A FIELD STUDY OF POLICE OFFICERS' USE OF THE COGNITIVE INTERVIEW BEFORE AND AFTER TRAINING

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A Field Study of Police Officers' Use of the Cognitive Interview Before and After Training

by

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Abstract

Witness interviewing practices were examined in a sample of interviews ($N = 80$) from Canadian police officers. Specifically, interviews were analyzed to determine whether (and to what extent) a cognitive interviewing course improved officers' interviewing practices. Interviews conducted by trained investigators generally contained better interviewing behaviours than those conducted by un-trained investigators. Most importantly, trained investigators displayed approximately double the amount of *engage and explain* behaviours than those who were un-trained. In addition, trained investigators asked more appropriate question types, and fewer inappropriate questions than investigators who were un-trained. The implications for implementing this cognitive interview training are discussed.

Key words: Witness interviewing; supervisory feedback; cognitive interview training

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1.0 Introduction

The resolution of any criminal investigation process involves the skillful interviewing of suspects, witnesses, and victims (Williamson, Milne, & Savage, 2009). In particular, it has been suggested that interviews with witnesses and victims (hereafter referred to as "witnesses") are the most valuable part of criminal investigations, as witnesses provide the leads necessary to resolve them (Kebbell & Milne, 1998; Milne & Bull, 2003; Sanders, 1986). Despite the importance of witness interviews, field studies have shown that, in general, witness interviewing practices tend to be inadequate (Wright & Alison, 2004). As a result, some progress has been made in training police officers to use the Cognitive Interview (CI; a memory enhancement technique). The CI has been shown in a number of empirical studies to be a technique that can elicit reliable and accurate information from witnesses; however, no ecologically valid studies have been conducted to examine the extent to which CI training programs are working, that is, being implemented by police officers as it is taught.

In the remainder of the introduction, field studies evaluating interviewing practices will be reviewed, common mistakes will be identified, and their implications for the course of an investigation will be discussed. In addition, the theory and efficacy underlying various versions of the CI will be examined, along with a discussion regarding the level of success of some CI training models.

1.1 *A Review of Field Studies Investigating Witness Interviewing Practices*

The worldwide adoption of audio/video-taping interviews with suspects, witnesses, and victims (Dixon, 2006; FTP Heads of Prosecutions Committee Working Group, 2004) has allowed researchers to obtain rich data on what exactly is happening during investigative interviews. In particular, research in the UK (Davies, Westcott, & Horan, 2000), US (Fisher & Geiselman, 1992), and Canada (Wright & Alison, 2004) has examined recorded police interviews and has consistently identified three shortcomings of interviewing styles. Each of these three common investigative interviewing errors will be reviewed below.

1.1.1 Using Inappropriate Question Types

Questions that yield a small amount of detail and incorrect information from witnesses are considered inappropriate questions. These can be classified into the following four question types: (a) inappropriate closed-ended questions, (b) leading questions, (c) multiple questions, and (d) forced-choice questions. Inappropriate closed-ended questions involve those that are restricted to having a *yes or no* response and often asked at random points in the interview. Leading questions are those that actually suggest the answer to the witness (e.g., you witnessed the crime, right?). Multiple questions are simply instances when an interviewer asks more than one question at a time (e.g., where did you go, what did you do, and when did you go home?). Forced choice questions involve forcing a witness to choose between a limited number of possible options for answering (e.g., was the colour of the car blue or black?).

Alternatively, appropriate questions are those that encourage longer and more accurate details which can be open-ended questions, probing questions such as "who" or "what" (with the sole purpose of gathering information not obtained from an open-ended question), or appropriate closed-ended questions (for the purpose of gathering any information not obtained from open-ended or probing questions, and asked immediately after those two types of questions have been used). Asking open-ended questions (those starting with *tell, explain,* or *describe*) has been shown in a number of studies to elicit more accurate information from witnesses, and has been a main component of interviews deemed to be effective (Fisher, Geiselman, Raymond, Jurkevich, & Warhaftig, 1987). Research has indicated that the most desirable questioning style is that of a combination of open and closed (or probing) questions, where the beginning of the interview begins with open-ended questions followed by closed-ended or probing questions (Fisher & Geiselman, 1992).

Field studies. Research has shown that investigative interviewers tend to ask many more inappropriate rather than appropriate questions (Myklebust & Alison, 2000; Smith & Ellsworth, 1987; Walsh & Milne, 2008). For example, in one of the first field studies exploring witness interviewing practices, Fisher, Geiselman, and Raymond (1987) analyzed 11 video recorded witness interviews and found that questions mostly consisted of direct closed-ended questions – described as being delivered in a staccato style - where only 3 open-ended questions were asked in each interview. On average, only 10% of questions comprising an interview consisted of open-ended questions. Similarly, Clifford

and George (1996) found that 73% of the questions asked by untrained investigators were closed-ended questions, and only 2% were open-ended. This pattern of questioning has also been documented in several other studies (Clark & Milne, 2001; Snook & Keating, 2010; Walsh & Milne, 2008), and in interviews with children (Davies et al., 2000; Lamb, Hershkowitz, Orbach, & Esplin, 2008).

1.1.2 Interrupting Witnesses

A second error observed during many interviews involves interrupting the witness before they complete their answers to questions. Fisher et al. (1987), for instance, found that interviewers interrupted interviewees only 7.5 seconds after an open-ended question had been asked. Similarly, Wright and Alison (2004) reported that on average, interviewers interrupted the witness 0.22 times per minute, or once every four and a half minutes. Interruptions are worrisome, because they can shorten a witness' response (if the witness does not go back to complete their thoughts), and may reduce the cognitive effort used by witnesses to provide an accurate and detailed report because they expect to be interrupted. Avoiding interruptions is therefore important for facilitating greater recall as the witness will be able to focus on extracting important crime-related information from their memory (Myklebust & Alison, 2000).

1.1.3 Over Talking

Researchers have also found that interviewers tend not to follow the widely recommended 80/20 talking rule, where the interviewer should speak only 20% of the total interview time (Fisher, 1995). For example, Myklebust and Alison (2000) reported

that interviewers spent about as much time talking as the interviewee. Similarly, Wright and Alison (2004) found that interviewers spoke, on average, 33% of the time. These results suggest that interviewers are not giving witnesses the opportunity to give an account of their version of events in their own time, and are providing an unnecessary intrusive degree of guidance (Wright & Alison, 2004). Similar to the consequences resulting from frequent interruptions, over talking can also lead to a reduction in the cognitive effort employed by witnesses, which may reduce the likelihood of their provision of a complete account. Given that the goal of an interview is to extract as much reliable and accurate information as possible, and the officer was not present to witness the offence, it is imperative that the majority of the talking be done by the witness.

The three above-mentioned shortcomings are of concern as poor interviewing practices have a number of consequences. It is possible that erroneous information may be obtained which can affect an investigator's ability to apprehend the individual who is responsible for the offence (Fisher, 1995). Further, inaccurate or incomplete information presented to judges and/or juries will impact their ability to make informed decisions regarding a criminal case. In addition, if investigators fail to collect untainted (or unbiased) information, miscarriages of justice can occur.

1.2 *In Theory: The Cognitive Interview*

In response to (a) the importance of collecting detailed and accurate accounts from witnesses, (b) lack of police training concerning methods to interview witnesses, and (c) a lack of literature investigating how the retrieval phase of memory can define

retrieval mnemonics, the cognitive interview (CI) was developed. In particular, the CI was designed as an investigative interviewing protocol to aid in the retrieval of information from eyewitnesses (Geiselman, Fisher, MacKinnon, & Holland, 1985). The CI is rooted in cognitive and social psychological theory, and has evolved from the original CI to the enhanced CI (henceforth referred to as ECI), as well as several modified versions. Despite these changes, the essence of the technique has remained the same, as there is a wealth of research that has shown both versions of the CI are effective memory enhancement tools.

The ideas behind the CI were derived from two perspectives held by cognitive psychology theorists (Tulving & Thomson, 1973). First, the encoding specificity principle suggests that enhanced memory retrieval will occur when the retrieval environment is similar to the environment in which the encoding took place (Hanon & Craik, 2001). Second, the multi-component view of memory suggests that a memory is not a single, holistic representation of a to-be-remembered (TBR) event, and therefore cannot be accessed with only one type of retrieval probe. That is, recall can be enhanced when multiple retrieval probes are utilized, given that some aspects of a memory may be accessible at one point in time, while others may not.

