

Latent variables underlying the memory beliefs of Chartered Clinical Psychologists,
Hypnotherapists and undergraduate students.

James Ost^{1*}, Simon Easton¹, Lorraine Hope¹, Christopher C. French² & Daniel B. Wright³.

¹Department of Psychology, University of Portsmouth, UK

²Goldsmiths, University of London, UK

³ACT, Inc., Austin TX

Keywords: Memory beliefs, hypnotherapists, expert witness, repression.

Word count: 5187 (excluding tables, figure and references)

*Corresponding author

Acknowledgements

The authors thank all the respondents who completed the questionnaire, Dr Julie Udell for assistance with the data collection, and two anonymous reviewers for constructive comments and suggestions that greatly improved the quality of this paper. This project was funded by a grant from the Odin Trust.

Author note: This is a pre-print version of the paper NOT the copy of record. The published version may contain minor grammatical or typographical changes. The dataset (SPSS file) is available online www.port.ac.uk/pure (search for James Ost).

Abstract

In courts in the United Kingdom, understanding of memory phenomena is often assumed to be a matter of common sense. To test this assumption three hundred and thirty seven UK respondents, consisting of 125 Chartered Clinical Psychologists, 88 individuals who advertised their services as Hypnotherapists in a classified directory, the Yellow Pages™, and 124 first year undergraduate psychology students, completed a questionnaire that assessed their knowledge of ten memory phenomena about which there is a broad scientific consensus. Hypnotherapists' responses were the most inconsistent with the scientific consensus, scoring lowest on six of these ten items. Principal Components Analysis indicated two latent variables – reflecting beliefs about memory *quality* and *malleability* – underlying respondents' responses. In addition, respondents were asked to rate their own knowledge of the academic memory literature in general. There was no significant relationship between participants' *self reported* knowledge and their *actual* knowledge (as measured by their responses to the ten-item questionnaire). There was evidence of beliefs among the Hypnotherapists that could give rise to some concern (e.g., that early memories from the first year of life are accurately stored and are retrievable).

In 2010 the British Psychological Society (BPS) published a document entitled '*Guidelines on memory and the law: Recommendations from the scientific study of human memory*' (BPS, 2010). The purpose of that document was to aid decision-making in court by providing a rigorously informed understanding of memory science. However, as Keane (2010) notes, little attention has been paid to the report in the legal community because the scientific findings are "the same as, or very similar to, commonly held beliefs, common experience and common sense" (Keane, 2010, p. 24; but see Howe & Knott, 2015 for a counter example). But, as Lilienfeld, Lynn, Ruscio and Beyerstein (2010) point out, there are many examples where scientific evidence refutes (or at least heavily qualifies) commonly held beliefs about psychology. The results of several large-scale surveys suggest that the same is also true of commonly held beliefs about memory.

Simons and Chabris (2011), for example, found that 63% of a representative U.S. sample agreed with the statement, 'Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later,' and 48% agreed with the statement that 'Once you have experienced an event and formed a memory of it, that memory does not change'. In contrast, a sample of memory experts, including 16 professors, each of whom had over 10 years of memory research experience, endorsed neither of those statements. Magnussen et al. (2006) surveyed 2000 adult Norwegians regarding their beliefs and opinions about human memory. On some issues (e.g., the date of earliest memories), the views of the general public were substantially consistent with the scientific literature. On other issues (e.g., the likelihood of repression of adult traumatic memories), their sample expressed beliefs that were largely unsupported by the scientific literature.

These recent findings accord with earlier surveys of memory beliefs. For example, Loftus and Loftus (1980) conducted an informal survey of 169 individuals (75 of whom had formal graduate training in psychology) concerning their beliefs about how memory works.

They found that 84% of the psychologists agreed with the statement that “[E]verything we learn is permanently stored in the mind, although sometimes particular details are not accessible. With hypnosis, or other special techniques, these inaccessible details could eventually be recovered”. Garry, Loftus, Brown and DuBreuil (1997) found that individuals who had participated in a number of memory recovery activities (e.g., participated in ‘memory work’ with a therapist, or reading books telling them about recovering lost memories) were more likely to endorse beliefs about the reliability of prenatal memories, and the permanence of memory.

Perhaps unsurprisingly given these widespread beliefs about memory in general, research shows that more specialised knowledge about memory science is also not well understood by lay people. In a meta-analysis of 23 surveys assessing lay knowledge of eyewitness issues, Desmarais and Read (2011) concluded that findings related to variables including the relationship between confidence and accuracy, and the effects of alcohol on memory (‘estimator’ variables) were frequently beyond the knowledge of a jury. Surveys of professional groups find that they, too, hold beliefs about memory that are not in accordance with scientific findings (see French & Ost, *in press*; Patihis, Ho, Tingen, Lilienfeld & Loftus, 2014). For example, Magnussen et al. (2008) surveyed U.S. and Norwegian judges’ knowledge and beliefs about a range of eyewitness issues and found that both groups included individuals who had limited knowledge of the scientific findings. Likewise, a survey of 99 judges in Scotland found a large degree of variability in the consistency of their views and beliefs with expert opinion in relation to the conceptualisation and understanding of memory (Houston, Hope, Memon & Read, 2013).

Moving away from surveys of legal professionals – who may have had little, if any, formal training in memory science – Legault and Laurence (2007) found that 68% of a sample of 220 social workers, psychiatrists and clinical psychologists, agreed with the

statement that ‘everything one experiences is permanently recorded in one’s brain’ (84% of the social workers agreeing with this statement). Similarly, Magnussen and Melinder’s (2012) survey of 858 licensed psychologists in Norway revealed that the average number of responses deemed correct given by this sample (63%) was no different from a parallel survey of judges (63%) and not much higher than a survey of the general public (56%). Worryingly, Melinder and Magnussen (2014) found that psychologists and psychiatrists who served as expert witnesses in court were overall no more accurate in their beliefs about memory than those who did not serve as expert witnesses. It is noted that another recent survey of psychiatrists found that a large majority of them endorsed beliefs that were reported to be substantially inconsistent with what the authors deemed to be the more generally accepted view of the memory literature among academics and experts familiar with the subject (e.g., that “blocked memories” can result in physical symptoms like non-epileptic seizures; Kemp, Spilling, Hughes & de Pauw, 2013).

Evidence consistently indicates that the public (and thereby potential jurors) as well as many professional groups (including those acting as investigators, witnesses to fact, and triers of fact) often hold beliefs about memory that are not in accord with the scientific literature. Based on this evidence some argue that expert testimony may be required to inform decision-making at court (e.g., Howe, 2013). Yet there is resistance to admitting evidence from expert witnesses on memory in court proceedings. A judgment in the UK Royal Courts of Appeal exemplifies this. In *R v Jonathan CWS* (2006) the judges refused to admit expert testimony, arguing that some of the points made about the inherent unreliability of memory (“the memories of adults, going back into their childhood, could often be wrong”) were simply “unremarkable” (paragraph 18). While Howe (2013) shares the goal of fewer memory researchers being called as expert witnesses to aid the jury, he nevertheless argues that it is unlikely, cautioning that until, “scientific knowledge becomes ... familiar to triers of fact

(judges, jurors), police, and laypeople, memory experts will continue to be an inexorable part of the legal process when memory serves as the main or only evidence” (p. 576; see also Conway, 2013; Zajac, Garry, London, Goodyear-Smith & Hayne, 2013).

In summary, the results of surveys of the general public and professionals (including qualified practitioner psychologists) indicate that many people hold beliefs about memory that would be viewed with concern by most academics involved in memory research. One limitation with the existing literature is that it generally focuses on accredited or registered therapists, thus ignoring lay or “unqualified therapists” (Memon, 1995, p. 156; Weiskrantz, 1995; but see Patihis et al., 2014). The beliefs about memory held by unchartered therapists are important to gauge for at least two reasons. Firstly, such an individual may be someone to whom an individual may be referred for psychological counselling and – thus – may be instrumental in guiding a client toward an understanding of his or her memories (or lack of them). Secondly, although an unchartered therapist would not be called as an expert witness in relation to memory evidence (i.e., to give opinion evidence), they might well be called as a witness of fact (i.e., to give evidence before a jury about what a client could or could not recall at a given time during treatment). The only authors to date that have compared memory beliefs of research-oriented psychologists to clinicians and laypersons are Patihis et al. (2014). In that paper (Study 2) they found evidence of a substantial disparity in beliefs about memory between memory scientists and psychological practitioners (Clinical Psychologists, NLP therapists) relating to issues like the repression of traumatic memories (less than 30% of research-oriented psychologists agreed that ‘traumatic memories are often repressed,’ compared to 60% of respondents in their other participant groups). An exploratory factor analysis of their data revealed one key factor that Patihis et al. (2014) summarized as ‘belief in repressed memory or memory reliability’ on which clinical-psychology practitioners scored significantly higher than clinical psychology researchers.

