The British Psychological Society

Research Board

Guidelines on Memory and the Law

Recommendations from the Scientific Study of Human Memory

A Report from the Research Board
June 2008

Contents

If you have problems reading this document and would like it in a different format, please contact us with your specific requirements.

Tel: 0116 252 9523; E-mail: P4P@bps.org.uk.

ISBN 978-1-85433-473-2

Printed and published by the British Psychological Society 2008.

The British Psychological Society
St Andrews House, 48 Princess Road East, Leicester LE1 7DR, UK
Telephone 0116 254 9568 Facsimile 0116 247 0787
E-mail mail@bps.org.uk Website www.bps.org.uk

Incorporated by Royal Charter Registered Charity No 229642

Executive summary

These guidelines are derived from a review of the scientific study of human memory and a detailed consideration of the relevant legal issues including the role of expert evidence. The purpose of the guidelines is to provide those involved in legal work (criminal and civil) with an accessible an0d scientifically accurate basis from which to consider issues relating to memory as these arise in legal settings. The key points are summarised on the page following.

The text that follows the key points overviews the relevant evidence and provides recommended reading for those who wish to follow up any of the points individually. Also provided for each section is a list of more technical references to some of the most relevant scientific studies and findings.

The study of human memory has made considerable advances in recent decades and we now have a much stronger and empirically informed understanding of memory. Current theoretical thinking is at a stage that supports probabilistic but not absolute statements.

The guidelines and key points should then be taken as they are intended – as guidelines and not absolute statements. Because they are based on widely agreed and acknowledged scientific findings they provide a far more rigorously informed understanding of human memory than that available from commonly held beliefs. In this respect they give courts a much firmer basis for accurate decision-making.

Acknowledgements

The meetings of the working party, preparation of the report, and publication, were supported by the Research Board of the British Psychological Society.

Martin A. Conway was supported by the award of a Professorial Fellowship from the UK Economic and Social Research Council (ESRC), RES-051-27-0127.

Emily A. Holmes was supported by the award of a Royal Society Dorothy Hodgkin Fellowship and a grant from the Economic and Social Research Council, RES-061-23-0030.

Key points

i. **Memories are records of people's experiences of events and are not a record of the events themselves.** In this respect, they are unlike other recording media such as videos or audio recordings, to which they should not be compared.

ii. **Memory is not only of experienced events but it is also of the knowledge of a person's life, i.e. schools, occupations, holidays, friends, homes, achievements, failures, etc.** As a general rule memory is more likely to be accurate when it is of the knowledge of a person's life than when it is of specific experienced events.

iii. **Remembering is a constructive process.** Memories are mental constructions that bring together different types of knowledge in an act of remembering. As a consequence, memory is prone to error and is easily influenced by the recall environment, including police interviews and cross-examination in court.

iv. **Memories for experienced events are always incomplete.** Memories are time-compressed fragmentary records of experience. Any account of a memory will feature forgotten details and gaps, and this must not be taken as any sort of indicator of accuracy. Accounts of memories that do not feature forgetting and gaps are highly unusual.

v. **Memories typically contain only a few highly specific details.** Detailed recollection of the specific time and date of experiences is normally poor, as is highly specific information such as the precise recall of spoken conversations. As a general rule, a high degree of very specific detail in a long-term memory is unusual.

vi. **Recall of a single or several highly specific details does not guarantee that a memory is accurate or even that it actually occurred.** In general, the only way to establish the truth of a memory is with independent corroborating evidence.

vii. **The content of memories arises from an individual's comprehension of an experience, both conscious and non-conscious.** This content can be further modified and changed by subsequent recall.

viii. **People can remember events that they have not in reality experienced.** This does not necessarily entail deliberate deception. For example, an event that was imagined, was a blend of a number of different events, or that makes personal sense for some other reason, can come to be genuinely experienced as a memory, **(these are often referred to as 'confabulations').**

ix. **Memories for traumatic experiences, childhood events, interview and identification practices, memory in younger children and older adults and other vulnerable groups all have special features.** These are features that are unlikely to be commonly known by a non-expert, but about which an appropriate memory expert will be able to advise a court.

x. **A memory expert is a person who is recognised by the memory research community to be a memory researcher.** It is recommended that, in addition to current requirements, those acting as memory expert witnesses be required to submit their full curriculum vitae to the court as evidence of their expertise.

Contributors

The Memory & The Law Committee
A Working Party of the Research Board of The British Psychological Society (BPS)

Members

Dr C. Brown, University of Leeds

Dr S.J. Brown, University of Coventry

Professor M.A.Conway, University of Leeds **(Chair)**

Dr J.A.Ellis, University of Reading

Dr R. Holliday, University of Kent at Canterbury

Dr E.A. Holmes, University of Oxford

Dr A.Madill, University of Leeds

Dr L. Morrison-Coulthard, Scientific Administrator, BPS

Dr C.J.A. Moulin, University of Leeds

Dr D.G. Pearson, University of Aberdeen

Dr D.B. O'Connor, University of Leeds

Mr V. Robinson, QC, London

Mr M. Shorrock, QC, London

Professor D.B. Wright, Florida International University

Ms S.C. Wright, Barrister, Sheffield

Advisors

Professor C. Brainerd, Cornell University, USA

Professor W.F. Brewer, University of Illinois, USA

Professor R.A. Bryant, University, New South Wales, Australia

Dr T. Dalgleish, MRC Cognition & Brain Sciences Unit, Cambridge, UK

Professor G.S. Goodman, University of California, Davis, USA

Professor M. Goldsmith, University of Haifa, Israel

Professor H.Hayne, University of Otago, New Zealand

Professor A. Koriat, University of Haifa, Israel

Professor E.F. Loftus, University of California, Irvine, USA

Dr C. Loveday, University of Westminster, UK

Professor V. Reyna, Cornell University, USA

Dr A. Waterman, University of Leeds, UK

1. Background and overview[1]

In legal cases memory may feature prominently as the main or as the only source of evidence. In such cases, evaluating accounts put forward as memories is nearly always critical to the course and outcome of the case or litigation.

The law generally is unaware of the findings from the scientific study of human memory. Consequently, courts and hearings typically cannot take advantage of these findings and use them to inform their decision-making. Most importantly, courts/hearings cannot draw upon a scientifically informed understanding of human memory during the process of evaluating an account that claims to derive from a memory of an experienced event.

Currently the main way to deal with this problem, when a court/hearing acknowledges it as a problem, is to seek the advice of an expert. But this is often especially unsatisfactory, as many professionals are willing to act as memory expert witnesses, when this is not their area of expertise.

Another, even more problematic solution is to deny that the court/hearing needs any expert advice on issues relating to memory. The argument here is that as the jurors all have memories, they know enough about memory from the experience of their own memories to make reliable evaluations of accounts put forward as memories. Thus, the argument goes, evaluating a memory is a 'jury matter'. If this were the case then there would be little need for the scientific study of memory and we would all simply know how our memories work, their limitations, properties, and failings. As it is so palpably clear that there is no such understanding, then relying on uninformed evaluations of memory can only lead to unreliable judgements. This report is intended to help by providing those who have to make such judgements in criminal and civil proceedings with straightforward accounts of scientific findings and thinking about the nature of memory and memories.

Please note: to assist the reader, all references are numbered by section and listed, with their number, in alphabetical order in the general reference section.

Suggestions for recommended reading are stated in full at the end of sections and also listed in the general reference section.

---

[1] For more general advice on expert witnesses the reader is referred to: *Psychologists as Expert Witnesses: Guidelines and Procedures for England and Wales.* Final Report August 2007. The British Psychological Society Expert Witness Working Party.

This can be accessed at: http://www.bps.org.uk/the-society/organisation-and-governance/professional-practice-board/ppb-activities/wpresources/expwit.cfm

2. Legal considerations

2.i THE LEGAL CONTEXT

The general rule as to experts

Expert evidence is only admissible in order to provide the court/hearing with information that is likely to be outside the experience and knowledge of the judge or jury.

If, on the proven facts, a judge or jury may form their own conclusions without help, then the opinion of an expert is unnecessary

(see the case of *R v Turner (1974) 60 Cr.App.R .80*)

Determination as to competence

Whether or not a witness is competent to give evidence as an expert is a matter for the judge to determine.

(see *R v Silverlock (1894) 2QB 766*)

Recently, the courts have moved towards admitting what was previously held to be inadmissible, due to advances in science and techniques—for example, in the field of facial 'mapping'

(see *R v Clarke (R.L.) (1995) 2 Cr.App.R. 425*)

Scope of the evidence

An expert can give an opinion on 'the ultimate issue' but the judge will warn the jury that they are not bound by the opinion of an expert and the issue remains one for them to decide.

If the outcome of a trial/hearing depended exclusively or almost exclusively on a serious disagreement between distinguished and reputable experts, it would often be regarded as unwise, and therefore unsafe, to proceed.

This was especially so in a field of learning in which experts were still 'at the frontiers of knowledge' (e.g. cot deaths).

(see *R v Cannings (2004) 2 Cr.App R. 7*)

Medical Evidence as to Reliability

A psychiatrist's evidence is not admissible where its purpose is, in effect, to tell a jury how an ordinary person, not suffering from mental illness, is likely to react to the strains and stresses of life, even though that person might have an abnormal personality

(see *R v Weightman (1991) 92 Cr.App.R 291*)

If a witness is mentally capable of giving reliable evidence, it is for the jury, with all the warnings from counsel and the court/hearing which the law requires, to decide whether or not that witness is giving reliable evidence.

(see *R v Mackenney (1983) 76 Cr. App. R. 271*)

Where, however, a witness suffers from some disease, defect or abnormality of the mind, medical evidence is admissible to prove that the witness is unreliable as a result of suffering from that condition.

(see *Toohey v Metropolitan Police Commissioner (1965) A.C. 595*)

More recently it has been said that expert evidence would be admissible in those 'rare cases' in which a witness provided a description of early events containing an unrealistic amount of detail.

Such evidence would, however, be inadmissible where it sought to analyse the accuracy or otherwise of a statement made by the witness. (Such questions were critically for the jury, upon careful reflection on a claimed memory of distant childhood events.)

(see *R v S.; R v W. (2007) 2 All E.R. 974*)

Expert evidence may be given under this head by a psychologist with suitable expertise, notwithstanding that he/she has no medical qualifications

(see *R v Mackenney (1983) 76 Cr. App. R. 271*)

2.ii WHOM WILL THE GUIDELINES HELP?

(a) The Police

Interviewing vulnerable and intimidated witnesses requires particular care and skill. Police officers often undergo training in this area.

The problem for many interviewers is to extract a detailed, coherent and succinct account from the witness for later use in court/hearing but at a point when the police may be at an early stage in their investigation and need to explore what may later become peripheral issues.

We believe that guidelines on the questioning of children and vulnerable adults would be useful, for instance, to help interviewers to recognise what is a leading question and to take care not to influence a witness by a particular line of questioning.

(b) The Crown Prosecution Service

Usually, the decision whether or not to prosecute lies with the Crown Prosecution Service. This may require a lawyer to make an assessment as to the credibility of a witness or a complainant.

The assessment process might involve reading statements, viewing a recorded interview and considering other relevant information, such as a social services file or an opinion from a psychologist or a psychiatrist.

Guidelines will be of assistance in this important decision-making process.

(c) Defence solicitors

There is a duty, when defending, to explore all reasonable lines of defence. It is often the position that in cases of historic child sex abuse, the defence can do no more than say that the matters complained of simply did not occur.

As prosecutions are regularly, and often successfully, brought on no other evidence than the complainant's word, it will be useful for solicitors to have guidance on what they should look for when examining a complainant's reliability.

(d) Barristers

The Bar will derive similar benefit from such guidance.

Even where expert evidence on the matter would be inadmissible, it may nevertheless provide legitimate material for cross-examination or jury comment.

It is frequently the case that advocates highlight evidential inconsistencies in order to undermine the evidence of a witness. This is an area in which guidance would be extremely beneficial, especially on subjects such as the possible effect of a traumatic event upon witness consistency.

(e) Judges

The judiciary is understandably very supportive of the concept that, in general, juries are able to make their own judgments upon factual issues based upon their own collective experience.

However, there are occasions where judges are required to warn juries about the need for caution, for instance in relation to evidence of identification.

(see *R v Turnbull (1976) 63 Cr.App.R. 132*)

The former requirement that in sexual cases a jury should be directed to look for corroboration before convicting has been abolished.

In appropriate cases, however, the judge has discretion to warn a jury that they should exercise caution before convicting on the unsupported evidence of a complainant.

(see *R v Makanjuola (1995) 2 Cr.App.R. 469*)

It would only be appropriate to exercise this discretion if there were an evidential basis for suggesting that the witness might be unreliable.

In some cases it has been possible to adduce expert evidence on the potential unreliability of evidence on account of childhood amnesia but the Court of Appeal has emphasised that only rarely would such evidence be admissible

(*R v JH(2) TG (Deceased)(2005)EWCA Crim 1828*)

(*R v S: R v W (2006)EWCA Crim 1404*)

2.iii GOVERNMENT PROPOSALS

Following the responses to its Consultation Paper on changes to the law on rape, the Government has pointed to the desirability that juries should have information concerning the psychological reactions of rape victims. To this end, it has indicated that it will look for a fair way to present such information to juries other than through evidence presented by the prosecution or defence.

Although this is very much in the future, it is difficult to see how, within our adversarial system, such evidence might be adduced other than by the prosecution or the defence.

2.iv THE USE OF MEMORY EXPERT EVIDENCE

It may well be some time before memory evidence will be admissible in general terms. There is, however, a strong argument for providing jurors with expert guidance regarding the way in which memories are formed and subsequently constructed in acts of remembering.

It is hoped that the information contained in these guidelines will be of assistance to all those engaged in criminal trials and civil proceedings by offering an insight into credibility issues and by directing the mind to relevant areas of research.

2.v CHILDCARE PROCEEDINGS

In this area of law, the courts/hearings are more ready to admit memory evidence.

In proceedings under the Children Act 1989 there are frequently 'Finding of Fact' hearings, in which a judge has to determine whether a child has suffered or is likely to suffer significant harm.

In such cases, the standard of proving such allegations is the civil standard, that is to say, on a balance of probabilities.

Memory evidence may be of assistance in cases in which sexual abuse is alleged and where the court/hearing would want to be able to draw upon all available material in order to safeguard the welfare of a child.

