



City Research Online

City, University of London Institutional Repository

Citation: Conway, M. A. (2013). On being a memory expert witness: Three cases. *Memory*, 21(5), pp. 566-575. doi: 10.1080/09658211.2013.794241

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/14573/>

Link to published version: <https://doi.org/10.1080/09658211.2013.794241>

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

RUNNING HEAD: THREE CASES

On Being a Memory Expert Witness: Three Cases

Martin A. Conway

Department of Psychology, City University London, England

Address for correspondence:

Professor Martin A. Conway

Department of Psychology

City University London,

Northampton Square,

London, EC1V 0HB

Email. Martin.Conway.1@city.ac.uk

Thursday, February 28, 2013

Abstract

I describe three legal cases in which I acted as a memory expert witness. The cases contain remarkable accounts of memories. Such memories are by no means unusual in legal cases, often are over retention intervals measured in decades, and contain details the specificity of which is highly unusual. For example, recalling from childhood verbatim conversations, clothes worn by self and others, the weather, actions that at the time could not have been understood, details that could not have been known, precise durations and calendar dates, and much more. I show how our scientific understanding of memory can help courts reach more informed decisions about such fantastical ‘memories’ and how these memories constitute data that as researchers we should seek to understand.

Being a memory expert witness is a lonely business, but it has some rewards. The main one in my view is that one has the opportunity to apply what one has learnt about human memory, in the real world and in so doing make a contribution to society generally. After all as researchers we have been funded by our society and as dutiful researchers we have, of course, developed the understanding of our areas, discovered new facts, made new insights and each of us has contributed to moving the field along, at least a little. When, then, an opportunity arises to apply what we have discovered and learnt and assist public bodies, such as courts, with expert advice they would not otherwise have, I personally think it is our duty to do so.

Rather an idealistic stance? Well it certainly is but nonetheless I believe it and I also believe(d!) that the courts, for instance, would welcome such advice. The reality is, however, rather different. Courts do not want expert advice, not just on memory but on anything. They want decisions to be made by juries, as far as possible on the evidence presented to them by the complaint(s) and (non-expert) witnesses. Judges are endlessly vigilant that an expert's evidence does not undermine or supplant the decision making of the jury. In the case of memory for example, the current view is that the jurors all have memories of their own and therefore are perfectly able to judge evidence in the form of memories when that is presented to them; rather an idealistic view too. Do the general public understand the nature of knowledge represented in memory, processes of retrieval, memory construction, impairments of memory following brain damage and psychological illnesses, the development of memory over the lifespan from childhood to old age? Of course not, why should they? They do not study human memory. So how then do they judge accounts of memories, especially when memory is the *only* evidence available, as is frequently the case? They do so, as

we all do in areas where we have no expert knowledge or advice, we judge on the basis of what we *believe*, for whatever reason, to be true.

I, for instance, know virtually nothing about ‘genetic fingerprinting’ and have long believed that it must be utterly definitive evidence when presented in a court. If the accused’s genetic fingerprint was found on some incriminating item, say the murder weapon, some item of clothing, or whatever, then surely they must be guilty? What more is there to consider? Case solved. A recent article changed my views. It turns out that what is at least as important as the genetic material itself is how it got to where it was found, and that is often not straightforward at all. In the case of memory such complexity is commonplace. The belief that when a person reports a memory they are doing so because they had an experience, formed a memory or set of memories, and now can report details of the past experience, is an oversimplification that in my view has led to many miscarriages of justice and unsound convictions.

The modern view of human memory, now based on very extensive scientific research from the behavioural to the neuroscientific, shows that human memories are mental constructions, that contain inferences, occasionally erroneous details, are always time-compressed relative to the original experience and therefore are always incomplete. Moreover, wholly false memories are more common than previously thought, especially for childhood events and, even more alarmingly, it turns out to be almost trivially easy to create false memories in others (see ‘Memory & The Law’, a Report from the Research Board of the British Psychological Society, 2008, and/or the collection of readings in Nadel & Sinnott-Armstrong, 2012). In addition the complicated neural networks that mediate remembering are not developed in their full form until early adulthood (mid-20s) and begin to deteriorate in later life (70+), (The Royal Society. (2012). Brain Waves 4. Neuroscience and the law). Would a typical

juror be aware of the modern view of human memory and its implications for memory evidence? I suggest not.

