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MAIN PAPER

AN INVESTIGATION INTO THE INFLUENCE OF HYPNOSIS ON THE CONFIDENCE AND ACCURACY OF EYEWITNESS RECALL

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ABSTRACT

Research suggests that although confidence–accuracy (C–A) relationships are typically low, investigative interviewing with hypnosis may have a particularly adverse influence on C–A relationships. However, it is possible that researchers may have paid insufficient attention to the issue of item difficulty. To address this issue an experiment was conducted which measured recall of information seen in a video film. Questions were constructed to range in difficulty and no misleading post-event information and/or leading questions were presented. Subjects' were assigned to either a hypnosis condition or one of two control conditions. Higher C–A correlations than have been usually reported were found, regardless of interview condition. Also, when subjects were 'absolutely certain' that a piece of information was correct they almost invariably were accurate, and again interview condition did not influence this. Some practical implications of these findings are discussed.

INTRODUCTION

Many studies have shown that eyewitnesses who are confident in their testimonies are more likely to be perceived as accurate than eyewitnesses who are hesitant in their testimonies (Cutler, Penrod & Stuve, 1988; Cutler, Penrod & Dexter, 1990; Fox & Walters, 1986; Leippe, Manion & Romanczyk, 1992; Lindsay, 1994; Lindsay, Wells & O'Connor, 1989). Consequently, the confidence which eyewitnesses express in information that they provide heavily influences both the investigative process, and the credence which jurors give to eyewitness testimony. Thus, care must obviously be taken to ensure that eyewitnesses are interviewed in a way that does not adversely affect the relationship between their expressed confidence and the accuracy of their testimony.

The possible use of hypnosis as an interview procedure to enhance eyewitness memory has provoked much debate (see, for example, Reiser, 1980, 1990; Wagstaff, 1993). According to some, forensic investigators should not use hypnosis because it encourages various forms of memory distortion (for reviews see, for example, Diamond, 1988; Orne, Sokis, Dinges & Orne, 1984; Sheehan, 1988; Wagstaff, 1993). Such conclusions are based on a number of investigations that have found that hypnotic subjects,

especially (but not always) those categorized as highly hypnotically susceptible, often show increased confabulation and a spurious confidence in inaccurate memories (see, for example, Dywan & Bowers, 1983; Rainer, 1983; Sheehan & Tilden, 1983; Sheehan, Grigg & McCann, 1984; Zelig & Beidleman, 1981); though this is not always the case (see, for example, Redson & Knox, 1983; Sanders & Simmons, 1983). On the basis of such studies, Sheehan (1988) concludes that probably the most consistent finding is that, whatever their accuracy, hypnotic subjects express high levels of confidence in information that they provide, both accurate and inaccurate. Hence, while not all the data support a weak or negative confidence–accuracy (C–A) relationship, the evidence suggests an absence of a large, positive C–A relationship in situations in which hypnosis is used to facilitate the retrieval of eyewitness information.

However, the failure to find strong C–A relationships does not appear to be limited to situations in which hypnosis is used. Many studies suggest that in non-hypnotic situations, there is either no C–A relationship at all, or only a small, positive C–A relationship (for reviews see, Bothwell, Deffenbacher & Brigham, 1987; Deffenbacher, 1980; Fruzzetti, Tolland, Teller & Loftus, 1992; Wells & Murray, 1984). Nevertheless, Keibell, Wagstaff and Covey (1996) have suggested that previous researchers in this area may have paid insufficient attention to the issue of item difficulty.

Typically in work on C–A relationships, researchers attempt to select items to avoid floor and ceiling effects; i.e. they try to avoid items that are either very easy or very hard to remember. In real life, however, forensic investigators may ask eyewitnesses some questions that are easier to answer than others. For example, for an assault, an investigator may ask an eyewitness ‘What sex was the attacker?’. Gender is among the first items noticed about an individual and is very likely to be answered accurately. Furthermore, most eyewitnesses are likely to be very confident that the identification of an individual’s sex is correct. Alternatively, an investigator might ask an eyewitness, ‘What was the colour of the attacker’s eyes?’ This question might be more difficult to answer and eyewitnesses may be less confident about their accuracy (see Christianson & Hubinette, 1993). Consequently, for easy questions eyewitnesses might be both confident and accurate while for difficult questions they might be less confident and less accurate. In these circumstances a positive relationship between confidence and accuracy would occur.