Memory evidence may help the judge to understand how memories are laid down and what a child might or might not be expected to recall. It is, however, important that the expert does not usurp the judge's role by seeking to offer an opinion on the truthfulness of a witness.

Such evidence may also assist others involved in the process, including local authorities, those acting on behalf of parents and the Guardian acting for the child.

2.vi WHO IS A MEMORY EXPERT WITNESS?

It is ultimately the function of the judge to decide who is and is not a memory expert. However, some general guiding principles that could be used are as follows:

- A memory expert is someone whose expertise is recognised by their peers, i.e. other memory researchers.
- Recognition should usually be in the form of relevant outputs that are publicly verifiable, e.g. peer-reviewed publications, other publications, and presentations at professional meetings. Of these, peer-reviewed publications are the most important.

What a court should require of a memory expert-witness.

- The memory expert witness should be required by the court to provide a statement of their expertise in human memory and in legal proceedings. This should normally also involve, as a matter of routine, the submission of their full curriculum vitae to the court.
- That evidence must be available to the prosecution, defence, litigant, applicant or respondent.

The following will NOT normally constitute evidence of expertise in memory:

- Being a member of a professional society or societies, no matter how exalted, does not of itself make a person a memory expert.
- Teaching a course or several courses on memory at university or elsewhere also does not of itself ensure the required level of expertise.
- Having acted as a memory expert witness in the past does not make a person a memory expert.
- Listening, evaluating, interpreting, or advising on accounts of memories as part of one's professional activities does not of itself necessarily make a person a memory expert.
- Working in a forensic area does not confer memory expertise.

2.vii RECOMMENDED READING

Ormerod, D. (2006). Expert evidence: Where now? What next? *Archbold News,* Issue 5.

3. Psychological considerations

This section provides an outline of some of the characteristics and properties of human memory relevant to memory in legal contexts. First we list four key properties:

- **Memory is a record of a person's experience of reality.**

It is not a record of reality itself (as, for example, a video might be). An experience is a product of a mind interacting with reality. Thus, an experience, and a memory of it, always contain elements that are non-veridical, i.e. that originate from the experiencing person's own mind rather than from reality.

- **Memories are samples of experience.**

Memories for single, specific, one-moment-in-time experiences are time-compressed summary representations that contain samples of an experience. They are never a complete record of an experience. (Note: these types of memories are what memory researchers call *episodic memories*.)

- **Remembering is a constructive mental process.**

Remembering engages many different brain areas; brings together episodic and conceptual knowledge; features visual imagery; and can also include information from other modalities. Memories contain general knowledge of experiences and an understanding of the meaning of an experience. Thus, memory is not only about particular experienced events, but also includes more general autobiographical knowledge (schools, occupations, holidays, friends, homes, achievements, failures, etc.). Hence, memories may be wrong with regard to precise details and yet accurate with regard to more general contextual information.

- **Memories are part of the present moment; they are a part of 'now'.**

Memories are part of the cognitive, emotional, physical, social, cultural, historical, and belief context in which they are recalled, with all that entails.

- Because of these four fundamental properties human memory has a high potential for inaccuracy, particularly with respect to details although it is less prone to inaccuracy at more general levels.
- The extent to which a memory corresponds to reality is difficult to establish. Normally this can only be achieved, with any degree of certainty, by independent corroborating evidence.

3.i AUTOBIOGRAPHICAL MEMORY

In general the type of memory we are concerned with here is known as *autobiographical memory* (3.25). The current view is that autobiographical memories are mental constructions that consist of various types of information. Two important types of information are *episodic memories* and *autobiographical knowledge* (3.23).

> **Episodic memories** represent information derived from specific experiences, often in the form of visual mental images although other modalities may also feature, e.g. auditory, olfactory, haptic (touch), and even propriorception (body configuration), etc.
>
> **Autobiographical knowledge** represents factual and conceptual knowledge about a person's life, e.g. 'I went to St Bede's School'; 'I didn't like school'; 'I was good at English'; 'John Smith was my best friend'; and so on.

When a person recalls an autobiographical memory, then, these two types of long-term memory representation are brought together and a person consciously experiences episodic memories of specific aspects of the past and conceptual knowledge that acts as a personal context for the episodic memories, locating them in a person's life and providing a personal, self-relevant, meaning for them (3.15).

It is widely established that adult memories of specific events experienced after about the age of 10 years can be either, i) highly accurate (3.21); ii) highly inaccurate, and sometimes wholly false (3.22, 3.31, 3.32, 3.33, 3.35); or iii) include both accurate and inaccurate reports relating to different aspects of the same episode (3.24, 3.40, 3.41). For example, it has been found that some memories of traumatic events, such as memory for being in a concentration camp, memories of traumatic events from the second world, etc. are highly accurate, even many decades later, when evaluated against accounts taken close in time to the actual experience. Similarly, vivid memories of one's personal circumstances when learning of important and surprising items of public news – the assassination of JFK, the moon landing, the death of John Lennon, the space shuttle *Challenger* disaster, the resignation of Margaret Thatcher, 9/11, to name but a few – have also been found to be highly accurate and to persist over many years. Set against this are findings, for many of the same events, of wholly false memories and memories that are partly accurate but which contain clearly false details. These are false details of which the rememberer is unaware and when the impossibility is finally pointed out they are usually highly surprised about.

The references cited above provide many examples as well as formal research findings but one case which was recently reported, appropriately by a member of the legal professions, is highly illustrative and it is described here to provide a good example of how highly vivid memories can turn out to be wrong:

> A middle-aged man recalled his father distracting him when he was young boy (about four years old) by asking him who was the first man on the moon. He had been intensely interested in the moon landings when he was a young boy and this incident occurred while his father was on the telephone to his mother, who had just given birth to his younger brother. My informant had a vivid and fond memory of his father placating him in this way; he was highly agitated by the birth, and in his

memory he could 'see' his father on the telephone and almost 'hear' his voice. It was only decades later that he realised that his brother had been born in 1968, one year before the first moon landing.

So these significant public events can be remembered vividly, but not necessarily completely accurately.

The references listed below provide many examples of these types of memories and, it should also be noted, many examples of vivid memories that as far as it has been possible to establish are correct. Distinguishing between the true, wholly false and partly false vivid memories of healthy adults is impossible currently unless the content of the memories contains an obvious impossibility or contradiction. Even then such a distinction may not be possible. In the 'moon landing' memory just described it seems likely that the event recalled probably did occur but at an earlier or later date and on a different occasion and has been transposed in memory, for what reason we do not know, to a more significant date.

In normal populations, it is easy to induce major memory errors and wholly false memories (3.16, 3.24, 3.30, 3.32), to mislead witnesses about details of staged events, and to increase the confidence of others in the accuracy of a falsely reported memory (3.39). Here are two examples of how malleable and how misleading memory can be (note that these are merely illustrative examples from many different and convergent lines of research):

i. In one series of studies (3.30) university students were asked to take part in an experiment in which they were to recall childhood memories as best they could. In order to facilitate recall the researchers wrote to each student's parents and asked them to provide a short list of events from the student's childhood that they thought the student would remember. Students were presented with a brief description of each event and were asked if they remembered it. Unknown to the students, a false event that referred to attending a wedding and knocking over a bowl of punch was also inserted into the list. About one third of the students 'remembered' the false event and in subsequent recalls elaborated and integrated it with their other childhood memories. Moreover, when instructed to try to bring to mind visual images of each event as an aid to remembering it, even more students developed the false memory (an effect now known more generally as *'imagination inflation'*, 3.24, 3.32).

ii. In an experiment (3.14) that featured a mock trial of a bank robbery, mock jurors were asked to judge the credibility of the evidence of the witnesses. One set of witnesses described events simply and without any details. For example, the (mock) witness might state 'as the robber ran out of the bank I think he turned right and ran off down the street'. In another version the same witness (to a new mock jury) would state 'as the robber, who I remember was wearing a green jumper, ran out of the bank I think he turned right and ran off down the street'. This second version of events was rated as far more likely to be correct than the first. The effect is known as 'trivial persuasion' because by inclusion of a trivial or irrelevant but highly specific detail the perceived credibility of the evidence is markedly raised.

Trivial persuasion is often seen when witnesses provide verbatim recall of spoken utterances. In controlled experiments in the laboratory and in field studies of actual

witness memories it has been found that such recall is simply not possible. What is recalled of this nature is invariably wrong. All the evidence indicates that we remember the 'gist' or meaning of what is spoken and not the exact words. It does not follow from this that the memory that is described is itself wrong, but the recall of implausible details does raise questions about the nature and purpose of a memory so described. Often such descriptions appear to be related to beliefs about memory in both the rememberer and recipient (3.42).

For the above reasons the accuracy of memory is typically studied in the laboratory, where the conditions of learning and memory can be carefully controlled. The accuracy of specific memories formed in everyday life is much harder to judge, and can only be established with any confidence when there is independent evidence relating to the episode in question. Relevant corroborating evidence may include i) independent reports that the person was present and did indeed witness relevant aspects of the event, and ii) consistency of recall of core details over long periods of retention. While ii) represents weaker corroborating evidence than i), it can be viewed as a prerequisite for a judgment of reliable testimony. Finally, it should be noted that more general knowledge of a person's life is considered to be less prone to the inaccuracies known to be associated with memories for one-off, unique, episodic events (3.26, 3.27, 3.28).

3.ii ADULT MEMORY FOR CHILDHOOD

Adult recall of very early childhood experiences is subject to amnesia. Most adults can remember few memories for events experienced before about five years of age (3.45, 3.46). When memories of events occurring at this early point are recalled, rememberers typically describe their recollection as having the form of 'knowing' in a general way rather than remembering specific details (3.18). When adults recall their earliest memories, they frequently do not know whether what they have in mind is really a memory, something constructed from facts they have been told or based on photographs, or is a mental representation based on a family 'story' (3.13, 3.29, 3.35, 3.37). When fragmentary details are available, they are typically recalled in the absence of organising conceptual information for the event.

Most people remember little or nothing below the period of three years of age, a period which is known as the period of *childhood amnesia*. A few memories can typically be recalled from when the individual was aged 3–5 years, and more aged 5–7 years. However, it is not until the period of eight years or older that many memories can be recalled (3.45). And it is not until the age of about eight to10 years that memories begin to feature the more typical structure, content and organisation of adult memories (3.13).

Childhood memories have the following characteristics:

- They are usually enigmatic in nature and feature only a few details. The information that is recalled is isolated, not associated with other memories, and is often perplexing to the individual. Unlike memories from later in life, early childhood memories lack detailed conceptual frameworks linking them into the personal history of the individual in complex and meaningful ways.
- Early childhood memories have been found to be much more open to suggestibility than later childhood memories (3.19, 3.20).

- Children below the age of five years have many memories that cannot be recalled in adulthood.
- The period from birth to five years is characterised by rapid neurological development, especially to those areas of the brain that in adulthood will control learning and memory. At the same time there is equally rapid acquisition of language, concepts and understanding of the world, including social interaction. It is important to note that infants and young children have yet to acquire many of the concepts familiar to adults, including complex emotions such as guilt, embarrassment, and shame. It would therefore not be possible for a child younger than five years who lacked, for example, the concept of 'embarrassment' to have an original memory that contained features labeled by the term, although this might of course be added later in adulthood, perhaps for purposes of 'presenting' a memory (3.13).

Thus, when gauging the accuracy of childhood memories recalled by adults, and by children older than about 10 years, the following rules of thumb are recommended:

- Detailed and well-organised memories dating to events that occurred between seven to five years of age should be viewed with caution.
- Detailed and well-organised memories dating to events that occurred between five to three years of age should be viewed with considerable caution.
- All memories dating to the age of three years and below should be viewed with great caution and should not be accepted as memories without independent corroborating evidence.

In general the accuracy of memories dating to below the age of about seven years cannot be established in the absence of independent corroborating evidence.

3.iii CHILDREN RECALLING AUTOBIOGRAPHICAL MEMORIES (see also Section 4.1)

Although there is less research into children recalling their (childhood) memories, what research there is broadly supports the conclusions stated earlier. In addition the research also indicates that children when remembering are more influenced by suggestion than adults and the younger the child the more prone they are to this.

However, it is important to note that children aged four to five years have been found to have specific autobiographical memories for events dating back to when they were aged about three years (3.13). These memories typically consist of some visual images and some conceptual knowledge, as with adult memories, although they appear to be less detailed and less well organised than the memories of older children and adults. The evidence indicates that very few of these memories can be retrieved in adulthood (this is the phenomenon of 'childhood amnesia'). Research has also found that children do not have explicit recall of events dating to the preverbal period (about 24 months and younger). On the other hand there is some evidence that such (unretrievable and nonverbal) memories can (implicitly) influence behaviour in the verbal period. Thus, it is certainly possible for a child below the age of about seven years to explicitly recall at least some specific events from earlier years but not to the period below about three to two years of age.

Related to this two recent studies (3.13, 3.44) of children remembering childhood memories found the following:

- Older children, aged eight and nine years recalled about one third of a set of events known to have been experienced, and committed to memory, aged three. Seven-year olds, however, recalled about 60 per cent of these distinctive childhood events. *Demonstrating considerable forgetting in the older group of children.*
- Older children recalled far more details of recent events than the younger children. *Indicating a more adult form of remembering from about nine years onwards.*
- Six- to nine-year-olds recalled earlier memories than 10- to 19-year-olds, *again showing forgetting in the older children.*
- Importantly, 10- to 19-year-olds recalled more negative events than the younger *children. The implication being that younger children have difficulty in recalling negative experiences.*

These findings lead to the conclusion that by approximately nine to 10 years of age children have autobiographical memories that are adult in nature.

Finally, it should also be noted that the memories of children, like those of adults, retain aspects of experience that were self-relevant to the child when the experience was first encoded into memory. Relevant to this is the distinction between central and peripheral information/details. Children will not always focus on the same aspects of an event as an adult, i.e. what adults view as an important detail may not be important to a child and thus the child may not remember it. This can sometimes lead to frustration/confusion in police interviews with children. Set against this, however, is the fact that a child's knowledge and comprehension of the world are undergoing rapid expansion, as is the way knowledge is represented and organised in long-term memory. Thus, the sort of knowledge present in adult memories and the way that knowledge is organised within a memory and related to other memories and other knowledge in long-term memory will not be the same for a child as it is for the adult. We should not then expect childhood memories recalled by children who are about seven to eight years old or younger to parallel in organisation and content the memories of adults. Indeed, the organisation and content of childhood memories recalled by children will be determined by their knowledge and understanding at the time of an experience. This conclusion leads to an important consideration when attempting to judge whether an account of the past by a child is based on the recall of memories or not:

- Childhood memories recalled by children should NOT contain knowledge that the child would not have had at the time. If they do then this is knowledge that has been added in at a later date. (Although, of course, a child who has been sexually abused and is able to remember the abuse may show knowledge of certain acts that few other children of their age would show.)