The development of the CI has also drawn upon procedures previously utilized by other memory enhancing protocols used in forensic contexts (Wagstaff, Cole, Wheatcroft, Marshall, & Barsby, 2007). For instance, prior to the development of the CI, hypnotic interviewing was a popular investigative tool in the 1970's and early 1980's, and contains

a considerable amount of overlap with the components used in the CI (e.g., eye closure, relaxation, focused retrieval, context reinstatement, repeated testing, etc.; see Hibbard & Worring, 1981; Wagstaff, 1982). Enhanced recall for faces and emotional material has been demonstrated through hypnotic interviewing (Gur & Gur, 1974), which consists of instructions for interviewees to focus their attention onto bodily experiences (e.g., breathing) and away from external sources. Wagstaff et al. (2004) suggested that this type of focus enhances memory recall by increasing non-executive right hemispheric processing, while decreasing left frontal processing. Although hypnotic interviewing techniques have the potential to produce more correct information than no memory enhancing technique (Geiselman et al., 1985), the use of hypnosis in policing contexts has several limitations (e.g., an increase in errors and a false sense of confidence, see Perfect et al., 2008) which prevent it from being of much utility for police organizations. More specifically, hypnotic interviewing often results in the eyewitness experiencing expectancy effects, therefore the CI has become the preferred method of interviewing eyewitnesses (Kebbell & Wagstaff, 1998).

1.2.1 The Original Cognitive Interview

The *original* CI was developed in 1984 by Geiselman and his colleagues (Geiselman et al., 1984) and encompassed the following four basic memory retrieval techniques: (i) report everything in as much detail as possible, (ii) imagine the environment where the TBR event took place and imagine how the witness felt at the time (mental reinstatement), (iii) recall everything they witnessed starting from the end of

the event and working back to the beginning (different orders), and (iv) describe what another individual may have witnessed during the event (different/change perspective). The theoretical basis for each of these is reviewed below.

Report everything. The first instruction involves telling witnesses to report absolutely everything they can remember, without leaving anything out or editing. It has been suggested that even cooperative witnesses, who wish to help the police as much as they can, will not spontaneously report everything that they can remember (Milne, 2010). Milne suggests that each time a witness remembers a piece of information they will subsequently make a decision about whether or not to share that information with the interviewer. Witnesses most often leave out information for two reasons: they may feel that a piece of information is not important to the police, or they may not want to give certain information that they are not completely confident in, due to concerns about lacking credibility. Therefore, the instruction to not leave anything out and report every detail ought to increase the amount of information retrieved from a witness.

Context reinstatement. The need to reinstate context is rooted directly in the encoding specificity theory (Tulving & Thomson, 1973), where retrieval will depend solely on the restoration of the encoding state that was originally experienced during the TBR event (Memon & Bull, 1991). For instance, rather than take a witness back to the actual location where the TBR event occurred (e.g., impractical, too traumatic), an interviewer will attempt to get the eyewitness to form an image of the event in their mind, and focus on such features as sights, sounds, smells, temperature, and any other aspects

of the TBR event. This idea parallels the literature concerning state-dependent learning, which illustrates that information encoded in certain conditions (e.g., under the influence of a drug) is most successfully remembered when the retrieval condition is the same (Eich, 1980).

Different order. Geiselman and Callot (1990) suggested that the effectiveness of the *recall in different orders* component could be attributed to the idea that prior knowledge, expectations, and schemas all affect retrieval of information. It is possible that information recalled in a forward order may consist only of schema-consistent knowledge, which is considered to be a conceptually driven process. Therefore, if information is recalled in different orders, recall may contain data that is not dependent on the witness's schema, rendering it more accurate. In addition, it is possible that information may not only be more accurate when derived from this technique, but the information may only be attainable through this component of the CI.

Change perspective. Schema theory can also explain why recalling an event from a *different perspective* can enhance memory (Geiselman et al., 1985). For example, a witness may be asked to provide an account consisting of the TBR event from the eyes of another individual who was present (e.g., the victim). Memon and Bull (1991) noted that forming a new perspective leads eyewitnesses to form a new schema that provides implicit cues for different categorizations of information.

1.2.2 The Enhanced Cognitive Interview

As mentioned above, Fisher and colleagues (1987) conducted a content analysis of police interviews and identified a number of communication problems (i.e., interviewers were interrupting witnesses and using inappropriate sequences of questioning). Therefore, in 1992, an enhanced CI (ECI) was developed to address these issues (Fisher & Geiselman, 1992) that was rooted in social psychological research. The ECI differs from the original version as it encompasses several principles of communication and rapport building (Memon, Meissner, & Fraser, 2010). Specifically, the ECI requires the interviewer to get to know the witness or build rapport (i.e., establishing harmony), which ensures that the witness remains comfortable throughout the interview process and subsequently provides more correct information (Collins, Lincoln, & Frank, 2002). Additionally, the ECI requires the interviewer to transfer control to the witness and structure the sequence of questioning in a way that is consistent with the witness' mental representation of the TBR event. This witness compatible questioning can be effective given that information is more accessible when it is related to an image that a witness is focusing on at one point in time (Fisher & Schreiber, 2007). Although the ECI requires more effort on the part of the interviewer to conduct, research has shown that the ECI can elicit 45 per cent more correct information than the original CI (Fisher et al., 1987). For the purpose of the present paper, all subsequent references to the CI will be referring to the enhanced version of the CI.

1.2.3 Effectiveness of the CI

Since the development of the CI, there have been upwards of 65 published articles that have assessed its effectiveness, including two meta-analytic reviews. The primary studies have been conducted in the US (Brock, Fisher, & Cutler, 1999; Geiselman et al., 1985), Germany (Aschermann, Mantwill, & Kohnken, 1991), Canada (J. Turtle, personal communication, August 26, 2010), the UK (Milne & Bull, 2003), and Australia (Davis, McMahon, & Greenwood, 2005). Typically, studies investigating the effectiveness of the CI consist of comparisons of the CI with either a standard interview or more recently, a structured interview. In early research (e.g., Geiselman et al., 1984) the CI was often compared to a standard interview, which has been defined as an interview that is administered by an interviewer who has not been trained in either cognitive or communicative components of the CI. Alternatively, the structured interview has been commonly used as a control interview in comparison studies, which is administered by an interviewer who has been trained in only communicative techniques involved in the delivery of the CI (see Memon & Stevenage, 1996). Therefore, the major difference between a CI and a structured interview is the inclusion of cognitive memory enhancing techniques.

As mentioned, there have been two meta-analyses that have investigated the effects of the CI on correct and incorrect recall. In the first meta-analysis, Kohnken, Milne, Memon, and Bull (1999) explored 55 individual comparisons between the CI and

control interviews and found a strong overall effect ($d = 0.87$) for an increase in correct recall for the CI. However, a significant increase in incorrect recall was also observed across the studies. The authors also found that as the delay between the viewing of the TBR event and the interview increased, the effect size for correct details decreased. In addition, Kohnken and colleagues reported that correct recall was higher when interviewees viewed a live event instead of a video, as well as if they physically participated in the TBR event.

In contrast to the initial meta-analysis, Memon et al. (2010) assessed not only the effectiveness of the original CI and enhanced version, but also included the modified CI in their analysis. Modified CIs have become increasingly popular, and are essentially an adapted version of the enhanced CI. For example, some researchers have created a modified CI that is more appropriate to meet the individual needs of the witness or interviewer. For example, modified CI's have been developed for the purpose of only including some mnemonics that interviewers find useful (e.g., excluding the change of perspective technique, see Davis et al., 2005).

Interestingly, in line with Kohnken et al.'s meta-analysis, Memon and her colleagues (2010) found a significant increase in the amount of correct information ($d = 1.20$) elicited by a CI compared to a control interview, but also a significant increase (although small in effect size) of incorrect information ($d = 0.24$), even with the inclusion of various modified CI's. This is reassuring, as modified CI's have become popular, and are receiving widespread use. Modified CIs have been created for a number of reasons,

such as to be a more applicable technique for use with children (Holiday, 2003; Saywitz, Geiselman, & Bornstein, 1992), or to eliminate components that interviewers find to be not useful (Davis et al., 2005). For example, Dando, Wilcock, Milne, and Henry (2009) created a modified version of the CI that eliminated the change of order and different perspective components, which was shown to be as effective as the full CI in retrieving information in a mock witness situation.

It has been suggested that the advantage of the CI to elicit more information than a control interview may be simply attributed to the fact that the CI encompasses multiple retrieval attempts (Memon & Stevenage, 1996). However, Compos and Alonso-Quecuty (1999) found that the CI outperformed an interview technique utilizing four consecutive retrieval attempts, indicating that the success of the CI is most likely a result of the mnemonic strategies designed to enhance recall.

