across conditions, any evidence or legal arguments that
54
55
56
57
58
59
60

1
2
3 were repeated by more than one individual were only scored once in the note taking and free
4
5 recall results, irrespective of how many times participants wrote this information down and
6
7 whether or not the information could be attributed to a specific source.
8

9
10 Reliability scoring was conducted on 30% of the notes from each of the four note
11
12 taking conditions and 30% of the free recall statements from each of the five conditions. This
13
14 was conducted by two student interns who worked independently and were blind to the aims
15
16 of the experiment. Inter-rater agreement was 99.73% for notes and 96.14% for free recall.
17
18 Disagreements between the first and second scorers were resolved by the lead author (CT).
19

20 21 Results

22 23 Verdict, Verdict Confidence, and Verdict Satisfaction

24
25 46.15% of participants returned a guilty verdict. Logistic regression revealed that the
26
27 condition participants were in (NN, FS+Access, FS-Access, TON+Access, or TON-Access)
28
29 did not predict the verdict they reached, $\chi^2(1, N = 130) = .06, p = .80$, with the model
30
31 explaining 0.01% of the variance (both Cox and Snell R square and Nagelkerke R squared).
32
33 A one-way between-subjects ANOVA also revealed no significant difference between
34
35 participants' confidence in their verdict across the five conditions, $F(4, 125) = .23, p = .92$,
36
37 $\eta_p^2 = .01$ (NN $M = 65.00\%$, $SD = 14.22$, 95% CI = 59.25 - 70.74%; FS-Access $M = 68.46\%$,
38
39 $SD = 14.89$, 95% CI = 62.45 - 74.47%; FS+Access $M = 68.46\%$; $SD = 21.67$, 95% CI = 59.71
40
41 - 77.21%; TON-Access $M = 67.69\%$, $SD = 14.78$, 95% CI = 61.72 - 73.66%; TON+Access M
42
43 = 68.84%; $SD = 16.08$, 95% CI = 62.35 - 75.34%). Similarly, a one-way between-subjects
44
45 ANOVA revealed no significant difference in terms of how satisfied participants were with
46
47 their verdict in each condition, $F(4, 124^3) = .80, p = .53, \eta_p^2 = .02$ (NN $M = 61.54\%$, $SD =$
48
49 17.36, 95% CI = 54.52 - 68.55%; FS-Access $M = 68.23\%$, $SD = 14.94$, 95% CI = 63.19 -
50
51 75.27%; FS+Access $M = 64.00\%$, $SD = 23.09$, 95% CI = 54.47 - 73.53%; TON-Access $M =$
52
53
54
55
56
57
58
59
60

Juror Memory

18

63.85%, $SD = 20.41$, 95% $CI = 55.60 - 72.09\%$; TON+Access $M = 68.85\%$, $SD = 19.86$, 95% $CI = 60.82 - 76.87\%$).

Note Taking Completeness and Accuracy

The completeness and accuracy of the notes made in the four note taking conditions were examined using separate 2 (note taking type: freestyle vs. TON) x 2 (note access at retrieval: no access vs. access) between-subjects ANOVA's. Table 1 contains the proportion of the complete trial information correctly noted and the proportion of all notes taken that were accurate.

For note taking completeness, there was a significant main effect of note taking style, with more correct trial information written down by TON notes takers ($M = .26$, $SD = .08$, 95% $CI = .24 - .28$) than freestyle note takers ($M = .15$, $SD = .06$, 95% $CI = .13 - .17$), $F(1, 100) = 61.28$, $p < .001$, $\eta_p^2 = 0.38$. There was no main effect of note access at retrieval, with a similar volume of correct trial information written down by those participants without note access at retrieval ($M = .20$, $SD = .09$, 95% $CI = .18 - .22$) and those with note access at retrieval ($M = .21$, $SD = .09$, 95% $CI = .19 - .23$), $F(1, 100) = .59$, $p = .44$, $\eta_p^2 = 0.01$. There was also no between note taking type x note access at retrieval interaction, $F(1, 100) = .19$, $p = .66$, $\eta_p^2 = 0.01$. To summarise, participants who used the TON's had more complete notes than those who took freestyle notes and the effects observed were medium sized.

For note taking accuracy, there was a significant main effect of note taking style, with more accurate trial information written down by TON notes takers ($M = .97$, $SD = .03$, 95% $CI = .96 - .98$) than freestyle note takers ($M = .94$, $SD = .05$, 95% $CI = .93 - .95$), $F(1, 100) = 18.13$, $p < .001$, $\eta_p^2 = 0.15$. There was no main effect of note access at retrieval, with a similar volume of correct trial information written down by those participants without access ($M = .95$, $SD = .04$, 95% $CI = .94 - .96$) and those with access, ($M = .94$, $SD = .04$, 95% $CI = .94 - .96$), $F(1, 100) = .37$, $p = .54$, $\eta_p^2 = 0.01$. There was also no note taking type x note access at

1
2
3 retrieval interaction, $F(1, 100) = .31, p = .58, \eta_p^2 = 0.01$. To summarise, participants who
4
5 used the TON's had more accurate notes than those who took freestyle notes but the effects
6
7 observed were small.
8