For example, a memory of feeling guilty at, say, age three is almost certainly false as children at this age have yet to develop this feeling (although they may have precursors of it) and, moreover, have yet to learn the word 'guilty'. Similarly recalling the duration of events, complex reasoning, thoughts and details such as handedness, are most unlikely for events dating to below five to seven years of age. Of course, such details may all be added in later, on the basis of inference.

3.iv MEMORY FOR REPEATED EVENTS

When people repeatedly experience the same or a similar event it is generally accepted that they form a *general* mental representation of the event in long-term memory. These general representations may take different forms but together they are termed: *schema*.

People have schema for a very wide range of events from *having breakfast* to *going on holiday*. The classic example schema used in the memory literature is that of *going to a restaurant*. The schema of *going to a restaurant* has certain features that are common to very many schema:

- There is a predetermined set series of actions that frequently occur, usually with only minor variations. For instance, *enter the restaurant*, *wait to be seated*, *order drinks*, *study the menu*, and so on.
- There are fixed locations and objects such as menus, tables, chairs, the cashier's till, etc.
- There are people (termed 'actors') common to the script. In our restaurant example these would be waiters, customers, and possibly a proprietor and chef.
- The actors have predefined roles and predetermined actions.

A schema then is not a memory of a single experience or event. Rather it is a general mental representation derived from many similar experiences. It is essentially a prediction about how a particular event should unfold overtime.

Schema are especially useful as they reduce the processing load on us and allow us to conduct other activities, such as talking, thinking, socialising, etc. without having to constantly monitor and attend to the environment.

Despite the consensus on the existence and nature of schema there are in fact relatively few direct studies of their properties (3.17). Indeed, they are most often studied in the area of text comprehension and story understanding rather than in the abstraction of general mental representations from actual experience.

For present purposes the following should be noted:

- Schematic representations have some specific memories associated with them but there are usually relatively few of these. Memory for early experiences related to the schema, e.g. the first restaurant one went to, and most recent experiences too are often highly available for recall.
- Events in which something unusual occurred, something outside the predictions of the schema, are often highly memorable. For example, paying for one's meal before it is served (as occurs in some European motorway service stations).
- In general, however, schema function to prevent the detailed encoding of experience. In schematic events information is highly redundant and if an event proceeds fairly in line with the schema then there is no informational value in retaining a specific memory of that event. It seems that our memories have evolved to avoid storing what would be redundant information.

An important question is: *How many repeated experiences must one have before a schema is formed?* Unfortunately research currently offers no definitive answer to this question (but

see 3.17), although some studies have found evidence of schema formation after only a few repeated very similar experiences. In contrast, other research suggests that schema formation is one of the main memory tasks of childhood and takes place over a period of years.

Finally, if a person was recalling a repeated schematic event, what features would this have? There should be at least a few specific early and recent memories (with the same features as described earlier) and also any experiences in which the schema predictions failed should be well recalled. In the main, however, there would be a great deal of recall of what *usually* occurred, what objects were *usually* present, who was *usually* there, and what they usually did. This knowledge would not be linked to information about specific times and occurrences.

3.v THE EFFECTS OF DELAY/RETENTION INTERVAL

The retention interval is the period of time elapsed between an experience and its recall. Retention interval is one of the most powerful determinants of the durability of human memory (3.34). The issue of retention interval featured centrally in an important case, R v Powell (Michael John) (2006) EWCA Crim 3, where it was concluded that achieving best evidence (ABE) in a child witness was compromised by a nine-week delay between the alleged incident of abuse and the police video interview. It is important, therefore, that courts are aware of what the effects of retention interval on memory are in general and what factors can weaken or even overcome these effects.

The main effect of retention interval is forgetting. As the retention interval increases then progressively more information is lost until a memory is forgotten. Thus, to give an example, a person's recall of their breakfast this morning will be surprisingly good. Tomorrow they will remember little and next week almost certainly nothing at all. Unless, however, other factors intervene. Two important factors that act against the effects of retention interval are memory *vividness* and amount of *rehearsal*.

Memory vividness is determined by many factors, including comprehension and emotion at the time of the experience, the personal significance of the experience, the extent to which it integrates with existing memories, and other factors also. Note that the effects of emotion generally upon memory are not covered in this report because there are many countervailing findings showing high emotion to lead to both accurate and inaccurate memories (see Section 3, above, on *flashbulb* memories). Thus, intense emotions within the normal range, although giving rise to vivid memories, do not appear to be selectively associated with raised levels of either memory accuracy or inaccuracy. Perhaps, the most extreme form of memory vividness is to be found in the psychological illness of *posttraumatic stress disorder* where the experience of trauma gives rise to the vivid 'reliving' of details of the trauma (see Section 5 below). Highly vivid memories are retained for long periods (over a full lifetime in some studies) and may be resistant to forgetting, or at least to the normal process of forgetting. It seems that the main property of vivid memories is their durability rather than their verisimilitude.

Rehearsal is one of the key mechanisms for retaining memories and knowledge. Talking and thinking about remembered experiences powerfully improves retention and confers resistance to forgetting. Nevertheless, it should be noted, and this is an especially

important point, that each instance of recall also offers an opportunity for distortion and error to be assimilated to a memory and, possibly, incorporated into it on a longer term basis.

Recommended reading

3.12 Baddeley, A.D. (1997). *Human memory: Theory and practice* (2nd rev. edn). Hove, Sussex: Psychology Press Ltd.

3.16 Brainerd, C.J. & Reyna, V.F. (2005). *The science of false memory.* NY: Oxford University Press.

3.25 Conway, M.A. & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self memory system. *Psychological Review, 107*, 261–288.

3.3.32 Loftus, E.F. (2005). Planting misinformation in the human mind: A 30-year investigation of the malleability of memory. *Learning & Memory, 12*, 361–366.

3.38 Roediger, H.L. Dudai, Y. & Fitzpatrick, S.M. (Eds.) (2007). *Science of memory: Concepts.* New York: Oxford University Press.

3.41 Schacter, D.L. (2001). *The seven sins of memory: How the mind forgets and remembers.* New York: Houghton Mifflin Co.

3.43 Strange, D. Clifasefi, S. & Garry, M. (2007). False memories (pp. 137–170). In M. Garry & H. Hayne (Eds.) *Do justice and let the sky fall: Elizabeth Loftus and her contributions to science, law and academic freedom.* Hillsdale NJ: Lawrence Erlbaum Associates.

The following websites also give important guidance on achieving best evidence:

Achieving the best evidence in criminal proceedings: Guidance for vulnerable and intimidated witnesses, including children (Home Office 2000)
http://www.cps.gov.uk/publications/docs/Achieving_Best_Evidence_FINAL.pdf
http://www.homeoffice.gov.uk/documents/achieving-best-evidence/

The Youth Justice & Criminal Evidence Act 1999 – applies to use of special measures in court; came into force in 2001
http://www.opsi.gov.uk/acts/acts1999/ukpga_19990023_en_1

3.vi SOURCE/REALITY MONITORING

A pervasive and widespread memory error is that of the misattribution of the source of a memory. Source memory refers to knowledge of the origin of a memory; that is, whether a person acted or watched someone else act, witnessed an event or imagined an event, heard someone say something or read about it, and so on.

Reality monitoring is a specific type of source memory that describes our ability to discriminate between internal (e.g. imagined) and external (e.g. seen or heard) events. Confusion or errors in reality monitoring lead to false memories by, for example, incorporating one's thoughts with the perceptual details of an actual event thereby confusing imagination with actual perception (3.vi.4).

- We make records of our internal events (such as dreams, thoughts, imaginings) and of our perceptions of external events and are not able to make perfect discriminations between these two events. This means that accurate recall of an actual event may be contaminated by details that originate solely from our thoughts, wishes, or imaginings.
- Our decisions about the origin or source of an event that we 'remember' are made on the basis of various qualities of that memory, e.g. perceptual, conceptual, emotional, contextual details. When a high amount of detail can be recalled this usually leads to a decision that the event must have happened as remembered. This can influence our judgments not only of the veridicality of our own memories but also that of the memories of others (3.vi.3).
- However, we also evaluate the details that we remember in terms of their plausibility (e.g. if they are consistent with other available information then we tend to accept their veridicality; if they are not then we would reject them) and their realism (e.g. if they are bizarre then we are likely to reject them). We also take account of
  (i) the importance of our decisions, adopting stricter criteria for more important decisions, and
  (ii) our involvement in the decision, adopting more lax criteria if we have a vested interest in the consequences of our decision. Again, this applies to judgments of both our own and others' memories (3.vi.2, 3.vi.10).
- Confusions (errors) can be caused by many other factors, including overlapping elements. For example, if you imagine one element (thinking about a friend when they are not present because a person you can see reminds you of your friend) and subsequently actually experience something related to this element (such as hearing your friend's voice) then you may conflate the two elements and incorrectly assume that your friend was present at the earlier occasion (3.vi.2, 3.vi.8).
- Confusions can be reduced by asking people to assess the details of what they recalled by considering, for example, the vividness of the detail or how strongly they felt or reacted at the time (3.vi.1).
- There is some indication that focusing on emotional aspects of one's memory can increase errors, possibly because it reduces our ability to access perceptual information about an event. Older adults, in particular, tend to focus on emotional more than perceptual features of an event and this may underlie their tendency to make more errors, even though they express greater confidence than younger adults in memories they associate with stronger thoughts and feelings. However, errors can be reduced when affective information is a good indicator of the source of one's memory and when the content is negatively arousing (3.vi.4, 3.vi.7, 3.vi.9).

Recommended reading

3.vi.4 Johnson, M.K. (2006). Memory and reality. *American Psychologist, 61*, 760–771.

3.vii VISUAL AND SPATIAL MEMORY

- The act of remembering often features mental images. Mental images are experienced with a 'quasi-perceptual' quality that resembles the conscious experience of actually perceiving something in the external world. There are considerable individual differences in how people report experiencing imagery. These can range from those who report no conscious quasi-perceptual experience at all, through to those who claim that their images are as vivid to them as genuine perceptual experience (3.vii.1, 3.vii.20).
- Although imagery may be experienced in a quasi-perceptual manner, it is in no sense like 'replaying' a previously recorded event. Repeatedly imagining the same event or scene is very different from repeatedly looking at the same picture or section of film. Images are not stable representations. An image is a temporary construct formed from information stored in long-term memory (3.vii. 16-18). Each time an image is created in consciousness it may differ subtly or substantially in terms of its depicted content.
- Images are not 'mental photographs'. No mental image is a completely accurate recreation of an original perceptual event. Mental images experienced while recalling an event from memory will include general schematic information as well as details specific to that event alone. Mental images are no more reliable than any other form of recollection, irrespective of how vivid or detailed they may appear to the individual experiencing them.
- The vividness of mental imagery is poorly related to memory accuracy (3.vii.23). Some studies have reported a negative vividness–accuracy relationship, with vivid imagers more likely to confuse false with genuine recollection because they are more able to imagine the misleading information as if it had actually occurred (3.vii. 11, 29 & 30). Imagining something happening can lead to distortions in memory, with an individual confusing an imagined event for something that actually happened (3.vii.13 & 14).
- Visual images may be experienced from a perspective that does not correspond to how an event was originally experienced (3.vii. 24). An autobiographical event can be viewed from a 'field' perspective in which the visual image is viewed as if through the individual's own eyes. Alternatively they may adopt an 'observer' perspective in which the image is created from the vantage point of a bystander. An image experienced from a field perspective should not be assumed to be a more accurate recollection than an image experienced from an observer perspective. Individuals who suffer a severe traumatic response to an event may display a heightened observer perspective for images associated with the event (3.vii.3 & 8).
- Circumstances involving spatial memory include the recollection of the details of a route travelled in a familiar or unfamiliar environment, recalling the position of objects or people in a scene, or estimating the distance or direction travelled either by the individual, or someone they were observing. Spatial memory is often linked to mental imagery, and spatial information can be represented during recall in the form of visual mental images.

- Individuals find recalling the absolute position of objects difficult, and instead recall the position categorically in relation to other items present in their memory of the scene. Memory for environments is subject to error and systematic distortion based on schematisation of different elements. Large environmental features such as roads tend not be remembered at their correct angles, but instead tend to be aligned against frame axes (e.g. vertical, north-east, east-west, etc.) to a greater extent than is actually the case. Large environmental features can also be recalled as being more aligned with each other than in reality (3.vii.36-38).
- An individual's memory for an environment will tend to be organised around salient landmarks such as a church, monument, supermarket, etc. The presence of landmarks can lead to errors in making metric judgments based on spatial memory. For example, people estimate the distance from a landmark to an ordinary building to be less than from an ordinary building to a landmark (3.vii.32). The number of objects in an environment can influence how large someone estimates it to be. For example, people will judge a field in a photograph to be larger if it contains an occasional pylon or tree than if it is entirely empty (3.vii.5). Children may judge interior environments to be larger and more complex than would an adult viewing the same scene (3.vii.9).
- The more objects or situations that are encountered while travelling a route, the longer people will judge it to have taken. People judged travelling a route with two intersections to be shorter than an equal route with six intersections (3.vii.34). The number of corners and turns will increase the perceived length of a journey (3.vii.53) while uphill or downhill sections are judged to be longer than equivalent distances on the flat (3.vii.25).
- When people are asked to estimate the distance between locations from memory, the vantage point they are asked to adopt may systematically distort their judgments. The distance between nearby locations will be judged to be relatively larger than the same distance between locations that are further away. This effect will be reversed if they are asked to imagine the scene from the opposite vantage point (3.vii.12).

Recommended reading

3.vii.3 Bernsten, D. Willert, M. & Rubin, D.C. (2003). Splintered memories or vivid landmarks? Qualities and organisation of traumatic memories with and without PTSD. *Applied Cognitive Psychology, 17*, 675–693.