Consider the following memory - but before you do please note that what is described both here and later is based on anonymised real cases and it features some memories with sexually explicit content – this is one of several memories from a 35 year-old adult complainant reporting alleged sexual abuse dating back to when she was 6 to 8 years of age. This is her memory of the first instance of abuse, as described in her police video interview:

He had a sort of den upstairs above the garage at the end of the garden. We used to play there and he was sometimes there too as he had a workshop at the back of garage. This first time Gran had gone to the shops and I was there on my own and he said to me “Look Sal I’m going down to the workshop to fix something” ... I can’t remember what, although I think it might have been the toaster which was always burning the toast ... “you come with me and you play in the den while I’m working”. I jumped up and we went out and it was a lovely sunny day, in July I think, the school holidays had just started. They had a lovely long garden and I skipped ahead of him down the garden path. When we got in the garage he said he’d give me a hand up the stepladder into the den. I was wearing a summer dress. I went first and he came behind me. And as I got to the top of the steps he was a couple of rungs down and right behind me he put his arm on my waist to steady me and then he put his other hand up my dress and touched my knickers. I didn’t really pay it any attention but just climbed up into the den, really I should have known what it meant, but I didn’t ... I was just too young. He climbed in behind me and we both fell

over almost on top of each other. We were laughing, it didn't hurt because he had these big sort of scatter cushions everywhere and we landed on them. I was lying on my back and he was leaning on one hand, his right hand, and he pulled my dress up with his other hand. I didn't feel frightened just curious I suppose. He slowly ran his fingers up between my legs pushing them apart, gently until he reached the point where my knickers covered my vagina and then, also gently he stroked the area and then pulled them to one side and stroked my clitoris.

This account of a 'memory' has many features that a memory researcher would find surprising from the temporal details (it was July) to exactly which hand was used (children aged six frequently have yet to develop accurate concepts of handedness, McManus, 2002, so how could it be encoded?). The narrative flow of the account suggests that it has been extensively rehearsed even, perhaps, rehearsed with others. Produced, maybe, as 'homework' during a course of therapy. But is it true? As memory researchers we know that we cannot determine whether such an account is true or not. What we can do, however, is point to unusual features of the account itself, the unusually specific details for example, and also, if known, potential negative influences operating when the account was created. If it had emerged during therapy featuring 'memory work' then the possibility of a false memory is raised (Loftus, 1997). More generally a memory researcher might point out that the memory falls in the period of childhood amnesia, roughly below the age of about 7 to 8 years, a period from which few memories can be recalled (Bruce, et al., 2000, 2005; Pillemer, 1998; Pillemer & White, 1989; Rubin, 2000; Waldfogel, 1948; Wang & Conway, 2004; Wells, Morrison, Conway, 2013; Wetzler & Sweeney, 1986). Moreover, it is recalled over a lengthy retention interval of 29 years. Both factors

detrimental to detailed recall of a childhood autobiographical memory. Let's now turn to three legal cases in which memory was the evidence and in which I was called as a memory expert witness. The first of these is a case of adult recall of alleged sexual abuse, the second a case of unconscious plagiarism, and the third features some remarkable memories of work.

A Case of Historic¹ Child Sex Abuse

A father was accused by his daughter of repeated sexual abuse from the age of 3 to 13 years, when the abuse abruptly and inexplicably stopped. The daughter, I will refer to her as 'B', at the age of 20 made a witness statement (WS) to a female policewoman (a child protection officer 'trained' in taking such accounts). B's WS contained a series of memories of escalating acts of sexual abuse culminating in a detailed and vivid memory of a rape by multiple assailants in her father's hardware store. B's memories in her WS are considered as specimen memories from a history of what is alleged to be almost continuous abuse up to the age of 13.

At the trial the father, a long-serving manager of his own hardware store, presented as a shabbily dressed rather inarticulate, cold, distant and disengaged individual. In the many cases of historic sexual abuse I have acted in it is quite often the case that these late middle-aged, nearly always male, defendants are unable to engage the court or, crucially, the jury in any meaningful way. Their usual response to the prosecution's, typically highly aggressive direct suggestions that they did indeed commit the acts they are accused of, is 'it never happened', 'no I didn't', and so on.

¹ The term 'historic' is used in the British Courts to refer to cases in which an adult recalls memories of alleged offences from years or decades ago.

When challenged to explain why the complainant might be lying, might have made it all up, they are at a loss for words and can make no insightful reply.