To date, comparable data for UK clinicians is insufficient. It is important to obtain such comparative data because, in North America particularly, there has been intense legal scrutiny of memory science as a result of high profile court cases involving ‘repressed’ or ‘recovered’ memories (see for example, Loftus, 1998). Thus it is possible that, as a result of the publicity and debate surrounding such cases, the research findings concerning memory have been debated more widely in the psychological community in North America than elsewhere.

In the interests of full disclosure we note that the data reported in the present paper were collected some years ago (between 2007 and 2009), but not published, as part of a separate project (see Ost, Wright, Easton, Hope & French, 2013). We were prompted to revisit these unpublished data by the rise in the UK in the number of reports of cases involving ‘historic’ or ‘non-recent’ allegations of abuse. That increase has been partly driven by successful prosecutions in several recent high profile cases (e.g., R v. Frank Maxwell Clifford, 2014; Office for National Statistics, 2013). Beliefs about memory stability or malleability are, of course, central to such cases. The memory beliefs of UK psychology practitioners may be particularly important to report, as they are people to whom initial disclosures of sexual assault may be made – sometimes many years after the alleged events occurred – before being reported to the police.

We surveyed the beliefs of two groups of practitioners (Chartered Clinical Psychologists and unchartered therapists), and first year undergraduate psychology students in the United Kingdom. For the purposes of this study, the unchartered sample consisted of Hypnotherapists who advertised their services in a classified directory, the Yellow Pages™. Hypnotherapists were selected for several reasons. Firstly, hypnosis was widely advocated during the 1980s and 1990s as a technique that could enable the recovery of forgotten memories of abuse (e.g., Poole, Lindsay, Memon & Bull, 1995), despite evidence that this

was not the case and that, in fact, its use might increase the likelihood of false memories (Pintar & Lynn, 2008). Secondly, as Rook and Ward (2010, p. 887) – widely acknowledged legal authorities on sexual offence case law – note, it is “not unknown for allegations of sexual assaults, particularly in childhood, to be made following such [hypnotherapy] treatment”. Finally, while advertising one’s services as a Hypnotherapist in the Yellow Pages™ does not mean one is unqualified, it is assumed here that the majority of these individuals would have a different background with respect to training and engagement with more formal routes and accreditation processes from that of Chartered Clinical Psychologists. The undergraduate sample was included to serve as a comparison group who may have more knowledge of psychology than a member of the general public (by virtue of relevant pre-university education) but have not been exposed to the psychology degree programme and would be, at that point in their careers, untrained for professional practice.

Method

Memory Beliefs Questionnaire (MBQ)

A Memory Beliefs Questionnaire (MBQ) was the final section of a larger questionnaire that was designed to gather data about respondents’ beliefs and practices about recovered memory. The first section was entitled ‘You and your practice’ and respondents were asked to record demographic information, including their gender, their age bracket (21-30yrs; 31-40yrs; 41-50yrs; 51-60yrs; 61-70yrs; 71+), and how many years of post-qualification practice they had (0-10yrs, 11-20 yrs, 21-30 yrs, 31+ yrs). The second section was entitled ‘Your clients’ memories of childhood sexual abuse’. The data from this part of the questionnaire are reported in Ost et al., (2013). The final part of the questionnaire consisted of the MBQ, and is detailed below. Note that the Undergraduate sample completed only the MBQ questions as a pen and paper exercise at the start of their first introductory lecture at University.

The MBQ contained 11 statements about memory. Six of these items were either taken directly or in a slightly adapted form from Yapko's (1994) survey (e.g., "The more *confidence* [*certainty* in the original] with which a memory is reported, the more likely it is to be accurate"¹). The remaining five items were devised based on established research findings, specifically that emotional content does not reliably indicate memory accuracy (e.g., Laney & Loftus, 2008), that it is not possible to reliably distinguish between true and false memories, (see Bernstein & Loftus, 2009), that the vividness of a memory is not diagnostic of its accuracy (e.g., Talarico & Rubin, 2003), that it is possible for an individual to develop 'false' memories of non-traumatic events (e.g., Hyman, Husband & Billings, 1995), and that it is possible for an individual to develop 'false' memories of traumatic events (e.g., Porter, Yuille & Lehman, 1999)². As these last two statements were very similar (the first asking about the possibility that someone could falsely remember *non-traumatic* events and the second asking about the possibility that someone could falsely remember *traumatic* events) and were both moderately correlated (Pearson's $r = .44, p < .005$) the more contentious statement (i.e., false memory for *traumatic* events) was omitted from the calculation of the final scale.

The remaining ten statements comprised those about which a broad scientific consensus exists (see Table 1). Respondents were asked to indicate on a four-point scale (1 = strongly disagree) their endorsement of each statement. The internal consistency of these ten memory statements was reasonable (Cronbach's alpha = .73). A 'don't know' option was not considered appropriate given that two of the three target populations would be expected to

¹ But see Wixted et al., (2015) for new evidence on the link between initial confidence in the absence of contamination and accuracy in line-up identifications.

² The original questionnaire consisted of these eleven items tapping beliefs about memory, and another further set of items concerning beliefs about hypnosis, trauma and treatment (taken from Yapko, 1994 and West, Easton & Fellows, 1997). As it did not seem reasonable to expect undergraduate psychology students to have knowledge of the research literature on hypnosis, trauma or treatment, these items were not included in the undergraduate questionnaire, and the responses of the Clinical Psychologists and Hypnotherapists to these items were excluded from the analyses reported here.

have knowledge of memory science given either their training (Clinical / Licensed Psychologists) or that they were advertising their professional services as therapists (Hypnotherapists). One item was positively phrased (such that an agree response was more in line with the scientific consensus), and the remaining nine were negatively keyed. To aid interpretation, the scores from nine of the ten items were subsequently reversed so that a higher score represented a response that was in line with the broad scientific consensus (the tenth item was already scored in that direction). These were then summed to produce a score between ten and 40 for each participant where a higher score meant that they had given responses to the ten items that were in line with the broad scientific consensus.

The final item on the MBQ asked respondents to rate their overall knowledge of the memory literature by responding to the following question: *What best describes your knowledge of the memory research literature relating to the long-term recall of trauma?* This question was taken from Yapko (1994) and adapted slightly so that the response options were qualified. The response options were: ‘*Below average*’ qualified with ‘(e.g., I rarely read relevant journal articles)’; ‘*Average*’ qualified with ‘(e.g., I occasionally read relevant journal articles)’; and ‘*Above average*’ qualified with ‘(e.g., I regularly read relevant journal articles)’. For the purposes of analysis, responses were assigned values of one (below average), two (average) and three (above average).

Respondents and sampling procedure (original survey)

The sampling procedure and response rates for the original survey are included below. This is followed by the demographics for only those respondents who responded to all of the MBQ items as well as the ‘knowledge of the memory literature’.

Chartered Clinical Psychologists (CCP): This sample consisted of members of the British Psychological Society Division of Clinical Psychology, membership of which

requires Chartered Clinical Psychologist status. Members of the Division were targeted using two methods. The first was via a full-page advert placed in a monthly publication (*Clinical Psychology Forum*) sent to all members of the Division of Clinical Psychology. Three adverts were placed in three consecutive issues (December 2007 through February 2008) containing a short statement of the aims of the research, a website for participants to access and complete the online questionnaire, and details of a prize draw. The exact wording of the advert was as follows:

“We have developed an online survey to obtain data on professional psychologists’ experiences, beliefs and practices regarding working with adult survivors of childhood sexual abuse.”

As of 4th March 2008 a total of 57 responses had been received. Further potential respondents were targeted directly via email using contact details available from the Directory of Chartered Psychologists on the British Psychological Society’s website. This search resulted in a list of 1339 Chartered Clinical Psychologists who were offering their services to the public using this facility. Of these, 1170 included an email address in their contact details. These potential respondents were sent an email that contained the same text as the advert and a hypertext link to the online questionnaire. Of these, 181 emails were returned as undeliverable leaving a final contactable sample of 989. One hundred and twenty-six of these potential participants responded, representing a response rate of 12.7%. The two sets of responses (from the email and the advert) were combined to produce the final sample of 183 respondents, of which 125 (68.3%) answered all of the items on the MBQ and the single ‘knowledge of the memory literature’ item.