It may be the case, therefore, that in an attempt to avoid ceiling and floor effects, previous researchers may have chosen unrealistic and overly homogeneous pools of items, thus reducing the variance necessary for high correlations. Consequently, higher C–A relationships might result with the use of a heterogeneous range of ‘hard’ or ‘easy’ questions. Another possibly important related factor is the relationship between ‘absolutely certain’ responses and accuracy. ‘Absolutely certain’ responses may have a particularly strong impact on the police and jurors but are unlikely to occur unless items that are easy are included. Regardless of the overall C–A relationship, it could be the case that the relationship between these ‘absolutely certain’ responses and accuracy remains high (Gruneberg & Sykes, 1993).

Keibell *et al.* (1996) addressed these issues by conducting two experiments that measured C–A relationships in response to information seen in video films. In each case, questions were used that ranged in difficulty, from easy to hard. Higher C–A correlations than usually reported were found in both experiments ($r = 0.54$ and $r = 0.78$). Furthermore, when subjects were ‘absolutely certain’ that a piece of information was correct they almost invariably were accurate. These findings have since been replicated (Pike, Towel & Kemp, 1995; see also, Sporer, Penrod, Read & Cutler,

1995). This presents the possibility that by using questions of varying difficulty, it may be possible to compare more sensitively and realistically differences between hypnosis and control procedures in terms of their effects on the C–A relationship. The aim of the present study was to address this issue.

On the basis of previous research and theorizing we hypothesized that hypnosis would have more of an adverse effect on C–A relationships than in control conditions. Two control conditions were used. A major problem in research in this area is determining what features of hypnotic interviewing procedures are responsible for uniquely ‘hypnotic’ effects. A whole host of factors are associated with hypnotic interviewing quite apart from the hypnotic induction procedure itself (Spanos & Chaves, 1989). These include instructions to the witness to reinstate context mentally, report everything, recall events in different orders and change perspectives (Geiselman, Fisher, MacKinnon & Holland, 1985; Gudjonsson, 1992; Hibbard & Worring, 1981; Reiser, 1980, 1990; Wagstaff, 1982, 1993). Thus, for realism, an evaluation of the influence of hypnosis on C–A relationships should include these instructions together with a hypnotic induction procedure. However, such instructions themselves form the components of a procedure called the ‘cognitive interview’ (Geiselman, Fisher, Firstenberg, Hutton, Sullivan, Avetissian & Prosk, 1984) that can have a positive effect on eyewitness performance (Fisher, 1995; Fisher & Geiselman, 1992; Memon & Bull, 1991). The first control group therefore was a group given identical instructions to the hypnosis group but without any induction procedure or mention of hypnosis.

Nevertheless, in ‘standard’ police interviews the above memory enhancement instructions are not routinely used (Fisher, Geiselman & Raymond, 1987; George, 1990). Therefore, the performance of subject-eyewitnesses in a control group using these memory enhancement instructions may overestimate that achievable using a ‘standard’ police interview (Kebbell & Wagstaff, 1996). Consequently, a further ‘standard’ control group was included in which subjects were given minimal instructions to enhance memory.

METHOD

Subjects

Fifty-three subjects (34 F; 19 M) of various backgrounds participated. Their mean age was 22.60 years (range 18–52, SD = 6.19).

Materials and Procedure

Subjects were randomly assigned to one of three conditions; ‘hypnosis’ (N = 18), ‘cognitive interview’ (N = 17) or ‘standard’ (N = 16). Subjects were tested either individually or in groups of up to five. They were shown a 5.5 min black and white video film that concerned the implied murder of a male by a female. After the film subjects were given a face-recognition filler task that lasted approximately 10 minutes. Once the filler task had been completed subjects received one of the three following procedures.

