

COMMUNICATION UNDER STRESS:  
INDICATORS OF VERACITY AND DECEPTION IN WRITTEN NARRATIVES

by

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(ABSTRACT)

This exploratory study examines linguistic and structural features of written narratives for predictive value in determining the likelihood of veracity or deception. Sixty narratives written by suspects and victims identified through the investigation of criminal incidents provided the database. The law enforcement context allowed for the examination of communication under stress. Using a retrospective approach, the veracity or deception of the narratives had already been determined; therefore, the study was able to focus on the degree to which selected linguistic and structural attributes were able to predict veracity and deception.

Six research questions guided the study, drawn from theoretical works and research in psychology, linguistics, and criminal justice. Three questions asked whether a positive relationship exists between deception of the narratives and the narrative attributes of equivocation, negation, and relative length of the prologue partition. Three questions asked whether a positive relationship exists between veracity of the narratives and unique sensory details, emotions in the conclusion partition, and quoted discourse. Support was found for the three questions relating to deception and for a relationship between veracity and unique sensory details. Weak support was found for a relationship between veracity and emotions in the

conclusion partition. No relationship was found with veracity and the general category of quoted discourse. When quoted discourse without quotation marks was examined separately, a weak relationship with veracity was found. An additional finding was a relationship between relative length of the criminal incident partition and veracity.

A logistic regression model was developed to predict veracity or deception using the six predictors from the research questions. The resulting model correctly classified the examined narratives at an 82.1% classification level. The most significant predictor of veracity was unique sensory details; the most significant predictor of deception was relative length of the prologue partition.

The analysis of the examined narratives written by suspects and victims suggests that linguistic and structural features of written narratives are predictive of the likelihood of veracity and deception. These results lend support to the Undeutsch Hypothesis (1989) that truthful narratives differ from fabricated narratives in structure and content.

Dedicated to Joe and Joey,  
my heart and my soul.

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## Chapter I Introductory Section

As technological advances multiply, new communication methods continually evolve. Electronic communication is commonplace, and websites have proliferated, adding more domains to meet the surging need for increased contact. Yet, despite continual changes in the methods of communication, confusion surrounding the discourse remains. Bohm (1996) described communication as "breaking down everywhere on an unparalleled scale" (p. 1). Without a clear understanding of discourse, many incorrect assessments are made, resulting in communication problems ranging from confusion to the arrest of innocent people.

Current communication problems result from bias and misinformation, as well as from deliberate deception. Intentionally deceptive discourse is pervasive, with frequent media attention focused on the deceptive messages of prominent figures such as politicians (Upchurch & O'Connell, 2000). Deliberate deception has become an effective form of communication during political campaigns and diplomatic negotiations. Knapp, Hart, and Dennis (1974) described deception as a communication strategy used to avoid conflict in interpersonal relationships, and noted that it is "publicly condemned, yet privately practiced by a significant proportion of the population" (p. 270). Knapp and Comadena (1979) viewed deceptive communication as an ancient technique: "Acts of deception have been used by human beings as an adaptive response to their environment since the origin of the species" (p. 275). Deception is not only pervasive, but also well established as a method of communication.

Investigators, negotiators, and human resource professionals frequently are faced with the challenge of distinguishing between veracity and deception in communication. Most people use heuristics, simple rules of thumb, to detect deception, because they lack knowledge of cues that more accurately discern veracity and deception (Fielder & Walka, 1993). The disadvantage in

using heuristics, however, is that they can replace in-depth, critical thinking regarding the detection of deception (Miller & Stiff, 1993). Therefore, instead of relying on heuristics alone to inform their decisions, professionals may benefit from identification of specific indicators to assist in determining the likelihood of veracity or deception in discourse.

Indicators of the likelihood of veracity and deception frequently are present in communication, and can be discerned upon careful examination of the discourse. For example, a man involved in an automobile accident provided his account of the collision. He ended his narrative with the phrase, "That's basically it." An alert listener will realize that the man provided only the basics of the accident and further discourse is needed to reveal missing details. Perhaps the withheld details were critical factors in the accident, such as the amount of alcohol the driver consumed before driving. A structured analysis can help detect gaps in the narrative and identify sensitive areas that need further exploration. In a second example, a woman reported she had been abducted and described seemingly implausible events. In her narrative, however, the victim described the smell of motor oil on the assailant's hands. The victim's inclusion of such a unique sensory detail as a specific smell is an indication that the allegation, as implausible as it might appear on the surface, may in fact be true. Clues to veracity often are present in discourse, yet frequently are ignored.

Structured analysis of discourse could identify specific attributes to help differentiate between veracity and deception. When individuals provide accounts of an event, they include numerous linguistic and structural features, which may reveal significant clues. Identification of these specific attributes could create a valuable communication tool to enhance the understanding of discourse.

## Statement of the Problem

Victims and suspects in criminal cases provide narrative accounts of events in stressful situations. Rarely are these accounts fully analyzed by law enforcement officers. An analysis of the narratives could reveal a wealth of information, but without knowledge of indicators of the likelihood of veracity and deception, critical information may be discounted.

The use of narrative analysis has increased noticeably during the past decade, but empirical research supporting the analysis techniques has not accompanied the growth. Law enforcement officers, insurance fraud investigators, and attorneys receive training in varied approaches to analyzing narratives. Porter and Yuille (1996) described some of these approaches as intuitively appealing but not necessarily accurate, because few researchers have published supporting validity and reliability studies. Much of the research draws from laboratory studies that lack the element of deception under stress. The present study is designed to fill a gap in this area of knowledge by examining indicators of veracity and deception in narratives written by suspects and victims of criminal incidents.

## Purpose of the Study

The purpose of this study was to examine linguistic and structural attributes of written narratives for predictive value in differentiating between the likelihood of veracity and deception of the narratives. The study analyzed narratives written by individuals identified through criminal investigations in cases that have been resolved. This was a retrospective study, as each narrative already had been determined to contain veracity or deception from investigative evidence. Therefore, the study was able to focus on the degree to which selected features of the narratives were able to predict the determination of veracity or deception.

## Questions Guiding the Inquiry

In an effort to examine whether deceptive written narratives differ linguistically and structurally from truthful<sup>1</sup> narratives, six questions guided the research. Three questions focused on positive relationships between deception and narrative attributes and three questions focused on positive relationships between veracity and narrative attributes. A positive relationship with veracity is interpreted as a negative relationship with deception.

*Question 1: Is there a positive relationship between equivocation and deception in written narratives?* Equivocation terms reveal lack of commitment in discourse (Bavelas, Black, Chovil & Mullett, 1990; Wade, 1993; Wiener & Mehrabian, 1968). In examining verbal and nonverbal cues to deception, DePaulo, Lindsay, Malone, Muhlenbruck, Charlton, and Cooper (in review) reported that the most statistically significant finding was that deceptive individuals were not totally committed to their narratives. Instead, they equivocated between possible options. Support for a positive relationship between equivocation and deception was found in studies of oral narratives (Knapp et al., 1974; Miller & Stiff, 1993). The current study examined equivocation and deception in written narratives, revealed through the use of specific words, such as "maybe" and "probably."

*Question 2: Is there is a positive relationship between negation and deception in written narratives?* Negation reveals a lack of specificity by stating what did not happen, rather than what did happen. Negation in narratives replaces direct and explicit discourse by failing to report a specific action. Wiener and Mehrabian (1968) described negation as "non-denotative specificity" (p. 23). A statement such as "The man didn't run" fails to denote what specific action the man did take. Rudacille (1994), Wade (1993), and Watson (1981) found more negative statements in deceptive oral accounts than in truthful accounts. In the present study,

negation in written narratives was examined by identifying the words "no," "not," and all contractions of "not."

*Question 3: Is there a positive relationship between the length of the prologue and deception in written narratives?* In recounting an incident, most suspects and victims include additional information, both before and after the incident itself. In the present study, the narratives were partitioned into three sections -- the prologue, the criminal incident, and the conclusion partitions. A narrator who provides a prologue that is much longer than the criminal incident or the conclusion partitions may be delaying the discussion of the incident by focusing on previous actions. Rabon (1996) described narratives with very long prologues as being deceptive on their form, and therefore worthy of further scrutiny. Driscoll (1994) found that short introductions, less than one third of the length of the narrative, were an indication of veracity. Although the length of the prologue partition is the focus of this research question, the relative lengths of all three narrative partitions were examined.

*Question 4: Is there a positive relationship between unique sensory details and veracity in written narratives?* Unique sensory details recounted by a suspect or victim include specific descriptions of smell, taste, sound, sight or touch. Examples from an assault case are descriptions of the sweaty smell of an assailant and the rough feel of his callused hands. Johnson and Raye (1981) and Johnson et al. (1988) found that truthful, experienced memories contained more sensory information than did constructed memories. Dana-Kirby (1997), DePaulo et al. (in review), Miller and Stiff (1993), and Parker and Brown (2000) cited unusual details as strong indicators of veracity in oral narratives. The present study examined the relationship of unique sensory details and veracity in written narratives.

*Question 5: Is there a positive relationship between emotions in the conclusion of the narrative and veracity in written narratives?* Emotions are strong feelings that evoke physiological responses. Fear, disgust and rage are examples of emotions that may appear in a victim's narrative when describing a traumatic event. The location of emotions in a narrative is of interest to both researchers and practitioners. References to emotions in truthful narratives have been found in the conclusion partition of the narrative, rather than during the incident itself (Kaster, 1999; Parker & Brown, 2000; Sapir, 1989). In a fabricated account, references to emotions may be omitted altogether. The present research examined references to emotions in written narratives, focusing on emotions included within the conclusion partition of the narratives.

*Question 6: Is there a positive relationship between quoted discourse and veracity in written narratives?* Quoted discourse is defined as the verbatim words that a narrator recalled hearing. Caldas-Coulthard (1994) and Davidson (1984) noted that any discourse quoted in the retelling of an event must have significance for the narrator. Raskin and Esplin (1991), Steller and Koehnken (1989) and Undeutsch (1989) found that conversations reproduced during the recounting of events indicated the likelihood of veracity in oral narratives. In written narratives, verbatim quoted discourse may be included either with or without the use of quotation marks. The current study examined both types of quoted discourse and their relationship to veracity in written narratives.

### Need and Significance

Few definitive studies focusing on written narratives provide empirical support for the identification of clues to deception in realistic, stressful settings. Specific indicators of deception

are believed to result from increased stress caused by the fear of the deception being detected. However, it is important to scientifically examine the validity of these indicators.

Subjects of previous deception studies frequently were college students in laboratory settings rather than diverse individuals in field settings. Such laboratory studies present two potential biases. First, college students used as subjects may not be representative of the population (Porter & Yuille, 1996). A second area of potential bias is the difficulty in reproducing realistic emotions in laboratory settings; the anxiety level may not be the same as in a stressful situation. Results from studies in which subjects are directed to lie may differ greatly from those in which individuals make their own decisions to lie. When the studies involved the assessment of a role player's deception, researchers such as Dulaney (1982) questioned the results. Dulaney asked whether differences could accurately be attributed to anxiety caused by the fear of detection or simply to the varied acting abilities of the role players. Horvath, Jayne and Buckley (1994) noted that individuals facing possible arrest and prosecution for a crime may exhibit indicators of deception that differ from individuals in laboratory studies.

Because increased cognitive stress disrupts one's normal pattern of communication, the motivation to deceive is an important aspect of deception detection (Watson, 1981). The more motivated an individual is to deceive successfully, the greater the state anxiety. State anxiety in this context is recognized as a temporary emotional state evoked by stress, as opposed to trait anxiety, an ongoing personality trait. When deceptive individuals are under stress from the perceived consequence of the detection of their deception, the resulting state anxiety may cause changes to appear in their narratives. Providing a truthful narrative is a relatively straightforward process of recalling an action that was actually perceived. Conversely, providing a deceptive narrative requires more complex cognitive tasking, particularly if the narrative is

extemporaneous (Sayenga, 1983). The person who provides a falsehood must recall not only the truth, but also the falsehood. Additionally, the deceiver must carefully align the narrative with the known facts of the case, while avoiding contradictions. Because deceptive communication is more cognitively difficult than telling the truth, this increased cognitive load can result in behavioral changes (Vrij, Semin & Bull, 1996). Falsification is recognized as a complex cognitive task. To avoid it, deceivers may choose to deceive through omission rather than commission. The deceivers simply omit incriminating facts instead of committing outright lies, yet structural differences may appear in their narratives.

Telling the truth is significantly easier than inventing a lie (Grice, 1989). The lexical selection is more complicated for deceivers than for truth-tellers, because deceptive communicators must choose words carefully to avoid detection. Deceivers draw from their entire vocabulary in an effort to convince another person of their own innocence, rather than simply conveying the truth (Sayenga, 1983). The syntax of deceptive discourse also can differ from that of truthful discourse, as the deceiver elaborates, qualifies, and modifies in the continuing effort to convince. Truthful discourse from perceived events is less cognitively complex because it is bound closely to reality (Sayenga). When recalling truthful, experienced events, it is therefore easier to provide concrete rather than abstract accounts.

Individuals who perceive that negative consequences will result from the detection of their deception frequently exhibit greater behavioral changes than those not under stress. The more motivated one is to avoid being detected in deceptive communication, the more obvious the deception becomes. Edelman (1999) explained the reason for this paradoxical motivational impairment effect. When a deceptive individual is highly motivated to avoid detection, the effort

to control nonverbal signs of deception often results in over-controlling one's behavior. This, in turn, draws attention to the unexpected behavioral signs.

In research specific to written communication, Greenberg and Tannenbaum (1962) induced cognitive stress in a group of college students. As a result, the students' writing samples changed in both structure and content, and writers under stress made significantly more errors. Greenberg and Tannenbaum concluded that cognitive stress had a negative effect on the writers' ability to produce messages. The letters written by the stressed writers also contained more efforts to convince than did letters written by the control group, as the stressed writers apparently felt a greater need to defend their positions. This observation also may apply to guilty suspects who are under stress and feel the increased need to defend their positions in criminal cases. It also may explain changes and errors in the written products. Because guilty criminal suspects have a greater motivation to successfully deceive, they are under increased stress and therefore are expected to exhibit even more behavioral changes than student groups in laboratory studies.

Sporer (1997) and Vrij and Akehurst (1997) emphasized the importance of conducting additional deception field studies rather than laboratory studies. For external validity of the studies, Zaparniuk et al. (1995) stressed the need to conduct experiments using people who actually experienced the events described instead of simply viewing videotapes or reading scenarios. After conducting laboratory research studies on motivational impairment effects, Edelman (1999) predicted that in actual interrogative settings, motivation would increase further, resulting in more observable changes in both verbal and nonverbal behavior. Miller and Stiff (1993) and Horvath et al. (1994) recommended that future deception studies take place within a law enforcement context, with the motivations and emotions of actual suspects.

The present study is designed to respond to the concerns of researchers such as Edelman (1999), Horvath et al. (1994), Miller and Stiff (1993), Sporer (1997), Vrij and Akehurst (1997), and Zaparniuk et al. (1995) by using a field study approach in a law enforcement setting. Such an environment will allow for a realistic examination of adult communication under stress. By using written narratives from actual criminal cases, observable differences between veracity and deception are anticipated, due to the motivational impairment effect that occurs when individuals are highly motivated to successfully deceive (Edelman, 1999).

Most of the previous research on indicators of veracity and deception has focused on oral, rather than written, discourse. Miller and Stiff (1993), however, identified the presence of a confounding factor in oral discourse studies. During the interview phase, the questions asked by researchers frequently influenced the respondents' answers. Alison, Fossi and Bramley (1998) noted that narratives provided by rape victims are actually a product of the interviewing process. Harvey, Turnquist, and Agostinelli (1988) and Parker and Brown (2000) cautioned researchers to carefully examine the questioning techniques used, in an attempt to avoid distorting or contaminating the responses. Hershkowitz, Lamb, Sternberg and Esplin (1997) found that direct questions, suggestive comments, and leading questions severely limited interview responses, in contrast to open-ended invitations. Harvey et al. described the interviewer's words and actions as "subtle social cues" (p. 41) that can skew research results. DePaulo et al. (in review) found that responses differed depending upon whether discourse was the result of direct questions or open discourse. For example, in response to direct, closed-ended questions, citing lack of memory was more indicative of a truthful account than a deceptive one. In open-ended discourse, however, mentioning lack of memory was more indicative of deception. Hershkowitz et al. discovered that when children were asked open-ended questions rather than direct questions,

more information was obtained, allowing for more accurate assessment of the credibility of their narratives.

The present study examined open-ended written accounts rather than oral answers to direct questions, in an effort to minimize confounding factors in the questioning process. The instructions to the writers in the present study were open-ended questions such as, "What happened?" The writers chose for themselves where to begin their narratives and what to include in them, without being asked additional questions that might confound the research results.

DePaulo et al. (in review), found that verbal cues examined in a meta-analysis of cues to deception appeared to be more accurate in discerning veracity and deception than nonverbal cues. Nonverbal cues may distract observers from hearing the critical verbal cues. Dana-Kirby (1997) noted that the nonverbal behavior of the interviewers themselves might influence subjects' responses, possibly confounding the research results. In an effort to minimize confounding influences, the current research focused on specific words used in discourse rather than on nonverbal behavior.

Steller (1989) recommended that future deception studies include retrospective studies of concluded cases to test the validity of statement analysis. Responding to Steller, the present study examined narratives from criminal incidents that have been fully resolved. All narratives studied have been determined by investigators to be either an account of veracity or deception. In most of the existing retrospective studies of narrative veracity and deception, the focus of the research was on oral narratives of child victims. This study focused on the written narratives of adult suspects and victims.

Results of the present study will contribute to the fields of adult education, human resource development, psychology and criminal justice. For adult educators and human resource

practitioners, the study examines adult communication under stress. In the field of psychology, the research results will contribute to the body of knowledge of deception detection. Finally, increased knowledge of indicators of veracity and deception in narratives will provide a significant contribution to the field of criminal justice; law enforcement officers and fraud investigators may gain an additional tool in attempting to discern veracity and deception in the written statements of suspects and victims.

### Theoretical Framework

Porter and Yuille (1995) encouraged researchers to adopt an eclectic approach when studying detection of deception. They suggested the incorporation of multiple theories from the fields of psychology and linguistics, in an effort to identify new clues to deception that have not yet been tested. Following Porter and Yuille, the current study incorporated varied theories from both psychological and linguistic research.

The present research draws from the work of Undeutsch (1989), who introduced the hypothesis that truthful narratives differ from fabricated narratives in both structure and content. Undeutsch developed a list of attributes, called Reality Criteria<sup>2</sup>, to discern the veracity of children's narratives in contested cases of child abuse. Steller and Koehnken (1989) later revised Undeutsch's original Reality Criteria and compiled a list of content criteria divided into five categories termed Criteria-Based Content Analysis<sup>3</sup>. Recent studies, summarized in Chapter Two, tested what is known now as the Undeutsch Hypothesis (Steller, 1989) and provided empirical support to the effectiveness of content criteria in discerning the veracity of child victim statements. The quoted discourse variable examined in the present study was derived from Criteria-Based Content Analysis and Reality Criteria.

Reality Monitoring research by Johnson and Raye (1981) and Johnson, Foley, Suengas and Raye (1988) examined whether individuals' original sources of information originated from experienced processes or from imaginative processes. Johnson et al. found that the recall of truthful, experienced memories differed from the recall of constructed memories. In the present study, the unique sensory details variable was drawn from the Reality Monitoring research of Johnson et al.

Two of the variables under study, equivocation and negation, were derived from linguistic models (Bavelas et al., 1990; Wade, 1993; Wiener & Mehrabian, 1968). The length of prologue variable and the emotions variable originated from statement analysis techniques (Kaster, 1999; Rabon, 1996; Rudacille, 1994; Sapir, 1987), which also supported the remaining four variables. The genesis of each variable is discussed in detail in the following chapter.

#### Definitions of Terms

The use of the word "deception" within the present study is used for deliberate, intentional deception, not unknowing or mistaken deception. O'Hair and Cody (1994) defined deception as "the conscious attempt to create or perpetuate false impressions among other communicators" (p. 183).