3.vii 18 Kosslyn, S.M. Thompson, W.L. & Ganis, G. (2006). The case for mental imagery. New York: Oxford University Press Inc. USA.

3.vii 22 McIsaac, H.K. & Eich, E. (2002). Vantage point in episodic memory. *Psychonomic Bulletin and Review, 9*, 146–150.

3.vii 38 Tversky, B. (2003). Structures of mental spaces: How people think about space. *Environment and Behavior, 35*(1), 66–80.

4. Vulnerable groups: Children, older adults and other groups

4.i ERRORS IN THE MEMORIES OF CHILDREN

- **Memory illusions.** These are false memories that arise spontaneously within the individual. They decrease in frequency with age from early childhood to late adolescence (4.i.2). But note that even adults have been found to have false memories (see Section 3). Thus, although they decrease with age they do not disappear altogether.
- **Implanted (suggestions) memories.** A misleading suggestion is implanted (4.i.10). Misinformation occurs when people who experience the same event talk to one another, overhear each other talk, or gain access to new information from the media, interviewers, parents, friends or other sources (4.i.5, 4.i 7 & 4.i 11). Children aged six and under are generally more susceptible to the negative effects of *implanted suggestions* than older children, adolescents and adults. Up to 75 per cent are negatively affected by such misinformation (4.i.7).
- **Memory and social factors underlie suggestibility.** Social compliance, source monitoring errors, all contribute to mediating patterns of suggestibility in early childhood (4.i.2, 4.i 5, 4.i 6, 4.i.9).
- **Deception.** Children can lie. Three- and four-year-olds will lie to avoid punishment and to get a reward or to keep a secret in a game. Some laypersons, social workers and legal professionals believe that children never lie, particularly about sexual abuse. Studies have shown that children can in fact lie about being touched (4.i.4).
- **Repeated interviews and questions.** Children are typically interviewed several times by numerous professionals and family members before a case gets to court. Repeated requests for information within an interview may signal to a child that their earlier answer was incorrect. Young children are especially prone to change their answers when questioned repeatedly and are often reluctant to say 'I don't know'. This is particularly the case when yes/no questions are asked (4.i.5)
- **Detecting accuracy.** Experts are unable to detect, without additional evidence, whether children's reporting of events is accurate or inaccurate, and whether they are describing true or false events (see Key points and Section 3).

Recommended reading

4.i.2 Brainerd, C.J. & Reyna, V.F. (2005). *The science of false memory.* NY: Oxford University Press.

4.i.5 Ceci, S.J. & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony.* Washington, DC: American Psychological Association.

4.ii Older adults

- **Some level of memory dysfunction is an inevitable part of the aging process.** Memory deficits may be subtle, such as errors concerning the source of information or a low level of richness or detail. It is incorrect to think of memory aging merely as increased forgetfulness. Older adults are more prone to false memories, due to an over-reliance on the gist of an event, in the absence of more specific and accurate forms of remembering (4.ii.6).
- **The aging process leads to exaggerated inter- and intra-individual variability.** Age is not a reliable index of cognitive function *per se*. A group of healthy older adults will show great variability in performance on tests of memory (4.ii.3), with some being much poorer than others. Neuropsychological examination would be necessary for an evaluation of an individual's memory function, but note that memory tests use age-based norms. These tests are designed to detect pathological memory difficulties, such that 'normal' memory performance for a 60-year-old is not equivalent to 'normal' performance of a 20-year-old.
- **It is not necessary to have a diagnosed memory complaint to have age-related memory decline.** Dementia has a clear impact on memory function, but healthy aging also leads to definite memory impairment (4.ii.1).
- **Known memory effects are accentuated in aging.** Older adults are disproportionately more prone to memory dysfunction according to retention interval, encoding duration, post-event suggestibility and interference from other sources (4.ii.2, 4.ii.5). That is, the memory phenomena outlined in this document will interact with age (4.ii.4).
- In particular, **older adults are likely to be more susceptible to suggestibility** than middle-aged and younger adults (4.ii.2). This is because as well as forgetfulness, older adults have difficulties in inhibiting or suppressing unwanted or irrelevant information. For instance: '…it is possible that older adults' difficulty in inhibiting the continued processing of information designated as irrelevant or wrong could have an impact on their ability as jurors to comply with a judge's instructions to ignore testimony that has been stricken from the record' (4.ii.7, p. 155.).

Recommended reading

4.ii.1 Balota, D.A. Dolan, P.O. & Duchek, J.M. (2000). Memory changes in healthy older adults. In E. Tulving & F.I.M. Craik (Eds.), *The Oxford handbook of memory* (pp. 395–409). New York: Oxford University Press

4.ii.2 LaVoie, D.J; Mertz, H.K; Richmond, T.L. (2007). False memory susceptibility in older adults: Implications for the elderly eyewitness. In M.P. Toglia, J.D. Read, D.F. Ross, R.C.L. Lindsay (Eds). *The handbook of eyewitness psychology, Vol I: Memory for events.* (pp. 605–625). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

4.ii.3 McDaniel, M.A. Einstein, G.O. Jacoby, L.L. (2008). New considerations in aging and memory: The glass may be half full. In F.I.M. Craik, T.A. Salthouse. *The handbook of aging and cognition* (3rd ed. pp. 251–310). New York, NY: Psychology Press.

4.ii.4 Moulin, C.J.A. Thompson, R.G., Wright, D.B. Conway, M.A. (2007). Eyewitness memory in older adults. In M.P. Toglia, J.D. Read, D.F. Ross, R.C.L. Lindsay (Eds.) *The handbook of eyewitness psychology, Vol I: Memory for events.* (pp. 627–646). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

4.ii.5 Mueller-Johnson, K. Ceci, S.J. (2007). The elderly eyewitness: A review and prospectus. In M.P. Toglia, J.D. Read, D.F. Ross, R.C.L. Lindsay (Eds.) *The handbook of eyewitness psychology, Vol I: Memory for events.* (pp. 577–603). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

4.iii Other vulnerable groups

Although we have focused on children and older adults in the sections above, it should be noted that there are many other individuals who either have, or have a raised potential for, memory dysfunctions. For example, individuals with head injury, brain damage, epilepsy, depression, AIDS, hydrocephalus, etc. Similarly, individuals on various types of medication or suffering from the chronic or acute effects of alcohol/drugs may show altered levels of memory performance. More generally, anyone who lost consciousness or entered an altered state of consciousness during an experience that later has to be remembered will have a raised potential for forgetting and error in their memory of that experience. Note that concussion also is a very common cause of memory dysfunction and is very often frustratingly unobservable, but nonetheless also very powerful. Individuals who suffer damage to the front part of the brain (the frontal lobes) are often especially prone to memory dysfunction in the form of confabulations. These are accounts of memories that often feature true information about a person's life but configured in ways which are false. Frequently the sufferer is unaware that their memories are false and hence these confabulations have been (memorably) described as honest lies.

The advice of a memory expert should be sought when individuals with any of these profiles are asked to recount memories in legal settings. Additionally, neuropsychological assessments should be routinely used with these individuals and the results of any assessment made available to a court/hearing.

5. Memory, trauma and stress

- According to formal diagnostic criteria (5.1), a *traumatic event* is a situation in which the individual experienced, witnessed or was confronted with actual or threatened death, serious injury, or threat to the physical integrity of self or others. Examples of typical traumatic events include sexual assault, road traffic accidents, physical assault, witnessing terrorist attacks or their aftermath, torture and natural disasters. The common psychological disorder following trauma is Post-traumatic Stress Disorder (PTSD) (5.37 & 5.40). However, trauma may also lead to a range of other psychological disorders, e.g. depression, phobias, psychosis (5.5, 5.41 & 5.45). People who have experienced a traumatic event may have some memory characteristics that appear different from our everyday memories (whether or not they receive a clinical diagnosis). These features of memory will be discussed below, using PTSD to illustrate their extreme form.

- To meet criteria for PTSD, the person must have experienced a severe emotional reaction at the time of the trauma, and subsequently must experience symptoms within three categories of symptoms (see definitions below): 're-experiencing symptoms' such as intrusive traumatic memories, and/or distress at reminders of the traumatic event; 'avoidance symptoms' such as avoidance of reminders and/or emotional numbing; 'hyperarousal symptoms' including difficulties sleeping and/or concentrating (5.1). Critically, these symptoms have to cause clinically significant distress or impairment in social or occupational functioning.

  1. **Intrusive traumatic memories (a type of 'reexperiencing symptom'):** People with PTSD commonly experience vivid and intrusive parts of the trauma memory in their mind, which spring to mind unbidden (5.15, 5.20, 5.21, 5.22, 5.28 & 5.35). These memories might be in the form of images of the event (in any of the senses), recurrent and distressing dreams about it, or 'flashbacks'. For example, a visual image of the face of an attacker or the sound of a car crashing. Flashbacks occur when the person suddenly acts or feels as if the event is happening now (5.1). For example, an assault victim may feel as if he/she is being attacked again, become very afraid and start to scream and 'fight off' his/her 'assailant', when this is not in fact actually occurring. Intrusive traumatic memories are typically visual images but can also include sounds, smells, tastes and physical sensations that were present during the trauma, that is they have sensory qualities rather than just taking the form of verbal thoughts (5.28). These intrusive memories tend to occur when the trauma victim is reminded of the event in some way, such as being asked to talk about it. However, he or she may not be aware of what is 'triggering' the memory. He or she may also experience intense psychological distress and/or physical stress reactions (e.g. heart racing) at such reminders. Some PTSD patients may meet diagnostic criteria by having physical and psychological stress reactions, in the absence of intrusive memories. Intrusive traumatic memories can be highly emotional (fear, helplessness, horror, anger, sadness and shame are common (5.4, 5.35 & 5.39) but see also emotional numbing, below). The term 'intrusive' memory recall refers to memories that come to mind directly and unbidden, rather than just

being deliberately recalled (5.8, 5.14, 5.15 & 5.16). While some memories that are intrusive can occur in everyday life, intrusive trauma memories are those which have traumatic content.

2. **Avoiding reminders of the trauma (5.1):** People with PTSD will commonly try not to think or talk about the trauma. If they feel intensely afraid when the trauma memory is in their mind, they will naturally try to avoid such thoughts. Similarly, after sexual assault or inter-personal violence, people may experience intense shame when they think or talk about the event. Hence they can try and avoid such activities. Trauma survivors may also tend to stay away from people, places or things that remind them of the event, in order to avoid triggering the associated memories and emotions. On the other hand, some people with PTSD have extensive emotional numbing, which may be seen as a form of 'blanket avoidance'. Such people may not appear at all upset when asked about the trauma, but they will also have difficulty in experiencing other emotions, such as love and happiness.

' 3. **'Hyperarousal' symptoms (5.1):** These type of symptoms can include poor sleep and concentration, increased irritability, being alert and 'on guard', and being 'jumpy' as well as physical hyperarousal symptoms such as changes in heart rate, sweating, breathing etc.

- **Following a traumatic event**, most people experience some traumatic stress symptoms for a few days or weeks. These typically reduce over time. A diagnosis of PTSD can only be made four weeks after trauma, reflecting the 'normality' of having some traumatic stress symptoms in the initial period (5.1, 5.19 & 5.49). Also, note a diagnosis of 'Acute Stress Disorder' may be made for those who have reexperiencing, avoidance and hyperarousal symptoms that last less than four weeks, plus marked dissociative symptoms (5.30). Rates of PTSD vary according to type of trauma. Lowest rates are found following natural disasters and road traffic accidents (under 10 per cent). Higher rates follow inter-personal violence, peaking at about 50 per cent following rape and torture (5.6 & 5.40). Thus, involvement in a trauma does not necessarily result in a diagnosable clinical disorder, i.e. absence of PTSD-type memories is not necessarily indicative of absence of trauma. However, as stated above, people who have experienced a traumatic event can have memory characteristics (e.g. highly emotional, intrusive memories of a traumatic event) that appear different from our usual everyday memories (whether or not they receive a clinical diagnosis).

- **Impact of traumatic events on memory:**

  1. Research suggests that in clinical cases the victim's memory for the trauma is likely to be fragmented into several key '**hotspot**' moments (5.21, 5.24, 5.26, 5.27 & 5.35). Hotspots are typically the 'worst moments' for the person during the trauma, and are also those points that tend to come back, as intrusive memories. While the hotspots are generally remembered as very vivid and clear, they may be recalled in a jumbled order. At the same time, other parts of the trauma can be more difficult to recall (e.g. details that were less important to the person at the time). Thus, while some parts of the trauma memory may be recalled consistently and in detail, it is common that other parts will be more vague, have some gaps, in jumbled order and,

possibly, contain inaccuracies (5.7, 5.9, 5.17, 5.19, 5.23, 5.28, 5.31, 5.42, 5.44, 5.47, 5.50 & 5.52). Some people incur head injuries during trauma which may also affect their memory. but which may improve over time (5.10, 5.11 & 5.29). Thus, some inconsistencies in memory across time (both for trauma and non-traumatic information) are common and this does not necessarily imply that the memory or the event is fabricated. Likewise, all memories can change with repeated re-telling.

2. Some people **dissociate** during trauma (5.34, 5.43 & 5.46). This means that they may spontaneously 'go blank', 'switch off' or 'leave' their bodies (often known as an out-of-body experience) in an attempt to distance themselves from the distress they are feeling. Generally, dissociating disrupts the trauma victim's ability to remember the entire event. Thus, people with PTSD may have 'gaps' in their memory for the traumatic event (5.1).

3. In addition to work on PTSD, it is worth noting that a large body of research has examined the effects of experiencing heightened levels of psychological stress on eyewitness memory (for reviews, see 5.13, 5.18 5.38). This work has included numerous carefully controlled laboratory studies as well as 'real world' field investigations (5.12, 5.13, 5.33, 5.36 & 5.48). However, to date, there is no clear consensus concerning whether heightened stress during the encoding or retrieval of a witnessed event leads to detriment or a benefit in memory. The contradictory findings from both laboratory and field studies suggest that the relationship between stress and memory is a complex one and is likely to be moderated by several psychological and biological factors.