Although it is difficult to determine whether the success of the CI rests on the inclusion of all mnemonic components or a complex combination of some, studies have been conducted with the purpose of investigating the effectiveness of the individual mnemonics. Boon and Noon (1994), for example, explored whether or not each individual mnemonic component could elicit a significant amount of additional information. Interviewees who were subsequently interviewed with either a *change order* technique or *context reinstatement* reported significantly more information than what was obtained following a *report everything* instruction. However, the *change perspective* mnemonic did not elicit more information from interviewees, where interviewees recalled

a high proportion (41%) of incorrect information regarding appearance details. In addition, interviewees who were initially interviewed with the report everything instruction supplied significantly more correct information than interviewees who were given only standard instructions.

Results obtained by Boon and Noon (1994) support past research suggesting that some isolated CI components are efficient in aiding memory retrieval, while others are not. Specifically, research has found that the change order instruction can facilitate greater recall (Geiselman & Callot, 1990) whereby more incidental information was recalled when interviewees were asked to recall a TBR event in reverse order. Interestingly, it has been suggested that this type of non-schematic information is often of more investigative value to police officers, because it is not obtained from the witness' free narrative which might follow a logical, schematic series of events that may lack important details that fall outside of the witness's schema. The change perspective instruction has been shown to be the weakest of the CI components, as it has elicited less information than a simple free recall instruction (Davis et al., 2005).

Although some CI components may not individually yield a great deal of accurate information, context reinstatement has been shown in numerous studies to elicit significantly more information from interviewees than a straight forward free recall task where someone is asked to recall the event (Dietze & Thompson, 1993; Smith & Vela, 2001). Further, Milne and Bull (2002) attempted to identify which CI components were responsible for the CI memory enhancing effect, and found that interviews that combined

free recall and context reinstatement yielded significantly more accurate information than interviews that consisted of each of the CI components alone.

1.3 *Does Training Work?*

Given that a crucial component of criminal investigations is to obtain accurate information from eyewitnesses, and given the effectiveness of the CI, it is imperative that the CI be used by police officers in interviews with witnesses. However, research has shown that the application of the CI in police interviews is often incomplete (e.g., Clifford & George, 1996; Memon, Holley, Milne, Kohnken, & Bull, 1994). For example, Memon et al. (1994) investigated police officers' administration of the CI immediately after training and found that performance was generally poor and some components were frequently left out of the interviews. Generally, research has found that of the CI components, the *change of perspective* and *recall in different orders* mnemonics are most often left out of interviews (Dando, Wilcock, & Milne, 2008; Kebbell & Milne, 1998). Similarly, Clifford and George showed that none of the police officers in their study applied the CI procedure in its entirety. The reason for the lack of CI implementation has been attributed to the fact that police officers believe *the different orders* and *changing perspective* components of the CI are of little use (Kebbell, Milne, and Wagstaff, 1999), and the CI itself is seen as time-consuming and cumbersome to apply (Dando et al., 2009).

Contrary to the lack of CI implementation discussed above, in-house studies have been conducted that have shown some positive effects (increased knowledge, improved

interviewing) of CI training for investigators (see Clark & Milne, 2001). McGurk, Carr, and McGurk (1993) evaluated officers who were given a five-day training course and assessed their performance on mock interviews at three different times: before the course, immediately after, and six months after. The results indicated that both knowledge and skill exhibited by trained police officers improved both immediately after the training course as well as after six months (compared to an untrained control group). In particular, the knowledge examination scores only decreased by four percentage points from immediately upon the completion of the course to the six month follow up session, indicating that the officers retained most of the information that they learned. In addition, officers showed a significant improvement in their witness interviewing practices in that they used appropriate questioning techniques, improved communication and listening skills, and were more likely to structure the interview.

However, in addition to the beliefs held by police officers about the relative effectiveness of the mnemonics comprising the CI, another factor that may hinder their application of the CI in its entirety is the lack of feedback from superiors on interviews conducted post-training. For the small number of officers who are trained to use the CI, Snook, Eastwood, Stinson, Tedeschini, and House (2010) reported that evaluation and feedback regarding post-training interviews does not appear to be regular practice within police organizations. Research on training transference (Broad, 1997) indicates that support and guidance of supervisors must be made available in order to provide a suitable environment for the use of new interviewing skills. This lack of feedback is worrisome,

and is one possible explanation for the poor interview practices documented in a number of the above-mentioned descriptive studies. In order to maintain long term improvements in witness interviewing skills, interviewers must participate in regular intensive interview training, receive regular supervision and feedback from supervisors, and study recently conducted interviews (Larsson & Lamb, 2009).

1.4 *The Current Study*

Although there have been countless laboratory-based comparison studies assessing the effectiveness of the CI (Kohnken et al., 1999), and a small number of studies have been conducted with the purpose of describing what happens during a real eye-witness interview (Wright & Alison, 2004), no study has assessed police officers' application of a CI (using a pre-post experimental design) training model in *actual* police interviews. The current study evaluated *actual* recorded police interviews (conducted by police investigators who work in the Major Crime section of their organization) with witnesses both before and after CI-based interview training. Specifically, the CI training received by investigators was made available through a PEACE model of interviewing course, which is a style of interviewing largely based on the CI (see Snook et al., 2010). In addition, a control group of untrained investigators who work within the same police organization was included in the present study in order to reduce the influence of various threats to internal validity (maturation, history, etc.).

Taking into account the results of previous field research regarding descriptive analyses of actual witness interviews, the following is hypothesized:

H1: interviews conducted by trained investigators will exhibit more desirable interviewing practices (e.g., evidence of more behaviours contained in the *engage and explain, account, and closure* phase of interviews) than interviews conducted by un-trained investigators.

H2: interviews conducted by trained investigators will exhibit less inappropriate interviewing behaviour (e.g., asking closed-ended/leading/multiple questions, talking more than 20% of the time) than interviews conducted by un-trained investigators.

H3: as the delay increases between date of training and the dates of interviews containing trained investigators, the desirable effect that training has on interview practices will decrease.

2.0 Method

2.1 Participants

A sample of 80 police interviews (12 videotapes, 36 transcripts, 30 DSS audio files, and 2 transcripts accompanied by DSS audio files) with adult witnesses was obtained from a police organization in Atlantic Canada. The interviews were collected through requests made by an Inspector for police officers to submit a sample of their interviews. Due to the nature of the sample, random selection of interviews was not possible. It was requested that the following interviews be submitted: 20 interviews conducted before PEACE training commenced with the organization (prior to 2008), 20 interviews conducted at least one week from the last day of PEACE training, 20 interviews conducted by individuals who did not participate in training during the same general time period (2004-2008) as the pre-experimental interviews, and 20 interviews conducted by individuals who did not participate in training during the same general time period (2008-2011) as the post-experimental interviews. Each transcript consisted of a verbatim written account of an audio-taped interview. Video tapes consisted of audio and video recording of the interview, and DSS audio files only consisted of audio recording. Videos, transcripts, and DSS files were extracted from the population of interviews conducted by the criminal investigation division of the organization. The interviews occurred between 2003 and 2010, with 1.3% occurring in 2003, 17.5% occurring in 2004, 17.5% occurring in 2006, 7.5% in 2007, 5% in 2008, 33.8% in 2009, and 17.5% in 2010.

Approximately 45% of the interviews pertained to the investigation of assault, 19% pertained to sexual assault, 9% to uttering threats, 9% to homicide, 4% to armed robbery, and 1% to each of the following: possession of child pornography, trespassing, missing person, attempt to

lure a child, and robbery. The offence under investigation was not made explicit in the remaining 9% of cases.

The interviewer(s) and interviewee were the only people present in 49% of the interviews. A total of 32 different officers were involved in the interviews. All interviewers were Caucasian, 26 of them were men, four were Sergeants and the remaining interviewers were Constables. The mean age of the primary interviewer at the time of interview was 42 years (SD = 4.47). The average years of experience for the primary interviewer at the time of interview was 17 years (SD = 6.70).

2.2 *Design*

The current study is a 2 x 2 between-subjects factorial design, with training and time as the two independent variables, resulting in four conditions: pre-experimental, post-experimental, pre-control, and post-control. Both pre-experimental and pre-control interviews took place prior to 2008 (before PEACE training commenced). Post-experimental interviews took place after 2008 and were conducted by investigators who took part in the training. Post-control interviews also took place after 2008, but were conducted by untrained investigators. The latter condition was included in the current study to control for any "leakage" that might have occurred, where some investigators may have picked up on some aspects of PEACE training by watching interviews conducted by trained individuals within their organization.