In contrast, B was an attractive and articulate young woman studying a science subject at a leading university. She wept and was visibly distressed by having to recount her memories of the alleged abuse in open court. We might note here that she had, of course, exercised her right to study her WS extensively prior to giving her evidence under oath in the court. Questioned first by the prosecution she was able to recall, in great detail, early memories of emotionally negative but not abuse memories from the age of 3, memories of inappropriate touching from the age of 4, memories of digital penetration from about 4/5 onwards including being forced to masturbate him, rape at the age of 5, oral and anal rape from 5/6 onwards, all featuring ejaculation by the father, and continuous abuse of this sort up to age of about 12 when other men were introduced into the abuse, and featuring a detailed and vivid memory of oral, anal, and vaginal rape in the back of her father's shop by 6 to 7 men, including the father. In addition there was a memory of objects being inserted in her vagina. We will come to some of these memories later, all that needs to be noted here is that her memories, from all ages, were vivid and detailed and included remembering locations, clothes, objects, hands used, smells, tastes, emotions of her own and others, time of day, times of year, sometimes an exact date (being raped on her 10th birthday), verbatim recall of conversations, and detailed recall of sexual acts performed on her. The judge, clearly sympathetic, instigated the occasional short break so she could regain her composure. Her evidence lasted a full and gruelling day and consisted entirely of her memories, no other evidence was presented.

The defence questioned B extensively but were not able to find any major inconsistencies or weaknesses in her account of her memories (although they did miss

an important one). The judge intervened on several occasions largely to find out what the point was of making B repeat all these distressing memories again. Of course, the defence were looking for inconsistencies between her memories as presented to the gentle questions of the prosecution who had elicited them the preceding day and as presented to the more forceful questioning of the defence lawyer. The reason for this is that barristers, solicitors, lawyers in general, have a non-expert understanding of human memory and, when memories are the evidence, they are often at a loss as to how to find a line of defence they regard as at least promising. In B's case the defence made a fatal error when they decided to pursue the line that B's memories were false. In support of this they called a clinical expert with some experience of 'false memory syndrome' (Yapko, 1997). Of course, there is no such syndrome but some common features of 'retractors', mainly from North America, have been noted. These are individuals who have made allegations of sexual and other types of abuse, often that have gone to trial and led to prosecutions, only to be later retracted. One feature is that the accounts of abuse often escalate into memories of abuse by multiple assailants, gangs, and even aliens, and alien abduction. Another is that of memories of objects being inserted into the vagina and/or anus. The expert pointed out, correctly so, that B's memories had these features and that this at least raised the possibility they might be false. However, when directly challenged with "How do you know that B's memories are false?" The expert could only say he did not. The prosecution won the day and B's father received a 14-year prison sentence - the hard end of memory evidence.

An appeal was launched but these take time and the Appeal Court will only consider an appeal on the basis of new evidence. It was difficult to see what new evidence there might be in this case. Nonetheless an important body, the Criminal

Cases Review Committee (CCRC), were uneasy with the conviction and a case was built that it should be re-examined. Some aspects of this were legal, the judge for example should have formally warned the jury to exercise due caution because the only evidence they had was B's memories. In his summing up he had done this but in rather round about and ambiguous way. There were some other grounds for concern too, one of which were the memories themselves. For reasons I have never uncovered a member of the CCRC had somehow found out this area of research called 'autobiographical memory' (this was a number of years ago before autobiographical memory became the research industry it now is, surprising then that this CCRC member knew about it). The committee approached me and asked if there was any research on adults remembering childhood. I told them there was, and briefly explained some of the findings and theory that then existed. They were particularly interested in the concept of 'childhood amnesia', hardly a new concept in memory research (going back to at least Henri & Henri, 1898, and Freud, 1915), but new to the CCRC and, moreover, new to the courts – especially the Court of Appeal.

I was then 'instructed' by the CCRC to prepare a report. The report was to answer three very specific questions. It is worth knowing this is how the law proceeds and I have learnt over the years that one should answer such instructions specifically and in detail. The instructions often relate to a line of defence that is being considered but at the time of writing the expert does not know what that line of defence will be. I have come to think this is good practice, the expert cannot then mislead, either explicitly or implicitly, by providing evidence that is biased to that line of defence. The instructions asked about:

1. adult recollection of childhood events, particularly those dating to below about 7 to 8 years of age, and how these related to B's early memories,
2. the potential effects of therapy/counselling on B's memories,
3. and whether it would be possible to completely forget a highly vivid memory of a traumatic experience that one could previously remember in detail, as B had done when questioned by the defence.