- **Treatments for PTSD:** The National Institute for Health and Clinical Excellence (NICE) recommends specific types of psychological therapy for treating PTSD, rather than medication (5.44). Known as 'trauma-focused psychological treatments', they are Cognitive Behavioural Therapy (CBT) and Eye-Movement Desensitisation and Reprocessing (EMDR). Cognitive Behavioural Therapy (CBT) is a structured psychological treatment usually provided weekly for about three months (5.19, 5.24, 5.25 & 5.44). A key component involves talking through the traumatic memory in detail. With successful treatment, the memory becomes less emotional or intrusive, and there may be some changes in the ease with which the correct chronological order of events is remembered (5.23 & 5.51). It is standard clinical practice to offer victims of trauma psychological treatment, whether or not a legal case is pending. The NICE treatment guidelines about when and what therapy should be delivered recommend that 'Trauma-focused cognitive behavioural therapy should be offered to those with severe post-traumatic symptoms or with severe PTSD in the first month after the traumatic event' (5.44; p.92), and that 'Trauma-focused cognitive-behavioural therapy should be offered to people who present with PTSD within three months of a traumatic event' (5.44; p.92). Note, the guidelines also caution that the provision of brief, single-session interventions (often referred to as 'debriefing') that focus on the traumatic incident should *not* be routine practice (5.44).
- Practice guidance for therapists delivering treatment in the context of legal cases can be obtained from the Home Office, see http://www.cps.gov.uk/publications/docs/pretrialadult.pdf.

- It is noted that the impact of therapy on trauma memory has been a concern in the arena of the 'false memory debate' for recovered memories of childhood sexual abuse. This is separate area and is covered in detail elsewhere by the British Psychological Society (5.2, 5.3 & 5.53).

Recommended reading

5.7 Brewin, C.R. (2007). Autobiographical memory for trauma: Update on four controversies. *Memory, 15*(3), 227–248.

5.8 Brewin, C.R. & Holmes, E.A.(2003) Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23*(3), 339–376

5.32 Herhily, J. & Turner, S. (2007). Asylum claims and memory of trauma: Sharing our knowledge. *British Journal of Psychiatry, 191*, 3–4.

5.44 NICE (2005). *Post-traumatic stress disorder (PTSD): The management of PTSD in adults and children in primary and secondary care.* National Institute for Clinical Excellence: London

In addition the following practice guidance from the Home Office may be of use:

Provision of therapy for vulnerable or intimidated adult witnesses prior to a criminal trial - Practice guidance.
Description: Practice guidance issued as part of the Home Office co-ordinated Action for Justice programme.
The guidance was published on 24 January 2002 and complements similar guidance for child witnesses, which was published on 8 February 2001.
http://www.cps.gov.uk/publications/docs/pretrialadult.pdf

Provision of therapy for child witnesses prior to a criminal trial – Practice guidance.
Description: The Crown Prosecution Service, the Department of Health and the Home Office have worked together to produce this guidance which is issued as part of the Action for Justice programme. The guidance is primarily for the assistance of child care professionals and lawyers involved in making decisions about the provision of therapeutic help for child witnesses prior to a criminal trial.
http://www.cps.gov.uk/publications/docs/therapychild.pdf

BPS guidelines for psychologists working with clients in contexts in which issues related to recovered memories may arise.
http://www.bfms.org.uk/Text_Assets/BPS%20Guidelines.pdf

6. Witness interviews and statements

- **Witness memory reports:** Memory reports are prone to errors whereby details are omitted, altered or falsely added into memory (see Section 3). Such errors arise as a natural consequence of the way in which people organise and interpret information in everyday settings. Memory reports are shaped in response to the social contexts within which the memory is recounted as well as by exposure to external sources of information.
- **Interviewing witnesses:** A witness's memory report will be influenced by the interviewer's questioning style, the content of questions, and the verbal and nonverbal feedback received. Section 6.i presents ways in which interviewers can influence a witness's recollection.
- **Repeated interviewing:** Although additional information may be obtained through repeated interviewing, there is likely to be some inconsistency in detail recounted from one interview to another and some additional error. Moreover, the simple act of repeating a statement can strengthen one's belief that the statement is true ('illusory truth effect') and repeated questioning may lead to increases in witness confidence.
- **External sources of information or influence:** An event can be described in many different ways without witnesses being, or attempting to be, disingenuous. This has implications for the way that memory reports can be influenced by external sources of information such as discussion with other witnesses, family, or friends, or exposure to information provided by the media. See Section 6.ii
- **Judgments about witness memory:** Judgment of the plausibility of a memory will be highly influenced by the way in which the memory is communicated, particularly when little other evidence is available. Non-experts will draw on common-sense understandings of how memory operates which are not always valid and which tend to underestimate the incomplete and disjointed nature of many memories of real events. See Section 6.iii

6.i INTERVIEWING WITNESSES

This section focuses on police interviewing, however, it is important to note that the guidelines stated here are applicable generally and in the majority of situations in which information is sought by formal questioning.

Section 6.v outlines the interviewing techniques in which police officers currently receive training. Memory reports can be influenced by the police interviewing context in the following ways:

- *Inappropriate questioning styles:* These include frequently interrupting the witness, over-talking on the part of the police officer, excessive use of closed or yes/no questions, and the inappropriate timing and sequencing of questions (6.5, 6.7 & 6.20). These interview styles are undesirable as they interrupt witness concentration, give little opportunity for the witness to provide information which is not specifically requested, and encourage the witness to engage in ineffective and superficial searches of their memory.

- *Leading questions/responses:* Interviewers may already have knowledge or a preconceived 'hypothesis' about the witnessed event that they seek to confirm. This bias can be conveyed through the nature and direction of the interviewer's questioning, responses, and non-verbal behaviour (6.3, 6.20). In particular, leading questions are where the interviewer accidentally or otherwise suggests certain details to the witness that are later incorporated into their recollections. Witnesses with no particular stake in the outcome of the inquiry, compliant witnesses, and non-confrontational interviewing contexts may be particularly susceptible to these effects (6.1, 6.6, 6.15, 6.16, 6.18). It is not always intuitively obvious as to when interviewer responses or questions can be considered as leading (6.17). Section 6.iv below provides further examples. For further discussion see (6.12).
- *Interrogative pressure:* The interviewer may 'shift' the witness's reporting of unwanted, but perhaps accurate answers, to untrue or distorted ones by the use of challenge (e.g. 'that's not right, is it?') and negative feedback which can be explicit (e.g. 'we believe some of the information you've provided is incorrect') or implicit (e.g. via the interviewer's demeanour or use of repeated questions which may imply to the witness that their first answer was wrong). For further discussion see (6.10).

  For examples of the above questioning styles/responses arising in real-world police interview contexts see (6.5, 6.20).

6.ii External sources of information and influence

- *Contamination through discussion:* When two people discuss their memory for an event, what one says can contaminate the other's memory report. The version of events developed during episodes of joint recall is influenced by many factors including the relationship the speakers have to each other. A thoroughly familiar activity, a witness may be unaware of the extent to which their recall has been influenced (6.6, 6.13). For further discussion see (6.8).
- *Remembering as a social activity:* Witness testimony is unusual as it emphasises literal recall (6.6). People are more used to offering *interpretations* of past events with the aim of communicating and illustrating a set of values or linked to such activities as blaming, persuading, or amusing (6.2, 6.13). More generally, a memory report is influenced by the witness's understanding of their current situation. For example, a witness may fear that his or her credibility is threatened and produce a defensive report which pre-empts challenge or cynicism (6.13).
- *Susceptibility to external information:* Witnesses are likely to be more susceptible to incorporating external information into their memory report the greater their uncertainty about the details in question, the longer the delay between witnessing the event and being interviewed, the more they trust the interviewers' motives and intentions, and the more they believe that they are expected to be able to recall what is asked of them. For further discussion see (6.12).

6.iii Judgments about witness memory: Plausibility

Whilst the following indicators are often used by non-experts in judging the plausibility of a memory report, they are not necessarily good indicators of memory accuracy.

- *Completeness and coherence:* Incomplete accounts are the norm in human memory and therefore do not indicate inaccurate memory. In fact, a coherent narrative may indicate the inclusion of detail that is not actually remembered but required in order to pull the description together into an integrated whole. Extremely coherent narratives may also be indicative of prior preparation and rehearsal. This, in itself, does not mean that the description is intended to deceive or is, in essence, inaccurate but does suggest that the memory may have been worked over and honed in retrospect (6.13).
- *Confidence:* Witness confidence is not by itself a good indicator of memory accuracy. Moreover, witness confidence is malleable and can be affected by factors separate from the quality of the witness's actual memory for the event. In particular, providing witnesses with feedback confirming their statement leads to inflated witness confidence (6.21).
- *The way in which memories are described:* The perceived accuracy of a memory report, particularly when little other evidence is available, will be influenced by the way in which the memory is described. Plausibility is increased by including incidental or mundane detail (see Section 3), descriptions of people's emotional reactions, and reports of what people said at the time, although these details may not, in fact, be correct (6.13). In general, the plausibility of a memory report is often judged on the extent to which it fits with expectations about how the world works and how specific kinds of people behave (expectations which may, in fact, be unreliable) (6.13, 6.14).

6.iv Leading questions/responses: Further examples

Obvious forms of leading questions (see section 6.i too) suggest or imply a response. For instance 'was he wearing a baseball cap?' suggests that the man wore a cap. It also suggests that the interviewer may have a particular person 'in mind'.

Also direct requests for information may be leading. An implicit assumption or maxim (6.9) underlying question asking is: A questioner will only ask a question that they reasonably believe can be answered by the person asked. Thus, a question to a complete stranger such as 'What is my mother's name?' is clearly absurd. But it is only absurd because it violates the maxim that I will only ask you what I reasonably believe you might be able to answer.

Because of this, apparently innocent questions such as 'What were you wearing?', 'What was the time of day?', 'What did you/he/she say?', are all leading in the sense that they imply that a person might reasonably be able to answer them. When in fact, for memories with long retention intervals, perhaps stretching back over decades to childhood, recalling such details is rare.

Thus, the implicit assumption behind such questions may lead a witness to attempt to answer questions to which they do not have a specific or sometimes any answer. This potential source of error will be enhanced when the person asking the question is perceived, explicitly or implicitly, to be an authority figure.

Less obvious forms of leading questions/responses include the following:

- *Assessing the interviewee's response.* Positive interviewer remarks increase the likelihood of the interviewee providing that kind of answer (e.g. 'that's brilliant').
- *Offering advice.* Interviewer advice, even when only implicit, suggests that the interviewee is doing something wrong, can be taken as criticism, and hence may encourage the interviewee to avoid such topics (e.g. 'I bet your money doesn't last long if you keep buying take-away food').
- *Summarizing the interviewee's answer:* When the interviewer offers a summary of the interviewee's answer, the answer may be changed subtly without the interviewee making an overt, or acknowledged, correction. For example, an interviewer might recap some witness statement by saying, 'So let me get this straight, it was on Sundays that you and your sister had a bath and your bath was always first. While your mother bathed your sister your father would take you up to the bedroom to read you a book. Is that correct? Yes?' In reality these facts were recalled hesitantly and not in any temporal order or narrative frame. This type of summarising is frequent in certain types of witness interviews.
- *Offering alternative answers within a question:* Offering a set of alternative answers when asking a question may limit the answer provided to this predetermined set (e.g. 'Give one of your helpers a ring? Or would you give your doctor or dentist a ring?').
- *Limiting the scope of the question:* When an interviewee has been unable to provide an (acceptable) answer to a question, a new, more limited, version of the question may be asked in order to help clarify the task but which is more directive regarding the type of answer expected (e.g. 'But what if you didn't want to do something we suggested? What would you say? (Interviewee: I wouldn't say no. I'd say yeah) But if you didn't want to go. Say I said 'Oh let's go to Paris…?'). For further examples see (6.1).

6.v Police interviewing techniques

A national training package in England and Wales for interviewing witnesses, victims and suspects of crime was introduced in 1993 (6.4). This advocates a five-stage model for investigative interviewing called PEACE. PEACE provides two methods of obtaining an account from an interviewee: Conversation Management and Cognitive Interview. Both methods advocate that a witness first provides a free recall account which the interviewer then uses as a basis for subsequent questioning and probing. Free recall is where the witness is encouraged to give an account in their own words and at their own speed without interruption.

The basic national training package is delivered during initial police training. Additional in-house training is carried out by many police forces, although the nature and quality of this training varies widely. In all, police officers can be trained on up to five levels, with level five achieving an interviewer advisor role. However, a prominent issue is whether the principles and methods taught in PEACE training are successfully implemented by police officers in the field.

We focus here on the Cognitive Interview which has been developed with reference to psychological research concerning memory and social communication and is used with co-operative witnesses.

The Cognitive Interview

The Cognitive Interview includes the following components that focus upon using basic principles in memory and cognition:

Developing rapport: The PEACE model outlines that interviewers should establish ground rules at the beginning of the interview to protect against vulnerability to suggestion, including telling the witness that they should feel free to ask questions when they do not understand, that they should not guess, and that they should tell the interviewer if the interviewer has misunderstood their answer.

Witness participation: Encouraging the witness to actively volunteer information by asking open-ended questions, refraining from interrupting the witness and encouraging the witness to take a dominant role in the interview conversation.

Context reinstatement: Interviewers instruct the witness to mentally reinstate their thoughts, feelings and physical experiences at time of the witnessed event.

Report everything: Asking the witness to report everything they can think of, even if it seems trivial.

Varied recall: Asking the witness to recall the event from a variety of different temporal orders, for example, starting at the end and recalling backwards from there. This aims to minimise the degree to which the witness reconstructs their memory for the event by using their knowledge and assumptions to 'fill in gaps' in their memory.

Imagery: Imagery techniques may be used to probe a witness's mental image of a specific part of an event.

Social dynamics: The Cognitive Interview also includes social techniques aimed at improving interviewer-witness communication.

The effectiveness of the Cognitive Interview: Laboratory studies have generally found the Cognitive Interview used with adults to elicit more correct information relative to a control interview without a corresponding decline in accuracy. However, occasionally small increases in errors have been reported. Special considerations may arise when using the Cognitive Interview with children and the elderly. For a further discussion of the Cognitive Interview and its effectiveness see 6.7, 6.11, 6.19.

Recommended reading

6.7 Fisher, R.P. & Geiselman, R.E. (1992). *Memory-enhancing techniques for investigative interviewing: The cognitive interview.* Springfield, IL: Charles C. Thomas.