9 10 **Use of Notebooks**

11 92.23% of participants felt note taking helped them to remember the trial information.
12
13 Logistic regression revealed that the note taking condition did not predict the degree to which
14
15 participants felt taking notes helped them remember the trial, $\chi^2(1, N = 102) = 2.71, p = .10$,
16
17 with the model explaining between .03% (Cox and Snell R square) and .06% (Nagelkerke R
18
19 squared) of the variance. 76.47% of participants also felt note taking helped them to reach a
20
21 verdict. Logistic regression revealed that the note taking condition did not predict the degree
22
23 to which participants felt note taking helped them reach a verdict, $\chi^2(1, N = 102) = 1.88, p =$
24
25 .17, with the model explaining between .02% (Cox and Snell R square) and .03%
26
27 (Nagelkerke R squared) of the variance.
28
29
30
31

32 **Free Recall of Trial Details**

33
34 This analysis involved all five conditions and compared the completeness of their
35
36 recall and the accuracy of their recall. To reduce the number of significance tests required for
37
38 this analysis, and thus lower the family-wise error rate, both dependent measures were
39
40 analysed separately using a two-step approach. First, one-way between subjects ANOVA's
41
42 were conducted comparing the completeness and accuracy scores across all five conditions.
43
44 Significant omnibus effects were followed up by four planned comparisons comparing the
45
46 NN condition to each of the four note taking conditions. For these planned comparisons, a
47
48 Bonferonni correction was used to alpha reduced to .013. Second, 2 (note taking type:
49
50 freestyle vs. TON) x 2 (note access at retrieval: note access vs. no note access) between-
51
52 subjects ANOVA's were conducted on each dependent measure with significant interactions
53
54
55
56
57
58
59
60

broken down using simple effects. Table 2 contains the proportion of trial information correctly recalled and the proportion of all recall that was accurate.

For recall completeness, there was significant difference observed between all five conditions, $F(4, 125) = 11.48, p < .001, \eta_p^2 = .27$. Planned comparisons showed that participants in the NN condition recalled less correct trial information than participants in the FS-Access condition, $t(125) = 2.60, p = .01, d = 1.00$, FS+Access condition, $t(125) = 3.16, p = .002, d = 1.10$, TON-Access Condition, $t(125) = 2.98, p = .003, d = 1.10$, and TON+Access condition, $t(125) = 6.72, p < .001, d = 2.42$. In summary, note taking enabled mock jurors to freely recall more correct trial information regardless of note taking style and irrespective of note access, with the effects observed being large. The 2 (note taking type: freestyle vs. TON note taking) x 2 (note access at retrieval: note access vs. no note access) between-subjects ANOVA revealed a main effect of note taking type, $F(1, 100) = 6.75, p = .01, \eta_p^2 = .06$, note taking access, $F(1, 100) = 7.95, p = .01, \eta_p^2 = .07$, and a note taking x note access interaction, $F(1, 100) = 4.37, p = .04, \eta_p^2 = .04$. Simple effects analysis showed that freestyle note takers and TON note takers who had no access to their notes at retrieval recalled an equivalent amount of trial information, $F(1, 100) = .13, p = .72, \eta_p^2 = .01$. When participants had access to their notes at retrieval, the TON note takers recalled more correct trial information than the freestyle note takers, $F(1, 100) = 10.99, p = .01, \eta_p^2 = .10$. Simple effects also showed that when participants took freestyle notes, have no note access or note access at retrieval made no difference to their recall completeness, $F(1, 100) = .27, p = .61, \eta_p^2 = .01$. However, when taking TON notes, more trial information was correctly recalled when participants had note access in comparison to when they did not, $F(1, 100) = 12.06, p = .001, \eta_p^2 = .11$. This second ANOVA therefore revealed that participants who took notes using the TON and who also had access to these notes at retrieval recalled more trial information than all other note takers but the additional recall enhancement observed was small.

1
2
3 For recall accuracy, there was no significant difference observed between all five
4 conditions, $F(4, 125) = 2.10, p = .08, \eta_p^2 = .06$, no significant 2 x 2 ANOVA main effects of
5 note taking type, $F(1, 100) = .88, p = .35, \eta_p^2 = .01$, or note access at retrieval, $F(1, 100) =$
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For recall accuracy, there was no significant difference observed between all five conditions, $F(4, 125) = 2.10, p = .08, \eta_p^2 = .06$, no significant 2 x 2 ANOVA main effects of note taking type, $F(1, 100) = .88, p = .35, \eta_p^2 = .01$, or note access at retrieval, $F(1, 100) = .26, p = .61, \eta_p^2 = .01$, and no interaction between note taking type and note access at retrieval, $F(1, 100) = .08, p = .77, \eta_p^2 = .01$.