2.3 *Materials and Procedure*

Investigators who participated in PEACE training attended a two-week tier two training course that was designed for interviewers who work on serious crime cases. The training took place on a full time basis (seven hours per day) over the period of ten consecutive week days. The training was administered by two individuals: a trained polygraph examiner and a university

professor. Investigators were trained to conduct CI's and were given numerous practice sessions with mock witnesses and were subsequently given feedback from the trainers. In addition, the training consisted of best practices for suspect interviews (e.g., conversation management) and covered a wide range of other relevant topics (e.g., cognition, rapport building, appropriate questioning style, etc.).

Although the current study involves an assessment of the efficacy of the PEACE model of interviewing training, PEACE is largely based on the CI (to be used with witnesses and victims) and conversation management (to be used with suspects or uncooperative witnesses). As the current study is concerned with interviews with witnesses and victims, the beginning (*engage and explain phase*), middle (*account phase*), and end (*closure phase*) of the PEACE interviews comprising the current sample overlap almost entirely with the ECI procedure, in that, many of the instructions are the same and are outlined below.

2.4 *Coding Procedure*

A coding guide (see Appendix for a detailed coding dictionary) containing the following categories of variables was created:

1. *Demographic and context variables*: these variables pertain to the characteristics used to describe those who are conducting the interview and context in which the interview took place. Also coded was the date of the interview, the type of crime witnessed, the number of people present, the length of the interview, and the age, gender, and years of experience of the primary interviewer. Note that the age and years of experience variables were provided by the participating police organization and not coded from the interviews.

2. *Engage and explain:* these variables pertain to the administration of the engage and explain portion of the interview. Behaviours that are recommended in this interview stage are

designed to decrease the interviewee's anxiety and uncertainty of the process by creating an environment where people feel comfortable providing information about witnessed events. Specifically, the interviews were coded for whether or not the interviewer: greeted the interviewee in a polite and professional manner, established the interviewee's preferred name, asked the interviewee to call him/her by their first name, identified others present in the room if there were any (and explained their role), built adequate rapport, encouraged questions, explained the route map, identified the time and date of the interview, established the purpose of interview, asked the interviewee why they think they are being interviewed, established interviewee's needs, and explained the routines and expectations of the interview.

3. *Account*: these variables pertain to the method used by the interviewer to obtain an account from the interviewee. Specifically, variables coded included whether or not the interviewer: attempted to set up a CI and if they did it properly, asked for a free narrative, summarized the free narrative, passed to the second interviewer if applicable, avoided topic hopping, talked less than 20% of the time, avoided interrupting the interviewee, and avoided using jargon. In addition, the number of leading, multiple, forced-choice, open-ended, probing, and closed ended questions were coded in terms of their frequency throughout the interview.

4. *Closure*: these variables pertain to the behaviours that conclude an interview. In particular, variables coded included whether or not the interviewer: gave a summary of what was said, provided their contact information, explained what will happen after the interview, recorded the date and time of the interview, and provided a professional closure.

Behaviours comprising each phase of the interview (e.g., engage and explain, account, and closure) were combined to create an overall score for that phase. Each score consists of a proportion of behaviours observed in each interview. Specifically, a proportion of behaviours was

calculated as the number of behaviours observed divided by total number of potential variables. A proportion was used because the total number of behaviours that could have been exhibited by an interviewer varied depending on the situation that was presented to the interviewer. For example, in some instances, the ability of the primary interviewer to "introduce" the second interviewer was not available because a second interviewer was not present in the interview room. It is important to note that due to the differences in interview format, not all variables could be coded for each interview. Only interviews in audio (DSS) and video format were coded for witness talking time (and subsequent adherence to the 80/20 rule) and avoidance of interruptions. This is illustrated in the results section; as the sub-samples are given that correspond to each mean and standard deviation.

2.5 *Inter-rater Reliability*

Coding agreement of the variables was assessed by having an independent researcher code 20% of the sample (n = 16), which was selected randomly. The independent coder was provided with a 2-hr training session that consisted of the structure and content of the coding guide and dictionary as well as the practical aspects of coding the interviews. Additionally, the coder participated in a practice session that covered the coding of two interviews before beginning to code the actual interviews. Any confusions pertaining to the task were resolved before inter-rater reliability commenced. The overall average percent agreement for 29 categorical variables was 90% and ranged from 56% to 100% agreement (SD = 10.69). Kappa ranged from 0.13 to 1.00 and the overall value was 0.74. On average, the raters disagreed on 1.28 interviews per variable. See Table 1 for the Kappa values and percent agreement for each categorical variable, and Table 2 for the agreement of continuous variables.

2.6 *Tests of Significance*

Given the practical significance of the data contained in the current study, the statistical estimates (and their associated 95% CI's) were emphasized. In addition, as the current study was concerned with the impact of PEACE training on interviews with witnesses and victims, independent *t*-tests were used to confirm or disconfirm any differences in behaviours exhibited in each interview condition. Analysis of variance (ANOVA) was not conducted as the main effects due to training or time were not informative for the current research. In order to measure the effect size of differences, Cohen's *d* was calculated for each *t*-test, which was calculated as the difference between the two means divided by the average standard deviation (Cohen, 1960). In addition, due to the multiple t-tests conducted in the current analysis, a Bonferroni correction was performed, and a new significance level ($p = .001$) was determined.

3.0 Results

Engage and Explain Phase

The frequency of behaviours exhibited in the engage/explain phase of interviews is shown in Table 3. As can be seen, the interviews conducted in the post-experimental condition contained more engage and explain behaviours than from interviews in which people were not trained on how to conduct a cognitive interview. Within the post-experimental interviews, the explaining of routines and expectations (n = 14), outlining of the route map (n = 12), asking the witness about the purpose of the interview (n = 12), and establishing the witness' needs (n = 10) were most frequently observed. Behaviours that did not change dramatically as a result of cognitive interview training included encouraging witnesses to ask questions and identifying other people present in the interview room to the interviewee.

The mean proportion of behaviours exhibited during the engage and explain phase for each of the four groups is shown in Figure 1. As can be seen, the mean proportion of the engage and explain behaviours observed for interviews conducted in the post-experimental group (51.73, 95% CI = 45.15, 58.30) is larger than the means for the pre-experimental (24.30, 95% CI = 17.71, 30.86), pre-control (20.20, 95% CI = 13.60, 26.76), and post-control groups (22.86, 95% CI = 16.28, 29.44), respectively. Independent sample t-tests, and more importantly, effect sizes confirmed that the mean proportion of behaviours exhibited during the engage and explain phase was higher for interviews conducted in the post-experimental condition than those in the pre-

experimental condition, $t(38) = -4.32$, $p < .001$, $d = 1.50$; post-control condition, $t(38) = 4.70$, $p < .001$, $d = 1.73$, as well as the pre-control condition, $t(38) = 5.20$, $p < .001$, $d = 2.01$.

Account Phase

The frequency of account behaviours is shown in Table 4. Interviews comprising the post-experimental condition exhibited more account behaviours than the other three conditions. Specifically, behaviours exhibited most often were: attempting to set up a CI ($n = 8$), avoidance of topic hopping ($n = 14$), and avoidance of interruptions ($n = 13$).

The mean proportion of account behaviours is shown in Figure 2. As can be seen, the mean proportion of account behaviours for the post-experimental group (61.55, 95% *CI* = 53.54, 69.56) was larger the pre-experimental (48.21, 95% *CI* = 40.21, 56.22), pre-control (52.14, 95% *CI* = 44.13, 60.15), and post-control conditions (54.16, 95% *CI* = 46.16, 62.18) groups, respectively. The effect sizes (and independent *t*-tests), albeit medium in size, demonstrated that interviews in the post-experimental group contained more required behaviours to obtain an account compared to those in the pre-experimental condition, $t(38) = -2.33$, $p < .05$, $d = .47$. Behaviours observed in the account phase of the interview did not differ between the post-experimental group and either of the post-control, $t(38) = 1.38$, $p > .05$, $d = .44$, and pre-control conditions, $t(38) = 1.57$, $p > .05$, $d = .49$.