Ekman (1985) divided deception into two categories. The first, falsification, includes any attempt to deliberately convey false information. This type of deception is deception by commission, in which an individual commits a lie. The second category is concealment, or actions taken to withhold truthful information. Such actions illustrate deception by omission, for they occur when individuals omit the truth. Austin (1962) emphasized that veracity and deception within narratives are affected not only by what is included in the narrative, but also by what is left out. Knapp and Comadena (1979) recognized this as a form of "information

treatment" (p. 271), the treatment of information by either adding or deleting from what is perceived to be the truth. The study of deception, therefore, examines not only the act of lying, but also the deliberate avoidance of telling the complete truth.

By describing a truthful narrative as "accurate and complete," a greater understanding of the deception process can be gained. In the present study, only narratives that were both accurate and complete were determined by investigators to be truthful. Some of the narratives were accurate but not complete. These narratives contained no inaccuracies, yet omitted crucial information, such as the writer's involvement in the crime; this is an example of deception by omission. Other narratives contained falsification, or deception through commission, and were therefore inaccurate and incomplete. The challenge in determining the veracity of the discourse is to seek both accuracy and completeness. The present study examined two categories of deception -- inaccurate (deception by falsification) and accurate but incomplete (deception by omission).

In previous Criteria-Based Content Analysis research, child victims alleging sexual abuse provided the majority of the statements (Steller & Koehnken, 1989; Undeutsch, 1989). Therefore, only deception by falsification could be studied, since each case involved an allegation of a specific crime. In the current study, deception by both falsification and omission was examined. Some individuals provided false narratives while others simply omitted their criminal involvement, providing an otherwise truthful narrative.

#### Limitations

The use of written narratives for inclusion in a study relies on the willingness of individuals to provide accounts in writing. Additionally, it necessitates that the writer's literacy level is high enough to produce a written account. A possible bias in studying written narratives

is the variation of instructions given concerning the writing of the narrative. An attempt was made to minimize this bias by selecting narratives written by individuals who received comparable open-ended instructions, such as, "Write what happened." Narratives written during direct questioning by the investigator could contain leading questions that confound the findings; these types of narratives were excluded from the present study.

### Summary

Communication becomes more complex as new technologies expand the range of communication options. Yet, much confusion remains concerning the accurate interpretation of discourse. Intentional deception in communication is prevalent and widely accepted, further adding to the complexities of discourse. Although numerous studies have examined oral deception in communication, few have focused exclusively on written narratives. The current study examined the attributes of written narratives describing criminal incidents, in an attempt to contribute to a better understanding of communication under stress. The goal of the research was to identify linguistic and structural features of narratives that may assist investigators and other practitioners in determining the likelihood of veracity or deception.

The following chapter provides a review of literature related to the research questions. Chapter Three describes the research strategy used to collect the data. The fourth chapter details the research methodology and findings. The fifth, and final, chapter presents the discussion, conclusions, and recommendations for further study.

## Chapter II Review of Related Literature

The concept of truth and the fascination of discerning truth from deception have a long history. "From the beginnings of human speculation about the world, the questions of what truth is and whether we can attain it have loomed large." (Bok, 1978, p. 5). The attempt to identify truth and to differentiate it from deception has captured interest since the beginning of civilization; yet in the twenty-first century it still remains a very complicated process. Austin (1962) revealed part of the reason for this complexity: "It is essential to realize that 'true' and 'false,' like 'free' and 'unfree,' do not stand for anything simple at all" (p. 144). Grice (1989), in fact, preferred to use the term "factually satisfactory" rather than the word "true."

This chapter provides a review of relevant literature published in this complex field. It encompasses a review of theoretical constructs as well as data-based research studies. The chapter is divided into five sections. The first section summarizes methods used to detect deception. The second section examines the detection of deception in oral narratives and the third section examines the detection of deception in written narratives. The fourth section discusses the specific research questions for the current study and the supporting data for each. The fifth and final section presents a summary of the chapter.

### Methods of Detecting Deception

Three general approaches exist for detecting deception -- physiological, nonverbal, and verbal. Each category uses different techniques in an attempt to discriminate between veracity and deception.

## Physiological Methods of Detecting Deception

In physiological detection of deception, specialized equipment monitors physical changes caused by increased stress. The polygraph, the most widely used physiological measure, monitors changes in blood pressure, respiration, and electrodermal response<sup>4</sup> (Iacono, 2000). The underlying principle is that increased autonomic arousal directly corresponds to the stressful feelings associated with deception. Because autonomic arousal also might result from the stress of the polygraph examination itself, the polygraph examiner conducts pre-tests to establish baselines for physiological responses (Fielder & Walka, 1993). Results of research in polygraph accuracy vary, depending on the interpretation of the data. Iacono cited accuracy ranges from 50 to 90 percent for innocent suspects and from 75 to 95 percent for guilty suspects<sup>5</sup>.

Additional measures of physiological changes associated with deception continue to be explored. Pupillography examines changes in the size of the pupils, voice stress analysis measures the repression of subaudible microtremors, electromyography measures electrical activity within muscle fibers, and electroencephalography monitors changes in electrical activity of the brain (Farwell, 1993; Stern, Ray & Quigley, 2001). Although the above listed techniques lack the years of research associated with the polygraph, they reveal the continuing fascination with detection of deception and they hold promise for the future. All of the listed physiological measures of deception, however, require specialized equipment and training. Therefore, they are not universally available for general practitioners.

## Nonverbal Methods of Detecting Deception

Nonverbal methods of detecting deception focus on the observation of nonverbal cues. This category includes kinesics, defined as body movements and positioning, and paralanguage, defined as voice volume, pitch, speed and tone. When studying nonverbal cues, the observer,

like the polygraph examiner, determines an individual's baseline behavior. The observer then notes any deviations from the baseline during discussion of pertinent topics (Inbau, Reid, Buckley & Jayne, 2001; Horvath et al., 1994). Deviations occurring concurrently with the discussion of a critical incident may reveal increased stress resulting from deception. In both physiological and nonverbal methods of detecting deception, the key is to identify changes, then discover what caused the changes.

DePaulo et al. (in review) analyzed the results of 119 studies in deception, including 1,332 estimates of 161 different deceptive cues. Of the eight most reliable cues in detecting deception, two were nonverbal cues -- pupil dilation (a kinesic cue) and higher pitched voice (a paralinguistic cue). The remaining six reliable cues were the following verbal cues: less immediacy, less details, less plausibility, more uncertainty, more negative narratives, and more repetition. Although nonverbal cues are valuable in detecting deception, verbal cues may be even more accurate in discriminating between veracity and deception. Watson (1981), in fact, found that nonverbal cues appeared to decrease accuracy in deception detection by distracting the observers from the more accurate verbal cues.

### Verbal Methods of Detecting Deception

Verbal detection of deception is the analysis of an individual's words, in either oral or written form. Verbal methods used to discriminate between veracity and deception in discourse include Criteria-Based Content Analysis (Steller & Koehnken, 1989; Undeutsch, 1989) and varied forms of statement analysis (Kaster, 1999; Rabon, 1996; Rudacille, 1994; Sapir, 1987).

The present research examined verbal detection of deception; therefore, the remainder of the chapter focuses specifically on this method. First, detection of deception in oral narratives is addressed, followed by detection of deception in written narratives.

## Detection of Deception in Oral Narratives

Numerous approaches are used to discriminate between veracity and deception in oral narratives. Varied techniques and relevant published research studies are summarized, including the analysis of narratives provided both by children and by adults.

### Analysis of Children's Oral Narratives - Criteria-Based Content Analysis

Criteria-based Content Analysis is the most structured of the narrative analysis methods reviewed. This method originated in the early 1950s, when Undeutsch (1989) developed a technique for analyzing children's narratives of contested allegations of child abuse. According to the Undeutsch Hypothesis, statements that recount experienced events differ in both structure and content from statements originating from imagination. In his research with children's statements, Undeutsch found that "real events do not tangle in the air without any relationship to time and place but have temporal and spatial anchoring points ..." (Translated by Sporer, 1997, p. 393). Undeutsch's research revealed that individuals recounting experienced events often included specific content not found in fabricated accounts.

A crucial German court decision added impetus to the development of the Undeutsch Hypothesis. In 1954, the Federal Republic of Germany's Supreme Court recognized the complexities of child witness testimony and sought guidance in determining the credibility of children's statements. Undeutsch analyzed a victim's narrative in a child abuse case and presented his findings to the Supreme Court, demonstrating that a structured examination of a statement could assist in determining if the statement was truthful. As a result of Undeutsch's presentation, the Supreme Court mandated that expert testimony regarding the veracity of victims' accounts be presented in all contested child abuse cases lacking corroborating evidence (Undeutsch, 1989).

The German Supreme Court mandate legitimized the technique of narrative analysis and prompted its further examination and refinement. Psychologists determined the veracity of statements in German courts in over 40,000 criminal cases between 1950 and 1980 (Undeutsch). Undeutsch's perspective was a unique contribution, because it focused not on the veracity of the victims or witnesses, but on the veracity of the statements they provided (Tully, 1999). Since Undeutsch introduced his hypothesis, statements are more frequently examined independently, without being affected by the reputation of the individuals who provided them.

Over a period of 30 years, Undeutsch (1989) analyzed 1,500 cases of alleged sexual abuse, and categorized his method of assessment. In his seminal work<sup>6</sup>, Undeutsch identified specific criteria found in truthful statements that usually were missing from fabricated statements. Called Reality Criteria (See Endnote 1), these attributes support the veracity of the narrative. Undeutsch also identified secondary criteria, which examine the extent to which the content of the narrative agrees with known psychological and scientific phenomena and the known facts of the case.

Steller and Koehnken (1989) integrated the work of Undeutsch with later research by Arntzen of West Germany, Trankell of Sweden, and Szewczyk of East Germany, and compiled a revised list of 19 content criteria divided into five categories (See Endnote 2). Steller and Koehnken called their technique for examining narratives Criteria-Based Content Analysis. Because Criteria-Based Content Analysis was created as a technique for assessing veracity rather than deception, each criterion is considered to be indicative of truthfulness. At least seven criteria must be present for the narrative to be assessed as truthful<sup>7</sup>, although the absence of an individual criterion does not necessarily indicate that the narrative is false. Examples of criteria believed to indicate veracity include Logical Structure and Quantity of Details. Criteria-Based

Content Analysis is one component of an entire assessment method known as Statement Validity Assessment; the remaining components are the Validity Checklist<sup>8</sup> and interview guidelines.

Varied research studies during the 1980s and 1990s tested the validity of the content-oriented approach to the detection of veracity. Steller, Wellershaus, and Wolf (cited in Driscoll, 1994) tested Criteria-Based Content Analysis in a lab study of children ages six through ten. Each child told a true and a false story about stressful events, such as blood samples drawn or medical shots received. Criteria-Based Content Analysis was found to accurately discriminate between the children's true and fabricated oral accounts; nine of the criteria were found more frequently in true statements than in fabricated ones. Yuille (1989) conducted a lab study with children aged six through nine. Each child related one truthful account and one false account; coders using Criteria-Based Content Analysis were able to accurately discriminate between the two types of accounts.

Simulated studies using Criteria-Based Content Analysis do not analyze the narratives of actual child sexual abuse victims, the group for which the method was originally created. Such simulated studies by their very nature lack external validity (Lamers-Winkelmann & Buffing, 1996). Esplin, Boychuk, and Raskin (cited in Vrij & Akehurst, 1997) moved the testing of Criteria-Based Content Analysis out of the laboratory and into the field, by analyzing actual narratives in criminal cases. The researchers found a significant difference between confirmed truthful statements and doubtful statements. Boychuk (1991) replicated the Esplin et al. field study, using 75 transcripts of interviews of children alleging sexual abuse. Twelve of the 19 Criteria-Based Content Analysis criteria were found significantly more often in the confirmed truthful statements than in the fabricated statements.

Lamers-Winkelman and Buffing (1996) studied the relationship of age to Criteria-Based Content Analysis in children ages two through eleven. The researchers found a positive relationship between the ages of sexually abused children and the presence of six of the criteria. More criteria were present in accounts by the older children than by the younger ones. Lamers-Winkelman and Buffing recommended developing age-related norms for the use of Criteria-Based Content Analysis.

Although research has not been extensive, the testing of Criteria-Based Content Analysis to date appears to support the Undeutsch Hypothesis that truthful oral statements of children differ from fabricated statements in both content and structure. Vrij and Akehurst (1997) summarized rates of accurate discrimination between veracity and deception in 11 Criteria-Based Content Analysis studies as ranging from 55 to 100 percent. Criteria-Based Content Analysis was created specifically to analyze the oral statements of child victims ages two and one half to 17 (Raskin & Esplin, 1991). For this age group, Criteria-Based Content Analysis appears to be a viable technique for discriminating between veracity and deception in oral narratives.

#### Analysis of Adults' Oral Narratives in Laboratory Studies

Most of the research concerning Criteria-Based Content Analysis has focused on determining the credibility of children's narratives rather than those of adults. Recently, however, several researchers tested the validity of Criteria-Based Content Analysis on narratives of college students in laboratory settings.

Landry and Brigham (1992) examined the ability of Criteria-Based Content Analysis to accurately discriminate between truthful and deceptive oral narratives of college students. Each student provided one truthful and one fabricated account of a self-experienced traumatic event.

Analysts trained in Criteria-Based Content Analysis performed significantly better than chance in identifying the truthful and false narratives.

Using a technique called Credibility Analysis of Verbatim Statements, Honts and Devitt (1993) adapted content criteria from Criteria-Based Content Analysis and linguistic criteria from Kaster's Statement Analysis technique<sup>9</sup>. The analysis of 26 students' narratives accurately discriminated between the truthful and fabricated narratives.

Kohnken<sup>10</sup>, Schimossek, Aschermann and Hofer (1995) used Criteria-Based Content Analysis plus six additional criteria<sup>11</sup> to analyze oral narratives of adults who either viewed a video of a blood donation or falsely purported to have viewed it. The intent of the study was to examine differences between the use of a cognitive interview and a structured interview, as well as to identify veracity and fabrication in the narratives. Analysis of the narratives gained from both interview techniques was found to reliably discriminate truthful from fabricated accounts.

Zaparniuk et al. (1995) used Criteria-Based Content Analysis to analyze witness statements of 40 college students to determine which criteria were useful in discriminating truthful from false statements and which combination of criteria were most powerful. One group of students watched a videotaped crime and provided an oral account of what was witnessed. A second group of students purported to have viewed the same incident, but in fact only listened to a research assistant read the account. Only one criterion, Spontaneous Reproduction, showed consistent accuracy in discriminating false accounts from true accounts.

Dulaney (1982) saw the need for laboratory studies to more closely replicate field settings. He therefore designed a study that allowed subjects to make their own choice of whether to deceive or to tell the truth. The subjects were 20 college students, paired with 20 partners who had received previous instructions to cheat during problem-solving exercises. The

subjects all observed their partners discover answers in a file folder. The answers were shared with the subjects and used by both partners during subsequent paired exercises. When the subjects were asked questions about the exercise, all were deceptive concerning the cheating issue and truthful in the other areas. The most significant difference between the truthful and deceptive portions of the responses was that truthful responses contained more total words than deceptive responses.

In summary, most of the limited laboratory studies of analysis of adult's oral narratives appear to support the Undeutsch Hypothesis. Several researchers offered suggestions in the use of Criteria-Based Content Analysis, however. Zaparniuk et al. (1995) recommended use of Criteria-Based Content Analysis only by experts who are trained in the use of this technique. Horowitz (1991) found the individual criteria in Criteria-Based Content Analysis, as they are currently delineated, to be difficult to teach to coders. Although Zaparniuk et al. found support for using Criteria-Based Content Analysis for research purposes, they reserved endorsement for its use in forensic settings until researchers further refine and supplement the individual criteria.

#### Analysis of Adults' Oral Narratives in Field Studies

Recent field studies examined oral narratives of adult victims and suspects in criminal cases. Researchers used analysis techniques previously developed for child victims, and also incorporated new statement analysis techniques.

Dana-Kirby (1997) used Criteria-Based Content Analysis to analyze transcripts of criminal suspects' interviews. Four of the criminal narratives were provided by a police department; 18 others were transcribed from television programs. More reality criteria were observed in truthful narratives than in deceptive narratives, when narratives were of similar length. Dana-Kirby found, however, that the length of the narrative directly affected the results,

as more criteria were observed in longer narratives than in shorter ones, whether truthful or deceptive. Criteria-Based Content Analysis criteria were found in 60 percent of the truthful statements compared to 45 percent of the deceptive statements. Two criteria significantly differentiated between veracity and deception in narratives -- Inclusion of Unusual Details and Description of Interactions. Dana-Kirby concluded that Criteria-Based Content Analysis differentiated truthful accounts from deceptive accounts only marginally better than chance.

Researchers encountered challenges when attempting to apply Criteria-Based Content Analysis directly to adult statements. Dana-Kirby (1997) found that several of the criteria, such as Accurately Reported Details Misunderstood, applied specifically to child victim statements rather than to adult suspect statements. A child victim might describe the actions of an offender, but clearly lack comprehension of what such actions mean. Such misunderstood details were typically found in sexual abuse cases, for which Criteria-Based Content Analysis originally was developed. Adult victims generally have a greater understanding of the details regarding the crime; this specific criterion, therefore, may be less valuable when applied to adult narratives. Other criteria, like Pardoning the Perpetrator, also may relate primarily to the narratives of children, because the child frequently knows the offender in child abuse cases. When the offender is not previously known to a victim, however, it is unlikely that the victim will include any kind of pardon for the perpetrator. Like Horowitz (1991) and Zaparniuk et al. (1995), Dana-Kirby also described the parameters for defining Criteria-Based Content Analysis criteria as vague, thereby resulting in reliability problems. Dana-Kirby cited the need to establish new criteria that are empirically derived for specific use with adult suspect statements.

Johnson et al. (1988) conducted a study of 72 college students who each recalled an experienced event and an imagined event such as a dream or a fantasy. Using a Memory

Characteristics Questionnaire (Johnson et al., p. 376), subjects rated the characteristics of each memory in a process called Reality Monitoring. Johnson et al. define Reality Monitoring as "the processes by which perceived and imagined events are discriminated and confused in memory" (p. 371). This process was developed to identify individual cues one can use to differentiate one's own memories that are internally generated from imaginative processes from those memories externally generated from experienced events. Johnson et al. found that recall of perceived events included more sensory information than recall of imagined events. More descriptions of sound, smell, taste, and visual detail were found in the perceived accounts. Specific temporal information, including references to year, season, day, and hour also was more prevalent in perceived memories, as was spatial information such as locations, settings, and arrangements of people and objects. A greater number of specific details were present in accounts remembered from actual experience than in fabricated accounts. Conversely, self-generated memories contained more cognitive processing, such as "I remember" and "I was thinking" phrases than did the recall of experienced events (Johnson et al., Johnson & Raye, 1981).

Sporer (1997) expanded the use of Reality Monitoring beyond the identification of the origin of one's own memories to the differentiation of self-experienced and fabricated events by an observer. Using both Criteria-Based Content Analysis and Reality Monitoring, Sporer examined narratives of 40 college students who each described an experienced and a fabricated event. The specific analysis subscales were clarity, sensory experiences, spatial information, time information, emotions and feelings, reconstructability of the story, realism, and cognitive operations. Both methods differentiated truthful from fabricated statements with greater than chance probability. Using both Criteria-Based Content Analysis and Reality Monitoring

criteria, 78.8 percent of the oral accounts were classified correctly. Sporer recommended future integration of Criteria-Based Content Analysis and Reality Monitoring when analyzing narratives. He described Reality Monitoring as having clearer definitions of criteria than Criteria-Based Content Analysis, and advocated further testing with real cases to develop criteria to identify deliberate deception. Following Sporer, the present study will examine criteria from both Criteria-Based Content Analysis and Reality Monitoring, with real cases that include deliberate deception.