As far as the first instruction was concerned I explained the nature of childhood amnesia, recall of memories below about 8 years of age rapidly tailed off (Walfogel, 1948), with accelerated forgetting below the age of 5 years (Wetzler & Sweeney, 1986). The age of the earliest memory was around 3 years 4 months and few people's earliest memories dated to below the age of 3 years (Rubin, 2000). It was thought not possible to recall any memories from the preverbal period (24/30 months approximately) or below (see Hayne, 2004, and Howe, 2011, for review). Moreover, recent findings indicated that fully formed memories, rather than memory fragments, date to the age of 6/7 years (Bruce, et. al., 2000, 2005; Wells, et al., 2013). From our own data base of earliest memories (at that point the corpus consisted of about 2,000 memories, it is now over 6,500) there were no memories featuring recall of handedness, few that mentioned weather, clothes, thoughts, conversations, etc. Instead early memories tended to be of fragments of experience, quite idiosyncratic in content and rarely richly detailed and recalled in a fluent narrative form. In these respects, then, B's memories from below the age of about 8 years were remarkably unusual.

B started her WS by recalling her earliest memory. Why is unclear but possibly B thought that this would establish the age from which she was able to have clear and

detailed memories – a type of detail that Bell and Loftus (1989) proposed served the purpose of *trivial persuasion*. That is, recalling trivial or irrelevant details in order to convince one's audience that one really is remembering. B's earliest memory was:

“I remember standing in the garden looking at the back of the house – it was the July just before my third birthday. The garden was full of rubbish and weeds and the back of the house was shabby and in disrepair with cracked paint peeling off the windows, he (her father) never kept anything in good shape.”

Clearly no 2/3 year-old child could have such a memory full as it is of adult concepts such as 'weeds', 'shabby', 'disrepair', etc. Also recalling that the event was just before her 3rd birthday seems highly unusual too, time markers are typically not well recalled (Thompson, et al., 1996) and it seems unlikely that a 2/3 year-old would know the month of the year.

A common defence against this line of argument is that the rememberer has a (visual) image in mind from this time and now describes it in adult terms. But remembering what one cannot understand at the time, from non-words to non-objects (Schacter, et al., 1990) is poor, and remembering stories where comprehension is low is subject to condensation, distortion, and error (Bartlett, 1932). Indeed the degree of understanding of complex negative events has been found to correlate with the amount that can later be recalled (Goodman, et al., 1994). Thus, although it is the case that B's first memory is undoubtedly reported in adult concepts and words, concepts and words she would not have had as a 3-year-old, this simply begs the question: what does she actually 'remember' compared to what she infers, guesses, or adds in to make the account consistent, coherent, and narratively fluid? This point is particularly important when it comes to sexual acts that she could not have understood as an

infant/child. Finally, given the paucity of early memories and their fragmentary nature B's first memory and subsequent early abuse memories stand out as being highly unusual. And this is the important point: a memory expert can tell a court what is unusual and why. Jurors and others without expert knowledge in the area cannot know this.

The CCRC also sent me some papers from the case including some, so called, "unused" evidence. Evidence can be unused for a variety of reasons but one reason is that the prosecution and defence both agree that it is not relevant to line of argument either is taking. In B's case the fact that she had been in "survivor" counselling for 3 years prior to making her witness statement and lived with a woman during that period who had written a book on survivors of childhood sexual abuse, was apparently considered irrelevant to the 'false memory' defence with its focus on the escalating memories of abuse by insertion of objects into B's vagina and rape by multiple men. We know now, however, after many years of research (and argument) that counselling/therapy even discussion with others can lead to false memories of sexual abuse. The base rates are not known but it is generally considered that interventions that feature "memory work" and or imaging what might have taken place, writing narratives of these and recounting them to others can all lead the emergence of false memories by *imagination inflation* (Garry, et al., 1996). Thus, periods spent in remembering the past with others, professionals or not, need to be taken into account when trying to identify the source of memories: imagination or experience. By the modern view of human memory both will usually be causes to varying degrees.

I suggested that even it was now some years since the case that the notes of the counsellor should be obtained and examined, their affiliation and training established,

and the book written by her friend (privately distributed) be examined. The counsellor had no formal training and had become a 'counsellor' through working for a crisis charity. There were no notes to the sessions as none had been taken. The book contained several accounts of child sexual abuse similar to those in B's memories and advice on how to work to remember the abuse memories, memories that would come to mind with effort. I suggested to the CCRC that the possibility of generating false memories was increased by these interventions. I pointed out that such false memories could arise by repeatedly imagining and by images later being recalled and mistakenly *experienced* as memories – a source monitoring error (Johnston, Hastroudi, & Lindsay, 1993). There was no reason to suppose explicit intentions to deceive, it could happen quite 'naturally'.