Each interview for each of the four groups was also analyzed for the proportion of six question types: leading, multiple, forced-choice, open-ended, probing, and closed-ended questions. The mean proportion (with 95% CIs) for each question type is presented in Table 5. As can be seen approximately half of questions comprising interviews in all conditions were closed-ended questions. In general, there was an improvement in the sorts of questions asked in post-experimental interviews, as interviewers in this condition asked few inappropriate questions (e.g., leading, forced-choice, multiple), and a larger proportion of more appropriate question types (e.g., probing).

Independent samples *t*-tests and effect size calculations were conducted to compare means between conditions for each question type. Interviews in the post-experimental condition exhibited a smaller proportion of leading questions than those in the pre-experimental condition, $t(38) = 3.05$, $p = .004$, $d = 1.39$. Interviews in the post-experimental condition exhibited a smaller proportion of leading questions, $t(38) = -2.08$, $p = .04$, $d = .73$, probing questions, $t(38) = -2.19$, $p = .03$, $d = .71$, and more open-ended questions, $t(38) = 2.30$, $p = .02$, $d = .75$, than those interviews in the pre-control condition. In addition, interviews in the post-experimental condition exhibited fewer leading questions, $t(38) = -2.26$, $p = .03$, $d = .77$, probing questions, $t(38) = -2.28$, $p = .03$, $d = .74$, and more open ended questions, $t(38) = 2.04$, $p = .04$, $d = .67$, than those interviews in the post-control condition.

On average, the proportion of witness talking time for those in the pre-experimental ($n = 5$), post-experimental ($n = 19$), pre-control ($n = 1$), and post-control (n

= 18) was: 49.82 (*SD* = 17.10), 45.85 (*SD* = 11.19), 61.51, and 52.79 (*SD* = 16.07), respectively. In addition (based on the same sub-sample sizes stated above), the average number of interruptions made by the interviewer was 4.2 (*SD* = 8.84), 1.79 (*SD* = 3.39), 0, and 0.68 (*SD* = 2.31), for the pre-experimental, post-experimental, pre-control, and post-control conditions, respectively.

Closure Phase

As shown in Table 6, the interviews in the post-experimental condition exhibited a high number of closure behaviours. Specifically, *providing a professional closure* and *summarizing the interview* were observed most frequently (n = 10, and n = 7, respectively) in those interviews.

The mean proportion (with 95% CIs in parentheses) of closure behaviours for interviews conducted in the pre-experimental, post-experimental, pre-control, and post-control conditions were 22.50 (15.01, 30.00), 39.17 (31.67, 46.66), 30.83 (23.34, 38.33), and 18.33 (10.84, 25.83), respectively.

As can be seen in Figure 3, the mean proportion of closure behaviours exhibited was higher for interviews conducted by those in the post-experimental condition than those in the pre-experimental condition, $t(38) = 2.68$, $p = .01$, $d = .84$, as well as the post-control condition, $t(38) = 4.16$, $p < .001$, $d = 1.40$. Although the difference between the post-experimental condition and pre-control condition for behaviours exhibited during the closure phase of the interview was non-significant, $t(38) = 1.42$, $p > .05$, the difference produced a medium effect size, $d = .45$.

Time Analysis

The relationship between overall score (calculated as the average of *engage and explain, account,* and *closure* scores) and delay (i.e., time between date of training and date of interview) was negatively correlated ($r = -.47$, $p = .05$). Thus, as the delay increased there was a decrease in interview performance.

4.0 Discussion

The current study examined the witness interviewing practices of a sample of Canadian police officers and, specifically, investigated whether (and to what extent) a course on cognitive interviewing improved police officers' interviewing practices. It was found that, in general, interviews conducted by trained investigators contained more appropriate interviewing practices than interviews conducted by un-trained investigators. Most notably, it was found that interviews conducted by trained investigators exhibited approximately double the amount of engage and explain behaviours as those conducted by un-trained interviewers. While trained investigators asked fewer leading questions and more open-ended questions, the proportion of closed-ended questions asked was approximately the same for those trained and un-trained. Although there is room for improvements to be made, these findings are encouraging, and indicate that Canadian police organizations should invest in CI-based PEACE interview training as a way of facilitating better witness interviewing practices.

Inherent within the protocol for the CI is the development of rapport and the steps taken to ensure that witnesses are comfortable, relaxed, and are aware of what to expect throughout the interview process (Fisher & Geiselman, 1992). The results of the current study are reassuring in that the majority of interviews conducted by trained investigators displayed at least half of the possible behaviours deemed essential for creating a positive and relaxing interview environment. Most often, trained interviewers explained the routines and expectations of the interview, established the purpose of the interview,

established the witness' needs, and built adequate rapport. Behaviours (such as the ones mentioned) aim to reduce witness anxiety and have been shown to subsequently increase the amount of correct information elicited in an interview (e.g., Collins et al., 2002). Beyond adhering to practices associated with the CI, these results suggest that interviews conducted by trained investigators may have contained more correct information from witnesses than those conducted with untrained investigators.

Consistent with previous descriptive field studies (Kebbell & Milne, 1998), interviews in the current study conducted by untrained officers exhibited few attempts at setting up a CI. While it is encouraging that interviews with trained investigators set up a CI in almost half of the cases examined, only a quarter were successful in setting up the CI properly. These results are similar to those reported in a study conducted by Clifford and George (1996), who found that the application of the CI after a training session was incomplete in all police interviews. There are two potential explanations as to why so few attempted CIs were administered properly. Firstly, it is possible that the CI may be too cumbersome for interviewers to apply in their witness interviews. If this explanation is indeed the cause for the improper administration of the CI, the results of the current study provide additional support for the development of a modified CI to be used by police officers. Secondly, and more plausibly, it is possible that a lack of follow-up training and feedback may have hindered police officers' application of the CI. As shown by Lamb, Sternberg, Orbach, Esplin, and Mitchell (2002), the termination of (or lack of) supervisory feedback can have a negative impact on interview quality. Given the ability

of the CI to elicit accurate and reliable information (Kohnken et al., 1999; Memon et al., 2010), it is encouraging that trained officers in the current study made attempts to include it in their interviewing repertoire, however, additional efforts (e.g., follow up training and feedback) need to be made to ensure that attempted CIs are implemented successfully more often.

In line with past research, overall interview performance decreased as a function of delay between date of training and date of interview. This finding, in combination with the low frequency of properly administered CIs indicate that follow-up training and feedback is essential for solidifying skills that are learned in training. It is not surprising that interview performance worsened as time increased from the end of training, given that police officers report that they rarely receive supervision on their interviews, obtain feedback from their supervisors, or have an opportunity to receive refresher interview training (Snook, House, MacDonald, & Eastwood, 2011). Feedback and supervision have been shown to be imperative for solidifying and maintaining interviewing skills (Lamb et al., 2002). In addition, a study by Clarke and Milne (2001) showed that police organizations that implemented a supervision policy in conjunction with regular supervision practices were more likely to have their officers' exhibit proper interviewing skills.

A central aspect of investigative interviewing is the questioning skills of interviewers. It was found that interviews conducted by trained investigators included more open-ended questions and fewer leading questions than those conducted by

untrained interviewers. However, proportions of open-ended questions asked by trained officers were similar to those reported in previous studies (which did not explicitly include officers trained to conduct a CI; Myklebust & Alison, 2000; Snook & Keating, 2010; Wright & Alison, 2004), where approximately 6% of all questions asked began with *tell, explain,* or *describe*. It is possible that additional training and supervisory feedback could also increase officers' use of open-ended questions. The reduction in leading questions asked in interviews with trained investigators is encouraging, as it is a well-established psychological principle that asking leading questions results in inaccurate information from witnesses (see Loftus, 1975).

In all interview conditions in the current study, the proportion of closed-ended questions hovered slightly below 50%, and nearly a quarter of all questions asked were probing in nature. While asking closed-ended questions has certain benefits, such as eliciting relevant information and keeping the witness' account from going astray (Fisher & Geiselman, 1992), it is worrisome that half of their interview questions were closed-ended. Of most concern is the problem that asking closed ended or probing questions results in the witness not accessing his or her entire mental representation of the event (if they actually have a detailed record), and only focusing on the answer to the particular question; which may result in inaccurate information (see Geiselman et al., 1984). Additionally, the high proportion of closed-ended and probing questions observed in all interview conditions may be representative of a *rapid-fire* style of questioning, which is a style and pace of questioning that is discouraged of interviewers.