Two groups of researchers used Criteria-Based Content Analysis for examining adult rape victim statements. Alison et al. (1998) used Criteria-Based Content Analysis and the Memory Characteristics Questionnaire from Johnson and Raye's (1981) Reality Monitoring approach to compare 47 rape victim narratives. The objective of the study was to examine variations in the two coding systems, and little variation was found. Parker and Brown (2000) analyzed 43 verbal statements of rape allegations, using Criteria-Based Content Analysis and the Validity Checklist. The Parker and Brown study accurately discriminated the truthful accounts from the falsified accounts. Because Criteria-Based Content Analysis was developed to verify truth and the Validity Checklist was developed to detect deception, the combination of the two techniques was more powerful than either method alone.

Parker and Brown (2000) cite as a limitation of their study the presumption that the interview process itself did not distort the information received. Because all statements were obtained through an interview process, the power of the specific criteria to differentiate between statements may have been adversely affected. In the present study, written statements were examined rather than statements obtained through interview, in an attempt to avoid distorting the information during the interview process.

Porter and Yuille (1996) examined oral narratives using criteria from four techniques -- Criteria-Based Content Analysis, Reality Monitoring (Johnson & Raye, 1981), Scientific Content Analysis (Sapir, 1987) and Lexical Diversity (Carpenter, 1981). Three groups of college students received varied directions. The first group was directed to take money, then deny it in a subsequent interview. The second group was directed to take money but report taking a folder instead of money. The final group did not take any money and was directed to tell the truth. During the interviews, three clues were identified that significantly differentiated veracity from deception. All three significant clues were from Criteria-Based Content Analysis -- Amount of Detail Reported, Coherence, and Admissions of Lack of Memory. Most of the lack of memory admissions occurred in response to direct questions rather than during free recall narratives. In examining why only three Criteria-Based Content Analysis components were of significance, the researchers surmised it was because the technique was developed to identify the veracity of victims who had experienced a loss of control. Every Criteria-Based Content Analysis criterion therefore may not be directly applicable to suspects who did not experience a loss of control.

In the Porter and Yuille (1996) study, none of the criteria from Reality Monitoring, Scientific Content Analysis or Lexical Diversity differentiated statements containing deception from those containing veracity. The specific criteria tested from Reality Monitoring were verbal hedges ("I believe," "it seems"), self-references ("I," "me," "my"), total word count, and pauses. Porter and Yuille noted that because Reality Monitoring was created to identify unintentionally untrue accounts, this approach might not be as valid for intentionally falsified accounts.

The components Porter and Yuille (1996) examined from the Scientific Content Analysis technique were unnecessary connectors ("after," "next"), pronoun deviations (deviations from first person, past tense), and component elements (ratio of words in conclusion to words in

introduction). None of the examined criteria from Scientific Content Analysis contributed in discerning veracity and deception.

The Lexical Diversity dimension in the Porter and Yuille study (1996) examined the structural pattern of the narrative by counting the number of new words introduced. For this analysis, a type-token ratio was calculated by dividing the number of different words used (type) by the total number of words (tokens) (Carpenter, 1981). Lexical diversity was not found to discriminate between veracity and deception in the Porter and Yuille research.

Another approach to examining narratives focused on verbal evasion in adult narratives and interview responses. Rudacille (1994) studied statements of victims, witnesses and suspects, and found more evasive responses in accounts containing deception than in accounts containing veracity.

In summary, recent deception studies of oral narratives of adults have drawn from varied analysis techniques. Several research studies used criteria from Criteria-Based Content Analysis, while others used components from Johnson and Raye's Reality Monitoring, Sapir's Scientific Content Analysis, and Rudacille's Verbal Evasion Study. The research questions in the present study draw from Criteria-Based Content Analysis, Reality Monitoring, Scientific Content Analysis, and Rudacille's Verbal Evasion Study, to examine veracity and deception in written narratives.

#### Detection of Deception in Adults' Written Narratives

Most of the research on verbal detection of deception has focused on oral statements, with few studies examining the attributes of written narratives, particularly in a law enforcement context. Yet, the use of statement analysis for examining written narratives of adult suspects and victims has steadily increased. Before 1990, few books referred to this technique. During the

past decade, however, several authors included chapters on statement analysis in their interviewing and interrogation books (Gudjonsson, 1992; Hess, 1997; Rabon, 1992). Three recently published books focused entirely on statement analysis from a criminal justice perspective (McClish, 2001; Rabon, 1996; Rudacille, 1994). Interest in statement analysis continues to grow, with numerous names applied to the varied methods. The supporting research is lacking, however; few research studies have empirically tested the accuracy of the diverse analysis methods on adults' written narratives. The following section of Chapter Two examines the attributes of written discourse, summarizes varied analysis methods, and reports the limited published research on analysis of adults' written narratives.

#### Attributes of Written Narratives

Written discourse is not simply oral discourse in written form, but a more deliberate and conscious process. Because written communication lacks the question-and-answer interaction that serves to clarify oral discourse, written narratives must be complete enough to stand on their own. Vygotsky (1962) described written communication as a "separate linguistic function, differing from oral speech in both structure and mode of functioning" (p. 98). While oral discourse is dynamic and constantly changing depending on the interaction, written narratives are static, requiring a specific sequence and a clear structure to ensure comprehension by readers (Vygotsky). Stubbs (1986) noted that written discourse was better planned and less spontaneous than oral discourse. Vygotsky viewed writing as a deliberate semantic process, a conscious construction of "the web of meaning " (p. 100).

Written language and spoken language vary both grammatically and lexically (Coulthard, 1999). Coulthard found longer clauses in written discourse and Tottie (1982) found longer sentences in written discourse, when compared to oral discourse. The comparison of total

narrative length of written and oral narratives is debated. Stubbs (1986) found the total length of written narratives to be shorter, while Watson (1981) found the reverse. Watson noted that a greater need exists to clarify information in written narratives than in oral narratives. Stubbs found that written narratives contained fewer repeated words than did oral narratives.

The density of lexical words such as nouns and verbs, compared to grammatical words like pronouns and prepositions, was found to be greater in written narratives than in oral narratives (Coulthard, 1999). Coulthard discovered that, while oral narratives tended to describe actions through the use of verbs, written narratives used more nominalizations by changing the verbs into nouns.

The incorporation of linguistics research in analyzing narratives can inform current practice in the criminal justice field. Jacobs (1994) defined discourse analysis as "an effort to close the gap between conceptions of communication process and language structure and function." (p. 199). Analysts closely examine suspects' and victims' narratives for any deviations from basic linguistic principles, including structure and function. Both syntax, the relationship of words within a sentence, and semantics, the meaning of words and the form of sentences, are scrutinized. Deviations from the basic linguistic principles may identify areas for investigators to explore more fully.

In examining narratives for possible areas of deception, Knapp et al. (1974) identified linguistic indicators of deception in the following five categories: uncertainty, reticence-tendency, dependence (disassociation with remarks), negative affect (unpleasantness) and vagueness (tendency to equivocate). Knapp also found that deceptive messages contained more speech errors and fewer statements regarding specific facts than did truthful messages.

## Methods of Analysis for Adults' Written Narratives

Varied methods are used to analyze the written narratives of adults. Kaster (1991), Rabon (1996), Rudacille (1994) and Sapir (1987) focused on analysis of narratives from a law enforcement perspective. Other contributors, such as Weintraub (1989), offered analysis tools from a psychological perspective. Each method will be described individually.

Rabon (1996) developed an approach to narrative analysis based on linguistics, entitled Investigative Discourse Analysis. He advocated careful examination of the eight major parts of speech to gain insight to the narrator. Rabon noted that individuals suspected of a crime either convey information directly (indicative of the likelihood of veracity) or make over-exaggerated attempts to convince (indicative of the likelihood of deception). Both approaches can be discerned through a structured analysis of the narrative. Specific areas of the narrative that need further clarification can thus be identified and, subsequently, explored during face-to-face interviews with the narrators.

Rudacille (1994) compiled matched pairs of indicators of deception in his examination of narratives of suspects, victims, and witnesses. He concluded that direct verbal responses, presence of details, active voice, and past tense verbs were indicative of a low probability of deception. The opposing indicators -- evasive verbal responses, lack of details, passive voice, and present tense verbs -- were indicative of a high probability of deception.

Sapir's (1987) approach to analyzing narratives is known as Scientific Content Analysis. Previously referenced indicators of deception used in this method are unnecessary connectors, pronoun deviations, and component elements. Additional Scientific Content Analysis components include changes in language, verb tense deviations, and lack of commitment.

To gain full use of tools available for conducting a comprehensive written narrative analysis, practitioners can also draw from the field of psychology. The incorporation of Reality Monitoring by Sporer (1997) added a new dimension to statement analysis by examining memory characteristics. Another dimension is the analysis of written statements from a psychoanalytical perspective. Weintraub (1989) identified pertinent parts of speech and recorded their frequency within a written sample. He then applied the frequency counts to a mathematical formula, to assess psychological adjustment. Final scores falling within a predetermined normal range for each category were identified as being indicative of the language of psychologically well-adjusted adults. Numbers outside the expected range revealed possible emotional impairment associated with depressive, delusional, and compulsive individuals. The specific linguistic features Weintraub identified as clues of emotional impairment were frequent use of the personal pronoun "I," adverbial intensifiers, and present tense verbs. Weintraub offered a quantitative research approach to the examination of meaning in discourse.

#### Research Studies Analyzing Adults' Written Narratives.

Driscoll (1994) and Smith (2001) used Scientific Content Analysis (Sapir, 1987) to analyze 30 narratives written by suspects in criminal cases. Each study is discussed separately.

Driscoll's (1994) research revealed that, within limits, Scientific Content Analysis can differentiate between "probably accurate" and "likely false" narratives. Driscoll identified the following components of written statements that indicated the likelihood of veracity: proper use of pronouns, use of past-tense verbs, denial of allegations within the narrative, and lack of spontaneous corrections. The strongest indicators of deception were deviations from the first-person singular pronoun, use of past tense, unnecessary connection words, failure to deny the allegations in the narrative, changes in language, and discussion of the main event at least one-

third of the way into the narrative. Driscoll described the last component as one of the strongest indicators of veracity narratives in his study. The present study draws from Driscoll's findings regarding partitioned narratives.

Smith (2001) examined the accuracy of analysts using the Scientific Content Analysis method to identify veracity and deception in written narratives. The analysts who were trained in Scientific Content Analysis were able to identify truthful statements with 80 percent accuracy and deceptive statements with 65 percent accuracy. However, untrained but experienced police officers performed at similar levels. Statistically significant differences in the ability to accurately discriminate between truthful and deceptive narratives were found only between trained analysts/experienced officers and untrained, inexperienced officers. Low inter-rater reliability was a factor in the study; 13 Scientific Content Analysis criteria<sup>12</sup> were used by the raters but were inconsistently applied.

Adults have spent a lifetime learning to communicate, in deceptive ways as well as truthful ones. Therefore, analysis techniques developed specifically for child victims may not be directly applicable to adult suspects (Dana-Kirby, 1997; Zaparniuk et al. 1995). Adults have developed patterns in deceptive communication that may differ from those of children. Many adults, for example, lie by omission rather than by commission whenever possible. Preferring to avoid outright falsification that can be detected, adults may conceal their guilty involvement by carefully omitting it rather than directly lying about it. A structured analysis of the verbatim narrative can often identify the omission. Because of the specificity of the child abuse cases for which the Criteria-Based Content Analysis technique was developed, deception by omission could not be examined, since the children's narratives contained direct allegations of abuse.

Varied statement analysis techniques are currently used to analyze narratives of adult suspects and victims (Kaster, 1999; Rabon, 1996; Rudacille, 1994; Sapir, 1987). Supporting research, however, has not accompanied the growth in the new techniques.

The current study draws from the fields of psychology and linguistics and incorporates various approaches from the criminal justice field. The specific research questions for analysis were chosen partly because of their previous application to oral narratives, and partly because of their relatively clear parameters, in an attempt to minimize conflicting interpretations of the data.

### Research Questions and Relevant Literature

The present research study addressed the following six attributes of written narratives: equivocation, negation, length of the prologue partition, unique sensory details, quoted discourse, and emotions in the conclusion partition. The total word count of the narratives was also examined.

#### Equivocation

Equivocation reveals uncertainty through the avoidance of a definitive answer. Communicators who precede discourse with words such as "maybe" or "probably," are not fully committed to their accounts (Wade, 1993). Equivocation in response to a direct question, like "Who did you call on the telephone last Saturday?" may have a reasonable explanation, such as lack of memory. However, equivocation within an open narrative (in response to the open-ended question "What happened?") is examined differently. When providing one's own account, communicators are expected to include the information they recall, in clear and specific terms. Such a high degree of detail is one indicator of credibility (Porter & Yuille, 1996). Conversely, equivocation in an open narrative can convey deliberate vagueness (Williams & Goss, 1975) by using ambiguous terms with multiple possible interpretations.

Researchers use varied terms for the concept of equivocation. Wiener and Mehrabian (1968) used the term "qualification" to refer to phrases such as "I think," "I believe," and "It might be." Qualification phrases imply uncertainty and indicate a separation between the communicator and the person or object of the communication. These indicate a less positive experience or an unwillingness to communicate the information (Wiener & Mehrabian). Weintraub (1989) subdivided the category of qualifiers into three components -- uncertainty expressions ("I think"), weakening modifiers ("kind of") and vague phrases ("what you might call"). Qualifiers serve to discount a message before it is even spoken, as the qualifiers generally precede the verb in the statement (Weintraub). Because qualifiers reveal the level of spontaneity in speech, Weintraub noted a direct application for law enforcement purposes; the low spontaneity level of guilty suspects who carefully qualify their responses may be revealed through their use of qualifier words.

Wade (1993) used the term "hedges" for equivocation words like "kind of," "probably" and "believe"<sup>13</sup> and identified three reasons why narrators might include hedges in their communication. First, the narrators may have forgotten aspects of the events and, therefore, had a legitimate need to equivocate. Another option may be that the narrators had emotional difficulty in describing a very traumatic, experienced event. The third reason is that narrators may not have actually witnessed the event being described. This last option is an example of deception if narrators implied that they witnessed events when in fact they did not.

Wiener and Mehrabian (1968) used the term "denotative specificity" to describe the amount of ambiguity used in referring to a specific object or person. As the number of possible referents increase, so does the ambiguity; thus, the denotative specificity decreases. Referring to an individual as "Sarah Jones" has high denotative specificity and low ambiguity. The

denotative specificity continually decreases if Sarah Jones is instead called "a woman," or "someone." Deceptive narrators would be more likely to describe a fictitious individual as "someone" rather than as "a tall balding man." Wiener and Mehrabian also identified the most direct reference as being the most immediate. A decrease in the directness of the communication therefore indicates a decreased degree of immediacy.

Knapp et al. (1974) found that deceptive college student speakers used more equivocation and more nonspecific statements than did truthful students. Watson (1981) discovered fewer specifics and more generalized, abstract responses in deceptive narratives than in truthful ones.

Grice (1989) described conversations as cooperative efforts and purported that participants in discourse are expected to observe a basic rule called the Cooperative Principle. The Cooperative Principle states: "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (Grice, p. 26). Grice defined four conversational maxims in support of the Cooperative Principle: the Manner, Quantity, Quality and Relation Maxims. Together, the maxims state that communication should be orderly, brief, true, and relevant.

Two of Grice's maxims, the Manner Maxim and the Quantity Maxim, specifically address the concept of equivocation in communication. The Manner Maxim states that conversation should be explicit, without ambiguous or obscure expressions. Speakers should intend their discourse to be clearly understood by listeners. The Quantity Maxim states that conversation should be as informative as is required for the discourse, including neither more nor less information than is expected. The use of vague, convoluted words in discourse instead of concise, specific words violates the Quantity Maxim of communication. Wiener and Mehrabian

(1968) call this type of discourse "over and under-responsiveness" (p. 38) for the existing conditions. Once an individual's baseline responses have been established, any responses that provide significantly more or less information are deviations from the established norm. Rabon (1996) alerts investigators to the fact that a narrator who provides more information than is required may be attempting to convince the listener of a deceptive narrative rather than simply conveying truthful information.

According to the Gricean maxims of communication (Grice, 1989), cooperative communicators either provide accurate information or give explicit acknowledgment of the inaccuracies. Grice's third maxim, the Quality Maxim, states that the conversational contribution should be what a speaker believes is the truth. A cooperative communicator who chooses to provide inaccurate information such as exaggeration is expected to make this exception to the maxim explicit. Any falsehood, therefore, contradicts the Quality Maxim.

Grice's (1989) final maxim, the Relation Maxim, purports that conversation should be relevant. The discourse should pertain to the subject being discussed. A narrative containing rambling, irrelevant, and extraneous explanations instead of short, direct discourse is a violation of Grice's Relation Maxim. Levi (1994) explains, "If the syntactic scaffolding is unduly entangled or needlessly ponderous for its task, then it may hinder our comprehension of the message and, at worst, obscure it totally" (p. 7). Why might an individual converse in this way? One explanation for the lack of clarity is that the speaker does not desire to be understood. Perhaps the communication contains deceptive discourse that the speaker does not wish to have exposed.

Bavelas et al. (1990) described equivocal communication as "contradictory, ambiguous, obscure and evasive" (p. 28). Using a scaling procedure called magnitude estimation, Bavelas et

al. examined discourse ranging from "completely clear" to "completely unclear" (p. 39). Subjects were offered one of four forced-choice responses. In potential conflict situations, respondents overwhelmingly chose to equivocate rather than to use a direct response that might be interpreted negatively and thus cause conflict. Bavelas et al. found the same results with both oral and written responses. Subjects in potential conflict situations responded with more equivocal discourse than those in non-conflict settings.

Bavelas et al. (1990) found that people who have the choice to lie or not to lie will choose not to lie directly, but rather to equivocate truthfully. In many situations, stating the equivocal truth is the only way to avoid negative alternatives. Bavelas et al. used a two dimensional scale to illustrate deception, dividing possible responses into four quadrants. The first quadrant contains responses that are true and clear ("I don't like the gift you sent and I won't use it"). Next are true and equivocal responses ("I think it was thoughtful of you to send the gift"). In the third quadrant are false, equivocal responses ("The gift is something I might be able to use"). The final quadrant contains false, clear responses ("I like the gift you sent and I'll use it often"). In many discourse situations, the true and equivocal quadrant is the only one without conflict.

The research of Bavelas et al. (1990) in equivocal communication provides insight as to why a guilty individual might use equivocation. Providing a complete and accurate narrative would mean admitting culpability; conversely, stating an outright lie could be disproved. If forced into one of the false quadrants, the preferred choice would be false and equivocal communication. Bavelas et al. question why a speaker might go through the complicated process of conversing in ambiguities unless a potential conflict exists.

In the meta-analysis of deception by DePaulo et al. (in review), the most statistically significant finding was that deceptive individuals were not totally committed to their discourse.

Instead, their communication contained vague references, evasive answers, irrelevant material, and distant involvement. Conversely, discourse judged to be truthful contained clear commitment and specific details. DePaulo et al. and Miller and Stiff (1993) found deceptive accounts included fewer specific details about people, places, and times than did truthful discourse. In examining witness statements, Trankell (1972) discovered that truthful witness accounts had a richness of details not generally present in constructed accounts. Miller and Stiff found that deceptive narratives included more generalizing than did truthful narratives, with the use of terms such as "all" and "none."

Many politicians and diplomats have perfected the use of equivocation to express general agreement with constituents and foreign representatives. For these individuals, the art of equivocation may be a conscious practice, for success in politics and diplomacy depends on the possibilities of many alternatives (Williams & Goss, 1975). Equivocation can be an effective technique to avoid offending another individual. However, when used to communicate one's own actions, particularly when one is a suspect in a criminal case, the use of equivocation is highly problematic. An innocent suspect, conversely, would intend the discourse to be crystal clear, in order to be understood.

A young college student used equivocation when reporting that she was attacked in her dormitory room in the middle of the night. When the student described her reaction to discovering a stranger on her bed, holding a knife at her throat, she stated, "I was kind of startled." A more appropriate reaction for a woman in fear of her life would have been "I was terrified." The equivocating words "kind of" revealed a lack of conviction, for the woman herself was not totally convinced of her own narrative. Additionally, the choice of the verb

"startled" instead of "scared" or "terrified" also provided insight to possible deception. During a subsequent interview, the young woman admitted that her account was fabricated.