Finally, and remarkably B in her WS had recalled, in detail, a multiple rape by several men in the backroom of her father's hardware store. She had also recalled some episodes predating this when she claimed to recall her father and another man, who she did not know, subjecting her to various sexual acts including rape by both men. When questioned by the prosecution, remember B is the prosecution's witness, she was gently reminded of parts of her WS in which she had described her memories of the rapes by her father the anonymous assailant. She recalled these and was able to provide details, especially of the conversation they had with each other while jointly assaulting her. However, when questioned with repeated cues from her WS about the assault by multiple men she denied that she had ever been raped by more than her father and other man. This a most unusual omission, especially as the court's growing acceptance of these remarkable memories being true accounts was based on the repeated suggestion by the prosecution that these events were so unusual and so traumatic that they would inevitably be vividly recalled. This "burnt into memory"

belief is a common one to encounter in the courts in the UK, although as we know as memory researchers the relation between emotion and memory is not as simple as this (see Riesberg & Hertel, 2004). Perhaps even more remarkable was that the defence did not pick up on this omission, perhaps because of the many breaks in her testimony sanctioned by the judge. I noted in my report that very vivid memories of any events are usually remembered fairly consistently on different occasions of recall (e.g., Luminet & Curci, 2009). There did not appear to be any studies that reported vivid memories being recalled on one occasion and then forgotten shortly after.

So, how was this expert memory testimony received by the Appeal Court judges? Not especially well. I was given a 3-hour grilling in the witness box at the Royal Court of Appeal. One thing I learnt from this is that there is much that is relevant in these cases that we simply have not researched. What is the evidence, for example, that people typically cannot remember the weather, clothes, orientation of limbs, etc., for memories dating to early childhood? There is some research evidence forthcoming (Wells, et al., 2013), but the appeal court judges want exactly what is known, what the evidence is, and if there is none they want to know that too. It was a salutatory experience to realise how much we did not know about adult autobiographical memory for childhood. They were fairly dismissive of my suggestion that the undisclosed evidence of counselling was relevant but thought the memory failure in the trial possibly was an issue, but not new evidence. Instead, and to my surprise, they concluded that ‘childhood amnesia’ was new evidence and it was expert evidence that a jury could not have known by virtue of their own memories. On that basis it was concluded that B’s ‘memories’ were questionable and the appeal was upheld and her father released – after 7 years in prison.

A Case of Memory for a Guitar Riff

In 1971 a famous rock band, Pinky², played a series of venues in the southern Sylvania city of Freedonia. At the time Pinky featured one of the world's leading rock guitarists, let's call him Jimmy Clapton (JC for short) who some 15 years later, long after Pinky had split up, had a world-wide solo hit featuring one of his trademark floating and haunting guitar riffs. After their performance in Freedonia, Pinky and their entourage visited a nearby night club where a local band, Rufus T, were playing. Rufus T had a lead guitarist who had modelled himself on JC and they rather proudly played their first single with an original if rather derivative and standard guitar solo. Sadly for Rufus T their single bombed and they were never heard of again, until that is JC released his world-wide hit single in 1986. The lead guitarist of Rufus T sued for copyright infringement claiming that JC's 1986 guitar riff was copied from their first and only single, which he, JC, had heard (once) live at the nightclub in Freedonia some 15 years earlier. And, indeed, there was a high degree of similarity between the two riffs when the two records were compared.

Unsurprisingly JC claimed to have no memory for the nightclub or Rufus T and neither did any of the surviving members of Pinky. Indeed, none of the band members including JC had any memory of ever having played in Sylvania. They had been a hard-living rock band and substance abuse at that time in their life had been the norm. In 1971 they had played over a 100 sets in a raucous and wild European tour. From a memory perspective given the effects of drugs and alcohol on memory and the repeated nature of their performances which featured the same play-list over the whole tour, JC's fragmentary memories attached to some generic/schematic knowledge of the performances is what would be expected. Assuming JC and the

² Obviously these names are fictitious.

other band members were truthful that they could not remember, this would seem to rule out any conscious or intentional attempt by JC to purposely copy the Rufus T riff. However, the prosecution argued that the plagiarism was unconscious, but even so, it was still plagiarism and infringement of copyright and a case ensued in which compensation of several million pounds was sought.