Hypnosis condition. Subjects in the hypnosis condition were given the following information: ‘One method that the Police use that may improve memory is hypnosis. I will now use a hypnotic procedure.’ These subjects were then played a 7.5 min taped hypnotic induction procedure. This was a slightly modified version of the induction

procedure provided by Barber (1969, pp. 251–254) for use with the Barber Suggestibility Scale. Subjects were required to report their state of hypnotic depth according to the modified Long Stanford Scale (LSS) (Tart, 1970). The LSS was modified to enable subjects to write down their answers (see Wagstaff & Ovenden, 1979).

After the hypnotic induction subjects were given four taped instructions for memory facilitation, which took 2 minutes. These were based on the four cognitive interview mnemonics used by Geiselman *et al.* (1984), though as mentioned earlier, similar instructions have been used by hypno-investigators. (References to photographs in these instructions refer to the previously mentioned face-recognition ‘filler’ task. None of these photographs concerned anyone shown on the film.) The instructions were as follows:

- *Reinstate context.* ‘What I would like you to do now is to think carefully about the photographs and the film that you saw. Think about what you felt and what you thought when you looked at the photographs and the film. Think about how you were feeling at the time, and of your reactions to the photographs and to the film. Try to reinstate the context in your mind, of the physical environment in which you saw the photographs and the film, such as the location of objects and people in the room.’
- *Report everything.* ‘It is known that some witnesses hold back information — because they are not sure about what they can remember or do not know if the information is relevant. However, you must try to report everything that you can.’
- *Recall the events in different orders.* ‘Most people remember details of an event in a certain order, from beginning to end. However, you should also try to recall the photographs and the film that you saw in a different order — perhaps starting at the end of the period that you viewed the photographs or the end of the film and working backwards. Alternatively, you can start at a photograph or part of the film that you can remember particularly well and work either forward or backwards from there.’
- *Change perspectives.* ‘People who witness events sometimes try to remember events from somebody else’s perspective, so try to remember what you would have seen if you were a different person viewing the photographs or what you would have felt and seen if you were one of the characters in the film.’

Subjects were then instructed to open their eyes, while remaining hypnotized, and to answer a 33-item questionnaire (as used by Kebbell *et al.*, 1996) devised to test their recall of the film. Questions were open-ended (i.e., not multiple-choice), but subjects were required to provide an answer, even if this was only a guess. A forced-response task was to allow comparison with other work in this area (e.g., Kebbell *et al.*, 1996; Smith, Kassin & Ellsworth, 1989). The questionnaire was devised by two experimenters who agreed on 11 questions in each of three categories of item difficulty: easy, medium or hard. To reduce the influence of being correct by chance, each question was devised such that a range of plausible answers was possible. For example, an easy question was ‘What song was the woman singing?’; a medium difficulty question was ‘What was on the dish next to the television set?’; and a hard question was ‘What was behind the Tabasco sauce bottle in the kitchen?’. After answering each question subjects were required to rate their confidence in their answer on a 10-point Likert scale, ranging from ‘pure guess’ (1) to ‘absolutely certain’ (10).

On completion of the questionnaire subjects were again required to attempt the face-recognition, filler task (again this was the face-recognition task not described here), this also took approximately 10 minutes. Subjects were then 'woken up' by counting from five to one. They were then debriefed and thanked for their participation.

Cognitive interview condition. Subjects in the cognitive interview condition were first given a reading filler activity designed to take the same time as the hypnotic induction procedure. The filler activity consisted of two reasonably interesting magazine articles. They were then given the following information, 'One method that the Police use that may improve memory is a cognitive interview. I will now use a cognitive interview.' Subjects were then played the tape recording of the four memory mnemonics used for the hypnosis group. This was so that 'hypnosis' *per se* would not be confounded with differences in memory facilitation instructions between the two groups. After these instructions subjects were required to complete the 33-item questionnaire. On completion of the questionnaire subjects were again required to attempt the face-recognition, filler task.

Control condition. The procedure for the control condition was identical to that of the cognitive interview condition but without the mnemonic instructions. The reading filler activity was increased in length so that there was a similar delay between stimuli presentation and memory testing as in the other groups. After the filler activity subjects were instructed as follows, 'One method that the Police use that may improve memory is asking witnesses to try hard. Please try hard to remember the film and the photographs.' After this they were tested in the same way as the cognitive interview condition.