In summary, the concept of equivocation has been well studied by linguists and psychologists. Linguists equate equivocation in discourse to uncertainty. Psychologists question why such uncertainty exists, particularly if the topic discussed is familiar to the subject, and should, therefore, be reported with certainty. The present study examined whether a positive relationship exists between equivocation and deception in written narratives.

### Negation

Negation within narratives can be a way to avoid providing a direct response. When asked the open-ended question, "What happened?" the expected response is an account describing the actions that occurred. A writer or speaker who instead describes what did not happen is using the process of negation. Narratives containing negation reveal a lack of specificity by stating what did not occur instead of what did occur. Negation phrases include the words "no," "not," and all contractions of "not." Pagano (1994) describes these words as overt negatives because they clearly mark areas of negation in written texts.

If a theft suspect is asked the direct question, "Did you take the missing money?" innocent suspects (and many guilty suspects) typically respond with the negation word, "No." Clear denials of involvement can indicate the likelihood of veracity. In response to the open-ended question, "What happened?" however, the suspect is not asked whether he committed the crime or not; he is asked to recount what happened. Avoidance of a clear account of what happened needs further explanation.

Negation phrases like "I don't know," "I'm not sure," and "I can't remember" can be used to avoid discussion of a topic which causes stress. Because these phrases also may reveal a

truthful lack of knowledge or lack of memory, the context must be carefully considered.

However, in response to an open-ended question such as "What happened?" respondents are expected to include information they do know and to omit information they do not know (Rudacille, 1994). Wiener and Mehrabian (1968) include negation as one example of "non-denotative specificity" (p. 23); the response fails to report a specific description or action. In stating what did not happen ("The woman did not drive the car") many other options are possible.

Tottie (1982) found the frequency of negation in oral discourse to be more than twice as high as that in written language. Due to the interactive nature of oral discourse, communicators naturally respond to each other, frequently expressing agreement or disagreement through the use of negatives. Tottie (1982, 1987) classified negation as the use of either rejections or denials. She then further divided the denial category into explicit or implicit denials. The explicit denials are found more frequently in oral discourse due to the interactive component. Implicit denials are used more often in written discourse; they reveal that the writer is refuting an assertion that is not evident. In criminal investigations, when suspects respond to the open-ended question, "What happened?" with negation words, the negation should be closely examined. Such negative words can indicate that the writer believes the reader will have an opposing view; clarification through negation therefore is added. This addition offers insight to the writer's thought process and may accomplish the opposite of what the writer intended. Instead of simply serving to clarify, the negation prompts the reader to question the veracity of the information provided.

Coulthard (1992) found that in both written and oral communication, the majority of clauses were positive rather than negative. If such a baseline is established, a reason must exist

for narrators to deviate from this norm. Do the narrators feel their assertions may not be believed? Unless questioners contaminated the responses with accusatory questioning, the narrators may be making exaggerated efforts to convince the questioner through the use of negation. This is an example of deception through omission rather than through commission. Instead of committing a lie regarding what did happen, the narrators truthfully state what did not happen.

DePaulo et al. (in review) and Watson (1981) found more negative statements in deceptive oral accounts than in truthful oral accounts. Weintraub (1989) posited that negative words may reveal the respondent is using the coping mechanism of denial. Porter and Yuille (1996) found that highly motivated deception contained more negative statements than did less motivated deception.

Rudacille (1994) examined negation phrases in his study of verbal evasion by criminal suspects, witnesses, and victims. By noting the presence of verbal evasion in both written and oral statements, he found over six times as many evasive responses in deceptive statements as in truthful ones. Rudacille identified 16 categories of evasion, including three negation categories - objection phrases, "I can't" phrases, and non-reflective denial of knowledge phrases<sup>14</sup>. Objection phrases include "I couldn't do something like that," "I'm not the kind of person who would do that," and "I wouldn't be able to do those things." Examples of "I can't phrases" are "I can't say," "I can't think," and "I can't tell you." Non-reflective denial of knowledge phrases are "I don't remember," "I can't think of," and "I don't recall." The last examples are considered to be non-reflective phrases when, in response to a direct question, the respondent makes no effort to reflect upon an answer.

The present study focused on the use of negation in written narratives that respond to the question, "What happened?" The narrator has free choice to determine what to include in the narrative. Narratives containing what did not happen or what would not happen therefore are believed to indicate the likelihood of deception. The current study examined whether a positive relationship exists between negation and deception in written narratives.

#### Length of the Prologue

If narratives describe events such as criminal incidents, the narratives can be subdivided into partitions. The concept of dividing narratives into partitions has clear historical precedence. Aristotle (1961) described tragedies as imitating life, having a beginning, a middle, and an end. Therefore, Greek tragedies were written with three specific parts, a Prologue, an Episode, and an Exode (Aristotle). Suspects and victims describing criminal incidents typically include information preceding and following the description of the incident itself. Their narratives can, therefore, be divided into three partitions -- the prologue, the criminal incident, and the conclusion partitions.

The first part of a narrative, the prologue, establishes the context of the event by providing details of when and where specific actions occurred. The second part of the narrative, the event such as a criminal incident, answers the questions, "What?" "Who?" and "How?" as they pertain to the pertinent issue being discussed. Gee (1999) instructs discourse analysts to identify the main activity as a clue to uncovering the meaning of the narrative. The final part of the narrative, the conclusion, describes the narrator's physical and mental reaction to the events. In the conclusion of a traumatic event, the narrator may describe calling 911 for assistance or may describe personal reactions such as crying, shaking, or vomiting. In their Reality Monitoring research, Johnson et al. (1988), found that the recall of experienced events included

three parts -- before, during, and after the incident. When events actually were experienced, the resulting truthful narrative contained more supporting information before and after the incident than did fabricated narratives of imagined events.

If an individual denies all knowledge of a crime, the narrative includes no incident and, therefore, the balance cannot be calculated. For example, a bank teller may claim to have no knowledge of the disappearance of money from a bank. If she were asked to write down what happened on the day the money was discovered to be missing, her narrative (truthful or deceptive) would contain no description of the relevant incident. Because there would be no incident described in her narrative, there also would be no prologue or conclusion. The length of the prologue cannot, therefore, be examined in narratives that fail to describe a specific incident.

Rabon (1996) described truthful narratives as being evenly balanced, with a third of the total words in the account each devoted to the prologue, to the incident and to the conclusion. Rudacille (1994) uses the division of 20 percent for prologue, 60 percent for event, and 20 percent for conclusion, to indicate truthfully balanced partitions in single-issue incidents. In both Rabon's and Rudacille's perspectives to balance, accounts believed to indicate veracity contained a fairly even percentage of the narrative before and after the relevant incident.

A reference to the length of prologues in narratives can be found as early as 104 - 63 B.C. when one of the Apocryphal books, 2 Maccabees, was written. In this book, the history of Judas Maccabeus is about to be related and is prefaced by the following verse from 2 Maccabees 2:32:

"At this point, therefore, let us begin our narrative, without adding any more to what has already been said; for it would be foolish to lengthen the preface while cutting short the history itself. " (Metzger & Murphy, Eds., 1991, p. 232.)

Rabon (1996), Rudacille (1994), and Sapir (1987) all note that an unusually long prologue may indicate deception in a narrative. Driscoll (1994) examined the balance of

partitioned narratives. He concluded that narratives introducing the relevant incident at least one-third of the way into the narrative were more likely to be truthful than those with longer prologues. If the percentage of the narrative devoted to the prologue is much higher than either of the percentages in the incident or conclusion partitions, the writer may be stalling prior to reporting the event. As the percentage of the prologue increases, the percentage of the incident or conclusion partitions necessarily decreases. This allows fewer words be used in the description of critical information regarding the incident and its subsequent effect on the individual.

Through examination of the word count percentages of the three partitions of the narrative, deception by omission may be revealed. A suspect in a criminal case might provide a long, truthful prologue followed by a brief, truthful recounting of the criminal incident that omits any implicating facts. Although the entire account is truthful, it may be deceptive regarding the writer's involvement in the crime. The relative imbalance of the prologue and incident partitions may provide the clue to investigators that critical information is missing from the narrative.

The insight gained from an unusually long prologue can be used to conduct a comprehensive interview of the writer. As an example, a man who called 911 to report his wife missing wrote a three-page narrative about the day his wife disappeared. The prologue contained two pages of arguments over the wife's infidelity and the impending divorce and custody battle. Very little was written about the incident itself, the wife's disappearance. Nothing was mentioned about a search for the wife or any calls to her relatives and friends. From the husband's perspective, the arguments over divorce and custody were more important than the search for his wife. Therefore, he devoted much more time to this area in his narrative. The prologue ending the statement was very short and lacked emotion. Using the insight gained

regarding the husband's perspective, investigators interviewed the husband with an understanding of the problems in his life. During the interview, the husband described the couple's final argument, which led to the husband's accidental strangling of his wife.

The length of the entire narrative was also examined in the present study. Linguists and psychologists have explored this area in relation to deception and found conflicting results. DePaulo et al. (in review) found that liars provided shorter oral narratives and shorter answers to direct questions than did truth tellers. Not only did these accounts contain fewer words, but they also included much less detail. Dulaney (1982), Miller and Stiff (1993), and Knapp et al. (1974) also found that deceptive oral accounts contained fewer words than truthful accounts. Dulaney identified the output level as the most obvious difference between the lexical diversity of truthful and deceptive narratives.

In contrast to other researchers, Sayenga (1983) found that deceptive accounts were longer than truthful accounts. He surmised that the extra length might have been added in an effort to convince the listener. However, Sayenga's results were mitigated by the effect of state anxiety, which decreased the length of the narratives of individuals highly motivated to succeed in the deception.

In the current study, word count and word count percentages were calculated for the three partitions of the narratives and word count was totaled for entire narratives. Although different aspects of word count were examined, the focus of the study was on the relative length of the prologue as an indicator of the likelihood of deception of the narrative.

#### Unique Sensory Details

Unique sensory details describe a sensory perception -- auditory, visual, kinesthetic, gustatory, or olfactory. Johnson and Raye (1981) and Johnson et al. (1988) found that truthful,

experienced memories contained more specific sensory information than did constructed memories. Three of Undeutsch's (1989) original Reality Criteria for children's statements related to the reporting of details. Dana-Kirby (1997), DePaulo et al. (in review), Steller and Koehnken, (1989), Miller and Stiff (1993), and Parker and Brown (2000) also cited specific, unusual details as strong indicators of veracity within oral narratives.

To be coded as unique sensory details in the current study, descriptions must not only include sensory data, but also must be detailed and unique. Detailed sensory data are explicit and clear, cited without equivocation. Unique sensory data include information not found in any other narratives under study.

Johnson and Raye (1981) examined sensory information in oral accounts; the present study examined sensory information in written accounts. The inclusion of unique sensory details in written suspect and victim narratives was examined to determine if this attribute has value in differentiating between the likelihood of veracity and deception.

#### Emotions in the Conclusion

An emotion is a "physiological departure from homeostasis that is subjectively experienced in strong feelings (as of love, hate, desire, or fear)" (Gove, 1993, p. 742). Goleman (1995) categorized emotions into eight main families -- anger, sadness, fear, enjoyment, love, surprise, disgust, and shame (pp. 289-290). Each emotion family includes a range of similar emotions that evoke the same physiological responses. For example, the fear family emotions range from anxiety and apprehension to fright and terror. Their accompanying physiological responses consist of decreased blood flow to the face and increased blood flow to the leg muscles in preparation for fighting or fleeing from the threat (Goleman). Plutchik (1993) identified

emergency emotions as fear, rage and disgust; these emotions are an attempt to return the body to its normal state.

Johnson and Raye (1981) and Johnson et al. (1988, 1993) examined the process involved in identifying the source of remembered information, focusing on whether memories were internally generated or externally experienced. Johnson et al. (1993) found that memories for experienced events included more affective information, such as emotional reactions, and fewer examples of cognitive operations.

Suspects or victims involved in traumatic events may include emotions in their narratives of the event. Truthful victims or suspects often conclude their narratives with specific descriptions of fear, anger, embarrassment, or shock (Kaster, 1999; Parker & Brown, 2000). During the traumatic event itself, victims are generally not aware of emotions; when the crisis is over, however, the emotions flood into consciousness. Such emotions may, therefore, appear in the conclusion of a narrative rather than simultaneously with the crisis.

Undeutsch (1989) used Reporting of Subjective Experiences as one of his original reality criteria for differentiating truthful from fabricated children's statements. Steller and Koehnken (1989) included Subjective Mental State as one of their 19 criteria of veracity in Criteria-Based Content Analysis. Trankell (1972) listed emotional experiences as an element of veracity in genuine accounts not generally found in constructed accounts. Dana-Kirby's (1997) study revealed that the inclusion of subjective experience was significant in differentiating truthful statements from false statements in oral accounts of adults.

The present study identified references to emotions in all partitions of written narratives. The research question specifically examined whether a positive relationship exists between veracity and the presence of emotions in the conclusion partition of the narratives.

## Quoted Discourse

Quoted discourse is the verbatim words a narrator recalls hearing someone utter. Caldas-Coulthard (1994) described any discourse included in a factual report as having particular significance to the writer. Although the verbal interchange may, in fact, have been lengthy, the writer reproduces in text only the fragments of the speech with the most significance.

Davidson (1984) describes quotations in written texts as pointing devices. The value of such devices is that they can point to utterances removed in time or space from the quoting sentence. Such quotations provide a level of specificity unexpected by a person giving a fabricated account. For example, a store clerk recounting a fictitious robbery might say that a man told her to give him money. A truthful recounting of a robbery, however, might include specific quotes the robber uttered, such as "Empty the drawer! Move it! Move it!"

In determining the veracity of a statement, Undeutsch (1989) specifically searched for any conversations that were reproduced in the recounting of the event. In the Criteria-Based Content Analysis approach to statement analysis, Steller and Koehnken (1989) continued Undeutsch's inclusion of quoted discourse as a significant item for examination. The inclusion of verbatim speech in a child victim's recounting of sexual abuse would not be expected to occur in fabricated narratives (Raskin & Esplin, 1991). Steller and Koehnken listed Reproduction of Conversation as one of their 19 criteria for analysis; Raskin and Esplin included Reproduction of Speech as one of their 18 analysis criteria. Undeutsch, Steller and Koehnken found this criterion to be an accurate indicator of veracity in the analysis of children's oral narratives.

Raskin and Esplin (1991) noted that the presence of reproduced speech was relevant for determining veracity or deception if the speech occurred during the recounting of the specific

incident in question. The current study, therefore, examined not only the presence of quoted discourse but also the location of the discourse within the partitioned narratives.

The present study further divided verbatim quoted discourse into two types -- quoted discourse written with quotation marks and that written without quotation marks. Each type of quoted discourse was examined for presence and location within partitioned narratives.

The referenced research studies examined quoted discourse in oral narratives. The present study examined whether quoted discourse is a useful attribute in determining the likelihood of veracity or deception in written narratives.

### Summary

Drawing from both theoretical works and research studies in the fields of psychology and linguistics yields valuable insight to the detection of deception. Oral narratives have received more attention as the focus of deception studies, and the examination of written narratives is less well documented. The analysis of narratives by child victims has also been more fully researched than the analysis of narratives by adults. The present exploratory study builds upon the body of research in deception detection in oral and written accounts by both children and adults. The specific research questions were drawn from previous works, and focus on narratives written by individuals under stress, in an effort to examine the predictive value of narrative attributes in determining the likelihood of veracity or deception.

### Chapter III Research Strategy

Chapter Three describes the research strategy used in collecting and analyzing the data for examining each research question. Chapter Four will further explain the research methodology as the descriptive and analytic findings are presented.

The summary of deception research and linguistic concepts reviewed in Chapter II supports the Undeutsch (1989) Hypothesis that truthful accounts differ from fabricated accounts in both structure and content. The literature review also supports the work of Johnson and Raye (1981) and Johnson et al. (1988) regarding differences between externally derived memories (from experience) and internally generated memories (from imagination). Frequently listed indicators of the likelihood of deception within oral narratives were equivocation, negative statements, and the absence of specific details (DePaulo et al., in review; Driscoll, 1994; Miller & Stiff, 1993; Parker & Brown, 2000). The most frequently cited indicator of veracity by the above-listed researchers was the presence of details. The above indicators of veracity and deception identified through deception research studies also are supported by the linguistic attributes of the narratives (Bavelas et al., 1990; Grice, 1989; Wiener & Mehrabian, 1968). The present study built upon both the theoretical works and the empirical studies summarized in the previous chapter. The above-listed attributes of oral narratives provide a starting point for the examination of veracity and deception in written narratives.

Specific research questions are offered to examine the relationships between narrative attributes and the likelihood of veracity or deception. The primary research question is whether the likelihood of veracity or deception can be determined by selected independent variables. A secondary question is to identify which independent variables have greatest predictive values.

In examining whether a linguistic and structural analysis of written narratives can differentiate between narratives determined to be truthful or deceptive, six attributes were identified. The differences in veracity or deception of the narratives were predicted based upon these six attributes. Based upon the literature reviewed, attributes hypothesized to increase the likelihood of deception are: equivocation, negation, and a long narrative prologue. Attributes hypothesized to increase the likelihood of veracity (and decrease the likelihood of deception) are unique sensory details, emotions in the conclusion of the narrative, and quoted discourse.

#### Dependent and Independent Variables

The dependent variable in this study is the likelihood of a narrative being deceptive or veracious. The scoring of deception or veracity is derived from the coding of narratives determined to be truthful or deceptive by investigators. The results of the research reflect the accuracy of the predicted veracity and deception of narratives when compared with actual veracity and deception.

The independent variables are the narrative attributes of equivocation, negation, length of the prologue, unique sensory details, emotions, and quoted discourse, as defined in each research question presented later in this chapter. Total word count also was examined.

Through bivariate analysis, the strength and direction of the relationships between the independent variables and the dependent variable were examined. The dependent variable, the likelihood of veracity or deception, was interpreted as a probability distribution ranging from 0 (no deception) to 1 (deception). When dichotomous group membership is expressed in a quantitative form as a continuous variable, Pearson's  $r$  Product-Moment Correlation Coefficient can be computed (Cohen & Cohen, 1983). Pearson's  $r$ , therefore, was used to examine correlations between continuous variables. Spearman's  $\rho$  also was computed to examine the

difference between Pearson's  $r$  and rank order correlation, since the sample contained one extreme outlier narrative with a word count much higher than any others.

Through multivariate analysis, the combined predictive effects of the independent variables were examined. Logistic regression was used to predict the veracity or deception of the examined narratives, due to the dichotomous nature of the dependent variable.

### Data Collection

The selection of data examined in the present study responds to issues raised by deception researchers, such as Miller and Stiff (1993), who questioned the value of applying laboratory research results to field settings. Sporer (1997) suggested that future research involve retrospective studies in law enforcement settings, to study realistic responses with known outcomes. Following Sporer, the present retrospective study focused on narratives written in a law enforcement setting. All narratives examined in the current study were collected from suspects and victims identified through the investigation of criminal incidents.

Each written narrative in the current study had been determined by investigators to be truthful or deceptive. Since the veracity or deception of the narratives had already been determined, the study was able to focus on the degree to which selected linguistic and structural attributes of narratives were able to predict the likelihood of veracity or deception.

Sixty narratives were selected for examination in the present study. All narratives were written by suspects or victims during the investigation of violent crimes and property crimes. The specific number of narratives chosen for examination was based on the fact that research results tend to stabilize after 30 observations. According to the central-limit theorem, if the number of samples is large enough, the sampling distribution will approximate normality (Blalock, 1979). Studies with less than 30 cases may not have enough cases in the sample to

provide information regarding normal distribution (Blalock). Therefore, 30 narratives determined by investigators to be truthful and 30 narratives determined to be deceptive were used in the current exploratory study.

The determination of veracity or deception of each narrative was made by investigators, using one or more of the following conditions: conviction by a judge or jury, overwhelming physical case evidence, or corroborated confession by the offender. For many of the narratives, all three conditions applied. A determination of veracity was made only if the narratives were accurate and complete regarding the writers' involvement in the criminal incident. A determination of deception was made if the narratives were deceptive either by commission or by omission. Therefore, narratives written by guilty suspects who provided accurate information but omitted their involvement were also determined to be deceptive.