However, on the other hand, it is difficult to determine the implications of an interview containing a high proportion of closed-ended questions without being aware of the sequencing of questioning. Specifically, it has been suggested that the ideal sequence of questioning involves an initial open-ended question (designed to facilitate a deep search of memory) followed by probing questions, then followed by closed-ended questions (only if needed to complete the details about the topic being discussed; see Fisher & Geiselman, 1992 for a discussion regarding proper question sequencing for maximum efficiency) for each topic (e.g., description of suspect) being questioned by the interviewer.

Interestingly, it is possible to measure depth of memory search by investigating the latency of the witness' response. Johnson (1972) found that answers to closed-ended questions were oftentimes shorter, less detailed, and also recalled after a shorter latency than responses to open-ended questions. Responses from witnesses were not analyzed in the current study; however, it seems that the next logical step in this research area is to examine aspects of witness behaviour (such as response latency, quality of response, etc.) as well as the investigator behaviour. Results of this type of analysis, in combination with an examination of question sequencing would certainly provide more insight into the implications of asking closed-ended questions, and would provide researchers with the empirical grounds to make recommendations regarding these question types.

The finding that interviews conducted by trained and untrained investigators spoke, on average, approximately half of the time, is slightly higher than findings from

previous studies, which have typically reported proportions of interviewer talking time around 30-40% (Myklebust & Alison, 2000; Snook & Keating, 2010; Wright & Alison, 2004). While it seemed discouraging that interviews conducted by trained investigators spoke approximately the same amount as those untrained (and no interview met the 80/20 talking rule criteria, where the interviewer should have spoken less than 20% of the time), it is possible that the increase in *engage and explain* behaviours accounted for at least some of this large proportion of talking time. For example, because trained investigators exhibited double the amount of engage and explain behaviours, they clearly would have had to speak more than those who did not exhibit such behaviours. Therefore, it can be suggested that trained investigators may not have provided an unnecessary degree of intrusiveness in their interviews, and the observed large proportion of interviewer talking time could be inflated by their elaborate demonstration of engage and explain behaviours. In order to thoroughly examine the effect of the adherence to the 80/20 talking rule, future research should be conducted to analyze witness and interviewer talking time during the three phases of an interview: engage and explain, account, and closure.

Due to the differences in format (some conditions contained interviews that were predominantly in transcript form) for the interviews in each condition, it was not possible to compare (using tests of significance) the differences in number of interruptions made by the investigators. However, it was encouraging that those who were trained tended to avoid interrupting the witness in almost 70% of cases. This is in contrast to previous field research with untrained officers, where they typically interrupted as frequently as once

every four and a half minutes, or after only a few second of a witness beginning their free recall of the TBR event (Fisher et al., 1987; Wright & Alison, 2004). This finding indicates that interviews conducted by trained investigators provided the witness with an environment to focus on extracting important information, without the worry of being continuously interrupted.

In addition to the first two interview phases (engage and explain; closure) discussed above, interviews conducted by trained investigators also exhibited a higher proportion of closure behaviours compared to those conducted by un-trained officers. Most importantly, investigators gave a summary of what was said during the interview, and provided a professional and polite closure in half of interviews analysed. Although the most important part of the interview (obtaining an account from the witness) has ended by the time investigators administer the closure phase, certain behaviours, such as providing a professional closure, are important as they can influence whether the witness will come back to be interviewed again if need be. It is important to note that on average, across interview conditions conducted by un-trained investigators, a polite/professional greeting was only afforded to witnesses in one third of interviews. Therefore, it can be assumed that training has impacted the behaviours investigators exhibited during this phase (such as thanking the witness for coming in).

There are three main limitations concerning the present research that deserve mentioning. Firstly, given the highly sensitive nature of the interviews collected in the sample, neither random sampling nor random assignment was possible. Therefore, it is

not possible to be completely confident that the pre-control and pre-experimental conditions were equal. However, given that interviews were obtained from officers within the same organization and during the same general time period, it is reasonable to predict that they were equal. Even though this renders the current study quasi-experimental, a test of CI training effectiveness has never been conducted with such a large sample of police interviewers or with actual police interviews (as opposed to police interviewers interviewing *mock* witnesses). Secondly, as discussed above, witness behaviour was not assessed in the current analysis. An examination of latency and quality of responses provided by witnesses would provide greater information and support for the effectiveness of the behaviours advocated in PEACE training (and studied in the current research). Thirdly, although the current research reports the proportion of question types asked by interviewers, the order in which questions were asked was not analyzed, making it difficult to determine whether the large proportion of closed-ended and probing questions would be considered problematic. Therefore, future research should address this issue by also including an analysis of questioning sequence.

Given the importance of witness interviewing, and the consequences of not obtaining accurate and reliable information from witnesses, it is imperative that police officers receive intensive interview training, such as the PEACE model of interviewing. Results of the current study suggest that witness interviews are better when conducted by investigators who have been trained to conduct cognitive interviews. Notwithstanding the increase in desirable behaviours, there is still room for improvement, and with follow-up

training and feedback it may be possible to increase observed interviewing practices to a rate closer to 100%.

Table 1

Inter-rater Reliability (Kappa and Percent Agreement) for Each Categorical Variable Coded in Each Interview

Variable	Kappa	% Agreement
Establish preferred name	--	100.00
Ask to be called by first name	--	100.00
Polite/professional greeting	0.77	93.75
Identification of others	0.39	75.00
Explain routines and expectations	1.00	100.00
Build adequate rapport	0.48	81.25
Encourage questions from witness	--	100.00
Explain the route-map	0.64	93.75
Identification of time	0.43	87.50
Explain roles of others present	--	100.00
Identification of date	0.64	93.75
Establish purpose of the interview	0.38	69.00
Ask witness purpose of interview	1.00	100.00
Establish witness' needs	--	100.00
Attempt to set up a CI	0.64	93.75
Set up a CI properly	--	93.75
Asked for a free narrative	0.67	87.50
Summarized witness' free narrative	0.64	93.75
Passed to the second interviewer	0.77	93.75
Avoided topic hopping	0.13	56.25
Followed the 80/20 talking rule	--	100.00
Avoided interrupting	0.69	85.71
Avoided use of jargon	--	100.00
Give a summary of interview	--	100.00
Provide contact information	--	100.00
Explain what will happen after the interview	0.64	93.75
Record date of interview	1.00	100.00
Record time of interview	0.77	93.75
Provide a professional closure	0.60	81.25

Note. Empty cells in table pertain to variables in which both raters agreed 100% of the time however only one option (e.g., yes or no) was coded, therefore Kappa values cannot be calculated. For example, both raters selected "no" and agreed 100% of the time.

Table 2

Inter-rater Reliability (Measured with Correlations) for Each Continuous Variable Coded in Each Interview

Variable	*r*	*p*
Interviewer interruptions	0.61	0.15
Interviewer use of jargon	--	--
Witness talking time	0.99	0.00
Leading questions	0.65	0.006
Multiple questions	0.83	0.00
Forced-choice questions	0.41	0.19
Open-ended questions	0.84	0.00
Probing questions	0.93	0.00
Closed-ended questions	0.97	0.00

Note. Empty cells are due to the absence of interviewers using any jargon terms.

Table 3

Frequency Data for the Presence of Behaviours Exhibited in the Engage and Explain Phase of Interviews

Engage and Explain Behaviour	Pre-control	Post-control	Pre-experimental	Post-experimental
Establish preferred name	0	1	0	7
Ask to be called by first name	0	1	0	7
Polite/professional greeting	1	0	1	7
Identification of others	5 (8)	4 (7)	1 (2)	8 (14)
Explain routines and expectations	2	0	0	14
Build adequate rapport	2	2	3	9
Encourage questions from witness	0	0	0	1
Explain the route-map	2	1	3	12
Identification of time	17	17	20	15
Explain roles of others present	0 (8)	0 (7)	0 (2)	6 (14)
Identification of date	18	18	19	17
Establish purpose of the interview	5	7	11	14
Ask witness purpose of interview	0	4	2	12
Establish witness' needs	1	3	0	10

Note. Unless otherwise specified in brackets, the above frequency data is based on a sample of $n = 20$ interviews in each condition.

Table 4

Frequency Data for the Presence of Behaviours Exhibited in the Account Phase of Interviews

Account Behaviour	Study Condition			
	Pre-control	Post-control	Pre-experimental	Post-experimental
Attempt to set up a CI	2	1	2	8
Set up a CI properly	1 (2)	1 (1)	2 (2)	2 (8)
Asked for a free narrative	14	17	14	17
Summarized witness' free narrative	1 (14)	3 (17)	2 (14)	3 (17)
Passed to the second interviewer	5 (8)	4 (7)	2 (2)	10 (14)
Avoided topic hopping	12	9	5	14
Followed the 80/20 talking rule	0 (1)	0 (19)	0 (5)	0 (19)
Avoided interrupting	1 (1)	16 (19)	3 (5)	13 (19)
Avoided use of jargon	20	20	20	20

Note. Unless otherwise specified in brackets, the above frequency data is based on a sample of $n = 20$ interviews in each condition.