RESULTS

The mean hypnotic depth score for the hypnosis condition was 3.06 ($SD = 2.15$), approximating to a report of a state slightly deeper than 'lightly hypnotized'. The range of these scores, however, was from 0 to 6, ranging from 'not at all hypnotized', to 'quite deeply and strongly hypnotized' (Tart, 1970).

The questionnaire was analysed in a similar manner to that used by Kebbell *et al.* (1996). A one-way ANOVA (control/cognitive interview/hypnosis) was conducted for correct answers, this was not significant. The means and standard deviations were as follows: control condition $M = 15.43$ ($SD = 2.55$); cognitive interview condition $M = 15.88$ ($SD = 2.78$); and hypnosis condition $M = 16.38$ ($SD = 2.70$).

C–A correlations were calculated for each subject across the 33 questions, producing 51 'within-subjects' correlations (for a discussion of the relative importance of the various correlations that follow see Kebbell *et al.*, 1996; and, Smith *et al.*, 1989). As with previous work in this area, a Fisher's z score was calculated for each subject's correlation. Average within-subjects C–A correlations were calculated for the different interview conditions and these were also transformed into z scores and the average z score tested against zero. The averages of these correlations and their levels of significance (based on the converted z scores) are shown in Table 1. As can be seen in Table 1, all the within-subjects' C–A correlations are significant. To assess the effects of interview condition a one-way ANOVA was conducted on the within-subjects' z scores across interview conditions (control/cognitive interview/hypnosis). This was not significant.

Each subject's average accuracy was correlated with his or her average confidence rating. These 'average' correlations are also shown in Table 1. All three correlations are significant.

Table 1. Within-subjects C–A correlations, each subject's average confidence correlated with his or her average accuracy, between-subjects C–A correlations and the average confidence expressed in a question correlated with average accuracy for that question for interview condition

| | Interview condition | | |
|----------------------------|---------------------------|---------------------------|---------------------------|
| | Control | Cognitive interview | Hypnosis |
| Within-subjects | 0.84** (0.8) N = 16 | 0.83** (0.6) N = 17 | 0.79* (0.08) N = 18 |
| Within-subjects (average) | 0.69** N = 16 | 0.78** N = 17 | 0.63** N = 18 |
| Between-subjects | 0.59 (0.39) N = 20 | 0.54 (0.44) N = 18 | 0.53 (0.36) N = 24 |
| Between-subjects (average) | 0.97*** N = 33 (items) | 0.96*** N = 33 (items) | 0.96*** N = 33 (items) |

Standard deviations are in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A C–A relationship was also then calculated across-subjects ('between-subjects') for each of the 33 questions. These correlations were again averaged, converted to z scores and tested for significance against zero for each interview condition. These correlations and significance levels for the z scores are shown in Table 1. None was significant.

The 'average' number of correct answers and average confidence score for each question was correlated for the three interview conditions; the results are displayed in Table 1. All three correlations are significant.

Average confidence in correct answers was compared with average confidence in incorrect answers with a 3×2 ANOVA (Control/Cognitive interview/Hypnosis \times Confidence in correct/Incorrect answers) with repeated measures on the second factor. Means and standard deviations are shown in Table 2. This analysis indicated that subjects showed higher confidence in correct answers than incorrect answers, $F(1,47) = 1741.61$, $p < 0.0001$. There was no effect of interview condition and no interaction between confidence in correct/incorrect answers and interview condition.

'Absolutely certain' responses were considered independently. In the control condition subjects made 141 'absolutely certain' responses of which 97.87 % were correct; for the cognitive interview condition 175 'absolutely certain' responses were made of which 99.42 % were correct; and, for the hypnosis conditions 162 'absolutely certain' responses were made of which 98.15 % were correct. Clearly there were no obvious differences between the conditions in this respect.

Table 2. Average confidence expressed in correct and incorrect answers (on a 10-point Likert scale) with respect to interview condition and question difficulty

| Correct/incorrect | Interview condition | | |
|-------------------|--------------------------|--------------------------|--------------------------|
| | Control | Cognitive interview | Hypnosis |
| Correct | 7.92 (0.60) N = 16 | 7.78 (0.88) N = 17 | 7.35 (1.27) N = 18 |
| Incorrect | 2.25 (0.83) N = 16 | 1.85 (0.60) N = 17 | 2.13 (0.55) N = 18 |

Standard deviations are in brackets

For the hypnosis group correlations were calculated between hypnotic depth and the number of correct answers, number of incorrect answers, confidence in correct answers, confidence in incorrect answers and within-subjects C–A correlations. None was significant ($p > 0.1$ in all cases).