Recognition Analysis

Signal detection theory (SDT) is often used when analysing recognition test data. A brief overview of SDT is now provided for readers not familiar with it (see Stanislaw & Todorov, 1999, for a comprehensive overview). In SDT, a hit refers to an instance where a participant correctly remembers a studied piece of information, whereas a false alarm refers to an instance where a participant incorrectly claims to have studied a non-studied piece of information. Hits and false alarms are used to calculate measures called d' and C . d' is the difference between the z-transformed probabilities of hits and false alarms and indicates how accurate participants are at discriminating between studied and non-studied information. No accuracy corresponds to a d' of 0, with higher scores indicating greater accuracy. C is the average of the transformed probabilities of hits and false alarms and is a measure of response bias. No bias corresponds to a C of 0, positive values indicate a bias towards responding “false” to test items, and negative values indicate a bias towards responding “true” to test items. Mean recognition test hits, false alarms, d' scores, and C scores can be seen in Table 2.

Recognition accuracy was quite high, with hit rates averaging 79%. A one-way between-subjects ANOVA revealed no significant difference in the d' scores across the five conditions, $F(4, 125) = .15, p = .96, \eta_p^2 = .01$. There was also little evidence of a response bias across the conditions with the C scores averaging $-.03$. A one-way between-subjects ANOVA revealed no significant difference in the C scores across the five conditions, $F(4,$

Juror Memory

22

125) = .19, $p = .94$, $\eta_p^2 = .01$. Note taking and note access therefore had no influence of recognition memory.

Metacognitive Belief about Recall of Trial Details

There was no difference in participants' metacognitive beliefs in the percentage of information they could remember from the trial across the five conditions, $F(4, 125) = .46$, $p = .77$, $\eta_p^2 = .01$. On average participants indicated that they recalled 68.76% ($SD = 13.98$, 95%; $CI = 66.34 - 71.19\%$) of the trial information (NN $M = 67.31\%$, $SD = 12.18$, 95% $CI = 62.38 - 72.23\%$; FS-Access $M = 69.61\%$, $SD = 13.99$, 95% $CI = 63.96 - 75.27\%$; FS+Access $M = 68.46\%$, $SD = 14.61$, 95% $CI = 62.56 - 74.36\%$; TON-Access $M = 66.92\%$, $SD = 14.63$, 95% $CI = 61.01 - 72.83\%$; TON+Access $M = 71.53\%$, $SD = 14.88$, 95% $CI = 65.53 - 77.55\%$). Their estimated recall is therefore higher than their actual recall (see Table 2).

Discussion

The principle findings from this study were that TON note takers made more complete and accurate notes during a trial than freestyle note takers, that all note takers freely recalled more trial information than non-note takers, and that note access at retrieval (in comparison to no note access at retrieval) further enhanced the amount of trial information TON note takers freely recalled. Note taking and note access at retrieval did not impact upon the accuracy of mock jurors' free recall or their ability to discriminate between true and false trial information on a recognition test. Each of these principle findings is now considered in turn.

Only Hope et al. (2014) have previously compared the completeness and accuracy of TON note takers and freestyle note takers notes. As in the present experiment, they found that the TON notes were more complete, in that they contained more correct trial information. The principle difference between TON notes and freestyle notes is that the former contain organisational cues. These cues appear in the form of headings outlining the trial proceedings with space beneath each to make notes. When students are provided with similar headings in

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

cued lecture notes they also record more lecture details than freestyle note takers (e.g., Cohn et al., 1995; Kiewra et al., 1989, 1991, 1995). Kiewra et al. (1991) argue that organisational cues help focus students' attention on lectures and the spaces provided for note taking beneath each heading entices them to make notes. It seems likely that the TON's organisational cues in the present experiment had a similar impact upon mock jurors.

A difference between the current findings and those of Hope et al. (2014) is that their TON note takers showed no increase in note taking accuracy whereas those in the current study did. Their null effect was likely caused by ceiling effects as accuracy rates were 99% for freestyle note takers and 98% for TON note takers. In the present experiment, accuracy ranged from 93% to 97%, meaning there were more errors (although error rates were still small). Our findings therefore extend those of Hope et al. by demonstrating that TON's can improve note taking accuracy when error rates are slightly higher amongst mock jurors.

Freestyle note takers in the present experiment freely recalled more trial information than non-note takers, which is consistent with previous studies in the literature (e.g., Fitzgerald, 2000; ForsterLee & Horowitz, 1997; Hope et al., 2014; Rosenhan et al., 1994). Similar to ForsterLee et al. (1994), it was also found that freestyle note access at retrieval offered no additional recall enhancement. A new finding here is that TON note takers without note access at retrieval freely recalled more trial information than non-note takers but as much information as freestyle note takers. As similar enhancements were observed in the absence of notes at retrieval, this suggests that both freestyle and TON note taking facilitate the encoding of trial information and that they do so to an equivalent degree. Although not tested directly, this pattern of results is consistent with the suggestion note taking enhances encoding as it encourages generative processing of the presented information (e.g., Bretzing & Kulhavy, 1979; DiVesta & Gray, 1972; Peper & Mayer, 1978, 1986) so that it is stored in memory in a meaningful and organised way (Wittrock, Marks, & Doctorow, 1975; Wittrock,