Table 5

Means and 95% Confidence Intervals of the Average Proportion of Question Types Asked in Each Interview Condition

Question Type	Mean	95% Confidence Interval	
Leading Questions		Lower bound	Upper bound
Pre-control	1.89	0.68	3.12
Post-control	1.63	0.41	2.85
Pre-experimental	3.24	2.02	4.46
Post-experimental	0.45	0.00	1.67
Multiple Questions			
Pre-control	2.88	1.35	4.40
Post-control	0.85	0.00	4.40
Pre-experimental	1.89	0.37	3.41
Post-experimental	1.5	0.00	3.02
Closed-ended questions			
Pre-control	44.12	38.17	50.06
Post-control	43.09	37.15	49.04
Pre-experimental	49.93	43.99	55.87
Post-experimental	50.94	44.92	56.88
Forced-choice questions			
Pre-control	1.91	0.46	3.36
Post-control	4.53	3.07	5.98
Pre-experimental	3.77	2.32	5.22
Post-experimental	3.52	2.06	4.96
Open-ended questions			
Pre-control	2.19	0.64	3.76
Post-control	2.53	0.98	4.09
Pre-experimental	2.61	1.05	4.17
Post-experimental	5.05	3.49	6.61
Probing questions			
Pre-control	46.99	41.34	52.66
Post-control	47.36	41.70	53.02
Pre-experimental	38.56	32.90	44.22
Post-experimental	38.55	32.89	44.21

Table 6

Frequency Data for the Presence of Behaviours Exhibited in the Closure Phase of Interviews

Closure Behaviour	Study Condition			
	Pre-control	Post-control	Pre-experimental	Post-experimental
Give a summary of interview	2	0	1	7
Provide contact information	0	0	0	4
Explain what will happen after the interview	2	1	3	5
Record date of interview	4	0	3	2
Record time of interview	19	18	14	19
Provide a professional closure	10	3	6	10

Note. Unless otherwise specified in brackets, the above frequency data is based on a sample of $n = 20$ interviews in each condition.

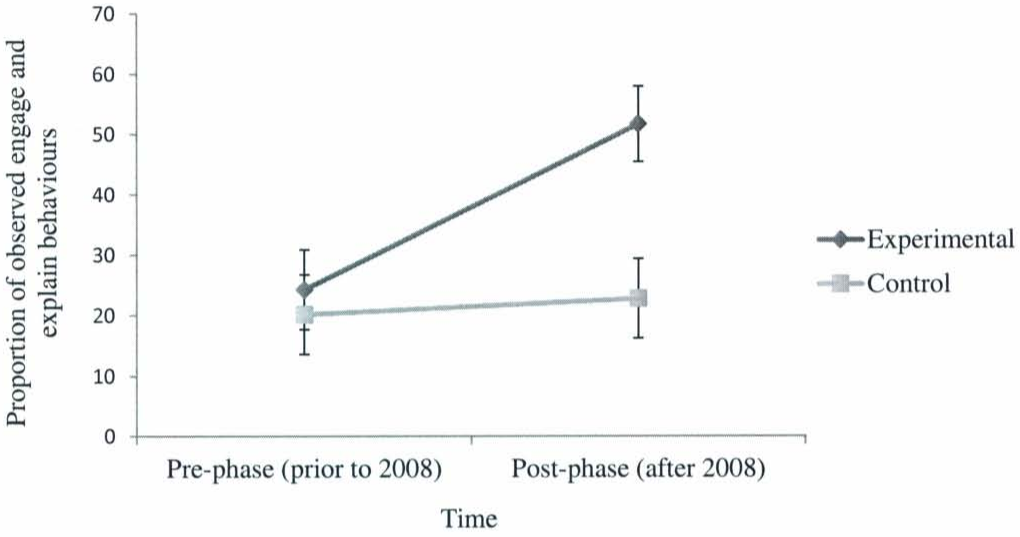

Figure 1. The mean proportion (and associated 95% confidence intervals) of engage and explain behaviours for each of the four conditions.

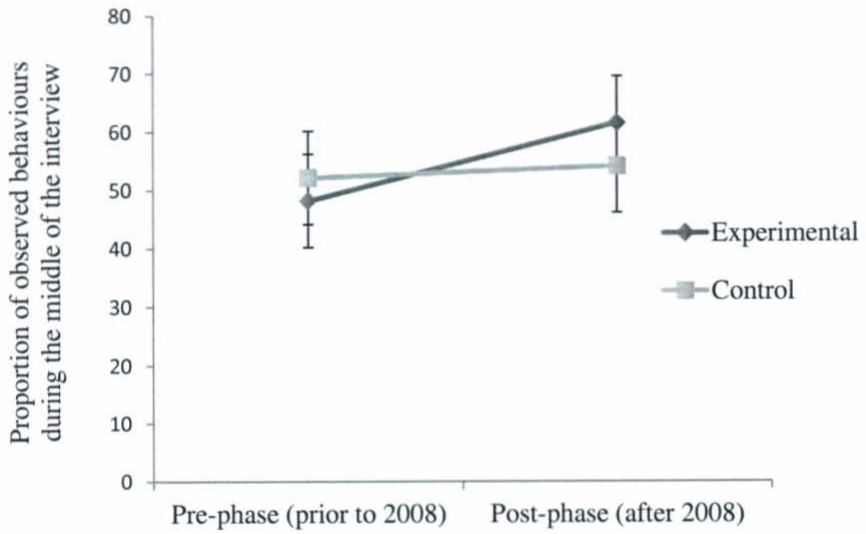

Figure 2. The mean proportion (and associated 95% confidence intervals) of account behaviours for each of the four conditions

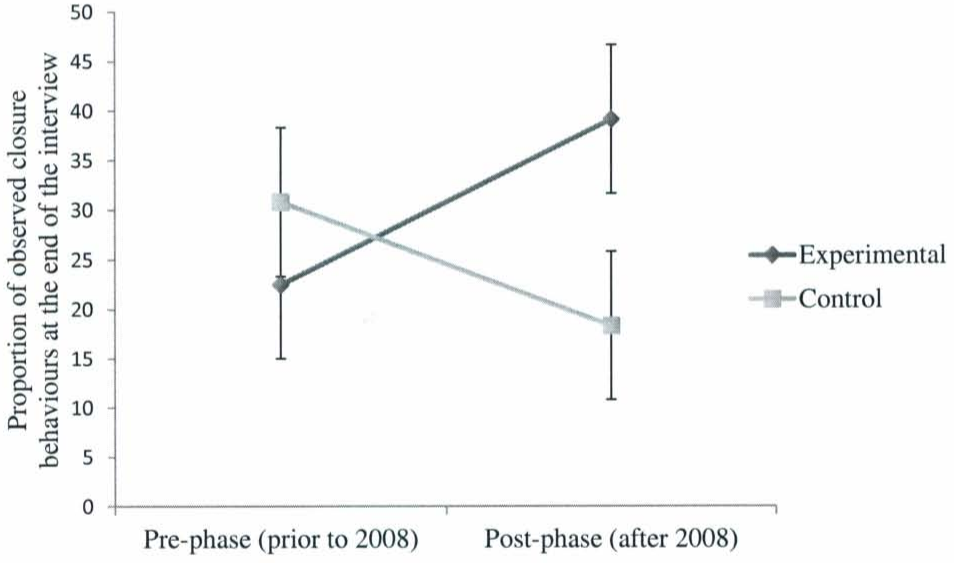

Figure 3. The mean proportion (and associated 95% confidence intervals) of closure behaviours for each of the four conditions.

5.0 Appendix

Evaluation Coding Dictionary

Engage and Explain

Did the interviewer establish the interviewee's preferred name?

Yes = The interviewer asked the interviewee what they would like to be called

No = The interviewer did not ask the interviewee what they would like to be called

Did the interviewer ask the witness to call him/her by their first name?

Yes = The interviewer asked the witness to call him/her by their first name

No = The interviewer did not ask the witness to call him/her by their first name

Did the interviewer greet the witness in a "polite/professional manner"? (Note: A polite professional manner refers to such behaviours as – a hand shake, using a relaxed tone of voice, open posture, etc.)