Under Sylvania law, and as is the case in several European countries, a defendant has to prove her or his innocence. In other words the defendant is by default guilty until they provide the evidence that demonstrates their innocence. (It is interesting that although this is the reverse of U.K. law defendants in cases of historical sexual abuse are in very much the same situation). The case was presided over by an investigating judge and no jury was used. The judge fairly quickly decided to call the experts and a professor at a prestigious School of Music was asked if it was possible to hear a piece of music once and later reproduce that piece of music, fairly exactly and believe it to be one's own creation rather than a copy. The music Professor started with an interesting example; Mozart had, allegedly on returning from a concert written the entire score of the music he had heard that evening, suggesting that one hearing for a music expert might be sufficient to produce a detailed and durable long-term memory representation. The Professor who was knowledgeable of the scientific research into memory for music (see Sloboda, 1985, for a comprehensive review) listed various findings that further supported the notion that a musician could, from a single listening, memorize at least part of a passage of music. For example, repetition is known to increase retention and the Rufus T riff contains a key phrase that is repeated four times. Musicians also have a technique for analysing heard music call 'listening off' and this too improves memory. The riff itself was judged likely to induce emotion and according to the Professor this too

would increase memory. Lastly the professor had his research assistant conduct an experiment using students at the school, who it was found were able to reproduce, fairly exactly, the riff after one hearing over a retention interval of several days. His conclusion was that all the memory evidence supported the proposal that JC had indeed heard the piece once and then unconsciously plagiarised it 15 to 16 years later.

At this point I was approached for an opinion of memory more generally and a second music expert was also called. As often happens in cases where experts are called they are pitted against one another and this can lead to fairly entrenched views especially when the scientific evidence is ambiguous or lacking. In my report I agreed with the music Professor's listing of the findings on memory for music, which were correct. However, I pointed out that all were from experiments in which the retention intervals had been typically of a few minutes or hours and all featured intentional memory (i.e., participants were instructed at the outset to remember). The relevance of these findings to unconscious or implicit retention was, thus, not clear. The Mozart vignette turned out to be apocryphal and he had written only a few lines of the piece that had caught his interest (Sachs, 2007). In any case no one was suggesting that JC or the guitarist from Rufus T were at a level of musical expertise comparable to that of Mozart. The second music expert produced a particularly interesting report in which he demonstrated that the guitar riff itself was a very common one. It had featured in the work of many artists and famous songs (e.g., 'I will survive' and many others). Perhaps more importantly it featured in several JC songs from the late 1960's and it seems most likely that Rufus T themselves had copied it from JC or some other source. Finally, the music students who had been able to recall the piece after one hearing were most probably recalling this standard riff rather than the piece itself. The second music expert concluded that the only

difference in how this progression differed from song to song was tempo and the way the strings were played. I concluded that there was no scientific evidence that a person could be exposed to a piece of music once and then reproduced it fairly exactly after a 15 year retention interval and be unaware of its source.

It would seem then that the memory evidence was overwhelmingly against Rufus T and in favour of JC, but in fact this was not the case. The problem with the memory evidence in this case is that is not especially relevant to the proposal that unconscious retention over a 15-year period after a single exposure is possible. Instead it is negative and simply states that from a scientific point of view we do not know. Negative evidence does not prove one's innocence, in Sylvania at least, and probably elsewhere too. Nonetheless, having a definitive statement from an expert about what is *not* known can be of use to a court and rule out what are often unhelpful speculations.

A Case of Memory for Work

An American law firm called me one day. They were representing a large financial corporation that owned banks and various finance houses, let's call them 'PPA Inc'. The lawyer explained that was facing a 'class action' from a set of former employees. A 'class action' (which I had not encountered before) is when a group of witnesses/plaintiffs each provide individual legal statements – affidavits – that make the same class of allegations against the same body. Note that this occasionally occurs in the UK when, for example, a number of complainants all allege abuse from the same source (e.g. a residential school or home). In cases where a number of individuals all allege sexual abuse by the same person the allegations often, at first

glance, appear much stronger, even though they are still based on the memories of individuals. In this case, however, the alleged abuse was rather different. The class action, made in 2008, alleged that there had been a culture of bullying in PPA offices emanating from managers who had compelled staff to work unpaid overtime over a period of 25 years. This was particularly serious for PPA because if upheld the outcome could have been that the corporation compensate all employees, at the appropriate level, who had worked for them during this period. A potential pay-out of hundreds of millions. My instruction was: is it possible for people to remember precise dates, hours of the day, and durations of time spent working?

The only evidence in this case were the accounts of memories in the sworn affidavits of the complainants. There were no work records, diaries, or any other form of external record of the alleged hours worked. Consider some of these memories:

Plaintiff 1 worked for PPA for 27 years from 1980 to 2007. She stated that “in 1994/95 we were short-staffed and my manager made me work about 15 minutes extra virtually every day. In total about 2hs 15ms extra per week, which was unpaid. He made it clear that if I failed to do this my job would be at risk.”