1
2
3 1992). This then results in a more elaborate and deeper encoding of the presented information
4
5 so that durable memory traces are created and recall is enhanced (Craik & Lockhart, 1972;
6
7 Craik & Tulving, 1975; Kiewra, 1985; Wittrock & Carter, 1975). This meaningful and
8
9 organised storage of information also benefits retrieval, as retrieval of one piece of
10
11 information can cue the recall of other related pieces of information and this further enhances
12
13 recall (Mayer, 1984, 1996; Tulving, 1983).
14
15

16 The present experiment also found that TON note takers who had access to their notes
17
18 at retrieval recalled more trial information than freestyle note takers, which is consistent with
19
20 the findings of Hope et al. (2014). We extend this finding by demonstrating that TON note
21
22 takers with note access also outperform TON note takers without note access. This suggests
23
24 that TON note taking can enhance recall to a degree that is greater than freestyle note taking
25
26 and that access to organised notes is required if TON's are to produce this additional recall
27
28 enhancement. These findings are consistent with the work of Kiewra et al. (1991) who
29
30 examined the benefits of cued note taking and note access on student's recall of lectures.
31
32 Kiewra et al. argued this retrieval enhancement occurs for two reasons. First, that cued note
33
34 takers have access to more studied information than freestyle note takers at retrieval and can
35
36 use this additional information to provide more complete responses during memory tests.
37
38 Second, and in line with the encoding-specificity principle (see Thomson & Tulving, 1970;
39
40 Tulving, 1983), the topic headings within the notes can act as powerful retrieval cues that
41
42 enhance recollection of the lectures.
43
44
45
46

47 In both the present experiment and Hope et al. (2014), note takers free recall of trial
48
49 information was more accurate than that of non-note takers. This effect, however, was only
50
51 significant in the latter study and was equivalent for freestyle and TON note takers. Error
52
53 rates were, however, quite low in both studies. Note taking also offered no advantage in terms
54
55 of discriminating between true and false trial information on a recognition test and does not
56
57
58
59
60

1
2
3 bias recognition test responses. It is perhaps not entirely unexpected that note taking had no
4
5 impact upon recognition test accuracy as research from the educational psychology literature
6
7 suggests any enhancements that arise as a result of freestyle note taking (Kobayashi, 2005)
8
9 and TON-style cued note taking (Cohn et al., 1995; Kiewra et al., 1988) are small. Kobayashi
10
11 suggests such small effects are consistent with the encoding-specificity principle (Thomson
12
13 & Tulving, 1970; Tulving, 1983) as recognition tests provide participants with
14
15 questions/statements/response options that overlap with information presented at encoding
16
17 and this overlapping information acts as a powerful retrieval cue for non-note takers that
18
19 facilitates their recognition so that it is almost at the level of note takers. In the present study,
20
21 the recognition test statements were quite detailed, so it is possible that they provided
22
23 powerful retrieval cues for non-note takers and that any beneficial effects of note taking/note
24
25 access were nullified.
26
27

28
29 ForsterLee et al. (1994) did not consider why access to freestyle notes at retrieval
30
31 offered no additional recall enhancement in their study. The same finding appeared here,
32
33 suggesting the effect is robust. There are several possibilities for this but all are speculative.
34
35 One possibility is that the freestyle note taking encouraged generative processing but that the
36
37 volume of notes taken was no greater than that which was already stored in memory.
38
39 Alternatively, the freestyle notes may have been poorly organised, meaning the relevant
40
41 information within them was difficult to locate during retrieval. In support of this, Rosenhan
42
43 et al. (1994) have demonstrated that mock jurors with the most organised freestyle notes have
44
45 the greatest recall of trial information.
46
47

48
49 There are several additional findings of interest in the present experiment. 46.15% of
50
51 participants returned a guilty verdict which is consistent with previous studies using this trial
52
53 video (e.g., Pritchard & Keenan, 1999, 2002; Ruva & McEvoy, 2008). Participants were quite
54
55 confident ($M = 67.69\%$) and satisfied ($M = 65.29\%$) with their verdict and, consistent with
56
57
58
59
60

1
2
3 Hope et al. (2014), these scores did not differ across the conditions. Participants believed they
4
5 could remember 68.76% of the trial and this did not differ by condition. This replicates an
6
7 earlier finding by Hope et al. and suggests participants overestimate their own ability to recall
8
9 trial information. Focussing on the note takers specifically, the vast majority (92.23%) felt
10
11 note taking helped them to remember the trial and three quarters (76.47%) felt note taking
12
13 helped them to reach a verdict. These beliefs were not predicted by the note taking condition
14
15 participants were in. This former result differs to that of Hope et al. who found that TON note
16
17 taking was rated as more helpful than freestyle note taking.
18
19