DISCUSSION

No significant differences were found between interview conditions in terms of correct answers (the effects for incorrect answers ‘mirror’ those for correct answers because the paradigm was forced-choice). The failure to find any differences in correct recall between groups fits in with much previous work on hypnosis (Sheehan, 1988; Wagstaff, 1993), but appears to conflict with previous results regarding the cognitive interview; as most studies using cognitive interview procedures have shown memory enhancements (for a review see Fisher, 1995; Fisher & Geiselman, 1992; Memon & Bull, 1991). This discrepancy may be due to the use of a questionnaire and group testing, although previous experiments have shown the cognitive interview to be effective in such situations (Geiselman *et al.*, 1984). However, the experiment presented here differed from previous studies in not physically changing the context, which might enable the context reinstatement mnemonic of the cognitive interview to show its effectiveness.

When C–A relationships were considered, however, considerable support was found for the view that, when questions that vary in difficulty are used, and thereby the probabilities of producing ‘absolutely certain’ and ‘pure guess’ responses are maximized, C–A relationships are considerably higher than have been previously reported (e.g., Smith *et al.*, 1989; Perfect, Watson & Wagstaff, 1993). These findings replicate those of Kebbell *et al.* (1996) and indicate that, in general:

- Subjects are more confident about their correct answers than their incorrect answers.
- Subjects who express higher confidence in their answers are more likely to be accurate than subjects who expressed lower confidence.
- Questions that are given high confidence ratings are more likely to be answered accurately.
- When subjects are ‘absolutely certain’ that an answer is correct they are almost always accurate.

Predictably also, non-significant correlations were found between subjects' accuracy scores and confidence ratings for individual questions (with this particular analysis, floor and ceiling effects drastically reduce the number of correlations it is possible to calculate and decrease the homogeneity of the responses). However, the three interview conditions had virtually no effect whatsoever on these various C–A measures.

Thus, the adverse influence of hypnosis on C–A relationships that might have been expected (e.g., Orne *et al.*, 1984; Sheehan, 1988; Wagstaff, 1993) was not shown here. It should be pointed out, nevertheless, that no attempt was made in the present experiment to use deliberately misleading information, or to assess confabulation during free recall; that is, manipulations that might have maximized hypnotic memory distortion effects. Also, although the range of hypnotic depth scores was reasonable, none of the subjects produced 'hypnotic virtuoso' scores on the LSS (Tart, 1970) (though none of the correlations between hypnotic depth and the other variables was significant).

Also the subject-witnesses did not take part in one-to-one interactive interviews because we wished to ensure rigorous control of variables. The social situation created in interactive interviews may influence the recall of eyewitnesses and make them less or more confident in parts of their statements, depending the kind of pressure applied, and longer retention intervals may also change the C–A relationship. The social situation may be particularly important for both hypnosis and the cognitive interview; indeed, recent versions of the latter emphasize manipulating the social situation to enhance recall (Fisher & Geiselman, 1992). Thus, future work might usefully consider the relationship between interview technique, C–A relationships, question-difficulty and absence/presence of leading questions and/or misleading post-event information in more naturalistic settings. It should be pointed out, nevertheless, that, typically, studies that have been used to support the view that the addition of a hypnotic induction technique to an interviewing procedure renders that procedure 'unsafe', have not used naturalistic settings either.

Thus although the present results cannot be assumed to support the view that hypnotic forensic interviewing is 'safe'; they do, however, suggest that it may be premature to assume that hypnosis will *routinely* have adverse effects on C–A relationships when no attempts are made to deliberately mislead the subject. This may be important given that, in more naturalistic field studies conducted in both the USA and the UK, using police interviewers, there is little evidence that interviewers attempt to mislead the witness *when their interviews are recorded* (Fisher *et al.*, 1989).

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