Hypnotherapists (HT): These were defined as those individuals who advertised in the ‘Hypnotherapists’ section of the Yellow Pages™ directory. Details of everyone who advertised their services in this section in all 110 directories for the UK were gathered. Their

details were entered into a spreadsheet and each entry was numbered separately. To avoid double counting, entries were deleted if it was clear from the advert that the person was a Chartered Clinical Psychologist, or a member of the British Psychological Society. This resulted in a total sample of 2646. One thousand entries were then selected randomly from the spreadsheet using an online random number generator (www.randomizer.org). Every person in this sample was then mailed a postcard advertising the study giving a web address for the online survey and the details of the prize draw (the wording of the advert was identical to the wording for the Chartered Clinical Psychologists sample). This initial postcard was sent in December 2007, with two reminder postcards sent in January and February 2008. Forty-three postcards were returned as undeliverable resulting in a potential sample of 957. One hundred and nineteen online questionnaires were completed, representing a return rate of 12.4%. Of these 119 respondents, 88 (73.9%) answered all of the items on the MBQ and the single 'knowledge of the memory literature' item.

Undergraduate students (UG): The undergraduate psychology student sample (UG) consisted of 141 Year 1 students (24 male) attending an introductory psychology lecture given by the first author during their first week at University (Autumn / Fall semester 2009). Of these, 124 (87.9%) answered all of the items on the MBQ and the single 'knowledge of the memory literature' item.

The following section provides the demographics and other relevant information for those respondents who responded to all the MBQ items as well as the 'knowledge of the memory literature' item.

Characteristics of responders.

Chartered Clinical Psychologists (CCP): One respondent did not indicate their gender. Of the remainder there were 41 males (33%) and 83 females (66%). One respondent

(0.8%) did not indicate their age. For the remainder, the age of respondents was as follows: 'under 30 years old' (7.2%); '31-40 years old' (32.8%); '41-50 years old' (22.4%), '51-60 years old' (30.4%); '61-70 years old' (5.6%); and 'over 70 years old' (0.8%). In terms of post-qualification clinical experience the responses were: '0-10 years' (41.6%); '11-20 years' (20.8%); '21-30 years' (21.6%); 'over 30 years' (16.0%). The majority (65.6%) described their main orientation as 'Cognitive-Behavioural'. The next largest category was 'Eclectic' (29.6%), followed by 'Systems' (17.6%), 'Psychodynamic' (14.4%) and 'Client-centred / Humanistic' (8.8%). These categories sum to more than 100 per cent because 41 respondents (32.8%) checked more than one orientation.

Hypnotherapists (HT): Of the 88 responders, 36 (40.9%) were male and 52 (59.1%) were female. Respondents fell into the following age brackets: 'under 30 years old' (1.1%); '31-40 years old' (11.4%); '41-50 years old' (21.6%); '51-60 years old' (46.6%); '61-70 years old' (17.0%); and 'over 71 years old' (2.3%). In terms of post-qualification experience the responses were: '0-10 years' (56.8%); '11-20 years' (26.1%); '21-30 years' (14.8%); and 'over 30 years' (2.3%). The most endorsed therapeutic orientation was 'Cognitive-Behavioural' (39.7%), followed by 'Client-centred / humanistic' (38.6%), 'Eclectic' (35.2%), 'Psychodynamic' (18.2%) and 'Systems' (1.1%). Again, these categories sum to more than 100 per cent because 46 respondents (52.3%) checked more than one orientation.

Undergraduate students (UG): Of the 124 responders, 21 (16.9%) were male and 103 (83.1%) were female. With the exception of one student (0.8%) who indicated that they fell into the '41-50 years old' bracket, the entire sample reported being 'under 30 years old'. While this sample was not asked to respond to questions about their post-qualification experience or therapeutic orientation, all 124 confirmed that they had studied some psychology prior to attending University.

Responders versus non-responders

Of the 302 professional respondents (Clinical Psychologists and Hypnotherapists) who responded to the original survey, 213 (70.5%) answered all of the MBQ items and the 'knowledge of the memory literature' item. Of the 141 potential undergraduate students, 124 (87.9%) volunteered to participate, and answered all of the MBQ items as well as the 'knowledge of the memory literature' item. There were no differences between those who responded and those who did not in terms of gender (% female: CCP responders 66.9% vs. non-responders 77.6%; HT responders 59.1% vs. HT non-responders 53.3%; UG responders 83.1% vs. UG non-responders 82.4%, all $\chi^2 < 2.15$, all $ps > .16$) or age bracket (CCP 3.93 vs. 3.96; HT 4.73 vs. 4.53; UG 2.01 vs. 2.00, all $ps > .31$). CCP responders indicated that they had significantly more post qualification experience ($M = 2.12$, $SD = 1.12$) than non-responders ($M = 1.77$, $SD = 0.92$), $t(181) = -2.03$, $p = .043^3$. There was no difference in post qualification experience between HT responders ($M = 1.62$, $SD = 0.82$) and non-responders ($M = 1.53$, $SD = 0.14$), $p = .61$.

³ Because this item required respondents to select a range bracket (e.g., 0-10 years; 11-20 years) rather than provide an exact number (e.g., of years) this may have led to a loss of resolution. Thus, although statistically significant, we cannot determine if this difference is meaningful, or an artifact of category boundaries (i.e., the difference between 10 and 11 years is unlikely to be meaningful where as a difference between 0 and 20 years may very well be).

Results

Memory Beliefs Questionnaire – item analyses

As shown in Table 1 the subsets differed in their endorsement of the ten memory belief questions. Recall that higher scores here indicate responses that are more in line with the broad scientific consensus. Hypnotherapists scored lowest on six of the ten statements: that *the mind is capable of unconsciously blocking out memories of traumatic experiences*; that *memory is like a computer, accurately recording events as they actually occurred*; that it is *possible for an individual to develop 'false' memories of non-traumatic events*; that *the more confidence with which a memory is reported, the more likely it is to be accurate*; that *early memories, from the first year of life, are accurately stored and retrievable*; and that *memory is not influenced by suggestion*.

Undergraduates scored lowest on two statements: that *very vivid memories are more likely to be accurate than vague memories*, and that *the more emotion with which a memory is reported, the more likely it is to be accurate* followed by the Hypnotherapists then the Chartered Clinical Psychologists. Chartered Clinical Psychologists scored lowest on the item asking whether *a poor memory for childhood events is indicative of a traumatic childhood*, followed by the Hypnotherapists and the Undergraduate students. Finally, the Chartered Clinical Psychologists scored highest in response to statement about whether it is *possible for an individual to distinguish between 'true' and 'false' memories* while the mean score for the Hypnotherapists and Undergraduates did not differ on this item.

--- Table 1 about here ---

In order to explore whether latent variables – in this case implicit beliefs about memory – could account for these responses, a Principal Components Analysis with a Varimax rotation of the ten memory belief items was conducted on the responses provided by all 337 respondents. The Kaiser-Meyer Olkin measure of sampling adequacy was good ($KMO = .76$). The resulting

component loadings (excluding those less than 0.4) are shown in Table 2. Inspection of the loadings and the scree plot (Figure 1) suggested a three-component solution that accounted for 52% of the variance in the memory belief scores.

--- Figure 1 about here ---

--- Table 2 about here ---

Four items loaded onto the first component that we named *quality ≠ accuracy*. These items all relate to beliefs about how the self-reported *qualities* of a memory relate to accuracy of that memory (low scores on which indicate a belief that confidence, emotion, are indicative of the accuracy of a memory Cronbach's alpha = .68). Four items loaded on the second component, that we named *memory = malleable*. These items relate to beliefs about the *malleability* of memory (low scores on which indicate a belief that early memories are accurately stored and retrievable; that 'true' and 'false' memories can be reliably distinguished, Cronbach's alpha = .63). The final component (that we labelled *outcomes*) consisted of the two items relating to a belief that false memories *cannot* occur and that 'unconscious' repression *can* occur. As these two items were uncorrelated ($r = -.01$) and the eigenvalue was just over one (1.06), meaning that the combination of these two items was explaining only marginally more variance than if the two items were considered separately, this component was not analysed further.