6.11 Holliday, R.E. Brainerd, C.J. & Reyna, V.F. (2008). The Cognitive Interview: Research and practice across the lifespan. In R.H.Bull & T. Williamson (Eds.) *Handbook of the psychology of investigative interviewing.* Chichester: Wiley & Sons.

6.13 Middleton, D. & Brown, S.D. (2005). *The social psychology of experience: Studies in remembering and forgetting.* London: Sage.

6.19 Wells, G.L. Memon, A. & Penrod, S.D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest,* 7, 45–75.

7. Identification parades

- Identification parades are often the primary evidence against a defendant and have been shown to be very influential in juror decision making (7.8). Several surveys of identification parades have been done which have found that about 40 per cent of the time the witness chooses the suspect, about 40 per cent of the time no identification is made, and about 20 per cent of the time a filler is chosen.(7.1, 7.15 & 7.19). Twenty per cent of known errant identifications is a substantial percentage and if an innocent suspect is taking part in a parade, this person is arguably in a similar situation to filler. This has led some commentators to estimate that about 10–15 per cent when the suspect is identified they are not the culprit(7.11). Multiplying this estimate by the number of suspect identifications everyday in the UK produces a large number of errant suspect identifications. In the USA DNA has led to more than 200 exonerations. In the vast majority of these (75 per cent) errant eyewitness testimony was the primary evidence (7.4 & 7.12). While these cases were from a different country and the crimes are not representative of all crimes, these data suggest that the majority of false convictions in the UK are due to errant eyewitness testimony.
- There are no magical techniques that are guaranteed to produce accurate identifications, but there is much discussion about how identifications can be improved to produce more reliable evidence. We described the three most discussed issues. They are: whether to have simultaneous parades (show the suspect and fillers simultaneously) or sequential parades (show the suspect and fillers one at a time and asked for each whether this is the culprit); how important it is that the person conducting the parade does not know which person the culprit is; and whether to measure something like confidence prior to telling the witness if they have chosen the suspect.
- The main debate in the US is about simultaneous versus sequential parades, but as discussed below it is relevant in the UK (7.7). The US Department of Justice's guide on eyewitness testimony allows either simultaneous or sequential parades to be used, but the language of the guide suggests that sequential administration is preferred(7.14 & 7.16). While analysis of studies from the 1980s and 1990s indicated an advantage for sequential parades (7.13), more recent data has not been as conclusive (7.9 & 7.10). Thus, while the majority of experts believe sequential parades are better than simultaneous ones (7.6), there is still enough disagreement to make us believe that more research is necessary before making any recommendations. In the UK, a mixture of the two methods is used. Witnesses see the suspect and all the fillers, in sequence, and then make a decision at the end. Further discussion is needed to assess whether this hybrid sequential-simultaneous procedure produces better evidence or is just easier to administer.
- The second issue is whether the person administering the parade should know who the suspect is. Psychological research for decades, with animals and humans, has shown that people can inadvertently influence the responses of others if they know the correct answer. Thus, there is strong support to conduct the parades blind, where the person administering the parade does not know which person is the

suspect. Surveys of US police say that this could be difficult to administer, but given that almost all UK parades are conducted in specialised suites it seems reasonable that parades should be conducted blind. This is not required by PACE at the moment, but was a suggestion made by the British Psychological Society in response to the Home Office consultation about changes to the Police and Criminal Evidence Act (7.2).

- The third issue is the confidence a witness gives and when to measure confidence. Several studies show that if you tell a witness that s/he has identified the suspect, it changes many meta-memory aspects (7.3 & 7.20). Telling somebody that they choose the suspect increases confidence both when the identification is accurate and when it is inaccurate. This means that any confidence measure taken after the witness has found out if they have identified the suspect is confounded and should not be used to assess the accuracy of the identification. Most eyewitness experts believe that confidence judgments should be gathered after the witness makes an identification but before they discover the outcome of the parade (7.17).
- In summary, identification parades are one of the main sources of evidence in many criminal investigations. Data from many sources suggest that errant identifications are a leading cause of false convictions. This has led some commentators question whether ID evidence is sufficiently reliable to be admitted in court (7.11). If fingerprinting or DNA had the same levels of errors as identification there would be many questions about admitting them as evidence. There are arguments for admitting witness identifications, but one of the strongest is that historically it has been admitted. By international comparisons UK identification parades are well done. If the current PACE guidelines coupled with these recommendations are followed, this is a 'good' identification parade procedure, but this does not mean that the identification will be accurate.

Recommended reading

7.4 Doyle, J. (2005). *True witness: Cops, courts, science, and the battle against misidentification.* New York: Palgrave MacMillan

7.18. Wells, G.L. & Quinlivan, D.S. (in press). Suggestive eyewitness identification procedures and the Supreme Court's reliability test in light of eyewitness science: 30 years later. *Law and Human Behavior.*

References

1. Background and overview

1.1 British Psychological Society Expert Witness Working Party (2007). *Psychologists as expert witnesses: Guidelines and procedures for England and Wales. Final Report August 2007.* Leicester: BPS.

2. Legal Considerations

2.1 Ormerod, D. (2006). Expert evidence: Where now? What next? *Archbold News*, Issue 5.

3 Autobiographical Memory (3.i, 3.ii, 3.iii, 3.iv. & 3.v)

3.11 Ahn, W-k. Brewer, W.F. & Mooney, R.J. (1992) Schema acquisition from a single example. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*, 391–412.

3.12 Baddeley, A.D. (1997). *Human memory: Theory and practice* (2nd revised edn.). Hove, Sussex: Psychology Press Ltd.

3.13 Bauer, P.J. (2007). *Remembering the times of our lives. Memory in infancy and beyond.* Mahwah, N.J.: Lawrence Erlbaum Associates.

3.14 Bell, B.E. & Loftus, E.E. (1989). Trivial persuasion in the courtroom: The power of (a few) minor details. *Journal of Personality and Social Psychology, 56*(5), 669–679.

3.15 Bluck, S. (2003). Autobiographical memory: Exploring its function in everyday life. *Memory, 11*, 113–124.

3.16 Brainerd, C.J. & Reyna, V.F. (2005). The science of false memory. NY: Oxford University Press.

3.17 Brewer, W.F. (1997). Children's eyewitness memory research: Implications from schema memory and autobiographical memory research. In N.L. Stein, P.A. Ornstein, B. Tversky & C. Brainerd (Eds.), *Memory for everyday and emotional events* (pp. 453–466). Mahwah, NJ: Erlbaum.

3.18 Bruce, D., Dolan, A. & Phillips-Grant, K. (2000). On the transition from childhood amnesia to the recall of personal memories. *Psychological Science, 11*(5), 360–364.

3.19 Ceci, S.J. & Bruck, M. (1993). Suggestibility of the child witness: A historical review and synthesis. *Psychological Bulletin, 113*, 403–439.

3.20 Ceci, S.J. & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony.* Washington, DC: American Psychological Association.

3.21 Conway, M.A. (1995). *Flashbulb memories.* LEA: Brighton, Sussex.

3.22 Conway, M.A. (Ed.) (1997). *Recovered memories and false memories.* Oxford: Oxford University Press.

3.23 Conway, M.A. (2005). Memory and the self. *Journal of Memory and Language, 53*(4), 594–628.

3.24 Conway, M.A., Collins, A.F., Gathercole, S.E. & Anderson, S.J. (1996). Recollections of true and false autobiographical memories. *Journal of Experimental Psychology: General, 125*(1), 69–95.

3.25 Conway, M.A. & Pleydell-Pearce, C.W. (2000) The construction of autobiographical memories in the self memory system. *Psychological Review,107*, 261–288.

3.26 Goldsmith, M., Koriat, A. & Weinberg–Eliezer, A. (2002). The strategic regulation of grain size in memory reporting. *Journal of Experimental Psychology, 131*, 73–95.

3.27 Goldsmith, M., Koriat, A. & Pansky, A. (2005) Strategic regulation of grain size in memory reporting over time. *Journal of Memory and Language, 52*, 505-525.

3.28 Goldsmith, M. & Koriat, A. (2008). The strategic regulation of memory accuracy and informativeness. In A. Benjamin & B. Ross (Eds.), *Psychology of learning and motivation*, Vol. 48: Memory use as skilled cognition (pp. 1–60). San Diego, CA: Elsevier.

3.29 Hayne, H. (2004). Infant memory development: Implications for childhood amnesia. *Developmental Review, 24*, 33–73.

3.30 Hyman, I.E., Husband, T.H. Jnr. & Billings, F.J. (2000). False memories of childhood experiences. In U. Neisser & I.E. Hyman (Eds.), *Memory observed* (2nd edn., pp. 335–349). New York: Worth Publishers.

3.31 Loftus, E.F. (1979). *Eyewitness testimony*. Cambridge, MA: Harvard University Press.

3.32 Loftus, E.F. (2005). Planting misinformation in the human mind: A 30-year investigation of the malleability of memory. *Learning & Memory, 12*, 361–366.

3.33 McNally, R.J. (2003). *Remembering trauma*. Harvard, MA: Harvard University Press.

3.34 Murdock, Jnr., B.B. (1974). *Human memory: Theory and data*. Potomac, MD: Erlbaum.

3.35 Neisser, U. & Hyman, I.E. (Eds.), *Memory observed* (2nd Edn.). New York: Worth Publishers.

3.36 Peterson, C., Grant, V.V. & Boland, L.D. (2005). Childhood amnesia in children and adolescents: Their earliest memories. *Memory, 13*(6), 622–637.

3.37 Pillemer, D.B. & White, S.H. (1989). Childhood events recalled by children and adults. In H.W. Reese (Ed.), *Advances in child development and behaviour.* (vol. 21, pp. 297–340). San Diego, CA: Academic Press.

3.38 Roediger, H.L., Dudai, Y. & Fitzpatrick, S.M. (Eds.) (2007). *Science of memory: Concepts*. New York: Oxford University Press.

3.39 Roediger, H.L. & McDermott, K.B. (1995). Creating false memories: Remembering words not presented in lists. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 21*, 803–814.

3.40 Schacter, D.L. (Ed.) (1997). *Memory distortion: How minds, brains, and societies reconstruct the past.* Cambridge, Mass.: Harvard University Press.

3.41 Schacter, D.L. (2001). *The seven sins of memory: How the mind forgets and remembers.* New York: Houghton Mifflin Company.

3.42 Schmechel, R.S., O'Toole, T.P., Easterly, C. & Loftus, E.F. (2006). Beyond the ken? Testing jurors' understanding of eyewitness reliability evidence. *Journal of Jurimetrics, 46*, 177–214.

3.43 Strange, D., Clifasefi, S. & Garry, M. (2007). False memories (pp. 137–170). In M. Garry & H. Hayne (Eds.), *Do justice and let the sky fall: Elizabeth Loftus and her contributions to science, law, and academic freedom.* Hillsdale NJ: Lawrence Erlbaum Associates.

3.44 Van Abbema, D.L. & Bauer, P.J. (2005). Autobiographical memory in middle childhood: Recollections of the recent past and distant past. *Memory, 13*(8), 829–845.

3.45 Waldfogel, S. (1948). The frequency and affective character of childhood memories. *Psychological Monographs, 62*, 1–39.

3.46 Wang, Q. (2003). *Infantile amnesia reconsidered: A cross-cultural analysis. Memory, 11*,(1), 65-80.

3.vi Source errors

3.vi.1 Dodson, C.S. & Johnson, M.K. (1993). Rate of false source attributions depends on how questions are asked. *American Journal of Psychology, 106*, 541–557.

3.vi.2 Gordon, R., Franklin, N. & Beck, J. (2005). Wishful thinking and source monitoring. *Memory and Cognition, 33*, 418–429.

3.vi.3 Henkel, L.A., Franklin, N. & Johnson, M.K. (2000). Cross-modal source-monitoring confusions between perceived and imagined events. *Journal of Experimental Psychology: Learning, Memory and Cognition, 26*, 321–335.

3.vi.4 Johnson, M.K. (2006). Memory and reality. *American Psychologist, 61*, 760–771.

3.vi.5 Johnson, M.K. & Raye, C.L.(1981). Reality monitoring. *Psychological Review, 88*, 67–85.

3.vi.6 Kensinger, E.A. & Schacter, D.L. (2006). Reality monitoring and memory distortion: Effects of negative, arousing content. *Memory and Cognition, 34*, 251–260.

3.vi.7 Kensinger, E.A., O'Brien, J.L., Swanberg, K., Garoff-Eaton, R.J. & Schacter, D.L. (2007). The effects of emotional content on reality-monitoring performance in young and older adults. *Psychology and Aging, 22*, 752–764.

3.vi.8 Lindsay, D.S., Hagen, L., Read, J.D., Wade, K.A. & Garry, M. (2004). True photographs and false memories. *Psychological Science, 15*, 149–154.

3.vi.9 Rahhal, T.A., May, C.P. & Hasher, L. (2002). Truth and character: Sources that older adults remember. *Psychological Science, 13*, 101–105.

3.vi.10 Schooler, J.W., Gerhard, D & Loftus, E.F. (1986). Qualities of the unreal. *Journal of Experimental Psychology: Learning, Memory and Cognition, 12*, 171–181.

3.vii Visual and spatial memory

3.vii.1 Abelson, R.P. (1979). Imagining the purpose of imagery. *Behavioral and Brain Sciences, 2*, 548–549.

3.vii.2 Berntsen, D. (1996). Involuntary autobiographical memories. *Applied Cognitive Psychology, 10*, 435–454.

3.vii.3 Bernsten, D., Willert, M. & Rubin, D.C. (2003). Splintered memories or vivid landmarks? Qualities and organisation of traumatic memories with and without PTSD. *Applied Cognitive Psychology, 17*, 675–693.

3.vii.4 Betts, G.H. (1909). *The distribution and functions of mental imagery*. New York: Teachers College, Columbia University.

3.vii.5 Coeterier, J.F. (1994). Cues for the perception of size of space in landscape. *Journal of Environmental Management, 42*, 333–347.

3.vii.6 Conway, M.A., Meares, K. & Standart, S. (2004). Images and goals. *Memory, 12*(4), 525–531.

3.vii.7 Conway, M.A. & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261-288.

3.vii.8 Cooper, B.S., Yuille, J.C. & Kennedy, M.A. (2002). Divergent perspectives in prostitutes' autobiographical memories: Trauma and dissociation. *Journal of Trauma and Dissociation, 3*, 75-95.