Yes = The interviewer greeted the witness in a "polite/professional manner"

No = The interviewer did not greet the witness in a "polite/professional manner"

Did the interviewer identify the date of the interview?

Yes = The interviewer stated the date of the interview

No = The interviewer did not state the date of the interview

Did the interviewer identify other people present in the interview room?

Yes = The interviewer identified others present in the room

No = The interviewer did not identify others preset in the room

Not applicable = Interviewer did not identify others, as others were not present in the room

Did the interviewer establish the purpose of the interview?

Yes = The interviewer stated the purpose of the interview

No = The interviewer did not state the purpose of the interview

Did the interviewer ask the witness why they think they are being interviewed?

Yes = The interviewer established that the witness knows the reason for the interview

No = The interviewer did not establish that the witness knows the reason for the interview

Did the interviewer explain the route-map for the interview? ***(Note: The route-map is defined as an explanation of what issues will be covered, and what the structure of the interview will be, where the interviewee will be asked to give an account of the incident under investigation, and will be asked if they have any questions or concerns about the process)***

Yes = The interviewer explained what would happen during the course of the interview

No= The interviewer did not explain what would happen during the course of the interview

Did the interviewer adequately establish the interviewee's needs? ***(Note: Possible needs include: sufficient refreshments and food, consideration of any domestic issues such as picking up a child from school, washroom breaks, acknowledgment of any injuries, or any other special considerations)***

Yes = The interviewer established 50% or more of the interviewee's possible needs

No = The interviewer established less than 50% of the interviewee's possible needs

Did the interviewer explain the role of others present in the room?

Yes = The interviewer explained the role of others present in the room

No = The interviewer did not explain the role of others present in the room

Not applicable = There were no others present in the room

Did the interviewer state the date of the interview?

Yes = the interviewer stated the date of the interview

No = the interviewer did not state the date of the interview

Did the interviewer state the time of the interview?

Yes = the interviewer stated the time of the interview

No = the interviewer did not state the time of the interview

Did the interviewer explain the routines and expectations? ***(Note: Routines/expectations include the following instructions – not to interrupt, not to rush, to tell the truth, to know that it***

is ok to say "I don't know", that the interviewer will not interrupt, will not rush, will not be judgmental, may need to go over things more than once, and will give the interviewee time to think and provide answers)

Yes = The interviewer explained at least 50% of the routines and expectations

No = The interviewer explained less than 50% of the routines and expectations

Did the interviewer build adequate rapport with the interviewee? ***(Note: Rapport can be obtained by exhibiting respect [showing good manners, sincerity, attentiveness and warmth], empathy, supportiveness, positiveness, openness, a non-judgmental stance, straight-forward talk, equal talking, talking in a slow and calm manner, avoiding hectic arm movements)***

Yes = The interviewer built adequate rapport with the interviewee

No = The interviewer did not build adequate rapport with the interviewee

Did the interviewer encourage the witness to ask questions at any time?

Yes = The interviewer told the witness to ask questions at any time

No = The interviewer did not tell the witness to ask questions at any time.

Account

Did the interviewer attempt to set up the Cognitive Interview?

Yes = The interviewer set up the Cognitive Interview

No = The interviewer did not set up the Cognitive Interview

(If yes)* Did the interviewer set up the Cognitive Interview properly?** ***(Note: A proper set up of the CI is defined as the interviewer using ONE of THREE memory enhancing techniques that compose the CI)

Yes = The interviewer set up the Cognitive Interview properly

No = The interviewer did not set up the Cognitive Interview properly

***(If yes)* Which memory enhancing technique did the interviewer use?**

(1) Report everything = report everything without editing, assuring the interviewee that the interviewer does not know everything and that every detail is important

(2) Mental reinstatement = providing instructions to reinstate the context of the scene (feelings, sounds, smells, etc.)

(3) Change temporal order = asking the witness to provide the account from the end to the beginning

Did the interviewer ask for a free narrative?

Yes = The interviewer obtained a free narrative

No = The interviewer did not obtain a free narrative

Did the interviewer summarize the witness's free narrative?

Yes = The interviewer summarized the witness's account

No = The interviewer did not summarize the witness's account

Did the interviewer pass to the second interviewer?

Yes = The interviewer passed to the second interviewer

No = The interviewer did not pass to the second interviewer

N/A = There wasn't a second interviewer present

Did the interviewer follow the 80/20 talking rule? ***(Note: This is coded as time spoken by interviewer divided by total time)***

Yes = The interviewer spoke 20% of the time or less

No = The interviewer spoke more than 20% of the time

Did the interviewer interrupt the interviewee at least once?

Yes = The interviewer interrupted the interviewee at least once

No = The interviewer did not interrupt the interviewee at least once

(If yes) **How many times did the interviewer interrupt the interviewee?**

Note: Coded as number of times

Did the interviewer use jargon terms? ***(Note: jargon terms refer to any legal term or technical language)***

Yes = The interviewer used jargon terms

No = The interviewer did not use jargon terms

(If yes) **How many jargon terms were used by the interviewer?**

Note: Coded as number of words considered to be jargon terms

Did the interviewer ask the witness leading questions? ***(Note: leading questions are defined as questions that suggest an answer to a question [e.g., "you witnessed the crime, right?"])***

Yes = The interviewer asked the witness leading questions

No = The interviewer did not ask the witness leading questions

(If yes) **How many leading questions were asked by the interviewer?**

Note: Coded as number of leading questions

Did the interviewer ask the witness multiple questions? ***(Note: multiple questions involve asking more than one question at once [e.g., Where were you last night? Who were you with? When did you go out for the evening?])***

Yes = The interviewer asked the witness multiple questions

No = The interviewer did not ask the witness multiple questions

(If yes) **How many times did the interviewer ask a set of multiple questions?**

Note: Coded as number of times a set of multiple questions were asked

Did the interviewee ask the witness forced choice questions? ***(Note: forced choice questions offer a limited number of options from which to choose [e.g., "Did you sell cocaine or marijuana?"])***

Yes = The interviewer asked the witness forced choice questions

No = The interviewer did not ask the witness forced choice questions

(If yes) **How many forced choice questions were asked by the interviewer?**

Note: Coded as number of forced choice questions

Did the interviewer ask the witness open-ended questions? ***(Note: those starting with tell, explain, or describe)***

Yes = The interviewer asked the witness open-ended questions

No = The interviewer did not ask the witness open-ended questions

(If yes) **How many open-ended questions were asked by the interviewer?**

Note: Coded as number of forced choice questions

Did the interviewer ask the witness probing questions? ***(Note: can then be used to gather more details that were not revealed from the response to an open-ended question. E.g., "who" what")***

Yes = The interviewer asked the witness probing questions

No = The interviewer did not ask the witness probing questions

(If yes) **How many probing questions were asked by the interviewer?**

Note: Coded as number of probing questions

Did the interviewer ask the witness closed-ended questions? ***(Note: used to gather any additional information about the topic that was not gathered from the open-ended or probing questions)***

Yes = The interviewer asked the witness closed-ended questions

No = The interviewer did not ask the witness closed-ended questions

(If yes) **How many closed-ended questions were asked by the interviewer?**

Note: Coded as number of closed-ended questions

In general, did the interviewer avoid "topic hopping"?

Yes = The interviewer did not jump around

No = The interviewer did not focus on one topic at a time

Closure

Did the interviewer give a summary?

Yes = The interviewer summarized the interview

No = The interviewer did not summarize the interview

Did the interviewer invite the witness to modify his or her account?

Yes = The interviewer asked the witness if they wanted to add/change or delete any information

No = The interviewer did not ask the witness if they wanted to add/change or delete any information

Did the interviewer provide contact information where they can be reached after the interview?

Yes = The interviewer provided contact information

No = The interviewer did not provide contact information

Did the interviewer explain what will happen after the interview is over? ***(Possible explanations include – having to go to court, testifying, dealing with insurance issues, individuals who will need to be phoned, etc.)***

Yes = The interviewer explained at least 50% of possible future occurrences

No = The interviewer explained less than 50% of possible future occurrences

Did the interviewer record the date of the interview?

Yes = The interviewer recorded the date of the interview

No = The interviewer did not record the date of the interview

Did the interviewer record the time of the interview?

Yes = The interviewer recorded the time of the interview

No = The interviewer did not record the time of the interview

Did the interviewer provide a professional closure? ***(Note – A professional closure includes thanking the witness for attending the interview)***

Yes = The interviewer provided a professional closure

No = The interviewer did not provide a professional closure

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