Inspecting histograms and the measures of dispersion of the resultant z scores revealed that the *quality ≠ accuracy* component was normally distributed (skew of -.026) whereas the *memory = malleable* component had moderate positive skew (skew of 1.03). In order to test for differences between our samples on these components, two Kruskal-Wallis one-way analysis of variance by ranks tests were conducted which revealed that the difference between the endorsement of the three groups on the *quality ≠ accuracy* component failed to reach conventional levels of statistical significance, $H(2) = 5.54, p = .063$. However, as shown in Figure 2, the three groups differed in

their endorsement of items from the *memory = malleable* component $H(2) = 84.44, p < .005$.

Mann-Whitney post-hoc tests (with Holm's sequential Bonferroni-correction to p 's = .016, .025 and .05 for the three comparisons respectively; Holm, 1979) revealed that Hypnotherapists provided the lowest endorsement of these items (i.e., lower beliefs in the *malleable nature* of memory), followed by Undergraduates and Clinical Psychologists (all p 's < .005).

--- Figure 2 about here ---

Memory Beliefs Questionnaire – total score

Scores on this variable had a potential range of 10 to 40 where higher scores indicated responses that were more in line with the scientific consensus. There were three outliers (all Hypnotherapists with scores of 16, 16 and 15) but no extreme values and the scores were normally distributed ($skew = -.33$; $kurtosis = .10$) with a mean of 29.01 ($SD = 4.45$). A one-way ANOVA revealed a significant effect of sample, $F_{2, 334} = 25.71, p < .001, partial \eta^2 = .13^4$. As shown in Figure 3, Scheffe post-hoc analysis revealed that Chartered Clinical Psychologists (range: 22-39) scored significantly higher than Hypnotherapists (range: 15-39) and Undergraduate students (range: 20-36) (whose scores did not differ from each other).

--- Figure 3 about here ---

Knowledge of the memory literature

Recall that participants were asked to rate their knowledge on a relatively crude three-point scale from one ('below average') to three ('above average'). The median and modal responses to

⁴ A second ANOVA was conducted on the memory belief scores of the Chartered Clinical Psychologists and Hypnotherapists that included respondent age and their self-reported years of clinical practice as covariates. The same main effect emerged for sample (CCP scored higher than HT; $F_{1, 209} = 24.69, p < .001, partial \eta^2 = .10$) and neither age, nor years of experience, had any effect on the memory belief scores (both F 's < .05). We thank an anonymous reviewer for suggesting this analysis.

this statement for all three groups were both two (i.e., 'average') with 29.4% (n = 99) rating their knowledge as 'below average', 61.1% (n = 206) as 'average' and 9.5% (n = 32) as 'above average'. A Kruskal-Wallis one-way analysis of variance of ranks indicated that there was a significant effect of group on this variable, $H(2) = 38.59, p < .005$ and Holm's sequential Bonferroni-corrected (to p 's $< .016, .025$ and $.05$ for the three comparisons respectively; Holm, 1979) Mann Whitney tests indicated that all three groups differed significantly from each other (CCP vs. UG, $p < .005$; UG vs. HT, $p < .005$; CCP vs. HT, $p < .05$). As shown in Figure 4, Undergraduates gave the lowest ratings (mean rank = 133.63), followed by Chartered Clinical Psychologists (mean rank = 180.03), with the highest ratings being provided by Hypnotherapists (mean rank = 203.17). A Spearman's rank correlation revealed no relationship between respondents' self-reported knowledge of the memory literature and their scores on the Memory Beliefs Questionnaire composite score ($\rho = .03, p = .62$), even when each group was considered separately (all correlation coefficients $< .05$).

--- Figure 4 about here ---

Discussion

In light of the view that the findings of memory science simply reflect ‘common sense’ assumptions (Keane, 2010), the aim of this study was to examine the memory beliefs of three groups of respondents: Chartered Clinical Psychologists, Hypnotherapists, and undergraduate students. The first finding of note was that Chartered Clinical Psychologists’ composite scores on the Memory Beliefs Questionnaire were more in line with the scientific consensus than either the Hypnotherapists, or undergraduate students. This may be explained by the fact that Chartered Clinical Psychologists receive extensive professional training. In any case, in line with many other surveys, these data show that beliefs about memory vary between different groups and can deviate markedly from the broad scientific consensus.

The second noteworthy finding was that a Principal Component Analysis revealed two internally consistent components that might underlie respondents’ answers to the questionnaire items. The first component (that we labelled *quality ≠ accuracy*) was comprised of items relating to the qualities of memories that might indicate their accuracy (e.g., emotion, vividness, held with confidence). The three groups did not differ significantly in their endorsement of items on this component. The second component (that we labelled *memory = malleable*) was comprised of items relating to the permanence of memory (e.g., memory is like a computer, early memories from the first year of life are possible, memories are not influenced by suggestion). Scores on this second component differed significantly between all three groups with Hypnotherapists scoring the lowest, followed by undergraduates and then Chartered (licensed) Clinical Psychologists. Thus, the Hypnotherapist group was significantly more likely to endorse the view that memories are stable and not vulnerable to suggestion than the comparison groups.

These findings echo those of Patihis et al. (2014) and Niedźwieńska et al. (2007) who found that responses to their questionnaire items could be summarized by components relating to belief in memory reliability and permanence. They also support other work that has found widespread

beliefs in the permanence and stability of memory (e.g., Loftus & Loftus, 1980; Garry, Loftus, Brown & DuBreuil, 1997; Simons & Chabris, 2011). This finding is also reminiscent of the stability bias found in laboratory studies where participants believe that the accessibility of their own memories will remain stable over time (e.g., Koriat, Bjork, Sheffer & Bar, 2004; Kornell & Bjork, 2009).

The third finding was that Hypnotherapists' ratings of their knowledge of the memory literature were significantly higher than the ratings provided by Chartered Clinical Psychologists and undergraduate students, despite the fact that their scores on the composite Memory Beliefs Questionnaire were the lowest of the three groups (and significantly lower than the Chartered Clinical Psychologists' scores) and, as such, reflected poorer knowledge of the relevant scientific literature.

Examining responses to individual items that comprised the Memory Beliefs Questionnaire revealed some additional findings of note. Firstly, 75% of the entire sample 'strongly agreed' with the statement that "*the mind is capable of unconsciously blocking out memories of traumatic events*". Despite decades of research, no credible evidence has been found to support this claim although it remains a common belief (see Garry, Loftus & Brown, 1994; Patihis, Lilienfeld, Ho & Loftus, 2014; Brewin & Andrews, 2014). Although important work on motivated forgetting suggests that people are able to reduce the accessibility of memories of positive, negative or neutral words when instructed to do so, this is framed as a gradual and intentional process that "people get better at with practice" not "where memories are forgotten abruptly via an unconscious defence mechanism" (Anderson & Huddleston, 2011, p. 109; Garry & Loftus, 2004). McNally (2003) has argued that the notion that the mind protects by unconsciously repressing memories "rendering them inaccessible to awareness, is a piece of psychiatric folklore devoid of convincing empirical support" (p. 275).

So what might explain the finding that 75% of the sample ‘strongly agreed’ that repression can occur? Firstly, the notion of unconscious repression is reinforced in countless books, television shows, films and popular psychology books. Although memory science has proposed a number of relatively mundane explanations of such experiences based on well established memory phenomena that do not require a ‘repression’ mechanism (McNally, 2012; McNally & Geraerts, 2009) this evidence may not be powerful enough to counteract such a powerful cultural ‘meme’. Secondly, our questionnaire did not probe beliefs about frequency or likelihood of phenomena. In other words we do not know from the current data whether respondents thought that repression is possible in principle, but might be an extremely rare or extremely common occurrence. Thirdly, although the wording of the question referred to ‘*unconsciously* blocking out memories,’ it is possible that this distinction was not obvious or relevant to respondents, and that their responses instead reflected their belief in intentional, motivated, forgetting or indeed other – more colloquial – understandings of the term ‘repression’ (i.e., ‘not thinking’ about something). Further research is clearly warranted about what it is that people understand by the term ‘repression’ although this is unlikely to lead to a clear resolution (see Garry, Loftus & Brown, 1994 for a discussion).