3.vii.9 Crompton A. (2001). The fractal dimension of the everyday environment. *Environment and Planning B, 2*, 243–254.

3.vii.10 Frank, M.G. & Gilovich, T. (1989). Effects of memory perspective on retrospective casual attributions. *Journal of Personality and Social Psychology, 9*, 17–31.

3.vii.11 Heuer, F., Fischman, D. & Reisberg, D. (1986). Why does vivid imagery hurt color memory? *Canadian Journal of Psychology, 40*(2), 161–175.

3.vii.12 Holyoak, K.J. & Mah, W.A. (1982). Cognitive reference points in judgments of symbolic magnitude. *Cognitive Psychology, 14*, 328–352.

3.vii.13 Hyman, I.E. & Pentland, J. (1996). The role of mental imagery in the creation of false childhood memories. *Journal of Memory and Language, 35*(2), 101–117.

3.vii.14 Johnson, M.K., Hashtroudi, S. & Lindsay, D.S. (1993). Source monitoring. *Psychological Bulletin, 114*, 3–28.

3.vii 15 Johnson, M.K., Foley, M.A. & Leach, K. (1988). The consequences for memory of imagining in another person's voice. *Memory & Cognition, 16*, 337–342.

3.vii 16 Kosslyn, S.M. (1994). *Image and brain: The resolution of the imagery debate*. Cambridge, MA: MIT Press.

3.vii 17 Kosslyn, S.M. (2005). Mental images and the brain. *Cognitive Neuropsychology, 22*(3–4), 333–347.

3.vii 18 Kosslyn, S.M., Thompson, W.L. & Ganis, G. (2006). *The case for mental imagery*. Oxford University Press Inc. USA.

3.vii 19 Libby, L.K. & Eibach, R.P. (2002). Looking back in time: Self-concept change affects visual perspective in autobiographical memory. *Journal of Personality and Social Psychology, 82*, 167–179.

3.vii 20 Marks, D.F. (1973). Visual imagery differences in the recall of pictures. *British Journal of Psychology, 64*, 407–412.

3.vii 21 McIsaac, H.K. & Eich, E. (2002). Vantage point in episodic memory. *Psychonomic Bulletin and review, 9*, 146–150.

3.vii 22 McIsaac, H.K. & Eich, E. (2004). Vantage point in traumatic memory. *Psychological Science, 15*, 248–253.

3.vii 23 McKelvie, S.J. (1995). The VIIIQ as a psychometric test of individual differences in visual imagery vividness: A critical quantitative review and a plea for direction. *Journal of Mental Imagery, 19*, 1–106.

3.vii 24 Nigro, G. & Neisser, U. (1983). Point of view in personal memories. *Cognitive Psychology, 15*, 167–182.

3.vii 25 Okabe, A., Aoki, K. & Hamamoto, W. (1986). Distance and direction judgment in a large scale environment. *Environment and Behavior, 18*(6), 755–772.

3.vii 26 Pylyshyn, Z.W. (1973). What the mind's eye tells the mind's brain: A critique of mental imagery. *Psychological Bulletin, 80*, 1–24.

3.vii 27 Pylyshyn, Z.W. (2002). Mental imagery: In search of a theory. *Behavioral and Brain Sciences, 25*, 157–238.

3.vii 28 Pylyshyn, Z.W. (2004). *Seeing and visualising: It's not what you think*. Cambridge, MA: MIT Press, USA.

3.vii 29 Reisberg, D., Culver, L.C., Heuer, F. & Fischman, D. (1986). Visual memory:When imagery vividness makes a difference. *Journal of Mental Imagery, 10*(4), 51–74.

3.vii 30 Reisberg, D. & Leak, S. (1987). Visual imagery ability and memory for appearance: Does Clark Gable or George C. Scott have bushier eyebrows? *Canadian Journal of Psychology, 41*, 521-526.

3.vii 31 Robinson, J.A. & Swanson, K.L. (1993). Field and observer modes of remembering. *Memory, 1*, 169–184.

3.vii 32 Sadalla, E.K., Burroughs, W.J. & Staplin, L.J. (1980). Reference points in spatial cognition. *Journal of Experimental Psychology: Human Leaning and Memory, 6*, 516–528.

3.vii 33 Sadalla, E.K. & Magel, S.G. (1980). The perception of traversed distance. *Environment and Behavior, 12*(1), 65–79.

3.vii 34 Sadalla, E.K. & Staplin, L.J. (1980). The perception of traversed distance: Intersections. *Environment and Behavior, 12*(2), 167–182.

3.vii 35 Tiggemann M. & Kemps, E. (2005). The phenomenology of food cravings: The role of mental imagery. *Appetite, 45*(3), 305–313.

3.vii 36 Tversky, B. (1981). Distortions in memory for maps. *Cognitive Psychology, 13*, 407–433.

3.vii 37 Tversky, B. (2000). Remembering spaces. In E. Tulving & F.I.M. Craik (Eds.), *Handbook of memory* (pp. 363–378). New York: Oxford University Press.

3.vii 38 Tversky, B. (2003). Structures of mental spaces: How people think about space. *Environment and Behavior, 35*(1), 66–80.

4. Vulnerable groups: Children and older adults

4.i. Children

4.i.1 Bjorklund, D.F., Bjorklund, B.R., Brown, R.D., Cassel, W. (1998). Children's susceptibility to repeated questions: How misinformation changes children's answers and their minds. *Applied Developmental Science, 2*, 99–111.

4.i.2 Brainerd, C.J. & Reyna, V.F. (2005). The science of false memory. NY: Oxford University Press. American Psychological Association.

4.i.3 Bruck, M. & Ceci, S.J. (1999). The suggestibility of children's memory. *Annual Review of Psychology, 50*, 419–439.

4.i.4 Bruck, M., Ceci, S.J. & Francoeur, E. (2000). Children's use of anatomically detailed dolls to report genital touching in a medical examination: Developmental and gender comparisons. *Journal of Experimental Psychology: Applied, 6*, 74–83.

4.i.5 Ceci, S. J. & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony*. Washington, DC: American Psychological Association.

4.i.6 Holliday, R.E., Douglas, K. & Hayes, B.K. (1999). Children's eyewitness suggestibility: Memory trace strength revisited. *Cognitive Development, 14*, 443–462.

4.i.7 Holliday, R.E., Reyna, V.F. & Hayes, B.K. (2002). Memory processes underlying misinformation effects in child witnesses. *Developmental Review, 22*, 37–77.

4.i.8 Home Office and Department of Health. (2001). *Achieving best evidence in criminal proceedings: Guidance for vulnerable or intimidated witnesses, including children*. London: HMSO.

4.i.9 Lindsay, D.S., Johnson, M.K. & Kwon, P. (1991). Developmental changes in memory source monitoring. *Journal of Experimental Child Psychology, 52*, 297–318.

4.i.10 Loftus, E.F. (1991). Made in memory: Distortions in recollection after misleading information. *The Psychology of Learning and Motivation, 27*, 187–215.

4.ii Older adults

4.ii.1 Balota, D.A., Dolan, P.O. & Duchek, J.M. (2000). Memory changes in healthy older adults. In E. Tulving & F.I.M. Craik (Eds.), The Oxford Handbook of Memory (pp. 395–409). New York: Oxford University Press.

4.ii.2 LaVoie, D.J., Mertz, H.K., Richmond, T.L. (2007). False memory susceptibility in older adults: Implications for the elderly eyewitness. In M.P Toglia (Ed.), J.D. Read, D.F. Ross, R.C.L. Lindsay (Eds.), *The handbook of eyewitness psychology.* Vol I: Memory for events. (pp. 605–625). Mahwah, NJ, US: Lawrence Erlbaum Associates.

4.ii.3 McDaniel, M.A., Einstein, G.O., Jacoby, L.L. (2008). *New considerations in aging and memory: The glass may be half full.* In F.I.M. Craik, T.A. Salthouse (Eds.), (2008). The handbook of aging and cognition (3rd edn., pp. 251–310). New York, NY: Psychology Press.

4.ii4 Moulin, C.J.A., Thompson, R.G., Wright, D.B. & Conway, M.A. (2007). Eyewitness memory in older adults. In M.P. Toglia, J.D. Read, D.F. Ross, R.C.L. Lindsay, *The handbook of eyewitness psychology. Vol I: Memory for events.* (pp. 627–646). Mahwah, NJ, US: Lawrence Erlbaum Associates.

4.ii.5 Mueller-Johnson, K. & Ceci, S.J. (2007). The elderly eyewitness: A review and prospectus. In M.P. Toglia, J.D. Read, D.F. Ross, R.C.L. Lindsay, *The handbook of eyewitness psychology. Vol I: Memory for events.* (pp. 577-603). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

4.ii.6 Tun, P.A., Wingfield, A., Rosen, M.J. & Blanchard, L. (1998). Response latencies for false memories: Gist-based processes in normal aging. *Psychology & Aging, 13,* 230–241.

4.ii.7 Zacks, R.T., Radvansky, G. & Hasher, L. (1996). Studies of directed forgetting in older adults. *Journal of Experimental Psychology-Learning Memory and Cognition, 22*(1), 143–156.

5. Memory, trauma and stress

5.1 American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th edn.). Washington, DC: American Psychiatric Association.

5.2 Andrews, B., Morton, J., Bekerian, D., Brewin, C.R., Davies, G.M. & Mollon, P. (1995a). Reply from the working party on recovered memories. *The Psychologist, 8*(11), 509-509.

5.3 Andrews, B., Morton, J., Bekerian, D.A., Brewin, C.R., Davies, G.M. & Mollon, P. (1995b). The recovery of memories in clinical-practice – experiences and beliefs of British Psychological Society practitioners. *The Psychologist, 8*(5), 209–214.

5.4 Bernsten, D., Willert, M. & Rubin, D.C. (2003). Splintered memories or vivid landmarks? Qualities and organisation of traumatic memories with and without PTSD. *Applied Cognitive Psychology, 16*(6), 675–693.

5.5 Blanchard, E.B., Hickling, E.J., Freidenberg, B.M., Malta, L.S., Kuhn, E. & Sykes, M.A. (2004). Two studies of psychiatric morbidity among motor vehicle accident survivors one year after the crash. *Behaviour Research and Therapy, 42*(5), 569–583.

5.6 Breslau, N., Kessler, R.C., Chilcoat, H.D., Schultz, L.R., Davis, G.C. & Andreski, A. (1998). Trauma and posttraumatic stress disorder in the community. *Archives of General Psychiatry, 55*(7), 626–632.

5.7 Brewin, C.R. (2007). Autobiographical memory for trauma: Update on four controversies. *Memory, 15*(3), 227–248.

5.8 Brewin, C.R. & Holmes, E.A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23*(3), 339–376.

5.9 Brewin, C.R., Kleine, J.S., Vasterling, J.J. & Field, A.P. (2007). Memory for emotionally neutral information in post traumatic stress disorder: A meta-analytic investigation. *Journal of Abnormal Psychology, 116*(3), 448–463.

5.10 Bryant, R.A. (2008). Disentangling mild traumatic brain injury and stress reactions. *New England Journal of Medicine, 358*(5), 525–527.

5.11 Bryant, R.A. & Harvey, A.G. (1998). Relationship between acute stress disorder and posttraumatic stress disorder following mild traumatic brain injury. *American Journal of Psychiatry, 155*, 625–629.

5.12 Buchanan, T.W. & Lovallo, W.R. (2001). Enhanced memory for emotional material following stress-level cortisol treatment in humans. *Psychoneuroendocrinology, 26*, 307–317.

5.13 Christianson, S.A. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin, 112*, 284–309.

5.14 Conway, M.A. & Holmes, E.A. (2005). Autobiographical memory and the working self. In N.R. Braisby & A.R.H. Gellatly (Eds.), *Cognitive Psychology* (pp. 507–538). Oxford: Oxford University Press.

5.15 Conway, M.A., Meares, K. & Standart, S. (2004). Images and goals. *Memory, 12*(4), 525–531.

5.16 Conway, M.A. & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self- memory system. *Psychological Review, 107*(2), 261–288.

5.17 Conway, M.A., Singer, J.A. & Tagini, A. (2004). The self and autobiographical memory: correspondence and coherence. *Social Cognition, 22*(5), 491–529.

5.18 Deffenbacher, K.A., Bornstein, B.H., Penrod, S. & McGorty, E.K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior, 28*, 687–706.

5.19 Ehlers, A. & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319–345.

5.20 Ehlers, A., Hackmann, A. & Michael, T. (2004). Intrusive reexperiencing in posttraumatic stress disorder. *Memory, 12*(4), 403–415.

5.21 Ehlers, A., Hackmann, A., Steil, R., Clohessy, S., Wenninger, K. & Winter, H. (2002). The nature of intrusive memories after trauma: the warning signal hypothesis. *Behaviour Research and Therapy, 40*(9), 995–1002.

5.22 Ehlers, A. & Steil, R. (1995). Maintenance of intrusive memories in Posttraumatic Stress Disorder: A cognitive approach. *Behavioural and Cognitive Psychotherapy, 23*, 217–249.

5.23 Foa, E.B., Molnar, C. & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder. *Journal of Traumatic Stress, 8*, 675–690.

5.24 Foa, E.B. & Rothbaum, B. (1998). *Treating the trauma of rape: Cognitive-behavioral therapy for PTSD.* New York: Guilford Press.

5.25 Gillespie, K., Duffy, M., Hackmann, A. & Clark, D.M. (2002). Community based cognitive therapy in the treatment of post- traumatic stress disorder following the Omagh bomb. *Behaviour Research and Therapy, 40*(4), 345–357.

5.26 Grey, N., Holmes, E.A. & Brewin, C.R. (2001). Peritraumatic emotional 'hot spots' in memory. *Behavioural and Cognitive Psychotherapy, 29*(3), 357–362.

5.27 Grey, N. ,Young, K. & Holmes, E. (2002). Cognitive restructuring within reliving: A treatment for peritraumatic emotional hotspots in PTSD. *Behavioural & Cognitive Psychotherapy, 30*, 37–56.

5.28 Hackmann, A., Ehlers, A., Speckens, A. & Clark, D.M. (2004). Characteristics and content of intrusive memories in PTSD and their changes with treatment. *Journal of Traumatic Stress 17*(3), 231–240.

5.29 Harvey, A.G. & Bryant, R.A. (2001). Reconstructing trauma memories: A prospective study of 'amnesic' trauma survivors. *Journal of Traumatic Stress, 14*(2), 277–282.