20
21 This study has a number of limitations that affect its external validity. The trial footage
22
23 used here lasted 30 min but real trials often run for several days. For example, the average
24
25 length of a criminal trial in the US is five days (U.S. Department of State, 2009). Note taking
26
27 behaviours may well differ over extended periods of time but this issue has yet to be
28
29 investigated. Real trials also place more demands on memory as they contain a larger amount
30
31 of evidence, arguments, and judicial instructions. The present study may therefore be
32
33 overestimating the memory performance of non-note takers and note taking may prove more
34
35 beneficial in real trials when the volume of information to be remembered is greater. These
36
37 shortcomings, however, affect the literature as a whole (see Bornstein, 1999, & Studebaker et
38
39 al. 2002, for a discussion of these issues and others). A further limitation is that memory was
40
41 studied at the level of the individual juror only. In real trials, jurors collaboratively retrieve
42
43 trial information during deliberation. The impact of note taking style and note access at
44
45 retrieval on recall during deliberations is unknown. On the few occasions when collaborative
46
47 remembering has been examined in the literature, homogenous groups of freestyle note takers
48
49 (with note access) and non-note takers have been compared (e.g., ForsterLee et al., 2005).
50
51 Real deliberations may contain jurors who opt to take notes and those who opt not to take
52
53 notes. Note takers, and in particular the TON users with note access at retrieval, may have an
54
55
56
57
58
59
60

1
2
3 advantage over others during deliberation and this could potentially influence both retrieval
4
5 and verdicts. Future research needs to consider these issues.
6

7 This study makes both a theoretical and applied contribution to the literature. In terms of
8
9 the theoretical contribution, it has determined the point at which both freestyle note taking
10
11 and TON note taking enhance free recall of trial information and established that these
12
13 enhancements do not extend to recognition memory. In terms of the applied contribution,
14
15 these findings demonstrate that TON note takers produce more complete and accurate notes
16
17 than freestyle note takers, reaffirm the benefits of note taking as a memory aid during trials,
18
19 and shed light on the importance of note access at retrieval. As mentioned, jurors' notes are
20
21 sometimes confiscated by judges prior to deliberation and our findings suggest this has little
22
23 impact upon the recall of freestyle note takers but can prevent TON notes takers from
24
25 recalling as much trial information as they otherwise would. Recall completeness is important
26
27 as jurors can sometimes forget critical trial evidence and this can then lead to incorrect
28
29 verdicts being reached (e.g., Costabile & Klein, 2005, Experiment 3).
30
31
32
33

34 Whilst TON's are a recent development in the literature and are not currently used by
35
36 courts, judges are becoming increasingly open-minded about providing jurors with trial aids
37
38 that will enhance their comprehension and retention of trial information. Some of the aids
39
40 adopted by judges over the last decade include notebooks with background information about
41
42 the trial, lists of witnesses, a glossary of technical terms, and a flowchart of trial proceedings
43
44 (see Dann, Hans, & Kaye, 2007, for examples in US courts and Ogloff et al., 2006, for
45
46 examples in Australian and New Zealand courts). It therefore seems likely that TON's will be
47
48 utilised by courts in the near future and the results here suggest that any jurors using them
49
50 should be allowed note access during deliberation if the full benefits of this note taking style
51
52 are to be realised.
53
54
55
56
57
58
59
60

References

- 1
2
3
4
5 Austin, J. L., Lee, M. G., Thibeault, M. D., Carr, J. E., & Bailey, J. S. (2002). Effects of
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- Austin, J. L., Lee, M. G., Thibeault, M. D., Carr, J. E., & Bailey, J. S. (2002). Effects of guided notes on university students' responding and recall of information. *Journal of Behavioral Education, 11*, 243-254. doi:10.1023/A:1021110922552
- Bodenhausen, G. V. (1988). Stereotypic biases in social decision making and memory: testing process models of stereotype use. *Journal of Personality and Social Psychology, 55*, 726-737. doi:10.1037/0022-3514.55.5.726
- Bornstein, B. H. (1999). The ecological validity of jury simulations: Is the jury still out?. *Law and Human Behavior, 23*, 75-91. doi:10.1023/A:1022326807441
- Bourgeois, M. J., Horowitz, I. A., ForsterLee, L., & Grahe, J. (1995). Nominal and interactive groups: Effects of preinstruction and deliberations on decisions and evidence recall in complex trials. *Journal of Applied Psychology, 80*, 58-67. doi:10.1037/0021-9010.80.1.58
- Bretzing, B. H., & Kulhavy, R. W. (1979). Notetaking and depth of processing. *Contemporary Educational Psychology, 4*, 145-153. doi:10.1016/0361-476X(79)90069-9
- Bretzing, B. H., & Kulhavy, R. W. (1981). Note-taking and passage style. *Journal of Educational Psychology, 73*, 242 -250. doi:10.1037/0022-0663.73.2.242
- Cohn, E., Cohn, S., & Bradley Jr, J. (1995). Notetaking, working memory, and learning in principles of economics. *Journal of Economic Education, 291*-307. doi:10.2307/1182993
- Costabile, K. A., & Klein, S. B. (2005). Finishing strong: Recency effects in juror judgments. *Basic and Applied Social Psychology, 27*, 47-58. doi:10.1207/s15324834basp2701_5
- Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: A framework for memory