Secondly, in addition to the high rate of endorsement of a repression mechanism, there was evidence of some ‘risky’ beliefs (Poole et al., 1995) amongst the Hypnotherapist group with 24% of those respondents ‘strongly agreeing’ that memories from the first year of life are accurately stored and retrievable (15.1% of the sample reported by Patihis et al., 2014, responded that people can, with effort, remember events back to birth). Although there is certainly strong evidence that very young infants can ‘remember’ events (Bauer & Leventon, 2013), there is also evidence that such memories do not survive in a way that means they are retrievable in adulthood (Bauer & Larkina, 2014). In addition, just under one fifth of the Hypnotherapist group (17%) ‘strongly agreed’ that memory accurately ‘records’ events as they occurred, counter to decades of research providing evidence to the contrary. The evidence of such ‘risky’ beliefs (e.g., that memories from the first

year of life are accurately stored and retrievable) was tempered somewhat by the finding that just over half of the sample (51%) ‘strongly agreed’ that false memories of non-traumatic events are possible.

This survey was motivated partly by the claim that the findings of memory science may simply reflect common sense (Keane, 2010). Our novel findings relating to the beliefs of UK Chartered Clinical Psychologists and individuals who advertise their services as Hypnotherapists, along with other similar studies on diverse samples of professionals and non-professionals, indicate that this is not the case. In our sample, Chartered Clinical Psychologists answered the Memory Beliefs Questionnaire in a way that was most consistent with the findings of memory science. However, the findings also suggest that many practitioners would proffer opinions orthogonal to, or in direct contradiction to, the findings of the memory literature (e.g., in relation to the accessibility of memories from the first year of life, or earlier; see Rowan, 2014). There are two primary causes for concern that relate to how such evidence might enter the criminal justice system. Firstly, although they could not testify as opinion experts in UK courts, they would nevertheless be allowed to testify as witnesses to fact about what their clients could (or could not) remember at any given point in time. Thus – in the case of the current sample – roughly one quarter would give unwarranted credence to memories that are claimed to be from the first year of life and may communicate this misunderstanding to their clients and thus, indirectly, to the courts. Secondly, they may have had a strong influence over the genesis and development of memory claims by communicating their (mis)understanding of memory phenomena to their clients (i.e., that adults’ reports of memories from a very young age are likely to be reliable, or that they could have unconsciously ‘repressed’ memories). To their clients, at least, they are likely to be viewed as experts (Dawes, 1994). Thus, misconceptions about memory may have been communicated to a client long before a report is made to the police, or the case reaches court. The court is then left with the task of trying to untangle reliable from unreliable aspects of recollections. As a result, the

evidence of genuine victims of abuse may then be viewed as less reliable than it would have been had no inappropriate therapeutic intervention taken place.

As with any survey, there are some limitations that should be acknowledged. Firstly, the self-reports about memory knowledge were taken *after* respondents had given their answers to the questionnaire items. Thus, these ratings are likely to have been affected by the difficulty that respondents had in answering those questions. Had respondents' ratings of their knowledge of the literature been consistently influenced by their perceptions of how easily they had answered the memory questions then one might have expected this to emerge as a positive correlation between their answers to the Memory Belief items, and their self-reported knowledge of the scientific literature on memory. No such correlations emerged. It is also possible that Hypnotherapists did indeed read lots of literature about memory, but that it was not particularly scientific literature.

Secondly, the original survey (in which the Memory Belief items were embedded) had a response rate of around 12%. However, this rate does not deviate markedly from the response rates in other similar surveys (15.5%, Patihis et al., 2014; 13%, Wise, Safer & Maro, 2011) and some of the respondents' characteristics were representative of the populations from which they were drawn (Ost et al., 2013). Finally, the measure used to assess self-reported knowledge of the scientific literature (adapted from Yapko, 1994) had a limited range (1-3) and therefore may not have been particularly sensitive to variation. It is noteworthy that differences between the three groups emerged, even with this relatively crude measure.

Thirdly, these data were collected in 2007-08 (Clinical Psychologists & Hypnotherapists) and 2009 (Undergraduates). It is of course possible that memory beliefs change over time. However, the key finding of the present study – that groups could be differentiated based on their latent beliefs regarding the malleability (or otherwise) of memory – replicates findings published around the same time as these data were collected (Niedźwieńska et al., 2007) as well as data published more recently (Patihis et al., 2014). Fourthly, to aid comprehension, many of the MBQ

items were keyed in the same direction. The disadvantage of doing this is that it may have introduced a bias in participants' responses. Any future work would need to correct this potential source of bias. Finally, with the benefit of hindsight, it would have been useful to compare the present findings to 'common sense' groups (i.e., those without any psychological training, like the general public) as well as to a group of memory experts (e.g., Kassin, Tubb, Hosch & Memon, 2001) or those who serve as expert witnesses in court (e.g., Melinder & Magnussen, 2014).

What do these findings mean for the practice of expert witnesses presenting memory evidence at court? An expert witness is somebody who can present to the court scientific or technical information that is likely to be outside the experience and knowledge of a judge or jury and the judge determines whether such a witness is competent to give evidence as an expert in any given case. The findings of the present survey suggest that Hypnotherapists may be unlikely to be reliable guides to memory science – they had the lowest scores on the memory belief scale but the highest confidence in their own knowledge of the memory literature. The Hypnotherapists were also more likely to endorse 'risky' beliefs (e.g., that memories from the first year of life are accurately stored and retrievable; memory is an accurate record of events). The current findings also suggest that some beliefs about memory science persist, even among highly trained and experienced Clinical Psychologists, which would be at odds with the consensus academic view among researchers in the field (e.g., that the mind is capable of *unconsciously* blocking out memories of trauma). Thus in cases involving complex memory phenomena, it may be more appropriate to consider seeking the evidence of an expert specializing in memory science, at the pre-court and police investigation stages and in court.

References

- Anderson, M. C. & Huddleston, E. (2011). Towards a cognitive and neurobiological model of motivated forgetting. In R. F. Belli (ed.), *True and false recovered memories: Toward a reconciliation of the debate (Vol. 58 Nebraska symposium on motivation)* (pp. 53-120). New York: Springer.
- Bauer, P. J., & Larkina, M. (2014). The onset of childhood amnesia in childhood: A prospective investigation of the course and determinants of forgetting of early-life events. *Memory, 22*, 907-924.
<http://dx.doi.org/10.1080/09658211.2013.854806>
- Bauer, P. J. & Leventon, J. S. (2013). Memory for one-time experiences in the second year of life: Implications for the status of episodic memory. *Infancy, 18*, 755-781.
<http://dx.doi.org/10.1111/infa.12005>
- Bernstein, D. M., & Loftus, E. F. (2009). How to tell if a particular memory is true or false. *Perspectives on Psychological Science, 4*, 370-374.
- British Psychological Society (2010). *Guidelines on memory and the law: Recommendations from the scientific study of human memory*. British Psychological Society, Leicester, UK.
- Brewin, C. R., & Andrews, B. (2014). Why it is scientifically respectable to believe in repression: A response to Patihis, Ho, Tingen, Lilienfeld and Loftus (2014). *Psychological Science, 25*, 1964-1966.
<http://dx.doi.org/10.1177/0956797614541856>
- Conway, M. A. (2013). On being a memory expert witness: Three cases. *Memory, 21*, 566-575.
<http://dx.doi.org/10.1080/09658211.2013.794241>
- Dawes, R. M. (1994). *House of cards: Psychology and Psychotherapy built on myth*. New York: Free Press.

Desmarais, S. L., & Read, J. D. (2011). After 30 years, what do we know about what jurors know?

A meta-analytic review of lay knowledge regarding eyewitness factors. *Law and Human Behavior, 35*, 200-210.

<http://dx.doi.org/10.1007/s10979-010-9232-6>

French, C. C. & Ost, J. (in press). Beliefs about memory, childhood abuse, and hypnosis amongst clinicians, legal professionals and the general public. In R. Burnett (Ed.), *Vilified: Wrongful allegations of sexual and child abuse*. Oxford, UK: Oxford University Press.

Garry, M. & Loftus, E. F. (2004). I am Freud's brain. *Skeptical Inquirer*, May/June, 16-18.

Garry, M., Loftus, E. F., & Brown, S. W. (1994). Memory: A river runs through it. *Consciousness & Cognition, 3*, 438-451.

<http://dx.doi.org/10.1006/ccog.1994.1025>

Garry, M., Loftus, E. F., Brown, S. W., & DuBreuil, S. C. (1997). Womb with a view: Memory beliefs and memory-work experiences. In D. G. Payne & F. G. Conrad (Eds.), *Intersections in basic and applied memory research* (pp. 233-255). Mahwah, NJ: Erlbaum.