5.30 Harvey, A.G. & Bryant, R.A. (2002). Acute stress disorder: A synthesis and critique. *Psychological Bulletin, 128*(6), 886–902.

5.31 Herlihy, J., Scragg, P. & Turner, S. (2002). Discrepancies in autobiographical memories-implications for the assessment of asylum seekers. *British Medical Journal, 324*(1), 324–327.

5.32 Herlihy, J. & Turner, S. W. (2007). Asylum claims and memory of trauma: Sharing our knowledge. *British Journal of Psychiatry, 191*, 3–4.

5.33 Het, S., Ramlow, G. & Wolf, O.T. (2005). A meta-analytic review of the effects of acute cortisol administration on human memory. *Psychoneuroendocrinology, 30*, 771–784.

5.34 Holmes, E.A., Brown, R.J., Mansell, W., Fearon, R.P., Hunter, E.C.M., Frasquilho, F. et al. (2005). Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review, 25*(1), 1–23.

5.35 Holmes, E.A., Grey, N. & Young, K.A.D. (2005). Intrusive images and 'hotspots' of trauma memories in posttraumatic stress disorder: An exploratory investigation of emotions and cognitive themes. *Journal of Behavior Therapy and Experimental Psychiatry, 36*(1), 3–17.

5.36 Hulse, L.M. & Memon, A. (2006). Fatal impact? The effects of emotional arousal and weapon presence on police officers' memories for a simulated crime. *Legal & Criminological Psychology, 6*, 313–325.

5.37 Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M. & Nelson, C.B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*(12), 1048–1060.

5.38 Kuhlmann, S., Piel, M., & Wolf, O.T. (2005). Impaired memory retrieval after psychosocial stress in healthy young men. *Journal of Neuroscience, 25*, 2977–2982.

5.39 Lee, D.A., Scragg, P. & Turner, S. (2001). The role of shame and guilt in traumatic events: A clinical model of shame-based and guilt based PTSD. *British Journal of Medical Psychology, 74*(4), 451–466.

5.40 Lee, D.A. & Young, K. (2001). Post-traumatic stress disorder: Diagnostic issues and epidemiology in adult survivors of traumatic events. *International Review of Psychiatry, 13*(3), 150–158.

5.41 Mayou, R., Bryant, B. & Ehlers, A. (2001). Prediction of psychological outcomes one year after a motor vehicle accident. *American Journal of Psychiatry, 158*(8), 1231–1238.

5.42 Moore, S.A. & Zoellner, L.A. (2007). Overgeneral autobiographical memory and traumatic events: An evaluative review. *Psychological Bulletin, 133*(3), 419–437.

5.43 Murray, J., Ehlers, A. & Mayou, R.A. (2002). Dissociation and post-traumatic stress disorder: Two prospective studies of road traffic accident survivors. *British Journal of Psychiatry, 180*, 363–368.

5.44 NICE (2005). *Post-traumatic stress disorder (PTSD): The management of PTSD in adults and children in primary and secondary care* (No. CG026). London: National Institute for Clinical Excellence.

5.45 O'Donnell, M.L., Creamer, M. Pattison, P. & Atkin, C. (2004). Psychiatric morbidity following injury. *American Journal of Psychiatry, 161*(3), 507–514.

5.46 Ozer, E.J., Best, S.R., Lipsey, T.L. & Weiss, D.S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129*(1), 52–73.

5.47 Porter, S. & Peace, K.A. (2007). The scars of memory – A prospective, longitudinal investigation of the consistency of traumatic and positive emotional memories in adulthood. *Psychological Science, 18*(5), 435–441.

5.48 Roozendaal, B. (2002). Stress and memory: Opposing effects of glucocorticoids on memory consolidation and retrieval. *Neurobiology, Learning and Memory, 78*, 578–595.

5.49 Rothbaum, B.O., Foa, E.B., Riggs, D.S., Murdoch, T. & Walsh, W. (1992). A prospective study of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress, 5*(3), 455–475.

5.50 Southwick, S.M., Morgan, C.A., Nicolaou, A.L. & Charney, D.S. (1997). Consistency of memory for combat-related traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry, 154*(2), 173–177.

5.51 van Minnen, A., Wessel, I., Dijkstra, T. & Roelofs, K. (2002). Changes in PTSD patients' narratives during prolonged exposure therapy: A replication and extension. *Journal of Traumatic Stress, 15*(3), 255–258.

5.52 Williams, J.M.G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E. et al. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin, 133*(1), 122–148.

5.53 Wright, D., Ost, J. & French, C.C. (2006). Recovered and false memories. *The Psychologist, 19*(6), 352-355.

6. Witnesses interviews and statements

6.1 Antaki, C., Young, N. & Finlay, M. (2002). Shaping client's answers: Departures from neutrality in care-staff interviews with people with a learning disability. *Disability & Society, 17*, 435–455.

6.2 Bartlett, F.C. (1932). *Remembering: An experimental and social study*. London: George Allen & Unwin.

6.3 Ceci, S.J. & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony*. Washington, DC: American Psychological Association.

6.4 Central Planning and Training Unit (1992). *Investigative interviewing: A guide to interviewing*. London: Home Office.

6.5 Clarke, C. & Milne, R. (2001). *National evaluation of the PEACE investigative interviewing course. Police research award scheme* (Report No. PRAS/149). London: Home Office.

6.6 Edwards, D. & Middleton, D. (1986). Joint remembering: Constructing an account of shared experience through conversational discourse. *Discourse Processes, 9*, 423–459.

6.7 Fisher, R.P. & Geiselman, R.E. (1992). *Memory-enhancing techniques for investigative interviewing: The cognitive interview*. Springfield, IL: Charles C. Thomas.

6.8 Gabbert, F., Memon, A. & Allan. (2003). Memory conformity: Can eyewitnesses influence each other's memories for an event? *Applied Cognitive Psychology, 17*, 533–543.

6.9 Grice, P. (1968). The Utterer's meaning and intention. *The Philosophical Review 78*, 147-77.

6.10 Gudjonsson, G.H. (2003). *The psychology of interrogations and confessions*. Chichester: John Wiley & Sons.

6.11 Holliday, R.E., Brainerd, C.J. & Reyna, V.F. (2008). The cognitive interview: Research and practice across the lifespan. In R.H.Bull & T. Williamson (Eds.), *Handbook of the psychology of investigative interviewing*. Chichester: Wiley & Sons.

6.12 Loftus, E.F. (2005). A 30-year investigation of the malleability of memory. *Learning & Memory, 12*, 361-366.

6.13 Middleton, D. & Brown, S.D. (2005). *The social psychology of experience: Studies in remembering and forgetting*. London: Sage.

6.14 Middleton, D. & Edwards, D. (1990). *Collective remembering*. London: Sage.

6.15 Pomerantz, A. (1984). Agreeing and disagreeing with assessments: Some features of preferred/dispreferred turn shapes. In J.M. Atkinson & J. Heritage (Eds.), *Structures of social action: Studies in conversation analysis* (pp. 57–101). Cambridge, UK: Cambridge University Press.

6.16 Pomerantz, A. & Zemel, A. (2003). Perspectives and frameworks in interviewers' queries. In H. van den Berg, M. Wetherell & H. Houtkoop-Steenstra (Eds.), *Analyzing race talk: Multidisciplinary perspectives on the research interview* (pp. 215-231). Cambridge, UK: Cambridge University Press.

6.17 Potter, J. & Hepburn, A. (2005b). Qualitative interviews in psychology: Problems and possibilities. *Qualitative Research in Psychology, 2*, 281-307.

6.18 Sarangi, S. (2003). Institutional, professional, and lifeworld frames in interview talk. In H. van den Berg, M. Wetherell & H. Houtkoop-Steenstra (Eds.), *Analyzing race talk: Multidisciplinary perspectives on the research interview* (pp. 64-84). Cambridge, UK: Cambridge University Press.

6.19 Wells, G.L., Memon, A. & Penrod, S.D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest, 7*(2).

6.20 Wright, A.M. & Alison, L. (2004). Questioning sequences in Canadian police interviews: Constructing and confirming the course of events. *Psychology, Crime & Law, 10*, 137–154.

6.21 Wright, D.B. & Skagerberg, E.M. (2007). Post-identification feedback affects real eyewitnesses. *Psychological Science, 18*, 172-178.

7. Identification parades

7.1. Behrman, B.W. & Richards, R.E. (2005). Suspect/foil identification in actual crimes and in the laboratory: A reality monitoring analysis. *Law and Human Behavior, 29*, 279–301.

7.2 British Psychological Society (2007). Response to the PACE consultation is summarized in 'Police and Criminal Evidence Act consultation'. *The Psychologist, 10*, 424–426.

7.3 Douglass, A.B. & Steblay, N. (2006). Memory distortion in eyewitnesses: A meta-analysis of the post-identification feedback effect. *Applied Cognitive Psychology, 20*, 859–869.

7.4 Doyle, J. (2005). *True witness: Cops, courts, science, and the battle against misidentification*. New York: Palgrave MacMillan

7.5 Gross, S.R., Jacoby, K., Matheson, D.J., Montgomery, N. & Patil, S. (2005). Exonerations in the United States, 1989 through 2003. *Journal of Criminal Law and Criminology, 95*, 523–560.

7.6 Kassin, S.M., Tubb, V.A., Hosch, H.M. & Memon, A. (2001). On the 'general acceptance' of eyewitness testimony research. *American Psychologist, 56*, 405–416.

7.7 Lindsay, R.C.L. & Wells, G.L. (1985). Improving eyewitness identification from lineups: Simultaneous versus sequential lineup presentations. *Journal of Applied Psychology, 70*, 556–564.

7.8 Loftus, E.F. (1974). Reconstructing memory: The incredible eyewitness. *Psychology Today, 8*, 116–119.

7.9 Malpass, R.S. (2007). A policy evaluation of simultaneous and sequential lineups. *Psychology, Public Policy & Law, 12*, 394–418.

7.10 McQuiston-Surrett, D.E., Malpass, R.S. & Tredoux, C.G. (2006). Sequential vs. simultaneous lineups: A review of methods, data, and theory. Psychology, Public Policy and Law, 12, 137-169.

7.11 Penrod, S. (2003). Eyewitness identification evidence: How well are witnesses and police performing? *Criminal Justice Magazine, 54* (Spring), 36–47.

7.12 Scheck, B., Neufeld, P. & Dwyer, J. (2003). *Actual innocence: When justice goes wrong and how to make it right.* New York: New American Library.

7.13 Steblay, N., Dysart, J.E., Fulero, S. & Lindsay, R.C.L. (2001). Eyewitness accuracy rates in sequential and simultaneous lineup presentations: A meta-analytic comparison. *Law and Human Behavior, 25*, 459–473.

7.14 US Department of Justice Technical Working Group for Eyewitness Evidence (1999). *Eyewitness evidence: A guide for law enforcement* (NCJ No. 178240). Washington, DC: US Department of Justice, Office of Justice Programs.

7.15 Valentine, T., Pickering, A. & Darling, S. (2003). Characteristics of eyewitness identification that predict the outcome of real lineups. *Applied Cognitive Psychology, 17*, 969–993.

7.16 Wells, G.L., Malpass, R.S., Lindsay, R.C.L., Fisher, R.P., Turtle, J.W. & Fulero, S. (2000). From the lab to the police station: A successful application of eyewitness research. *American Psychologist, 55*, 581–598.

7.17 Wells, G.L., Memon, A. & Penrod, S.D. (2007). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest, 7*, 45–75.

7.18 Wells, G.L. & Quinlivan, D.S. (in press). Suggestive eyewitness identification procedures and the Supreme Court's reliability test in light of eyewitness science: 30 years later. *Law and Human Behavior.*

7.19 Wright, D.B. & McDaid, A.T. (1996). Comparing system and estimator variables using data from real line-ups. *Applied Cognitive Psychology, 10*, 75–84.

7.20 Wright, D.B. & Skagerberg, E.M. (2007). Post-identification feedback affects real eyewitnesses. *Psychological Science, 18*, 172–178.

The British Psychological Society was founded in 1901 and incorporated by Royal Charter in 1965. Our principal object is to promote the advancement and diffusion of a knowledge of psychology pure and applied and especially to promote the efficiency and usefulness of Members of the Society by setting up a high standard of professional education and knowledge.

The Society has more than 46,000 members and:

- has offices in England, Northern Ireland, Scotland and Wales;
- accredits undergraduate programmes at 117 university departments;
- accredits 143 postgraduate programmes at 84 university departments;
- confers Fellowships for distinguished achievements;
- confers Chartered Status on professionally qualified psychologists;
- awards grants to support research and scholarship;
- publishes 11 scientific journals, and also jointly publishes *Evidence Based Mental Health* with the British Medical Association and the Royal College of Psychiatrists;
- publishes books in partnership with Blackwells;
- publishes *The Psychologist* each month;
- supports the recruitment of psychologists through the Psychologist Appointments section of *The Psychologist*, and www.psychapp.co.uk;
- provides a free 'Research Digest' by e-mail and at www.bps-research-digest.blogspot.com, primarily aimed at school and university students;
- publishes newsletters for its constituent groups;
- maintains a website (www.bps.org.uk);
- has international links with psychological societies and associations throughout the world;
- provides a service for the news media and the public;
- has an Ethics Committee and provides service to the Professional Conduct Board;
- maintains a Register of nearly 15,000 Chartered Psychologists;
- prepares policy statements and responses to government consultations;
- holds conferences, workshops, continuing professional development and training events;
- recognises distinguished contributions to psychological science and practice through individual awards and honours.

The Society continues to work to enhance:

- recruitment – the target is 50,000 members;
- services to members – by responding to needs;
- public understanding of psychology – addressed by regular media activity and outreach events;
- influence on public policy – through the work of its Policy Support Unit, Boards and Parliamentary Officer;
- membership activities – to fully utilise the strengths and diversity of the Society membership;
- operates a Psychological Testing Centre which sets, promotes and maintains standards in testing.

The British Psychological Society
St. Andrews House, 48 Princess Road East, Leicester LE1 7DR, UK
Telephone 0116 254 9568 Facsimile 0116 247 0787 E-mail mail@bps.org.uk Website www.bps.org.uk

Incorporated by Royal Charter Registered Charity No 229642

INF75/07.2008