- 1
2
3 research. *Journal of Verbal Learning and Verbal Behavior*, 11, 671-684.
4
5 doi:10.1016/S0022-5371(72)80001-X
6
7
8 Craik, F. I., & Tulving, E. (1975). Depth of processing and the retention of words in episodic
9
10 memory. *Journal of Experimental Psychology: General*, 104, 268-294.
11
12 doi:10.1037/0096-3445.104.3.268
13
14 Dann, B. M., Hans, V. P., & Kaye, D. H. (2007). Can jury trial innovations improve juror
15
16 understanding of DNA evidence? *National Institute of Justice Journal*, 255, 2-6.
17
18 doi:10.1111/j.1740-1461.2007.00107.x
19
20
21 DiVesta, F. J., & Gray, G. S. (1972). Listening and note taking. *Journal of Educational*
22
23 *Psychology*, 63, 8-14. doi:10.1037/h0032243
24
25 Fitzgerald, J. M. (2000). Younger and Older Jurors The Influence of Environmental Supports
26
27 on Memory Performance and Decision Making in Complex Trials. *The Journals of*
28
29 *Gerontology Series B: Psychological Sciences and Social Sciences*, 55, 323-331.
30
31 doi:10.1093/geronb/55.6.P323
32
33
34 ForsterLee, L., & Horowitz, I. A. (1997). Enhancing juror competence in a complex trial.
35
36 *Applied Cognitive Psychology*, 11, 305-319. doi: 10.1002/(SICI)1099-0720(199708)
37
38 11:4<305::AID-ACP457>3.0.CO;2-J
39
40
41 ForsterLee, L., Horowitz, I. A., & Bourgeois, M. (1994). Effects of notetaking on verdicts
42
43 and evidence processing in a civil trial. *Law and Human Behavior*, 18, 567-578. doi:
44
45 10.1007/BF01499175
46
47
48 ForsterLee, L., Kent, L., & Horowitz, I. A. (2005). The cognitive effects of jury aids on
49
50 decision-making in complex civil litigation. *Applied Cognitive Psychology*, 19, 867-
51
52 884. doi: 10.1002/acp.1124
53
54
55 Gabbert, F., Memon, A., & Allan, K. (2003). Memory conformity: Can eyewitnesses
56
57
58
59
60

- 1
2
3 influence each other's memories for an event?. *Applied Cognitive Psychology*, *17*,
4
5 533-543. doi:10.1002/acp.885
6
7
8 Grabowski, B. L. (2004). Generative learning contributions to the design of instruction and
9
10 learning. In D. H. Jonassen (Ed.), *Handbook of Research on Educational*
11
12 *Communications and Technology* (2nd Ed., pp. 719-743). Mahwah, NJ: Lawrence
13
14 Erlbaum Associates
15
16
17 Hartley, J. (1976). Lecture handouts and student note-taking. *Programmed Learning and*
18
19 *Educational Technology*, *13*, 58-64. doi:10.1080/1355800760130208
20
21
22 Hope, L., Eales, N., & Mirashi, A. (2014). Assisting jurors: Promoting recall of trial
23
24 information through the use of a trial-ordered notebook. *Legal and Criminological*
25
26 *Psychology*, *9*, 316–331. doi:10.1111/lcrp.12003
27
28
29 Horowitz, I. A., & Bordens, K. S. (2002). The effects of jury size, evidence complexity, and
30
31 note taking on jury process and performance in a civil trial. *Journal of Applied*
32
33 *Psychology*, *87*, 121-130. doi:10.1037/0021-9010.87.1.121
34
35
36 Horowitz, I. A., & ForsterLee, L. (2001). The effects of note-taking and trial transcript access
37
38 on mock jury decisions in a complex civil trial. *Law and Human Behavior*, *25*, 373-
39
40 391. doi: 10.1023/A:1010655602400
41
42
43 Kassin, S. M., & Wrightsman, L. S. (1979). On the requirements of proof: The timing of
44
45 judicial instruction and mock juror verdicts. *Journal of Personality and Social*
46
47 *Psychology*, *37*, 1877-1887. doi:10.1037/0022-3514.37.10.1877
48
49
50 Kiewra, K. A. (1989). A review of note-taking: The encoding-storage paradigm and beyond.
51
52 *Educational Psychology Review*, *1*, 147-172. doi:10.1007/BF01326640
53
54
55
56
57
58
59
60