Holm, S. (1979). A simple sequential rejective multiple test procedure. *Scandinavian Journal of Statistics, 6*, 65-70

Houston, K. A., Hope, L., Memon, A., & Read, J. D. (2013). Expert testimony on eyewitness evidence: In search of common sense. *Behavioral Sciences and the Law, 31*, 531-682.

<http://dx.doi.org/10.1002/bsl.2080>

Howe, M. L., (2013). Memory lessons from the courtroom: Reflections on being a memory expert on the witness stand. *Memory, 21*, 576-583.

<http://dx.doi.org/10.1080/09658211.2012.725735>

Howe, M. L., & Knott, L. (2015). The fallibility of memory in judicial processes: Lessons from the past and their modern consequences. *Memory, 23*, 633-656.

<http://dx.doi.org/10.1080/09658211.2015.1010709>

Hyman, I. E. Jr., Husband, T. H. & Billings, F. J. (1995). False memories of childhood experiences. *Applied Cognitive Psychology, 9*, 181-197.

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.

Keane, A. (2010). The use at trial of scientific findings relating to human memory. *Criminal Law Review, 1*, 19-30.

Kemp, S., Spilling, C., Hughes, C., & de Pauw, K. (2013). Medically unexplained symptoms (MUS): What do current trainee psychologists, neurologists and psychiatrists believe? *Open Journal of Medical Psychology, 2*, 12-20.

<http://dx.doi.org/10.4236/ojmp.2013.21003>

Koriat, A., Bjork, R. A., Sheffer, L., & Bar, S. K. (2004). Predicting one’s own forgetting: The role of experience-based and theory-based processes. *Journal of Experimental Psychology: General, 133*, 643-656.

Kornell, N., & Bjork, R. A. (2009). A stability bias in human memory: Overestimating remembering and underestimating learning. *Journal of Experimental Psychology: General, 138*, 449-468.

<http://dx.doi.org/10.1037/a0017350>

Laney, C., & Loftus, E. F. (2008). Emotional content of true and false memories. *Memory, 16*, 500-516.

Legault, E., & Laurence, J-R. (2007). Recovered memories of childhood sexual abuse: Social worker, Psychologist, and Psychiatrist reports of beliefs, practices and cases. *Australian Journal of Clinical and Experimental Hypnosis, 35*, 111-133.

Lilienfeld, S. O., Lynn, S. J., Ruscio, J., & Beyerstein, B. L. (2010). *50 great myths of popular*

psychology: Shattering widespread misconceptions about human behavior. Chichester, UK: Wiley-Blackwell.

Loftus, E. F. (1998). The price of bad memories. *Skeptical Inquirer*, 22, 23-24.

Loftus, E. F. & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, 13, 585-589.

Loftus, E. F., & Loftus, G. R. (1980). On the permanence of stored information in the human brain. *American Psychologist*, 35, 409-420.

Magnussen, S., Andersson, J., Cornoldi, C., De Beni, R., Endestad, T., Goodman, G. S., Helstrup, T., Koriat, A., Larsson, M., Melinder, A., Nilsson, L-G., Rönnerberg, J., & Zimmer, H. (2006). What people believe about memory. *Memory*, 14, 595-613.
<http://dx.doi.org/10.1080/09658210600646716>

Magnussen, S., Wise, R. A., Raja, A. Q., Safer, M. A., Pawlenko, N. & Stridbeck, U. (2008). What judges know about eyewitness testimony: A comparison of Norwegian and US judges. *Psychology, Crime & Law*, 14, 177-188.
<http://dx.doi.org/10.1080/10683160701580099>

Magnussen, S., & Melinder, A. (2012). What Psychologists know and believe about memory: A survey of practitioners. *Applied Cognitive Psychology*, 26, 54-60.
<http://dx.doi.org/10.1002/acp.1795>

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

McNally, R. J. (2012). Searching for repressed memory. *Nebraska Symposium on Motivation*, 58, 121-147.

McNally, R. J., & Geraerts, E. (2009). A new solution to the Recovered Memory Debate. *Perspectives on Psychological Science*, 4, 126-134.

<http://dx.doi.org/10.1111/j.1745-6924.2009.01112.x>

- Melinder, A., & Magnussen, S. (2014). Psychologists and psychiatrists serving as expert witnesses in court: what do they know about eyewitness memory? *Psychology, Crime & Law*, 21, 53-61
- Memon, A. (1995). Response to the British Psychological Society report on recovered memories. *Expert Evidence*, 3, 155-158.
- Niedźwieńska, A., Neckar, J., & Baran, B. (2007). Development and validation of the Implicit Memory Theory Scale. *European Journal of Psychological Assessment*, 23, 185-192.
- Office for National Statistics (2013) British Crime Survey. London: HMSO. Available online at <http://www.ons.gov.uk/ons/rel/crime-stats/crime-statistics/period-ending-september-2013/stb-crime-in-england-and-wales--year-ending-sept-2013.html>
- Ost, J., Wright, D. B., Easton, S., Hope, L., & French, C. C. (2013). Recovered memories, satanic abuse, dissociative identity disorder and false memories in the United Kingdom: A survey of Clinical Psychologists and Hypnotherapists. *Psychology, Crime & Law*, 19, 1-19.
- Patihis, L., Lilienfeld, S. O., Ho, L. Y., & Loftus, E. F. (2014). Unconscious repressed memory is scientifically questionable. *Psychological Science*, 25, 1967-1968.
- <http://dx.doi.org/10.1177/0956797614547365>
- Patihis, L., Ho, L. Y., Tingen, I. W., Lilienfeld, S. O., & Loftus, E. F. (2014). Are the "memory wars" over? A scientist-practitioner gap in beliefs about repressed memory. *Psychological Science*, 25, 519-530.
- <http://dx.doi.org/10.1177/0956797613510718>
- Pintar, J. & Lynn, S. J. (2008). Hypnosis: A brief history. Chichester: Wiley-Blackwell.
- Poole, D. A., Lindsay, D. S., Memon, A., & Bull, R. (1995). Psychotherapy and the recovery of memories of childhood sexual abuse: U.S. and British practitioners' opinions, practices, and

experiences. *Journal of Consulting and Clinical Psychology*, 63, 426-437.

<http://dx.doi.org/10.1037/0022-006X.63.3.426>

Porter, S. Yuille, J. C. & Lehman, D. R. (1999). The nature of real, implanted, and fabricated memories for emotional childhood events: Implications for the recovered memory debate. *Law & Human Behavior*, 23, 517-537.

Rook, P., & Ward, R. (2010). *Rook and Ward on sexual offences law and practice (4th edition)*. London, UK: Sweet & Maxwell.

Rowan, J. (2014). Letter to The Psychologist. *The Psychologist*, 27, p. 637.

R v Frank Maxwell Clifford (2014) EWCA Crim 2245.

R v Jonathan CWS (2006) EWCA Crim 1404.

R v Malcolm W (2006) EWCA Crim 1404.

Simons, D. J., & Chabris, C. F. (2011). What people believe about how memory works: A representative survey of the U.S. population. *PLoS ONE*, 6 (8): e22757.
<http://dx.doi.org/10.1371/journal.pone.0022757>

Talarico, J. M., & Rubin, D. C. (2003). Confidence, not consistency, characterizes flashbulb memories. *Psychological Science*, 14, 455-461.

Weiskrantz, L. (1995). Comments on the report of the working party of the British Psychological Society on 'recovered memories'. *The Therapist*, 2, 5-8.

West, V., Easton, S., & Fellows, B. (1997). Yellow PagesTM hypnotherapists: A survey of the South. *Contemporary Hypnosis*, 14, 63-67.

Wise, R. A., Safer, M. A. & Maro, C. M. (2011). What U.S. law enforcement officers know and believe about eyewitness factors, eyewitness interviews and identification procedures. *Applied Cognitive Psychology*, 25, 488-500.
<http://dx.doi.org/10.1002/acp.1717>

Wixted, J. T., Mickes, L., Clark, S. E., Gronlund, S. D., & Roediger III, H. L. (2015). Initial eyewitness confidence reliably predicts eyewitness identification accuracy. *American Psychologist, 70*, 515—526.