Plaintiff 7 worked for PPA for 14 years, 1988 to 2002, and stated that “we always did the till as soon as the bank closed and it had to be completed before we could leave. Some days people left early for legitimate reasons but that meant those of us who were left had to do their tills. When I first started work there I was told I was on probation and could be dismissed if my work wasn’t up to standard. Several of the other female tellers had young children and often had to leave early and I had to finish their tills. This led to me working, I would guess, about 2 hours extra per week throughout 1988 and ’89, until I moved to another branch.”

Plaintiff 12 (there were 12 plaintiffs in all) worked for PPA from 1987 to 2007 and stated, “We often had to see clients late in the afternoon. The routine was that we’d complete yesterday’s paper work in the morning then after lunch set up new appointments and then interview clients between 3 and 5pm. I distinctly remember that in July 1989 I was basically forced by the threat of losing my job – he said he’d transfer me to another office to which I would not have been able to commute – to work ‘till 6.30pm every day. This was not uncommon and would happen variably but frequently, until this particular office manager moved to head office. This happened to others too and I believe it was basically because they didn’t have enough people in the office to deal with the volume of work.”

Is it possible to remember such specific times, durations, and dates? The answer is not usually. It has long been known that calendar dates in autobiographical memory are rare (Skrowonski, et al., 1996). Precise dates are retained in memories because they are integral to the memory (e.g. the birth of a child, wedding day, deaths, etc.) or are linked to some other memorable date, (birthday, Christmas, etc.) or to memory for some other personal or public landmark event (e.g. England winning the World Cup, assassination of JFK, and so on). But this aside in general, calendar dates are not retained in memory but rather inferred with reference to other information in memory, even then an exact date is usually no more than an informed guess. What about memory for duration? Is it possible to remember how long a period of work lasted? This is called ‘retrospective duration’ and it is determined by the amount of information processed during the target period, a lot leads to overestimation of duration and a little to underestimation – the so called ‘filled time illusion’ (Wearden, et al., 2007, see Zakay, 2012, for a review). In either case duration is estimated and, therefore, the claimed period of overtime worked can at best be estimates the

accuracy of which is unknown. Finally, the plaintiff's memories are all of highly scripted or schematic events and it is well known that memory for specific instances of repeated schematic events is low and only usually occurs when something distinctive relative to the schema is present in the event (Brewer & Treyens, 1981). Repeatedly working overtime on many different days will not give rise to many specific memories. Thus, frequency too is an estimate or inference the accuracy of which, again, is unknown. In summary my report stated that duration, frequency, and calendar date are not literally remembered but rather are estimated, inferred, and guessed at. Without further evidence external to memory it is not possible to judge the accuracy of the plaintiff's recall of overtime worked but what we can be sure of is that these are estimates that at best would approximate to what actually occurred. The judge found scientific evidence in this case to be useful.

Closing Comments

Being a memory expert witness is truly a fascinating experience. Learning what courts and other organizations need in the way of expert advice or finding out what is not helpful, open one's eyes to what we have achieved in memory research and what is yet to be achieved – rather a lot, if my experience of being a memory expert is any yardstick. One conclusion I have come to is that outside the small world of memory research, understanding of memory is completely based on *beliefs* about memory; sometimes those beliefs approximate to scientific understandings, sometimes they are contradicted by the findings, and sometimes there is no credible evidence supporting them one way or another. Often as a memory expert one is simply indicating to non-experts which beliefs fall in which of these three classifications.

One other, perhaps more scientific, aspect of being a memory expert witness is that one encounters data and patterns of data one would never encounter in the laboratory or even in field work. For instance, I have now acted as a memory expert witness in many cases of historic sexual abuse, over a 10-year period, and I have noticed an emerging pattern: cases come in two forms. One form is unique and unusual and other is more prevalent and of a type. I estimate that about 70% of the cases I have acted in approximate very closely to that of the case of B described earlier. This could, of course, just be a sampling bias, after all I have no control over the cases that come my way. Nevertheless, a question it raises for me is that, what if it does *not* arise from sampling bias? What if there really are two *types* of sexual abuse allegation? What might that mean for the majority of allegations of childhood sexual abuse, those that are like B's? Which brings me to my final conclusion and that is: when memory is the only evidence the advice of a memory expert is essential.