- 1
2
3 *effects of notetaking format and study technique on performance*. Paper presented at
4
5 the annual meeting of the American Educational Research Association, San
6
7 Francisco.
- 8
9
10 Kiewra, K. A., Benton, S. L., Kim, S. I., Risch, N., & Christensen, M. (1995). Effects of
11
12 note-taking format and study technique on recall and relational performance.
13
14 *Contemporary Educational Psychology*, 20, 172-187. doi:10.1006/ceps.1995.1011
15
- 16 Kiewra, K. A., DuBois, N. F., Christian, D., & McShane, A. (1988). Providing study notes:
17
18 Comparison of three types of notes for review. *Journal of Educational Psychology*,
19
20 80, 595-597. doi:10.1037/0022-0663.80.4.595
21
- 22 Kiewra, K. A., DuBois, N. F., Christian, D., McShane, A., Meyerhoffer, M., & Roskelley, D.
23
24 (1991). Note-taking functions and techniques. *Journal of Educational Psychology*, 83,
25
26 240-245. doi:10.1037/0022-0663.83.2.240
27
- 28 Kobayashi, K. (2005). What limits the encoding effect of note-taking? A meta-analytic
29
30 examination. *Contemporary Educational Psychology*, 30, 242-262. doi:10.1016/
31
32 j.cedpsych.2004.10.001
33
- 34 Kobayashi, K. (2006). Combined Effects of Note-Taking/-Reviewing on Learning and the
35
36 Enhancement through Interventions: A meta-analytic review. *Educational*
37
38 *Psychology*, 26, 459-477. doi:10.1016/j.cedpsych.2004.10.001
39
- 40 Lloyd-Bostock, S. (2007). The jubilee line jurors: Does their experience strengthen the
41
42 argument for judge-only trial in long and complex fraud cases. *Criminal Law Review*,
43
44 255-273.
45
- 46 Matthews, R., Hancock, L., & Briggs, D. (2004) Jurors' perceptions, understanding,
47
48 confidence and satisfaction in the jury system: A study in six courts. Findings. (p.
49
50 227). London: Home Office.
51
- 52 Mayer, R. E. (1984). Aids to text comprehension. *Educational Psychologist*, 19, 30-42. doi:
53
54
55
56
57
58
59
60

Juror Memory

32

10.1080/00461528409529279

Mayer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review*, 8, 357–371. doi:10.1007/BF01463939

Ministry of Justice. (2014). *Increase in the age limit for jury service in England & Wales*.

Retrieved from www.parliament.uk/documents/impact-assessments/IA14-03H.pdf

Morgan, C. H., Lilley, J. D., & Boreham, N. C. (1988). Learning from lectures: The effect of varying the detail in lecture handouts on note-taking and recall. *Applied Cognitive Psychology*, 2, 115-122. doi:10.1002/acp.2350020203

Ogloff, J.P.R., Clough, J., Goodman-Delahunty, J., & Young, W. (2006). *The jury project: stage 1-A survey of Australian and New Zealand judges*. Melbourne, Australia: Australian Institute of Judicial Administration Incorporated.

Pennington, N., & Hastie, R. (1988). Explanation-based decision making: Effects of memory structure on judgment. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14, 521-533. <http://dx.doi.org/10.1037/0278-7393.14.3.521>

Peper, R. J., & Mayer, R. E. (1978). Note taking as a generative activity. *Journal of Educational Psychology*, 70, 514-522. doi:10.1037/0022-0663.70.4.514

Peper, R. J., & Mayer, R. E. (1986). Generative effects of note-taking during science lectures. *Journal of Educational Psychology*, 78, 34-38. doi:10.1037/0022-0663.78.1.34

Pritchard, M. E., & Keenan, J. M. (1999). Memory monitoring in mock jurors. *Journal of Experimental Psychology: Applied*, 5, 152 -168. doi:10.1037/1076-898X.5.2.152

Pritchard, M. E., & Keenan, J. M. (2002). Does jury deliberation really improve jurors' memories?. *Applied Cognitive Psychology*, 16, 589-601. doi:10.1002/acp.816

Rosenhan, D. L., Eisner, S. L., & Robinson, R. J. (1994). Notetaking can aid juror recall. *Law and Human Behavior*, 18, 53-61. doi:10.1007/BF01499143

Juror Memory

33

- 1
2
3 Ruva, C. L., & McEvoy, C. (2008). Negative and positive pretrial publicity affect juror
4
5 memory and decision making. *Journal of Experimental Psychology: Applied*, *14*, 226-
6
7 235. doi:10.1037/1076-898X.14.3.226
8
9
10 Stanislaw, H., & Todorov, N. (1999). Calculation of signal detection theory measures.
11
12 *Behavior Research Methods, Instruments, & Computers*, *31*, 137-149. doi:
13
14 10.3758/BF03207704
15
16 Studebaker, C. A., Robbennolt, J. K., Penrod, S. D., Pathak-Sharma, M. K., Groscup, J. L., &
17
18 Devenport, J. L. (2002). Studying pretrial publicity effects: New methods for
19
20 improving ecological validity and testing external validity. *Law and Human Behavior*,
21
22 *26*, 19-41, doi: 10.1023/A:1013877108082
23
24
25 Thomson, D. M., & Tulving, E. (1970). Associative encoding and retrieval: Weak and strong
26
27 cues. *Journal of Experimental Psychology*, *86*, 255-262. doi:10.1037/h0029997
28
29
30 Thorley, C. (2013). Memory conformity and suggestibility. *Psychology, Crime & Law*, *19*,
31
32 565-575. doi:10.1080/1068316X.2011.648637
33
34
35 Tulving, E. (1983). *Elements of Episodic Memory*. Oxford: Clarendon Press.
36
37
38 U.S. Department of State, Bureau of International Information Programs (2009). Anatomy of
39
40 a Jury Trial. *eJournal USA*, *7*. Retrieved from [http://photos.state.gov/libraries/
41
42 amgov/30145/publications-english/EJ-jury-0709.pdf](http://photos.state.gov/libraries/amgov/30145/publications-english/EJ-jury-0709.pdf)
43
44
45 Wittrock, M. C. (1992). Generative learning processes of the brain. *Educational
46
47 Psychologist*, *27*, 531-541. doi:10.1207/s15326985ep2704_8
48
49
50 Wittrock, M. C., & Carter, J. F. (1975). Generative processing of hierarchically organized
51
52 words. *The American Journal of Psychology*, 489-501. Retrieved from
53
54 <http://www.jstor.org/stable/1421780>
55
56
57 Wittrock, M. C., Marks, C., & Doctorow, M. (1975). Reading as a generative process.
58
59
60 *Journal of Educational Psychology*, *67*, 484-489. doi:10.1037/h0077017