In selecting the 60 narratives for research purposes, six selection factors were considered: clear case resolutions, open-ended instructions, legibility, language, redundancy by individual, and redundancy by incident. Each selection factor, further detailed below, was used to eliminate as many potential confounding factors as possible.

**Clear case resolutions** Only narratives in cases with clear resolutions were chosen for study. If the narrative did not meet the resolution requirements of conviction, overwhelming case evidence, or corroborated confession, the narrative was rejected for study.

**Open-ended instructions** All narratives chosen for examination were written in response to open-ended instructions such as, "Write down what happened." Narratives resulting from question and answer type interviews might be influenced by confounding factors by the interviewer, such as tone of voice, nonverbal responses or contaminating leading questions. Therefore, these narratives were excluded from the present study. In cases in which the

interviewer wrote the narrative instead of allowing the suspects or victims to provide their own verbatim accounts, the narratives were also rejected.

**Legibility** The third selection factor, legibility, applied to narratives containing words that were difficult to read. Rather than guessing the writer's intention, any narratives containing illegible words were rejected from further examination.

**Language** An examination of language revealed that several narratives available for study had been translated into English from Spanish. Because the writer's exact choice of words might not be accurately represented in the translation, all translated narratives were excluded from the present study.

**Redundancy by individual** Examination of the narratives available for study revealed that several suspects wrote multiple narratives. Some suspects wrote more than one narrative regarding the same criminal incident, and others provided narratives for more than one incident. To examine accounts written by 60 different individuals, only one narrative from each individual was examined. When multiple narratives were provided for the same incident, the original narrative was retained for study and subsequent narratives were ignored.

**Redundancy by case** Criminal incidents typically involve multiple narratives provided by different individuals. In an effort to minimize confounding factors, such as differences in instructions to writers, only one narrative was used from each criminal incident. The 60 narratives available for study represent 60 different cases, including both violent crimes and property crimes. Forty-seven of the narratives involve the violent crimes of abduction, assault, homicide, rape, and robbery. Thirteen of the narratives relate to the property crimes of arson, drugs, and theft.

A total of 347 narratives written by suspects or victims involved in criminal incidents were reviewed before finding 60 narratives that met all six selection factors. Once the narratives were selected, all narratives were typed for computer searching purposes.

### Research Questions

Six research questions were examined in the present study. Each research question is described below, focusing on the steps used in the research process.

#### **Q1: Is there a positive relationship between equivocation and deception in written narratives?**

Equivocation in narratives is indicated by noncommittal words such as "maybe," "probably," and "think." The use of equivocation as a clue to deception was identified in previously reviewed studies of oral discourse (Bavelas et al., 1990; DePaulo et al. in review; Miller & Stiff, 1993). Porter and Yuille (1996) found that counting the numbers of occurrences of each truthful criterion was a more objective approach than using a rating scale indicating presence and absence. The present study, following Porter and Yuille, used frequency counts for coding occurrences of individual criterion.

The following 13 equivocation words were found in the present study by using computer search functions:

#### **Equivocation Words in Sampled Narratives**

<b>around</b>	<b>maybe</b>	<b>someone</b>	<b>somewhere</b>	
<b>assume</b>	<b>might</b>	<b>something</b>	<b>suppose</b>	
<b>guess</b>	<b>probably</b>	<b>somewhat</b>	<b>think</b>	<b>whatever</b>

All equivocation words were highlighted and manually checked for context, specifically for the use of equivocation relating to time or occurring in discourse. Regarding times,

individuals typically include approximate times when relating events. Therefore, when phrases such as “around 6:00 p.m.” were found in the present study, the word “around” was not included in the equivocation count. When the word "around" was used to modify a verb, however, as in the examples “driving around” and "riding around," the word "around" was coded as equivocation.

The present study specifically examined equivocation used by the narrator to recount events. Therefore, when equivocation words were used in replicating discourse, they were not included in the equivocation count. As an example, in an assault case the victim related that her assailant said, “I’ll do this again until I think you’ve had enough.” The word “think” was not included in the equivocation word count because it did not indicate equivocation on the narrator’s part. In a homicide example, however, a suspect recounted his day’s activities and included the following sentence: “I think we started watching a movie.” The word “think” in this example is considered to be equivocation by the narrator and was therefore coded as such. Additional examples of equivocation in the examined narratives are listed below:

"All of a sudden *someone* blindfolded me."

"My wife *probably* came home."

"I felt *something* poke me."

All frequencies of equivocation, excluding equivocation when relating to time or when occurring within discourse, were determined. A density ratio was calculated by dividing the number of equivocation words by the total word count of the narrative. Equivocation frequency counts and density ratios also were derived for each partition of the narrative (prologue, criminal incident and conclusion). These variables comprise interval and ratio variables respectively.

**Q2: Is there a positive relationship between negation and deception in written narratives?**

In previous studies of oral deception, higher frequencies of negation were found in deceptive accounts than in truthful accounts (DePaulo et al., in review; Watson, 1981). Words indicating negation include "no," "not," and all contractions of "not." In the present study, all occurrences of negation words were identified through computer searches. Each occurrence was highlighted, and the context was manually checked for possible spelling errors and use of negation within discourse. In two narratives, writers included the phrase, "I didn't no..." The context of the narrative revealed that the word "no" was a phonetic spelling of the intended word "know." Therefore, these errors were not included in the total negation count.

Negation words pertinent to the present study are those words used by the narrator in providing the account. Negation words uttered during discourse, therefore, were not coded. For example, the sentence, "He told me not to move" contains the negation word "not." Since this word was uttered during discourse, it was not an example of the narrator's use of negation and, therefore, was not coded. In the sentence, "I don't remember" the narrator used the negation word "don't" while recounting events. Because this is an example of the narrator's use of negation, it was coded and included in the negation frequency count.

The following ten negation words were found in the examined narratives:

**Negation Words in Sampled Narratives**

<b>can't</b>	<b>don't</b>		<b>wasn't</b>
<b>couldn't</b>	<b>hadn't</b>		<b>won't</b>
<b>didn't</b>	<b>no</b>	<b>not</b>	<b>wouldn't</b>

Examples of negation within context in the narratives studied are as follows:

"I *don't* recall double checking the safe."

"I *can't* remember how I got back to the parking lot."

"I *didn't* look down to confirm whether it was a knife or *not*."

Frequency counts of all negation, excluding spelling errors and negation in discourse, were determined at the interval level of measurement. Frequency counts were derived for negation in the entire narrative and in partitioned narratives. Negation density ratios also were calculated for entire narratives and for partitioned narratives, at the ratio level of measurement.

**Q3: Is there a positive relationship between the length of the prologue and deception in written narratives?**

Narratives describing specific incidents can be divided into partitions -- the prologue, the incident, and the conclusion partitions. Driscoll (1994) found that narratives with prologues of approximately one-third of the length of the total narrative or less indicated the likelihood of veracity. Rudacille (1994) found that narratives with approximately one-fifth or less of the entire narrative devoted to the prologue were indicative of veracity. Rabon (1996), Rudacille, and Sapir (1987) note that prologues that are much longer than the incident partition are indicative of the likelihood of deception.

The prologue research question can be examined only in narratives in which the writer indicates knowledge of a specific event, such as a theft. If a suspect in a theft case denies all knowledge of the crime, his statement will include only his activities on the day of the theft, with no reference to the crime itself. Therefore, the narrative cannot be divided into partitions. However, if a suspect includes knowledge of the crime (whether he admits or denies his involvement in the crime) the criminal incident partition will be present and the relative lengths of the three partitions can be examined.

In calculating the relative length of the prologue in the present study, the first word of the narrative was considered to mark the beginning of the prologue. The point in the narrative where the criminal incident began determined the end of the prologue and the beginning of the incident. Rabon (1996) described the incident partition as that portion of the narrative that marks the point where a criminal case would be opened. The following is an excerpt from a robbery narrative:

".....My husband and I were sitting in the first booth on the right as you come in.

*(End of Prologue and Beginning of Criminal Incident)*

I heard a loud bang like a firecracker and shouts to lay down on the floor...."

In the quoted example, a criminal case begins when the narrator heard the loud bang. Therefore, the prologue partition has ended and the criminal incident partition has begun. The criminal incident partition ends when the description of the crime is over. Some narratives end at this point and others continue, by adding a conclusion partition.

In examining this research question, frequency counts of words within each partition were determined. The totals were then divided by the number of words in the entire narrative, to calculate word count percentages of each partition.

**Q4: Is there a positive relationship between unique sensory details and veracity in written narratives?**

Johnson and Raye (1981) found that truthful, experienced memories contained more sensory information than did constructed memories. Other researchers cited unusual details as indicators of veracity within a narrative (Dana-Kirby,1997; DePaulo et al., in review; Steller & Koehnken, 1989; Miller & Stiff, 1993; Parker & Brown, 2000).

In the present study, phrases were coded as unique sensory details if they met three criteria. First, they must include one of the sensory perceptions -- auditory, visual, kinesthetic, gustatory, or olfactory. As an example, the sentence, “I saw flames flickering in the side window...” recounts a specific visual perception and was coded as a unique sensory detail.

Second, the words must be detailed, therefore cited without equivocation. If the previous example had been written, “I think I saw flames flickering in the side window...” it would not be coded as a unique sensory detail because of the inclusion of the equivocation word "think."

Third, the sensory details must be so unique that they are not found in any other narratives in the study. The sentence, “I saw flames flickering in the side window...” is unique in that it appears in only one narrative in the study. Therefore, for a phrase to be coded as a unique sensory detail, it must include sensory data, be detailed rather than equivocal, and be unique within this study.

Each occurrence of a unique sensory detail found in the narratives for study was highlighted and counted. The following are additional examples of unique sensory details found in the present study, divided into the five sensory categories:

### **Visual**

“...I looked back and saw that the car was in total flames...”

“...I saw blood on my hand...”

“...I watched him grab a bottle shaped as a gun....”

### **Auditory**

“...I heard these loud gun shots...”

“...he made some grunting noises...”

“...I heard a very loud thud...”

### **Kinesthetic**

“...I wiped off the door knob...”

“...I was choking and having a hard time breathing...”

“...the window blew out and I felt heat on my face...”

### **Gustatory<sup>15</sup>**

“...I ate some hotdogs...”

“...I drank a fifth of vodka...”

"...he made me a sandwich and I ate it..."

### **Olfactory**

"...I had to change her diaper cause she smelled awful..."

Measurement of unique sensory details at the interval level was derived from frequency counts. Density ratios of unique sensory details were determined by the number of unique sensory details divided by the total number of words. Frequency counts and density ratios also were calculated for partitioned narratives.

### **Q5: Is there a positive relationship between emotions in the conclusion of the narrative, and veracity in written narratives?**

Truthful accounts of traumatized victims frequently contain clear descriptions of emotions, such as fear and anger, in the conclusion of the narrative (Kaster, 1999; Parker & Brown, 2000). In the present study, the conclusion partition is defined as the portion of the narrative that follows the recounting of the criminal incident. Emotions frequently appear after an incident rather than during it. In the narrative, emotions are likewise often recounted within the conclusion partition rather than within the criminal incident partition.

The following sentences are examples from the current study that illustrate emotions found within the conclusions of the examined narratives:

“I was scared out of my mind.”

“I was frightened to stay in the house.”

“I was really scared. I became hysterical.”

Frequency counts for references to emotions within the entire narrative, as well as counts for emotions within partitioned narratives, were calculated at the interval level of measurement. Measurement at the ratio level was derived from density ratios of the number of references to emotions divided by the word count of the entire narrative. This calculation was repeated for emotions within partitioned narratives.

**Q6: Is there a positive relationship between quoted discourse and veracity in written narratives?**

Quoted discourse is defined as the verbatim words that a narrator recalls hearing. During a store robbery, one of the victims recounted the exact words she recalled hearing the robber utter when a customer attempted to escape: "Yo, where are you going?" Quoted discourse was found to indicate the likelihood of veracity in oral narratives (Dana-Kirby, 1997; Steller & Koehnken, 1989; Undeutsch, 1989). Only verbatim discourse was examined in this study. For example, “He said that I couldn’t use the phone” was not considered verbatim discourse and therefore was not included in the frequency count. Additionally, only discourse uttered aloud was coded. Internal dialogue, such as the example, “I said to myself, don’t go in there,” was not examined in the present study.

Verbatim discourse in narratives can be recounted through two different methods. First, narrators can enclose quoted discourse within quotation marks. The following are examples of quoted discourse within quotation marks, from the present study:

...He started yelling, "I'll be back. I'm gonna get you!"...

...He said, "You should have been there, it was sweet."...

...Finally he said "Okay, we'll go downstairs, act normal." ...

A second method writers can use to identify quoted discourse is to include the verbatim words spoken, with correctly quoted pronouns, but without the use of quotation marks. Examples follow:

"...he said so that's the way you're going to be now..."

"...he said what did I say keep your hands away from your face..."

"...she said why don't you have another drink so you have a good time..."

The words "yes" and "no" can be communicated in numerous ways, both verbal and nonverbal, as in nodding or shaking the head. Therefore, unless the words "yes" and "no" were placed within quotation marks, they were not coded. For example, in the sentence, "She said no, she didn't want to go with me," the word "no" was not considered to be quoted discourse.

Conversely, in the following sentence, the word "no" was coded as quoted discourse: "I kept screaming "No!" but he wouldn't stop."

Frequency counts of quoted discourse with and without quotation marks were determined for the entire narrative and for partitioned narratives. A density ratio of the frequency of quoted discourse divided by the total word count was also derived, for the entire narrative and for partitioned narratives.

Chapter Three described the research strategy as it applied to each research question under study. In the following chapter, the research methodology is further explained, as the univariate, bivariate, and multivariate findings are presented.

## Chapter IV Research Methodology and Findings

Chapter Four reports the research methodology used in the current study and the descriptive and analytic findings. The descriptive findings are presented as univariate analysis results; the analytic findings are divided into bivariate analysis and multivariate analysis results. The research methodology used is explained for each type of analysis.

### Univariate Analysis

Univariate statistics analyze one variable at a time, by measuring and describing the variable (Babbie & Halley, 1998). Univariate findings in the current study describe the attributes of the narratives and the demographic data of the narrative writers. These measures relate to entire narratives and to partitioned narratives. Because two of the research questions address variables found in specific locations within the narratives, the narratives were partitioned into three sections. The narrative section describing the criminal incident is identified as the criminal incident partition. The narrative sections preceding and following the criminal incident partition are identified as the prologue and conclusion partitions, respectively.

Narratives were first examined for frequency and density measures within entire narratives. The independent variables represent the attributes of the narratives and the dependent variable represents the likelihood of veracity or deception of the narratives. Narratives were also examined for frequency and density measures within each of the three narrative partitions.

### Demographic Data of Narrative Writers

Gender, age, race, and education levels of the narrative writers were examined (See Table 1). Forty-seven percent of the narratives in the present study were written by females and 53 percent were written by males. Ages of the narrative writers ranged from 15 years to 50 years, with a mean age of 27. Caucasian writers provided over half of the narratives (55%). Other races

represented in the current study were African American and Hispanic. The known education levels of the writers ranged from less than a high school education to the completion of a post-graduate college degree. The most frequent level of education among narrative writers was high school graduate, with no college education.

**Table 1 Age, Race, and Education of Narrative Writers by Gender**

	<b>Total</b>	<b>Females</b>	<b>Males</b>
<b>Age</b>			
15 - 19	8.3%	7.1%	9.4%
20 - 29	50.0%	50.0%	50.1%
30 - 39	25.0%	32.2%	18.7%
40 - 49	5.0%	3.6%	6.3%
50 - 59	3.4%	0%	6.3%
Unknown	8.3%	7.1%	9.2%
<b>Race</b>			
African American	24.4%	21.4%	25.0%
Caucasian	55.0%	57.2%	53.1%
Hispanic	13.3%	10.7%	15.6%
Unknown	8.3%	10.7%	6.3%
<b>Education</b>			
Some High School	13.3%	7.1%	18.8%
High School Graduate	28.3%	35.8%	21.9%
Some College	6.7%	7.1%	6.3%
College Graduate	1.7%	0%	3.1%
Graduate Degree	1.7%	0%	3.1%
Unknown	48.3%	50.0%	46.8%

#### Frequency Counts of Offense Type

The criminal incidents described in the narratives involved both property crimes and violent crimes. Twenty-two percent of the examined narratives concerned the property crimes of arson, drugs and theft. Seventy-eight percent of the narratives related to the violent crimes of abduction, assault, homicide, rape and robbery (See Table 2). Sixty-two percent of the narratives were written by suspects of property and violent crimes; thirty-eight percent were written by victims and alleged victims of violent crimes.

**Table 2 Types of Crimes Represented by Narratives**

	<b>Frequency</b>	<b>Percent</b>
<b>Property Crimes</b>		
Arson	6	10.0
Drugs	1	1.7
Theft	6	10.0
Total	13	21.7
<b>Violent Crimes</b>		
Abduction	3	5.0
Assault	8	13.3
Homicide	22	36.7
Rape	8	13.3
Robbery	6	10.0
Total	47	78.3

#### Frequency Counts of Independent Variables in Entire Narratives

Six independent variables represent the attributes of the narratives identified in the six research questions. The descriptive statistics relating to each research question, Q1-Q6, are reported separately.

##### Equivocation (Q1)

Fifty percent of the narratives in the present study contained equivocation words ranging in frequency from one (N = 16) to 15 (N = 1). The remaining 50 percent of the narratives had no equivocation words (See Table 3).

**Table 3 Equivocation Words in Narratives**

# Equivocation Words	Frequency	Percent
0	30	50.0
1	16	26.7
2	2	3.3
3	4	6.7
4	2	3.3
5	1	1.7
6	1	1.7
7	1	1.7
8	2	3.3
15	1	1.7
Total	60	100.0

Negation (Q2)

Sixty-eight percent of the examined narratives contained negation words, ranging from a minimum of one negation word (N = 9) to a maximum of 93 negation words (N = 1). Fifty-nine narratives contained 18 or fewer frequencies of negation (See Table 4). Thirty-two percent of the narratives contained no negation words.

**Table 4 Negation Words in Narratives**

# Negation Words	Frequency	Percent
0	19	31.7
1	9	15.0
2	5	8.3
3	9	15.0
4	4	6.7
5	1	1.7
6	3	5.0
7	4	6.7
8	1	1.7
10	2	3.3
11	1	1.7
18	1	1.7
93	1	1.7
Total	60	100.0

### Prologue (Q3)

Ninety-three percent of the narratives included a prologue partition preceding the recounting of the criminal incident. Seven percent of the narratives omitted any reference to a criminal incident and therefore no prologues could be identified. Fourteen percent of the narratives omitted any conclusion following the criminal incident partition.

Lengths of the prologue partitions in the examined narratives ranged from four words to 5,437 words. Word lengths of the entire narratives ranged from 26 words to 6,089 words.

### Unique Sensory Details (Q4)

Eighty-three percent of the examined narratives contained unique sensory details, ranging in frequency from one to 38. Ninety-three percent of the narratives contained eight or fewer unique sensory details (See Table 5). Seventeen percent had none.

**Table 5 Unique Sensory Details in Narratives**

# Unique Sensory Details	Frequency	Percent
0	10	16.7
1	10	16.7
2	12	20.0
3	7	11.7
4	5	8.3
5	4	6.7
6	4	6.7
7	2	3.3
8	2	3.3
11	1	1.7
16	1	1.7
29	1	1.7
38	1	1.7
Total	60	100.0

### Emotions (Q5)

Twenty-three percent of the narratives included references to emotions; seventy-seven percent did not. The number of references to emotions within narratives ranged from zero to four. (See Table 6).

**Table 6 Emotions in Narratives**

# Emotions	Frequency	Percent
0	46	76.7
1	9	15.0
2	3	5.0
3	1	1.7
4	1	1.7
Total	60	100.0

### Quoted Discourse in Narratives (Q6)

Fifty percent of the narratives studied contained one or more quoted discourse references and fifty percent contained none. One narrative included 60 references to quoted discourse; the remaining number of quoted discourse references ranged from one to 16 (See Table 7). The term "quoted discourse references" includes quoted discourse written with quotation marks as well as quoted discourse written without quotation marks.