References

- Bartlett, F. C. (1932). A theory of remembering. *Remembering A Study in Experimental and Social Psychology*. Cambridge: Cambridge University Press.
- 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*, Vol. 56, No. 5, 669-679.
- Brewer, W. F. & Treyens, J. C. (1981). Role of schemata in memory for places. *Cognitive Psychology*, 13, 207-230.
- The British Psychological Society, Research Board (2008). *Guidelines on Memory and The Law: Recommendations from the Scientific Study of Human Memory*. Leicester: The British Psychological Society. ISBN978-1-85433-473-2.
- 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.
- Bruce, D., Wilcox-O’Hearn, L.A., Robinson, J.A., Phillips-Grant, K., Francis, L., & Smith, M.C. (2005). Fragment memories mark the end of childhood amnesia. *Memory & Cognition*, 33(4), 567-576.
- Freud, S. (1915). Repression. Translated by C.M.Baines and J.Strachey. In, The Standard Edition of the Complete Psychological Works of Sigmund Freud, edited by J.Strachey, et al.. Vol. XIV. London: Hogarth Press, 1957.
- Gary, M., Manning, C.G., Loftus, E.F., & Sherman, S.J. (1996). Imagination inflation: Imagining a childhood event inflates confidence that it occurred. *Psychonomic Bulletin & Review*, 3, 208-214.

Goodman, G. S., Quas, J. A., Batterman-Faunce, J. M., Riddlesberger, M. M., & Kuhn, J. (1994). Predictors of accurate and inaccurate memories of traumatic events experienced in childhood. *Consciousness and Cognition*, 3, 269-294.

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

Henri, V. & Henri, C. (1898) Earliest recollections. *Pop. Sci. Month.* 53, 108–115.

Howe, M.L. (2011). *The Nature of Early Memory: An Adaptive Theory of the Genesis and Development of Memory*. Oxford: Oxford University Press.

Loftus, E. (1997) Creating False Memories. *Scientific American*, 277, 70-75.

Luminet, O. & Curci, A. (Eds.) (2009). , *Flashbulb memories: New issues and new perspectives* (pp. 51–76). New York, NY: Psychology Press.

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

McManus, C. (2002). *Right hand, left hand*. London: Weidenfeld & Nicolson.

Pillemer, D.B., (1998). What is remembered about early childhood events? *Clinical Psychology Review*, 18(8), 895-913.

Pillemer, D. B. & White, S. H. (1989). Childhood events recalled by children and adults. In H.W. Reese (Ed.), *Advances in child development and behavior* (Vol. 21). (pp. 297-340). New York: Academic Press.

Reisberg, D. & Hertel, P. (Eds.) (2004)., *Memory and emotion* (pp. 3-41). New York: Oxford University Press.

The Royal Society. (2012). Brain Waves Module 4: Neuroscience and the Law.

Rubin, D. C. (2000). The distribution of early childhood memories. *Memory*, 8, 4, 265-269.

Sacks, O. (2007). *Musicophilia. Tales of Music and the Brain*. London: Picador.

Schacter, D.L., Cooper, L.A., & Delaney, S.M. (1990). Implicit memory for unfamiliar objects depends on access to structural descriptions. *Journal of Experimental Psychology: General*, 119(1), 5-24.

Sloboda, J. (1985). *The Musical Mind: The Cognitive Psychology of Music*. Oxford: Oxford Science Publications.

Thompson, C. P., Skowronski, J. J., Larsen, S. F., & Betz, A. L. (1996). *Autobiographical memory: Remembering what and remembering when*. Philadelphia, PA: Psychology Press.

Waldfoegel, S. (1948). The frequency and affective character of childhood memories. *Psychological Monographs*, 62, 1-34.

Wang, Q., Conway, M.A., & Hou, Y. (2004). Is Infantile amnesia a universal phenomeon? A cross-cultural investigation. *Cognitive Sciences*, 1, 31-46.

Wells, C., Morrison, C.M., & Conway, M.A. (2013). What adults can and cannot remember of early childhood memories. *Under review*.

Wetzler, S. E., & Sweeney, J. A. (1986). Childhood amnesia: An Empirical demonstration. In D. C. Rubin (Ed.), *Autobiographical memory*, (pp. 202-221). Cambridge: Cambridge University Press.

Yapko, M D, (1997). The troublesome unknowns about trauma and recovered memories. In M.A.Conway, (Ed.), *Recovered memories and false memories*. Oxford: Oxford University Press.

Author's Note

This research this paper was based on was supported by the award of a Professorial Fellowship, 2004-2007, from the Economic and Social Research Council (ESRC), RES-051-27-0127 of the United Kingdom, and by a follow-on ESRC grant, RES-189-25-0226. The author thanks the Council for their continued support. Email communications about this paper can be sent to: Martin.Conway.1@city.ac.uk