1
2
3 Wright, D. B., Self, G., & Justice, C. (2000). Memory conformity: Exploring misinformation
4 effects when presented by another person. *British Journal of Psychology*, 91, 189-
5
6
7 202. doi: 10.1348/000712600161781
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For Peer Review Only

Footnotes:

¹Completeness is determined by dividing the number of correct details a participant recalls by the possible number of correct details they could have recalled. For example, if there are 100 pieces of evidence presented during a trial and a person correctly recalls 50 of these, then this is 50% completeness. Accuracy is calculated by dividing the number correct details a participant recalls by the total number of details they recalled (including errors). For example, if person recalled 50 pieces of trial information correctly and makes 10 errors, then this is 83% accuracy.

²Research from the educational psychology literature suggests that being given a fixed period to time to review notes prior to a memory test can enhance recall of lectures (see Kobayashi, 2006, for a meta-analysis). Note reviewing is suggested to help learners consolidate noted information and relearn forgotten information (DiVesta & Gray, 1972). Reflecting the experience of real jurors, participants in ForsterLee et al.'s (1994) juror recall study were not provided with a set period of time to review their notes prior to the memory test. The benefits of note reviewing on juror recall are currently being explored by the lead author (CT).

³For several of the questionnaire analyses, the degrees of freedom are lower than anticipated. This is a result of participants making no response to the questions.

Appendices

Table 1

The proportion of trial information correctly noted and the proportion of notes taken that were accurate in the freestyle (FS) and trial-ordered-notebook (TON) conditions when notes were either unavailable (- Access) or available (+ Access) during subsequent memory testing. Standard Deviations (SD) and 95% Confidence Intervals appear in parentheses.

<u>Note Taking Condition</u>	<u>Note Completeness</u>		<u>Note Accuracy</u>	
	<u>M, SD</u>	<u>95% CI</u>	<u>M, SD</u>	<u>95% CI</u>
<i>FS - Access</i>	.14 (.08)	[.11, .17]	.94 (.05)	[.92, .95]
<i>FS + Access</i>	.16 (.04)	[.14, .17]	.93 (.05)	[.92, .95]
<i>TON - Access</i>	.26 (.07)	[.23, .28]	.97 (.02)	[.96, .98]
<i>TON + Access</i>	.26 (.09)	[.22, .30]	.96 (.03)	[.95, .97]

Running head: Juror Memory

37

Table 2

The proportion of correct trial details recalled, the accuracy of all trial details recalled, and the recognition test hits, false alarms, d', and C scores for non-note takers, freestyle (FS) note takers and trial-ordered-notebook (TON) note takers when notes were either unavailable (- Access) or available (+ Access) during memory testing. Standard Deviations (SD) and 95% Confidence Intervals appear in parentheses.

Note Taking Condition	Recall Completeness		Recall Accuracy		Recognition Hits		Recognition False Alarms		Recognition d'		Recognition C	
	<i>M, SD</i>	<i>95% CI</i>	<i>M, SD</i>	<i>95% CI</i>	<i>M, SD</i>	<i>95% CI</i>	<i>M, SD</i>	<i>95% CI</i>	<i>M, SD</i>	<i>95% CI</i>	<i>M, SD</i>	<i>95% CI</i>
No Notes	.07 (.04)	[.06, .09]	.88 (.08)	[.85, .92]	.78 (.12)	[.74, .83]	.24 (.13)	[.19, .29]	1.60 (.72)	[1.31, 1.89]	-.03 (.23)	[-.13, .06]
FS - Access	.11 (.04)	[.10, .13]	.93 (.13)	[.87, .98]	.79 (.13)	[.74, .85]	.23 (.09)	[.19, .27]	1.69 (.65)	[1.42, 1.94]	-.06 (.25)	[-.16, .04]
FS+ Access	.12 (.05)	[.10, .14]	.93 (.07)	[.90, .95]	.78 (.15)	[.72, .84]	.21 (.10)	[.17, .25]	1.73 (.71)	[1.44, 2.02]	-.01 (.29)	[-.13, .10]
TON - Access	.12 (.05)	[.10, .14]	.94 (.08)	[.91, .97]	.80 (.11)	[.76, .85]	.23 (.13)	[.17, .28]	1.73 (.66)	[1.46, 2.00]	-.05 (.26)	[-.15, .05]
TON+ Access	.18 (.10)	[.14, .22]	.95 (.09)	[.93, .97]	.79 (.11)	[.74, .83]	.22 (.11)	[.18, .27]	1.67 (.69)	[1.39, 1.95]	-.01 (.21)	[-.10, .07]