**Table 7 Quoted Discourse References in Narratives**

# Quoted Discourse References	Frequency	Percent
0	30	50.0
1	11	18.3
2	8	13.3
3	3	5.0
6	2	3.3
7	1	1.7
8	2	3.3
11	1	1.7
16	1	1.7
60	1	1.7
Total	60	100.0

When quoted discourse references with quotation marks and without quotation marks were examined separately, 17 narratives contained discourse references with quotation marks and 18 narratives contained discourse references without quotation marks. The number of quoted discourse references with quotation marks ranged from zero to eight (See Table 8). The number of quoted discourse references without quotation marks ranged from zero to 52 (See Table 9).

**Table 8 Quoted Discourse References with Quotation Marks**

# Quoted Discourse References	Frequency	Percent
0	43	71.7
1	8	13.3
2	5	8.3
3	2	3.3
7	1	1.7
8	1	1.7
Total	60	100.0

**Table 9 Quoted Discourse References without Quotation Marks**

# Quoted Discourse References	Frequency	Percent
0	43	71.7
1	5	6.7
2	4	6.7
3	3	5.0
5	1	1.7
7	1	1.7
8	1	1.7
9	1	1.7
15	1	1.7
52	1	1.7
Total	60	100.0

Means and standard deviations for the variables under consideration were calculated and are summarized in Table 10.

**Table 10 Descriptive Statistics of Narrative Attributes (n = 60)**

	Minimum	Maximum	Mean	Standard Deviation
Equivocation (Q1)	0	15	1.48	2.68
Negation (Q2)	0	93	4.38	12.15
Word Count (Q3)	26	6089	486.83	833.64
Unique Sensory Details (Q4)	0	38	4.05	6.31
Emotions (Q5)	0	4	.37	.80
Quoted Discourse References (Q-6)	0	60	2.63	8.11

#### Density Ratios of Independent Variables in Entire Narratives

As noted earlier, density variables were also calculated to account for the variance in narrative length. This measure was added to reveal additional information not fully explained by frequency counts alone. Density ratios represent the frequency of the attribute divided by the total word count (See Table 11). The resulting values are expressed as rates, as the number of occurrences per 1,000 words.

**Table 11 Density Ratios of Independent Variables (n = 60)**

	Minimum	Maximum	Mean	Standard Deviation
Equivocation (Q1)	0	29.7	3.2	5.0
Negation (Q2)	0	29.0	6.8	6.8
Unique Sensory Details (Q4)	0	51.3	9.7	9.1
Emotions (Q5)	0	13.5	.8	2.1
Quoted Discourse References (Q-6)	0	45.1	4.7	8.6

Note. Density ratios were calculated for number of occurrences per 1,000 words. Density cannot be calculated for Q3, word count.

#### Frequency Counts and Density Ratios of Independent Variables in Partitioned Narratives

The independent variables of equivocation, negation, unique sensory details, emotions and quoted discourse references were further examined within partitioned narratives. If a criminal incident was included in the narrative, the narrative was divided into three partitions --

prologue, criminal incident, and conclusion partitions. Frequency counts and density ratios were calculated for the five independent variables within each partition. Fifty-six of the 60 narratives contained partitions; four narratives included no mention of a criminal incident and therefore the prologue and conclusion partitions could not be determined. The four narratives without partitions were excluded from the partitioned analysis. Forty-eight of the 56 partitioned narratives contained all three partitions. Eight of the 56 partitioned narratives contained only prologue and criminal incident partitions, and lacked conclusion partitions.

#### Equivocation in Partitioned Narratives (Q1)

When the three narrative partitions were examined individually, the prologue partitions contained more equivocation than either the criminal incident or the conclusion partitions (See Table 12).

**Table 12 Equivocation in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	12.000	.786	2.016
Prologue - Density	56	0	31.25	2.939	6.369
Criminal Incident - Frequency	56	0	5.000	.446	.989
Criminal Incident - Density	56	0	23.000	2.303	4.824
Conclusion - Frequency	48	0	2.000	.229	.515
Conclusion - Density	48	0	38.461	2.600	7.108

#### Negation in Partitioned Narratives (Q2)

Negation words were found in all three partitions of narratives. The criminal incident partitions contained the highest frequency of negation words, followed by the prologue, then the conclusion partitions (See Table 13).

**Table 13 Negation in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	34.000	1.768	4.839
Prologue - Density	56	0	52.631	5.261	9.230
Criminal Incident - Frequency	56	0	59.000	1.946	7.854
Criminal Incident - Density	56	0	90.490	10.843	18.380
Conclusion - Frequency	48	0	6.000	.854	1.321
Conclusion - Density	48	0	69.767	10.400	17.005

### Length of Prologue (Q3)

Word counts in all three narrative partitions were examined. The length of the prologue partition was the focus of Research Question 3. The mean relative prologue length was 43% of the entire narrative word count. Prologue lengths ranged from 2% to 90% (See Table 14).

**Table 14 Word Count within Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Word Count in Prologue	56	4.00	5,437.00	274.36	730.72
Percentage of Words in Prologue (%)	56	2.45	89.67	43.01	24.99
Word Count in Criminal Incident	56	6.00	1,213.00	150.21	197.68
Percentage of Words in Criminal Incident (%)	56	5.16	87.50	38.79	23.08
Word Count in Conclusion	48	6.00	283.00	72.50	67.17
Percentage of Words in Conclusion (%)	48	.68	80.67	21.38	15.46

### Unique Sensory Details in Partitioned Narratives (Q4)

A higher mean for unique sensory details was found in the criminal incident partitions of narratives than in the prologue or conclusion partitions (See Table 15).

**Table 15 Unique Sensory Details in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	28.000	1.500	4.130
Prologue - Density	56	0	58.823	4.602	9.914
Criminal Incident - Frequency	56	0	25.000	2.393	3.883
Criminal Incident - Density	56	0	70.707	17.978	19.683
Conclusion - Frequency	48	0	3.000	.396	.707
Conclusion - Density	48	0	74.074	6.484	14.685

#### Emotions in Partitioned Narratives (Q5)

References to emotions were present in all three partitions of narratives, with a higher mean in the conclusion partitions (See Table 16). A total of 22 references to emotions were present in the examined narratives. Four of the emotion references were located in the prologue partitions, six were in the criminal incident partitions and the remaining 12 were found in the conclusion partitions.

**Table 16 Emotions in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	58	0	2.000	.069	.317
Prologue - Density	58	0	4.123	.116	.588
Criminal Incident - Frequency	56	0	2.000	.125	.384
Criminal Incident - Density	56	0	22.222	1.204	4.272
Conclusion - Frequency	49	0	3.000	.265	.670
Conclusion - Density	48	0	23.255	2.648	6.097

#### Quoted Discourse in Partitioned Narratives (Q6)

More quoted discourse was present in the criminal incident partitions of the narratives than in the prologue or conclusion partitions (See Table 17). The totals include quoted discourse written with quotation marks as well as quoted discourse written without quotation marks.

**Table 17 Quoted Discourse in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	16.000	1.018	3.042
Prologue - Density	56	0	37.037	3.371	8.321
Criminal Incident - Frequency	56	0	45.000	1.446	6.027
Criminal Incident - Density	56	0	57.471	5.817	11.341
Conclusion - Frequency	48	0	4.000	.125	.606
Conclusion - Density	48	0	21.390	1.141	4.566

When quoted discourse with and without quotation marks were examined separately, both groups had highest means within the criminal incident partitions. The lowest means were found within the conclusion partitions (see Tables 18 and 19).

**Table 18 Quoted Discourse with Quotation Marks in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	5.000	.232	.809
Prologue - Density	56	0	37.037	1.288	5.865
Criminal Incident - Frequency	56	0	8.000	.393	1.216
Criminal Incident - Density	56	0	34.482	2.328	6.340
Conclusion - Frequency	48	0	1.000	.042	.202
Conclusion - Density	48	0	20.408	.695	3.457

**Table 19 Quoted Discourse without Quotation Marks in Partitioned Narratives**

	N	Minimum	Maximum	Mean	Std. Deviation
Prologue - Frequency	56	0	15.000	.786	2.903
Prologue - Density	56	0	32.258	2.082	6.347
Criminal Incident - Frequency	56	0	37.000	1.054	4.963
Criminal Incident - Density	56	0	34.482	3.489	7.665
Conclusion - Frequency	48	0	4.000	.104	.592
Conclusion - Density	48	0	21.390	.8541	4.143

The univariate analysis revealed that all narrative attributes relating to the six research questions were found within the examined narratives, although each attribute was not present in every narrative. Fifty percent of the narratives contained equivocation words; 50 percent contained quoted discourse references. Eighty-three percent of the narratives contained unique

sensory details, 68 percent contained negation and only 23 percent contained references to emotions. Ninety-three percent of the narratives had prologues that preceded the recounting of the criminal incident.

The greatest variance was found in word count, as length of narratives ranged from 26 words to 6,089 words. The five shortest narratives had word counts of 26, 40, 63, 74, and 88; the five longest narratives had word counts of 1,032, 1,292, 1,557, 2,293 and 6,089. The longest narrative was, therefore, identified as an extreme outlier narrative, as no other narrative came close to its 6,089 word length. The length of this narrative resulted in skewed distributions of independent variables, particularly negation and quoted discourse. Therefore, analysis was conducted both with and without the extreme outlier narrative. The findings resulting from the two analysis approaches were similar, as reported in the bivariate analysis section.

#### Bivariate Analysis

The strength and direction of the relationships between two variables were examined using bivariate analysis correlation-based measures. Each of the independent variables representing the narrative attributes were correlated with the dependent variable, the likelihood of veracity or deception. The independent variables in the present study were continuous ratio data. The nominal dependent variable was interpreted as a continuous variable, with a probability distribution ranging from 0 to 1. The criteria for using Pearson's *r* Product-Moment Correlation Coefficient were met (Cohen & Cohen, 1983) and Pearson's *r* was computed. Due to the presence of an extreme outlier value for word count, Spearman rho correlation coefficient was also used, to examine rank order correlations. This measure supported the results obtained from using Pearson's *r* correlation.

In the current study, three research questions predicted positive relationships with veracity of the narratives and three predicted positive relationships with deception. In coding the veracity or deception of the narratives, veracity (no deception) was coded as "0" and deception was coded as "1."

Blalock (1979) cited an advantage of using correlation coefficients as being ease of interpretation. Positive values of the correlation coefficient reveal direct relationships with deception. Negative values reveal inverse relationships with deception, or direct relationships with veracity. Correlation coefficient values close to zero indicate weak relationships between narrative attributes and the likelihood of deception or veracity; values closer to 1.00 or -1.00 indicate stronger relationships. The correlation coefficients, therefore, reveal the direction and strength of the relationship between the independent variables and the veracity or deception of the narrative, interpreted as one continuous variable.

The bivariate analysis examined correlations between the dependent variable of deception and the six independent variables relating to each research question. Correlations between the independent and dependent variables were further examined within a case-specific context, focusing on homicide narratives. The crime of homicide is of particular interest in the present study, as homicide is associated with a greater level of stress than are the less serious crimes represented. Finally, correlations are presented between the independent variables and a second measure of deception. Recognizing the possibility that the dependent variable did not adequately distinguish between deceptive narratives containing falsification and deceptive narratives that were accurate although incomplete, the dependent variable was reformulated. The correlations were computed using the reformulated dependent variable of accuracy and inaccuracy.

## Correlations of Independent Variable Frequency Counts with Deception

The independent variables were first examined as straightforward count variables within entire (unpartitioned) narratives. Relationships between deception and the independent variables were examined, as were relationships between the independent variables themselves. Because the present study is an exploratory study with only 60 narratives, marginally significant correlations ( $p \leq .10$ ) are noted, to provide additional information.

When operationalizing the independent variables as frequency counts in entire narratives, a positive relationship was found between equivocation and deception ( $r = .295$ ,  $p \leq .05$ ) and between negation and deception ( $r = .223$ ,  $p \leq .10$ ). No other relationships between the independent variable frequency counts and deception were significant (See Table 20).

Table 20 Pearson Product-Moment Correlation of Variable Frequencies and Deception (n = 60)

	Veracity/ Deception	Equivocation	Negation	Unique Sensory Details	Emotions	Quoted Discourse References
Equivocation (Q1)	$r = .295^{**}$	.				
Negation (Q2)	$r = .223^*$	$r = .727^{***}$	.			
Unique Sensory Details (Q4)	$r = .077$	$r = .467^{***}$	$r = .589^{***}$			
Emotions (Q5)	$r = -.126$	$r = .184$	$r = .201$	$r = .643^{***}$		
Quoted Discourse (Q6)	$r = -.087$	$r = .121$	$r = .259^{**}$	$r = .818^{***}$	$r = .621^{***}$	
Word Count	$r = .200$	$r = .722^{***}$	$r = .935^{***}$	$r = .773^{***}$	$r = .375^{***}$	$r = .514^{***}$

\*  $p \leq 0.10$     \*\*  $p \leq 0.05$     \*\*\*  $p \leq 0.01$

The univariate results of the present study identified the mean word count for all 60 narratives as 487. One narrative, however, had a total word count of 6,089. As a result of identifying an extreme outlier, Spearman's rho rank order was also used to examine the relationships between the independent variables and deception. The results from Spearman's rho supported the results from Pearson's Product-Moment Correlation. A positive correlation was

found between equivocation and deception ( $r_s = .295, p \leq .05$ ) and between negation and deception ( $r_s = .373, p \leq .01$ ). Only one other relationship with deception was found using Spearman's rho -- a positive relationship with word count ( $r_s = .390, p \leq .01$ ).

To examine how much of an effect the extreme outlier narrative had on the correlation results, this narrative was excluded from an additional examination of the relationships between deception and the independent variables using Pearson's  $r$ . The results revealed that the effect of the extreme outlier narrative was minimal. Equivocation was again found to be positively correlated with deception ( $r = .281, p \leq .05$ ), as was negation ( $r = .343, p \leq .01$ ). No other relationships between deception and independent variables were found.

In using frequency counts to examine the relationships among independent variables, relationships were found in 12 of the 15 pairs of variables (See Table 20). Correlations with word count were found with every other independent variable. The relationship between negation and word count was so strong ( $r = .935, p \leq .01$ ) that a multicollinearity problem existed, with shared variance between the independent variables. Frequency counts of unique sensory details and quoted discourse were also highly correlated ( $r = .818, p \leq .01$ ). Tabachnick and Fidell (1996) discouraged use of two variables in the same analysis if their bivariate correlation exceeded .700. Blalock (1979) cautioned that multicollinearity not only results an overlap in variance among the variables, but that intercorrelated independent variables are also sensitive to sampling and measurement errors. Therefore, to avoid interpretation problems and sensitivity to errors that may occur when the independent variables are operationalized as frequency counts, density ratios were also examined.

## Correlations of Independent Variable Density Ratios with Deception

To account for the varied lengths of the narratives and in an attempt to avoid multicollinearity problems, density ratios were computed. Density ratio values represent the frequency of each attribute divided by the total word count of the narrative. The density ratios are expressed as standardized rates -- the number of occurrences of each attribute per 1,000 words.

When operationalizing the independent variables as density ratios, the strongest and most significant finding was a positive relationship between unique sensory details and veracity, reported as a negative relationship with deception ( $r = -.426, p \leq .01$ ; See Table 21). A relationship between negation and deception was also found ( $r = .254, p \leq .05$ ), as well as a weak relationship between equivocation and deception ( $r = .237, p \leq .10$ ).

**Table 21 Pearson Product-Moment Correlation of Variable Density Ratios and Deception (n = 60)**

	Veracity/ Deception	Equivocation	Negation	Unique Sensory Details	Emotions
Equivocation (Q1)	$r = .237^*$				
Negation (Q2)	$r = .254^{**}$	$r = .148$			
Unique Sensory Details (Q4)	$r = -.426^{***}$	$r = -.148$	$r = -.133$		
Emotions (Q5)	$r = -.202$	$r = .101$	$r = .062$	$r = .043$	
Quoted Discourse (Q6)	$r = -.112$	$r = -.046$	$r = -.247^*$	$r = .121$	$r = -.037$

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

No relationships with deception were found with emotions or quoted discourse. When quoted discourse was examined with and without the use of quotation marks, however, a weak relationship was found between veracity and the density of quoted discourse without quotation

marks ( $r = -.224, p \leq .10$ ). No relationship was found between deception and quoted discourse with quotation marks.

Correlations among the independent variables operationalized as density ratios were examined. Only one weak relationship was found, between the variables of negation and quoted discourse ( $r = -.247, p \leq .10$ ). The multicollinearity problems evident when the independent variables were operationalized as frequency counts were, therefore, eliminated by the use of density ratios.

The relationships between the density ratios of variables and deception were also examined using rank order correlation, due to the presence of the extreme outlier narrative. Results from Spearman's rho closely supported the Pearson's r results. A positive relationship between unique sensory details and veracity (negative relationship with deception) was found using Spearman's rho ( $r_s = -.435, p \leq .01$ ). Positive weak relationships between deception and equivocation ( $r_s = .217, p \leq .10$ ) and deception and negation ( $r_s = .223, p \leq .10$ ) were the only other findings.

Examination of density ratio correlations without the extreme outlier narrative did not differ significantly from the results using all narratives. A correlation was found between unique sensory details and veracity ( $r = -.422, p \leq .01$ ). Correlations were also found between equivocation and deception ( $r = .242, p \leq .10$ ) and negation and deception ( $r = .238, p \leq .10$ ).

#### Correlations of Independent Variable Frequency Counts and Density Ratios with Deception in Partitioned Narratives

In the present study, two of the research questions directly address narrative attributes found within partitioned narratives. Question Three relates to word count percentage in the prologue partition. Question Five addresses emotions in the conclusion partition. Therefore,

each narrative partition -- the prologue, the criminal incident, and the conclusion, was examined separately.

Fifty-six of the total 60 narratives included criminal incidents in the written account. Therefore, these 56 narratives could be divided into partitions. All 56 narratives contained prologue and criminal incident partitions; forty-eight narratives also contained conclusion partitions. The bivariate results from operationalizing the independent variables as frequency counts and as density ratios in partitioned narratives are presented separately, as they relate to each research question.

**Q1: Is there a positive relationship between equivocation and deception in written narratives?**

Positive relationships between deception and equivocation frequency and between deception and equivocation density were previously reported in the current study's findings regarding unpartitioned narratives. When examining partitioned narratives, a positive relationship was found between deception frequency and equivocation in the prologue partition ( $r = .282$ ,  $p \leq .05$ ; See Table 22). No support for the research question was found when examining the relationship between deception and frequency counts of equivocation in the criminal incident or conclusion partitions. No relationships between deception and density ratios for equivocation within partitioned narratives were found.

**Table 22 Pearson Product-Moment  
Correlation of Equivocation and Deception**

Variables	Veracity/ Deception
Veracity/Deception	r = 1.000 n = 60
Entire narrative - Frequency	r = .295** n = 60
Entire narrative - Density	r = .237* n = 60
Prologue - Frequency	r = .282** n = 56
Prologue - Density	r = -.005 n = 56
Criminal Incident - Frequency	r = .107 n = 56
Criminal Incident - Density	r = .122 n = 56
Conclusion - Frequency	r = .141 n = 48
Conclusion - Density	r = .074 n = 48

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$

**Q2: Is there a positive relationship between negation and deception in written narratives?**

In examining the strength and direction of the relationship between negation and deception, positive relationships were previously reported for frequency counts and density ratios in unpartitioned narratives in the present study. In partitioned narratives, positive relationships were found in the prologue and criminal incident partitions. In the prologue, deception was positively correlated with negation frequency ( $r = .248, p \leq .10$ ; See Table 23) and negation density ( $r = .279, p \leq .05$ ). A positive relationship was also found between deception and negation density in the criminal incident partition ( $r = .250, p \leq .10$ ). No correlations were found with deception and negation in the conclusion partition.