Yapko, M. (1994). Suggestibility and repressed memories of abuse: A survey of psychotherapists' beliefs. *American Journal of Clinical Hypnosis, 36*, 163-171.
<http://dx.doi.org/10.1080/00029157.1994.10403066>

Zajac, R., Garry, M., London, K., Goodyear-Smith, F., & Hayne, H. (2013). Misconceptions about childhood sexual abuse and child witnesses: Implications for psychological experts in the courtroom. *Memory, 21*, 608-617.

RUNNING HEAD: LATENT VARIABLES UNDERLING MEMORY BELIEFS

Table 1. Total and individual mean endorsement scores for, and total and individual % samples that 'strongly agreed' (SA) with, the ten memory statements.

	CCP \bar{X} (SE)	% SA (n)	HT \bar{X} (SE)	% SA (n)	UG \bar{X} (SE)	% SA (n)	Total \bar{X} (SE)	Total %SA
	(n = 125)		(n = 88)		(n = 124)		(N = 337)	
The mind is capable of unconsciously 'blocking out' memories of traumatic events.	1.36 (.05)	69.6 (87)	1.13 (.04)	88.6 (78)	1.33 (.05)	70.2 (87)	1.29 (.03)	74.8
Memory is like a computer, accurately recording events as they actually occurred.	3.78 (.04)	0.0 (0)	2.67 (.11)	17.0 (15)	3.09 (.08)	5.6 (7)	3.24 (.05)	6.5
It is possible for an individual to develop 'false' memories of non-traumatic events.	3.48 (.06)	54.4 (68)	3.30 (.09)	47.7 (42)	3.37 (.06)	51.6 (64)	3.40 (.04)	51.6
Very vivid memories are more likely to be accurate than vague memories.	2.92 (.07)	3.2 (4)	2.63 (.10)	14.8 (15)	2.20 (.07)	21.8 (27)	2.58 (.05)	13.1
A poor memory for childhood events is indicative of a traumatic childhood.	3.00 (.08)	2.4 (3)	3.10 (.10)	5.7 (5)	3.15 (.07)	2.4 (3)	3.08 (.05)	3.3
The more confidence with which a memory is reported, the more likely it is to be accurate.	3.05 (.07)	0.0 (0)	2.77 (.09)	6.8 (6)	2.99 (.07)	1.6 (2)	2.95 (.04)	2.4
Early memories, from the first year of life, are accurately stored and retrievable.	3.61 (.05)	0.0 (0)	2.44 (.11)	23.9 (21)	2.97 (.06)	1.6 (2)	3.07 (.05)	6.8
Memory is not influenced by suggestion.	3.79 (.05)	2.4 (3)	3.44 (.09)	6.8 (6)	3.67 (.05)	5.6 (7)	3.65 (.04)	2.7
It is possible for an individual to distinguish between 'true' and 'false' memories.	2.96 (.06)	2.4 (3)	2.84 (.10)	10.2 (9)	2.84 (.07)	3.2 (4)	2.88 (.04)	4.7
The more emotion with which a memory is reported, the more likely it is to be accurate.	3.08 (.07)	1.6 (2)	2.81 (.10)	11.4 (10)	2.62 (.07)	10.5 (13)	2.83 (.05)	7.4

Notes: CCP = Chartered Clinical Psychologist, HT = Hypnotherapist, UG = Year one undergraduate Psychologist. A higher score indicates endorsement of that item that is in line with the scientific consensus. SE = standard error. **Bold** font indicates group(s) with the lowest mean score on each item.

RUNNING HEAD: LATENT VARIABLES UNDERLING MEMORY BELIEFS

Table 2. Varimax rotated component loadings for the ten memory belief items.

Component	1	2	3
	<i>Quality ≠ accuracy</i>	<i>Memory = malleable</i>	<i>Outcomes</i>
The more emotion with which a memory is reported, the more likely it is to be accurate	.759		
The more confidence with which a memory is reported, the more likely it is to be accurate.	.749		
Very vivid memories are more likely to be accurate than vague memories.	.727		
A poor memory for childhood events is indicative of a traumatic childhood	.536		
Memory is like a computer, accurately recording events as they actually occurred.		.785	
Early memories, from the first year of life, are accurately stored and retrievable.		.710	
Memory is not influenced by suggestion.		.695	
It is possible for an individual to distinguish between 'true' and 'false' memories		.440	.802
The mind is capable of unconsciously 'blocking out' memories of traumatic events.			-.411
It is possible for an individual to develop 'false' memories of non-traumatic events.			
Eigenvalue	2.16	2.02	1.06
% total variance	21.63	20.24	10.68

Note. Extraction method: Principal Component Analysis. Rotation method: Varimax with Kaiser normalization. Three components extracted. Four iterations required.

Component loadings below .4 were suppressed.

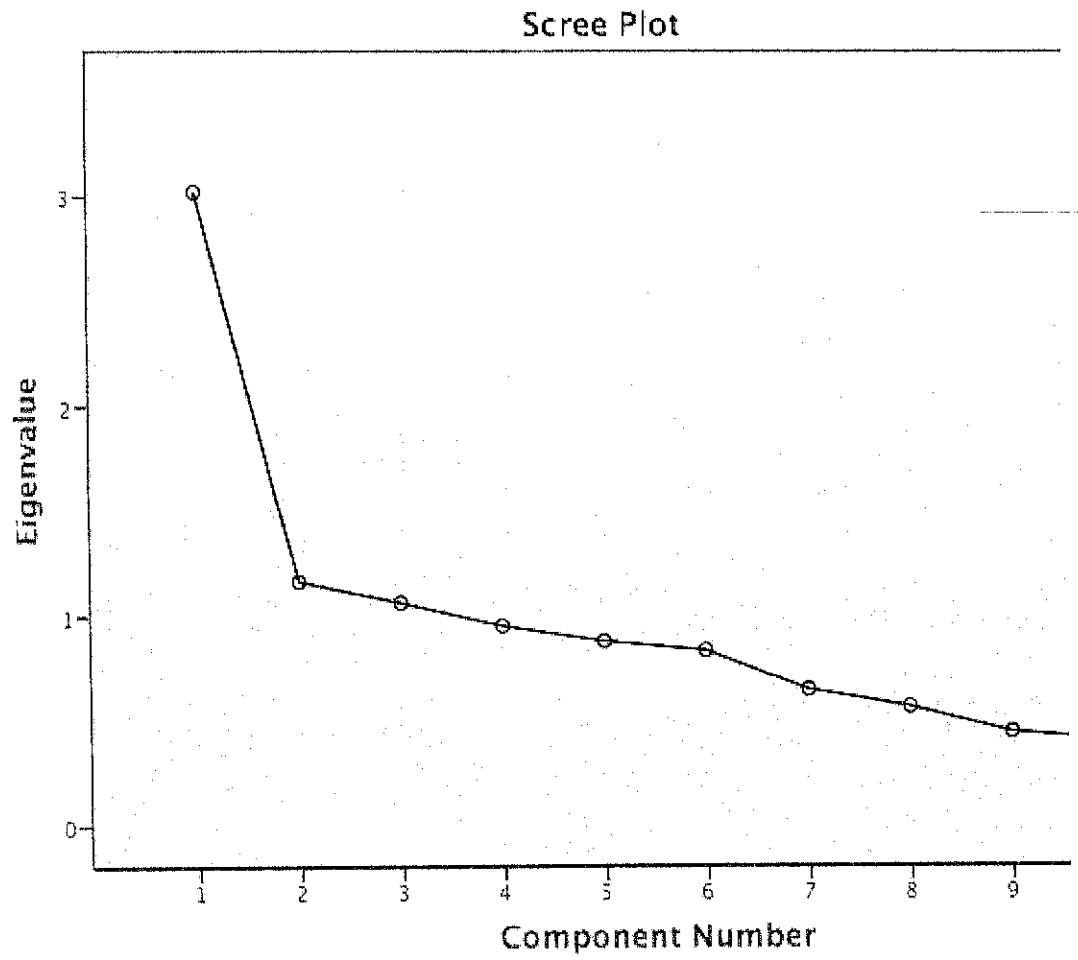


Figure 1. Scree plot of eigenvalues from Principal Component Analysis.

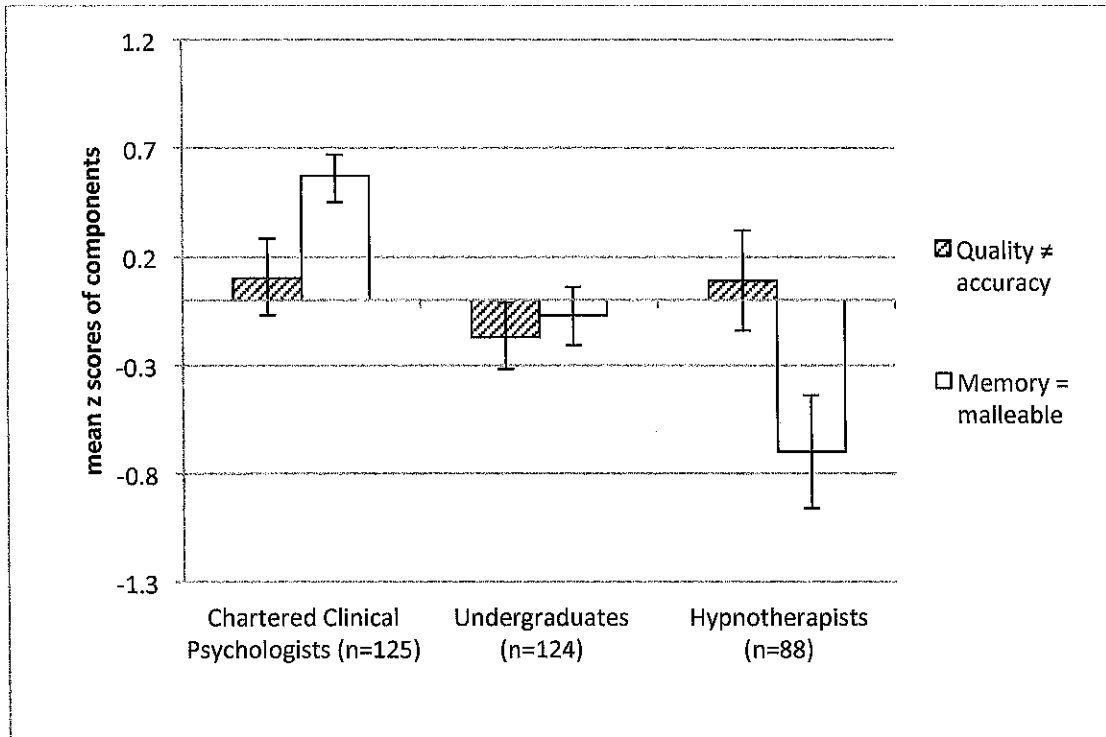


Figure 2. Mean z scores of the three groups on the *Quality ≠ accuracy* and *Memory = malleable* components (error bars show 95% CIs).

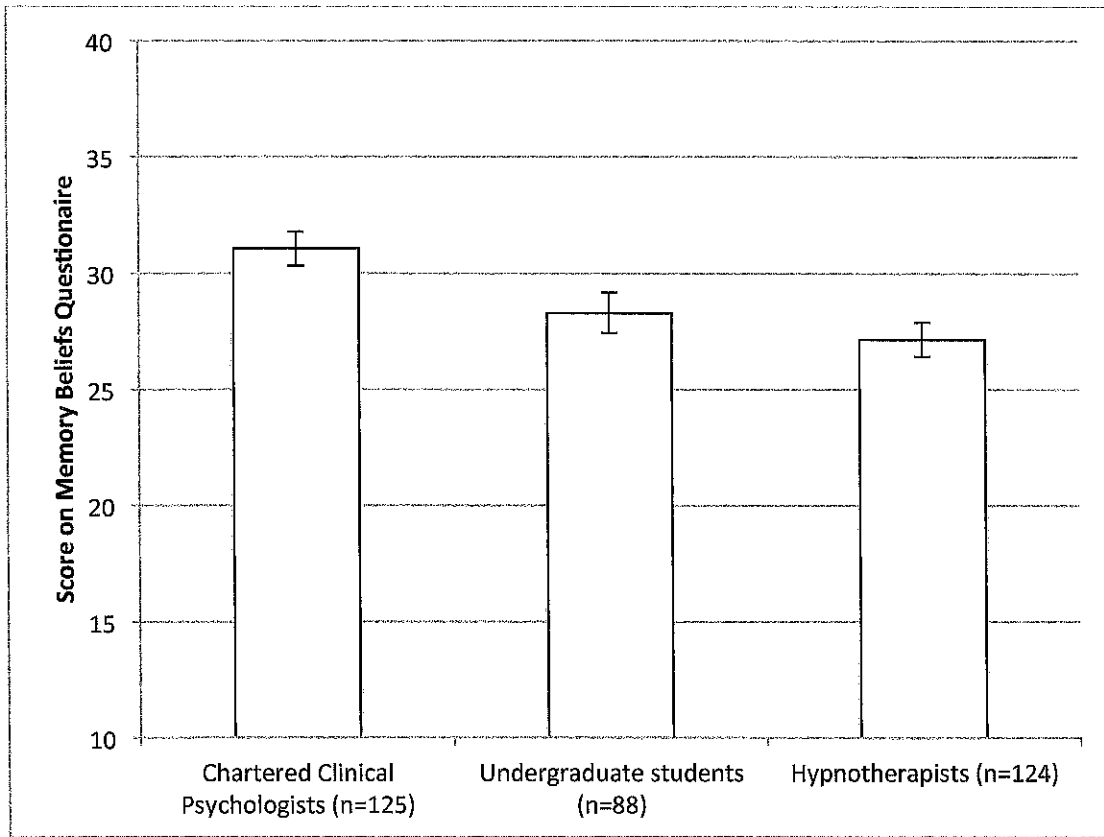


Figure 3. Mean scores of the three groups on the Memory Beliefs Questionnaire (error bars show 95% CIs).

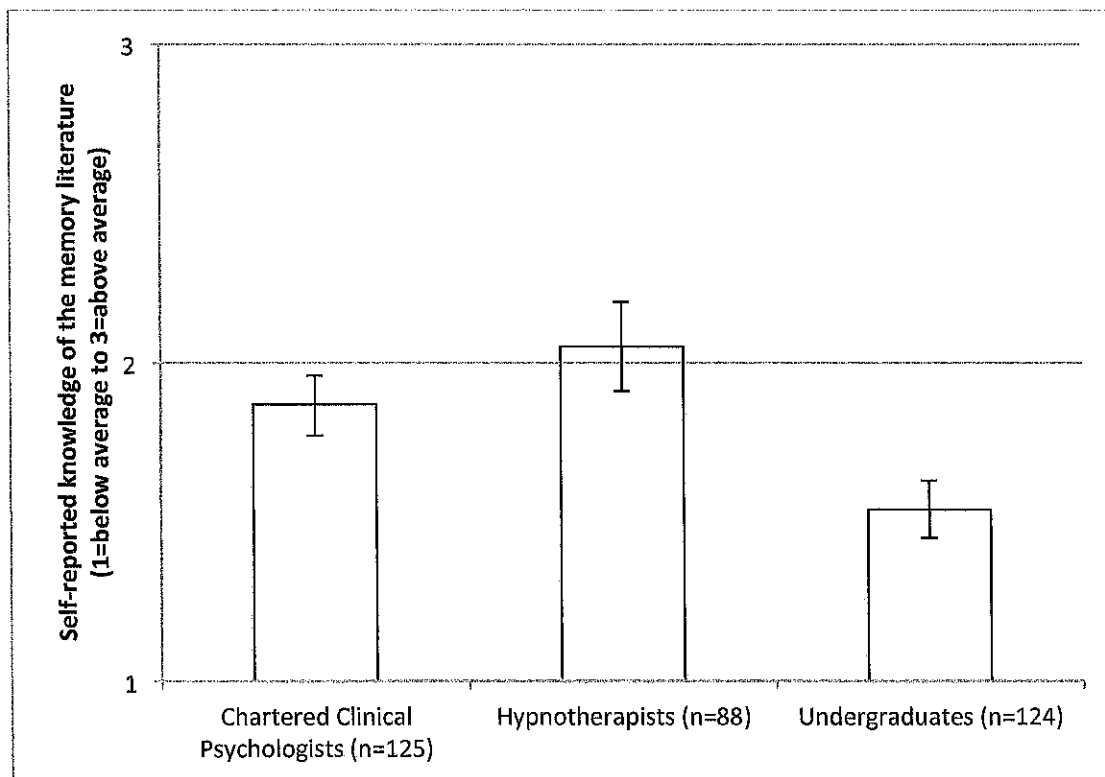


Figure 4. Mean scores of the three groups on the self-reported knowledge of the memory literature item (error bars show 95% CIs).