**Table 23 Pearson Product-Moment  
Correlation of Negation and Deception**

Variables	Veracity/ Deception
Veracity/Deception	r = 1.000 n = 60
Entire narrative - Frequency	r = .223* n = 60
Entire narrative - Density	r = .254** n = 60
Prologue - Frequency	r = .248* n = 56
Prologue - Density	r = .279** n = 56
Criminal Incident - Frequency	r = .172 n = 56
Criminal Incident - Density	r = .250* n = 56
Conclusion - Frequency	r = .207 n = 56
Conclusion - Density	r = -.168 n = 48

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$

**Q3: Is there a positive relationship between the length of the prologue and deception in written narratives?**

A positive relationship was found between the percentage of words in the prologue partition and deception of the narratives ( $r = .425$ ,  $p \leq .01$ ; See Table 24). Although not predicted, a correlation was also found between the word count percentage of the criminal incident partition and deception, in the opposite direction ( $r = -.461$ ,  $p \leq .01$ ). If deception is found to be positively correlated with the relative length of the prologue, it will, as a result, be negatively correlated with the relative length of one or both of the other partitions of the narrative. In the conclusion partition, word count was found to be positively correlated with deception ( $r = .285$ ,  $p \leq .05$ ).

**Table 24 Pearson Product-Moment Correlation of Word Count and Deception**

Variables	Veracity/ Deception
Veracity/ Deception	r = 1.000 n = 60
Prologue Word Count	r = .220 n = 56
Prologue Word Count Percentage	r = .425 *** n = 56
Criminal Incident Word Count	r = -0.05 n = 56
Criminal Incident Word Count Percentage	r = -.461*** n = 56
Conclusion Word Count	r = .285** n = 48
Conclusion Word Count Percentage	r = .020 n = 48

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

**Q4 Is there a positive relationship between unique sensory details and veracity in written narratives?**

A positive relationship between veracity and the density of unique sensory details in unpartitioned narratives in the current study was reported previously. When examining partitioned narratives, positive relationships were found between veracity and unique sensory details in the criminal incident partition of the narrative, for frequency ( $r = -.266, p \leq .05$ ) and density ( $r = -.294, p \leq .05$ ; See Table 25).

**Table 25 Pearson Product-Moment Correlation of Unique Sensory Details and Deception**

Variables	Veracity/Deception
Veracity/Deception	r = 1.000 n = 60
Entire narrative - Frequency	r = -0.077 n = 60
Entire narrative - Density	r = -.426*** n = 60
Prologue - Frequency	r = .144 n = 56
Prologue - Density	r = -0.117 n = 56
Criminal Incident - Frequency	r = -.266** n = 56
Criminal Incident - Density	r = -.294** n = 56
Conclusion - Frequency	r = -0.009 n = 48
Conclusion - Density	r = -.142 n = 48

\* p ≤ 0.10 \*\* p ≤ 0.05 \*\*\* p ≤ 0.01

**Q5: Is there a positive relationship between emotions in the conclusion of the narrative, and veracity in written narratives?**

Although all references to emotions were calculated, the presence of emotions in the conclusion partitions of narratives was the focus of the current research. A positive correlation was found between veracity and the density of emotions in the conclusion partitions ( $r = -.241$ ,  $p \leq .10$ ; See Table 26). No relationships were found between veracity and emotions in the remaining partitions.

**Table 26 Pearson Product-Moment  
Correlation of Emotions and Deception**

Variables	Veracity/ Deception
Veracity/Deception	r = 1.000 n = 60
Entire narrative - Frequency	r = -.126 n = 60
Entire narrative - Density	r = -.202 n = 60
Prologue - Frequency	r = .117 n = 56
Prologue - Density	r = .406 n = 56
Criminal Incident - Frequency	r = -.035 n = 56
Criminal Incident - Density	r = -.021 n = 56
Conclusion - Frequency	r = .186 n = 48
Conclusion - Density	r = -.241* n = 48

\*  $p \leq 0.10$

**Q6: Is there a positive relationship between quoted discourse and veracity in written narratives?**

No relationship was found between veracity and the general category of quoted discourse in partitioned narratives. As previously reported, a relationship between veracity and the density of quoted discourse without quotation marks was found in unpartitioned narratives. In partitioned narratives, no relationships were found between veracity and quoted discourse either with or without quotation marks.

**Bivariate Offense Specific Analysis -- Homicide Narratives**

Homicide narratives were of particular interest in the present study, because the focus of the study was on communication under stress. Homicide was the most serious crime represented in the current study, the only crime involving a loss of life. The sentences imposed on offenders

for conviction of a homicide are also more serious, for the offender may be subject to life imprisonment or to capital punishment. The level of stress associated with homicide cases may be further elevated by the use of the polygraph and other investigative resources to solve homicide crimes. For these reasons, homicide narratives, which totaled 37 percent of the narratives in the sample (n = 22), were examined separately.

The relationships between deception and the attributes of homicide narratives were examined in entire, unpartitioned narratives, and in partitioned narratives. Eighteen homicide narratives contained all three partitions. Twenty-one homicide narratives contained only the prologue and criminal incident partitions.

A weak relationship was found between deception and word count percentage in the prologue partition ( $r = .387, p \leq .10$ ; See Table 27). A weak relationship with veracity was found between deception and word count percentage in the conclusion partition ( $r = -.417, p \leq .10$ ).

**Table 27 Pearson Product-Moment Correlation of Word Count and Deception in Homicide Narratives**

Variables	Veracity/ Deception
Veracity/ Deception	$r = 1.000$ $n = 22$
Prologue Word Count	$r = .354$ $n = 21$
Prologue Word Count Percentage	$r = .387^*$ $n = 21$
Criminal Incident Word Count	$r = .049$ $n = 21$
Criminal Incident Word Count Percentage	$r = -.261$ $n = 21$
Conclusion Word Count	$r = -.063$ $n = 18$
Conclusion Word Count Percentage	$r = -.417^*$ $n = 18$

\*  $p \leq 0.10$

The research question predicting a positive relationship between unique sensory details and veracity was supported by correlations with five different aspects of homicide narratives --

density in entire narratives, frequency and density in the criminal incident partition, and frequency and density in the conclusion partition (See Table 28).

**Table 28 Pearson Product-Moment Correlation of Unique Sensory Details and Deception in Homicide Narratives**

Variables	Veracity/Deception
Entire narrative - Frequency	r = -.288 n = 22
Entire Narrative - Density	r = -.501** n = 22
Prologue - Frequency	r = .272 n = 21
Prologue - Density	r = .141 n = 21
Criminal Incident - Frequency	r = -.548*** n = 21
Criminal Incident - Density	r = -.421* n = 21
Conclusion - Frequency	r = -.486** n = 18
Conclusion - Density	r = -.491** n = 18

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

The research question predicting a positive relationship between emotions in the conclusions of narratives and veracity was supported in homicide narratives through examination of frequency counts ( $r = -.582, p \leq .05$ ) and density ratios ( $r = -.740, p \leq .01$ ; See Table 29). In examining unpartitioned homicide narratives, a positive relationship with veracity was also found with emotion frequency counts ( $r = -.406, p \leq .05$ ) and density ratios ( $r = -.578, p \leq .05$ ).

**Table 29 Pearson Product-Moment Correlation of Emotions and Deception in Homicide Narratives**

Variables	Veracity/Deception
Veracity/Deception	r = 1.000 n = 22
Entire narrative - Frequency	r = -.406** n = 22
Entire Narrative - Density	r = -.578** n = 22
Prologue - Frequency	r = .175 n = 21
Prologue - Density	r = .175 n = 21
Criminal Incident - Frequency	r = .040 n = 21
Criminal Incident - Density	r = .065 n = 21
Conclusion - Frequency	r = -.582** n = 18
Conclusion - Density	r = -.740*** n = 18

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

It was predicted that quoted discourse was positively related to veracity. No relationships were found between veracity and the general category of quoted discourse in homicide narratives. In examining quoted discourse without quotation marks, however, a positive relationship with veracity was found with density ratios ( $r = -.400$ ,  $p \leq .10$ ; See Table 30). In partitioned homicide narratives, the prologue partitions were the most informative. Correlations between veracity and quoted discourse without quotation marks in the prologue partitions were found with frequency counts ( $r = -.483$ ,  $p \leq .05$ ) and density ratios ( $r = -.503$ ,  $p \leq .05$ ). No relationships were found with quoted discourse with quotation marks or with equivocation or negation in homicide narratives.

**Table 30 Pearson Product-Moment Correlation of Quoted Discourse without Quotation Marks and Deception in Homicide Narratives**

Variables	Veracity/Deception
Veracity/Deception	r = 1.000 n = 22
Entire Narrative - Frequency	r = -.246 n = 22
Entire Narrative - Density	r = -.400* n = 22
Prologue - Frequency	r = -.483** n = 21
Prologue - Density	r = -.503** n = 21
Criminal Incident - Frequency	r = -.204 n = 21
Criminal Incident - Density	r = -.332 n = 21
Conclusion - Frequency	r = -.285 n = 18
Conclusion - Density	r = -.304 n = 18

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$

#### Bivariate Analysis of Accurate and Inaccurate Narratives

The bivariate analysis concludes with a closer examination of deception in narratives. In Chapter One, the definition of deception provided for the current study specified that deception includes both deception by commission and deception by omission. The deceptive narratives were, therefore, divided into two groups, those that were deceptive by the commission of falsehoods (inaccurate) and those that were deceptive by the omission of pertinent facts (accurate, although incomplete). As the focus of the present study is on communication under stress, examination of accuracy and inaccuracy in narratives may yield additional information concerning deception and stress. Deception by falsification may be associated with greater stress than deception by the omission of incriminating information. The dependent variable of deception was therefore recoded into deceptive/accurate and deceptive/inaccurate narratives.

In the present study, 30 narratives had been determined by case evidence to be deceptive. Seventeen of these narratives included deception by the commission of falsification; because they included false information concerning the criminal incident, they are inaccurate accounts. The remaining 13 narratives were deceptive by the omission of critical information concerning the criminal incident. Although these 13 narratives were accurate, they were not complete; the veracity of the information provided was confirmed through investigative facts, but the writers omitted their own involvement in the crime. Since the writers were specifically asked to explain what happened concerning the criminal incident and they did not fully do this, their narratives were deceptive by the omission.

The narratives were recoded, with accurate narratives coded as "0" and inaccurate narratives coded as "1." After recoding, 72 percent of the examined narratives were accurate and 28 percent were inaccurate (See Table 31).

**Table 31 Accurate and Inaccurate Narrative Description**

		<b>Frequency</b>	<b>Percent</b>
<b><u>Accurate</u></b>	Accurate/Complete n = 30 (Veracity)	<b>43</b>	<b>71.7</b>
	Accurate/Incomplete n = 13 (Deception)		
<b><u>Inaccurate</u></b>	Inaccurate/Incomplete n = 17 (Deception)	<b>17</b>	<b>28.3</b>

Each independent variable was examined for its relationship to accuracy and inaccuracy. Regarding equivocation, a positive relationship was found between inaccuracy and equivocation frequency ( $r = .401, p \leq .01$ ; See Table 32) in unpartitioned narratives. In partitioned narratives, positive relationships were found with inaccuracy and equivocation in both the prologue partition ( $r = .401, p \leq .01$ ) and the criminal incident partition (frequency,  $r = .294, p \leq .05$ ; density,  $r =$

.320,  $p \leq .05$ ). Stronger equivocation correlations were found with inaccurate narratives than with the broader category of deceptive narratives.

**Table 32 Pearson Product-Moment Correlation of Equivocation with Deception and Inaccuracy**

	Veracity/ Deception	Accuracy/ Inaccuracy
Veracity/Deception	$r = 1.000$ $n = 60$	$r = .629^{***}$ $n = 60$
Accuracy/Inaccuracy	$r = .629^{***}$ $n = 60$	$r = 1.000$ $n = 60$
Entire Narrative - Frequency	$r = .295^{**}$ $n = 60$	$r = .401^{***}$ $n = 60$
Entire Narrative - Density	$r = .237^*$ $n = 60$	$r = .155$ $n = 60$
Prologue - Frequency	$r = .282^{**}$ $n = 56$	$r = .401^{***}$ $n = 56$
Prologue - Density	$r = -.005$ $n = 56$	$r = .110$ $n = 56$
Criminal Incident - Frequency	$r = .107$ $n = 56$	$r = .294^{**}$ $n = 56$
Criminal Incident - Density	$r = .122$ $n = 56$	$r = .320^{**}$ $n = 56$
Conclusion - Frequency	$r = .141$ $n = 48$	$r = .161$ $n = 48$
Conclusion - Density	$r = .074$ $n = 48$	$r = .187$ $n = 48$

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

Stronger relationships between equivocation and inaccuracy were also found when examining homicide narratives than when examining narratives from all types of crimes. In unpartitioned homicide narratives, a relationship was found between deception and equivocation frequency ( $r = .743$ ,  $p \leq .01$ ). In partitioned homicide narratives, equivocation frequency within the prologue partition revealed a stronger correlation with deception ( $r = .719$ ,  $p \leq .01$ ) than equivocation within the criminal incident or conclusion partitions.

In examining correlations with negation, positive relationships were found between inaccuracy and negation in the entire narrative and in each partition of the narrative (See Table

33). Two additional relationships with negation were found when examining inaccuracy that were not found when examining deception. These additional relationships both related to frequency counts, one observed in the criminal incident partition and one in the conclusion partition. The strength and significance of inaccuracy correlations were found to be greater than deception correlations.

**Table 33 Pearson Product-Moment Correlation of Negation with Deception and Inaccuracy**

	Veracity/ Deception	Accuracy/ Inaccuracy
Veracity/Deception	r = 1.000 n = 60	r = .629*** n = 60
Accuracy/Inaccuracy	r = .629*** n = 60	r = 1.000 n = 60
Entire Narrative - Frequency	r = .223* n = 60	r = .275** n = 60
Entire Narrative - Density	r = .254** n = 60	r = .341*** n = 60
Prologue - Frequency	r = .248* n = 56	r = .283** n = 56
Prologue - Density	r = .279** n = 56	r = .362*** n = 56
Criminal Incident - Frequency	r = .172 n = 56	r = .234* n = 56
Criminal Incident - Density	r = .250* n = 56	r = .238* n = 56
Conclusion - Frequency	r = .207 n = 56	r = .247* n = 48
Conclusion - Density	r = -.168 n = 48	r = -.059 n = 48

\* p ≤ 0.10 \*\* p ≤ 0.05 \*\*\* p ≤ 0.01

In examining the total word count of the narratives, a positive correlation between inaccurate narratives and total word count was found (r = .259, p ≤ .05). Correlations of the remaining independent variables (length of prologue, unique sensory details, emotions, and quoted discourse) with inaccuracy supported the findings from deception correlations but did not

contribute additional information; the strength and significance of the correlations were the same or slightly less than the deception correlations.

### Multivariate Analysis

Multivariate analysis is the simultaneous analysis of multiple independent or dependent variables known to be correlated with each other (Tabachnick & Fidell, 1996). In the present study, binary logistic regression was performed to assess prediction of group membership -- the likelihood of veracity or deception of written narratives. Logistic regression is described as a more flexible multivariate analysis method than are methods such as discriminant function analysis, because the predictor variables in logistic regression do not need to meet the same assumptions of normality (Norusis, 1999; Tabachnick & Fidell). Logistic regression is particularly suitable for models with a dichotomous dependent variable (Norusis). The dichotomous dependent variable in the current study is the likelihood of veracity or deception of the narratives, and the predictors are the six narrative attributes identified in the research questions -- equivocation, negation, length of prologue, unique sensory details, emotions in the conclusion, and quoted discourse.

Because one objective of logistic regression is to correctly predict group membership, a relationship between the outcome and a set of predictors must first be established. If a relationship is found, the model can be simplified by eliminating some of the predictors without losing predictive power. The final model is used to predict group membership for new cases. In the present study, the goal was to develop a model to be used in predicting the likelihood of veracity or deception of written narratives in future cases in which the outcome is unknown.

The narratives under study were first examined in their entirety, without partitions. A logistic regression model, Model 1, was developed using frequency counts as predictors.

The bivariate analysis results reported previously revealed that the independent variables operationalized as density ratios appeared to be more suitable for the present study than when operationalized as frequency counts. The density measures accounted for the differences in narrative length; density measures also contained fewer correlations between the independent variables. Therefore, Model 2 was developed using density ratios. Because Model 2 applies to unpartitioned narratives, it does not include the independent variable, length of the prologue partition.

The bivariate analysis revealed differences in correlations when narrative partitions were examined individually. Therefore, three models were developed to examine the contribution of variables within each partition of the narratives. Models 3, 4, and 5 represent the prologue partition, criminal incident partition, and conclusion partition respectively.

The regression coefficients (B) indicate the change in the log odds for each one-unit change in the independent variable. The pattern, strength, and significance of the regression coefficients for each of the predictors were examined in all five regression models (See Table 34). Word count and unique sensory details found support as predictors in three of the models. Word count was of value as a predictor in Models 1, 3, and 4; unique sensory details was a significant predictor in Models 1, 2, and 4. The predictors of equivocation, negation, and emotions found support in one model each -- Model 4, Model 3, and Model 1, respectively. No support was found for quoted discourse as a predictor in any of the models.

**Table 34 Logistic Regression Coefficients (B) for Deception**

<b>Predictors</b>	<b>MODEL 1 Frequency Count Model For Entire Narrative</b>	<b>MODEL 2 Density Model For Entire Narrative</b>	<b>MODEL 3 Density Model for Prologue Partition</b>	<b>MODEL 4 Density Model for Criminal Incident Partition</b>	<b>MODEL 5 Density Model for Conclusion Partition</b>
Equivocation (Q1) Estimated Coefficient	.166	98.830	-29.784	118.507*	82.748
Negation (Q2) Estimated Coefficient	.270	89.394	72.364*	22.763	-26.781
Word Count <sup>a</sup> Estimated Coefficient	.010**	-----	4.694***	-6.790***	.682
Unique Sensory Details (Q4) Estimated Coefficient	-.7898***	-150.513***	-57.855	-41.933**	-37.785
Emotions (Q5) Estimated Coefficient	-1.716*	-294.959	441.969	23.086	-102.641
Quoted Discourse (Q6) Estimated Coefficient	.079	4.380	-40.454	38.488	-26.815
Constant Estimated Coefficient	-1.326*	-.635	-2.053***	2.437*	.322
Classification %	76.7	76.7	69.6	78.6	62.5
-2 Log Likelihood	49.956	61.318	57.947	53.530	58.655
Nagelkerke R Square	.567	.407	.394	.465	.200

\* p ≤ 0.10    \*\* p ≤ 0.05    \*\*\* p ≤ 0.01

<sup>a</sup>Word count in Model 1 is expressed as a frequency. Word count in Models 3 -5 is measured as a percentage of words in the partition to total words in the narrative. No word count is listed for Model 2, as density of words in the entire narrative cannot be calculated.

The significant predictors of deception in the regression models were equivocation, negation and length of prologue (word count percentage in prologue partition). As predictors of veracity, unique sensory details, emotions, and length of criminal incident partition (word count percentage in criminal incident partition) were significant contributors. The opposing directions

indicated by the relative lengths of the prologue and criminal incident partitions are expected, because as the percentage of words in one partition increases, the percentage of words in one or both remaining partitions decreases.

Model 2, the density model for unpartitioned narratives, is missing one predictor, since word count in the entire narrative could not be tabulated as a density. Therefore, in order to represent each of the six research question variables, the word count percentage of the prologue partition (Q3) was added to the predictors in Model 2, resulting in a mixed model, Model 6 (See Table 35).

**Table 35 Logistic Regression Coefficients (B) for Deception in Model 6**

<b>Predictors</b>	<b>MODEL 6 Density Model For Entire Narrative with Percentage of Prologue Added</b>
Equivocation (Q1) Estimated Coefficient	73.418
Negation (Q2) Estimated Coefficient	113.924*
Word Count Length of Prologue, (Q3) Estimated Coefficient	4.815***
Unique Sensory Details (Q4) Estimated Coefficient	-171.680***
Emotions (Q5) Estimated Coefficient	-311.794
Quoted Discourse (Q6) Estimated Coefficient	32.373
Constant Estimated Coefficient	-1.517
Classification %	82.1
-2 Log Likelihood	47.819
Nagelkerke R Square	.550

\*  $p \leq 0.10$  \*\*  $p \leq 0.05$  \*\*\*  $p \leq 0.01$

Logistic regression models express the ratio of the probability that an event will occur to the probability that it will not occur, or membership in one group rather than in another. In order to assess how well the models fit the population from which the sample data was drawn, the

predicted outcomes were compared to the observed outcomes. Narratives with a predicted probability of 0.5 or greater were classified as deceptive narratives and those below 0.5 were classified as veracious narratives. Both Models 1 and 2 correctly classified 76.7% of the narratives. The classification level of the partitioned models ranged from 62.5% to 78.6%; Model 4, the criminal incident partition model, had the highest classification level of the partitioned models. Model 6 had the highest classification level of any of the models, with 82.1% of the narratives correctly classified. Using Model 6, seventy-nine percent of the truthful narratives were correctly predicted and eighty-five percent of the deceptive narratives were correctly predicted (See Table 36).

**Table 36 Classification Table of Observed and Predicted Veracity or Deception <sup>a</sup>**

		Predicted		
		Veracity of Narrative	Deception of narrative	Percentage Correct
Observed		0	1	
Step 1	Veracity of Narrative 0	23	6	79.3
	Deception of Narrative 1	4	23	85.2
	Overall Percentage			82.1

a. The cut value is .500

A second method of assessing how well the models perform is to examine the likelihood, or the probability, of the observed results. This goodness of fit measure results in such a small number that the log of the likelihood is typically multiplied by -2, resulting in a -2 Log likelihood (Norusis, 1999). A perfectly fitting model would have a likelihood value of 1 and a -2 Log likelihood of 0 (Norusis). The likelihood value changes as variables are added to or deleted from the model. Models that perform well have low values for the -2 Log likelihood. Model 6 had the lowest -2 Log likelihood, 47.819. The -2 Log likelihood values of Models 1-5 ranged from 49.956 to 61.318.

To assess how much of the variation in the outcome variable is explained by the logistic regression models, Nagelkerke R Square was computed. In Models 1 and 6, the percentage of the variation in the outcome variable explained by the model was 56.7% and 55.0%, respectively. In Models 2 - 5, the percentage ranged from 20.0% to 46.5%.

After comparing the classification levels, -2 Log likelihood and Nagelkerke R Square of all six regression models, Model 6 appears to perform the best. Model 6 will therefore be used to examine the individual contributions of the regression coefficients.

If variables have only one degree of freedom, as in the current study, the Wald statistic is the square of the ratio of the coefficient to its standard error (Norusis, 1999). According to the significance level for the Wald statistics in Model 6, the coefficients for prologue percentage and density of unique sensory details reliably predicted deception of narratives at the 0.01 significance level (See Table 37). The coefficient for negation density was significant as a predictor at the 0.10 level.

**Table 37 Logistic Regression Analysis of Deception as a Function of Narrative Variables**

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Equivocation Density (H1)	73.418	118.435	.384	1	.535	7.673
Negation Density (H2)	113.924	66.023	2.977	1	.084	3.000
Prologue Percentage (H3)	4.815	1.777	7.339	1	.007	123.315
Unique Sensory Detail Density (H4)	-171.680	64.371	7.113	1	.008	.000
Emotion Density (H5)	-311.794	281.531	1.227	1	.268	.000
Quoted Discourse Density (H6)	32.373	42.456	.581	1	.446	1.148
Constant	-1.517	1.132	1.795	1	.180	.219

The odds ratio, Exp (B), for each predictor variable represents the change in odds of being in one category when the value of the predictor variable increases by one unit. The odds for unique sensory details are less than one; therefore, increasing the variable value results in decreasing odds of the narrative being deceptive. Increasing the value of the negation or prologue percentage variables results in increasing odds of the narrative being deceptive.

Emotions in the conclusion partition previously found support in a relationship with deception in the bivariate analysis of the current study. In multivariate analysis, however, emotions in the conclusion partition was of no greater predictive value than was density of emotions in the entire narrative. Similarly, although a relationship between deception and quoted discourse without quotation marks was reported in bivariate analysis, quoted discourse without quotation marks was of no greater value as a predictor in multivariate analysis than was the general category of quoted discourse.

When Model 6 was applied solely to homicide narratives, the resulting classification accuracy was 81.0%. This finding was close to the 82.1% accuracy percentage achieved with all narratives. The Nagelkerke R Square for the homicide narratives, however, was .708, revealing that a greater percentage of the variation in the outcome variable was explained by Model 6 when examining homicide narratives separately. A relatively low -2 Log likelihood of 12.47 for homicide cases revealed that the model performed better with homicide narratives than with narratives from all represented crime types.

Model 6 also inspired a similar model (7) conceiving of the dependent variable as the accuracy or inaccuracy of the narratives. The resulting classification level in predicting accuracy or inaccuracy was 73.2% (Nagelkerke R Square = .409, -2 Log likelihood = 49.62).

The following chapter presents a discussion of the statistical findings relating to the six independent variables and the dependent variable, veracity or deception. Conclusions and recommendations for further research are also discussed in this final chapter.

## Chapter V Discussion, Conclusions, and Recommendations

Chapter One presented the need for deception research examining the attributes of narratives written by adults in realistic, stressful contexts. Six research questions guided the current study. Three questions predicted a positive relationship between deception and the attributes of written narratives -- equivocation, negation, and length of the prologue partition. Three questions predicted a positive relationship between veracity and the attributes of written narratives -- unique sensory details, emotions in the conclusion partition, and quoted discourse. The purpose of the present study was to examine attributes of written narratives for possible predictive value in differentiating between the likelihood of veracity and deception of the narratives.

Chapter Two reviewed published theoretical works and research studies relating to detection of deception in oral narratives, and the few studies addressing detection of deception in written narratives. Chapter Three described the research strategy used to collect the data, and Chapter Four detailed the research methodology and findings. This fifth, and final, chapter presents the discussion of these findings and offers conclusions and recommendations for further study.

### Discussion

Examination of the attributes of the narratives under study provided support for four of the research questions, and weak support for a fifth question. The strongest correlation between deception and narrative attributes was found with length of the prologue, the partition that preceded the account of the criminal incident. The strongest correlation between veracity and narrative attributes was found with unique sensory details. Support was also found for

relationships between deception and equivocation, and deception and negation. Weak support was found for a correlation between veracity and emotions in the conclusion partition. A sixth research question addressed quoted discourse. No support was found for the broad category of quoted discourse; weak support was found for the specific category of quoted discourse without the use of quotation marks. These results are discussed further as they relate to each research question posed.

**Question 1: Is there a positive relationship between equivocation and deception in written narratives?**

The univariate analysis of equivocation in narratives revealed that half of the examined narratives contained equivocation words and half did not. The mean for equivocation words, 1.48, indicates relatively few equivocation words included in the narratives under study.

Although few equivocation words were present in the examined narratives, the bivariate analysis revealed a positive relationship between equivocation and deception, in entire narratives and in the prologue partition. The relationship between equivocation and inaccurate deception (falsification) was stronger and more significant than between equivocation and the general category of deception (including deception by falsification as well as by omission). Bavelas et al. (1990) reported that in oral discourse, adults chose to equivocate rather than to respond with definitive replies that might cause conflict. Deception by falsification may cause more conflict than deception by omission. This increased stress may explain the reason for the stronger relationship between equivocation and inaccuracy than between equivocation and deception in general.

The contribution of the equivocation variable in predicting veracity or deception was examined through multivariate analysis. In the logistic regression models developed,

equivocation had a weak contribution to the prediction of deception in the model that examined the criminal incident partition.

The correlation of equivocation and deception in the examined narratives of suspects and victims may prompt investigators to examine the context of equivocation words to identify areas of the narrative needing further explanation. Reasonable explanations may exist for the presence of certain equivocation words within the context of a narrative. Any areas of importance reported with equivocation rather than with specificity, however, invite further questioning by an investigator, to determine if a plausible explanation exists. By asking open-ended questions such as "What happened?" and remaining alert for equivocation words, investigators can identify areas that victims and suspects fail to address with specificity. Once identified, these areas can be subsequently explored with specific questioning to gain critical missing information.

**Question 2: Is there a positive relationship between negation and deception in written narratives?**

Univariate analysis of negation revealed that more than half of the examined narratives (68%) contained negation words, with a mean of 4.38 negation words per narrative. Through a bivariate examination of the strength and direction of the relationship between negation density and deception, positive relationships were found in entire narratives and in partitioned narratives. As found when examining equivocation in narratives, strongest support for correlations with negation and deception was found in the prologue partitions of the examined narratives. This finding reveals the importance of closely examining the prologue partitions, for writers may provide clues to deception even before they discuss the criminal incident itself.

Relationships between negation and inaccuracy were found in all three partitions. This finding may indicate increased avoidance when the narrative contained falsification and when the writer was under greater stress. The correlations found between deception and negation are consistent with detection of deception research in oral communication (DePaulo et al., in review; Watson, 1981) and particularly in oral accounts by individuals highly motivated to deceive (Porter & Yuille, 1996).

Through multivariate analysis, the density of negation was found to be a weak predictor of deception. This finding was observed in the prologue partition model as well as in the unpartitioned final model.

Although the inclusion of one or two negation words in a written narrative might be unrelated to deception, continued use of negation words by a suspect who is asked to write down what happened raises questions. Why might a suspect provide information about what he did not do, instead of directly answering the question concerning what he did. What information may be missing from the narrative? If negation is found within narratives, the context of the negation words should be examined. The location of these words may be informative in identifying specific areas of the narrative that need further explanation during interviews of the victims and suspects.

**Question 3: Is there a positive relationship between the length of the prologue and deception in written narratives?**

In narratives responding to the open-ended question, "What happened?" the writers determined what to include in their narratives and how to address the criminal incident for which they were being questioned. In the present study, 93% of the victims and suspects included a partition describing the criminal incident. Therefore, seven percent of the victims and suspects

completely omitted any reference to the criminal incident, even though they had received specific instructions to write down what happened concerning the incident. This finding illustrates the use of deception through omission rather than deception through the commission of a falsehood. Guilty suspects may find it less stressful to simply omit their involvement rather than to lie about it.

All writers who included the criminal incident in their narratives preceded this partition with a prologue partition, ranging in length from four words to 5,437 words. Fourteen percent of the writers ended their narratives with the end of the criminal incident; the remaining writers added a conclusion partition to their narratives.

The bivariate analysis revealed a positive relationship between deception and length of the prologue measured as word count percentage. This correlation was the most powerful relationship with deception in the present study. The multivariate analysis also identified length of prologue as the most significant predictor of deception in the examined narratives.

Although not predicted, an equally powerful correlation was found with word count percentage of the criminal incident partition, in the opposite direction. The opposing directions of the relationships between deception and partition lengths are to be expected, for as the relative length of one of the narrative partitions increases, the relative length of one or both of the remaining partitions necessarily decreases. In the conclusion partition, word count was found to be positively correlated with deception, although with less strength and significance than were correlations with the other two partitions.

The positive relationship between deception and prologue length is consistent with the reviewed literature, but the negative correlation of deception and length of the criminal incident was missing from the literature reviewed. This unexpected finding can alert investigators to give

close attention to the relative length of the criminal incident partition. The criminal incident partition is the essence of the narrative, for only this partition directly answers the question, "What happened?" Either an unusually long prologue or an unusually short criminal incident partition should inform investigators that the writer did not focus on the primary event, the criminal incident. Focused dialogue with the writers of such unbalanced narratives may uncover vital missing information concerning the criminal incident.

**Question 4: Is there a positive relationship between the presence of unique sensory details and veracity in written narratives?**

The univariate analysis revealed that eighty-three percent of the narratives contained unique sensory details, with a mean of 4.05 unique sensory details per narrative. This variable was found in more narratives than was any other variable examined in the present study.

In the bivariate analysis, a positive relationship was found between density of unique sensory details and veracity in unpartitioned narratives and in criminal incident partitions. The correlation between veracity and unique sensory details is consistent with previous research regarding oral narratives (Steller & Koehnken, 1989; Miller & Stiff, 1993), but the findings concerning partitioned narratives provide additional insight. Unlike the variables of equivocation and negation that correlated with deception in the prologue partitions, the criminal incident partition was the most informative partition for examining correlation with unique sensory details.

In homicide narratives, unique sensory details correlated positively with veracity in unpartitioned narratives, criminal incident partitions, and conclusion partitions. The writers of these narratives, all suspects in homicide incidents, would be expected to experience greater

stress than the narrative writers in crimes with lesser consequences. If the homicide suspect provided a deceptive narrative, even greater stress may be experienced.

In multivariate analysis, unique sensory details were powerful and significant predictors of veracity. This variable was a predictor in all three unpartitioned models and one partitioned model, the criminal incident model. No other single predictor in the current study performed as well.

Of the three variables predicted to indicate the likelihood of veracity in written narratives, unique sensory details appears to be the most informative, and provides important information for investigators. Examination of a narrative written by a falsely alleging victim may reveal a lack of unique sensory details because no sensory data was perceived during the fictitious incident. A narrative written by a deceptive suspect may reveal the same lack of unique sensory details, but for different reasons -- to avoid providing detailed false information that could be refuted by a competent investigator and to avoid providing a truthful account that would implicate the writer.

The examination of partitioned narratives revealed more information concerning unique sensory details than did the examination of unpartitioned narratives. An unexpected finding in the current study was the lack of correlation found between veracity and unique sensory details in the prologue partitions. This lack of correlation could indicate that deceptive writers may feel a need to include some amount of specific details in their narratives, and are most likely to place these details in the prologue partitions. Unique sensory details in the prologue partitions may represent accurate recall of events not directly related to the criminal incident. A prologue partition filled with unique sensory details followed by a criminal incident partition devoid of such details should alert the investigator to closely scrutinize the narrative.

The examination of the prologue partition for unique sensory details can enable the investigator to establish a writing pattern of the victim or suspect. Any deviations from this pattern, such as reduced unique sensory details in the criminal incident partition, may be a clue to the likelihood of deception. Suspects or victims who fail to include unique sensory details when recounting the criminal incident need carefully planned follow-up questioning to address the missing details.

**Question 5: Is there a positive relationship between the presence of emotions in the conclusion of the narrative, and veracity in written narratives?**

Only twenty-three percent of all examined narratives included references to emotions. The mean frequency count of emotions was the lowest for all the variables under study -- 0.37. No narrative contained more than four references to emotions.

Results from the bivariate analysis revealed a weak relationship between veracity and density of emotions in the conclusion partitions of the examined narratives. When examining only the homicide narratives, however, veracity correlations with frequency and density of emotions were moderate. No relationships were found between deception and emotions in other partitions of the narratives. Of the six research questions, the question regarding emotions appeared to be most affected by the level of stress associated with the crime. Suspects in homicide incidents would be expected to be more emotionally involved than suspects in crimes of lesser import, since homicides involve loss of life of a victim and loss of freedom (or life) of the offender.

Emotions were of minimal value as predictors of veracity and deception in multivariate analysis. The only effect of emotions as a predictor was a marginal contribution in the frequency count logistic regression model.

As the literature suggested, the inclusion of emotions in the conclusion partitions was more informative than in the prologue or criminal incident partitions. This is the narrative partition in which victims and suspects include their own reactions to the criminal incident. By carefully noting any references to emotions in the conclusion partitions of narratives, investigators gain valuable insight to how the victim or suspect was emotionally affected by the events.

**Question 6: Is there a positive relationship between the presence of quoted discourse within a narrative and veracity in written narratives?**

Half of the narratives studied contained one or more quoted discourse references. The mean for quoted discourse references was 2.63.

Through bivariate analysis, no relationship was found between veracity and the broad category of quoted discourse. A weak relationship was found between veracity and the density of quoted discourse without quotation marks in the entire narrative. In examining homicide narratives, however, two additional findings were present. Moderate support was found for relationships between veracity and quoted discourse without quotation marks in prologue partitions, both with density ratios and with frequency counts. No support was found for a relationship between deception and quoted discourse with quotation marks.

In multivariate analysis, quoted discourse had no significant impact as a predictor of deception in the present study. This variable did not contribute to predicting deception in either the partitioned or the unpartitioned models.

An unexpected finding in the present study was that quoted discourse with quotation marks was used differently than quoted discourse without quotation marks. This difference identifies an area for future research that may contribute to the study of veracity and deception.

Rabon (1996) makes a clear distinction between narratives that convey information directly and those that make exaggerated attempts to convince. In deceptive narratives, particularly those by falsely alleging victims, quoted discourse placed within quotation marks may be an exaggerated attempt to convince an investigator of a false accusation. Edelmann (1999) found that individuals who were highly motivated to avoid detection exhibited observable behavioral signs, due to the motivational impairment effect. In narratives written under stress, the motivational impairment effect may contribute to differences in the narratives. Under greater stress more changes may become evident, such as an effort to convince investigators through the use of quotation marks to accentuate quoted discourse. Due to the overcompensating effort to avoid detection of deception, the changes in the narratives of deceptive victims and suspects may actually become more obvious.

### Summary

Investigators, human development professionals, and other practitioners are frequently faced with the challenge of attempting to discern veracity and deception in communication. Although much has been written about the detection of deception in oral discourse, less research has been published concerning detecting deception in written narratives. The purpose of the present exploratory study was to examine linguistic and structural features of written narratives for possible predictive value in determining the likelihood of veracity or deception of the narratives.

Sixty narratives, written by suspects and victims identified through the investigation of criminal incidents, provided the database for the study. The law enforcement context was chosen in order to examine communication under stress. The narratives described criminal incidents ranging in severity from thefts to homicides, with homicide narratives potentially

involving the greatest level of stress. In the current retrospective study, the veracity or deception of the narratives had already been determined by investigative evidence. The study was, therefore, able to focus on the degree to which selected linguistic and structural attributes of the narratives were able to predict the determination of veracity or deception.

Six research questions guided the study, drawn from theoretical works and research studies in the fields of psychology, linguistics, and criminal justice. Three questions asked whether a positive relationship existed between the deception of the narrative and the narrative attributes of equivocation, negation, and length of the prologue partition. Three questions asked whether a positive relationship existed between veracity of the narrative and the narrative attributes of unique sensory details, emotions in the conclusion partition, and quoted discourse. The prologue partition, the portion of the narrative preceding the account of the criminal incident, was measured in word count percentage; all other narrative attributes were measured in frequency counts and density ratios. Support was found for the three questions relating to deception. Support was also found for a positive relationship between veracity and unique sensory details; weak support was found for a positive relationship between veracity and emotions in the conclusion partition. No correlation was found between veracity and the general category of quoted discourse. When quoted discourse without quotation marks was examined separately, weak support for a positive relationship with veracity was found.

When the narratives were partitioned into three sections, the prologue, criminal incident, and conclusion partitions, additional information was gained concerning relationships between the narrative attributes and veracity and deception. Relationships between deception and equivocation and deception and negation were stronger when located within the prologue partition. A relationship between veracity and unique sensory details was found only in the

criminal incident partition and a relationship between veracity and emotions was found only in the conclusion partition. Correlation between deception and word count percentage was strongest in the prologue partition and correlation between veracity and word count percentage was found only in the criminal incident partition.

When examining homicide narratives, the narratives believed to involve the greatest level of stress, stronger relationships with veracity were found than when examining narratives from all types of crimes. The three homicide narrative attributes found to have a higher correlation with veracity were unique sensory details, emotions in the conclusion partition, and quoted discourse without quotation marks.

Deceptive narratives containing falsification may involve a greater level of stress than narratives containing accurate information (including veracious narratives and narratives that are deceptive by omission). Therefore, relationships between narrative attributes and the accuracy or inaccuracy of the narratives were examined. Bivariate analysis revealed positive relationships between inaccuracy and the narrative attributes of equivocation, negation, and word count. These relationships were stronger than those found when examining veracity and deception.

Using multivariate analysis to examine the relative contributions of predictors, a logistic regression model was developed to predict veracity or deception of the examined narratives. The three predictors of veracity in the model were unique sensory details, emotions, and quoted discourse. The three predictors of deception were equivocation, negation, and length of the prologue partition. The resulting model correctly classified the examined narratives at an 82.1% classification level. The most significant predictor of veracity in the model was density of

unique sensory details; the most significant predictor of deception was length of the prologue partition.

### Conclusions

The results of the current exploratory study lend support to the Undeutsch Hypothesis that deceptive narratives differ from truthful narratives in structure and content. When deceptive suspects and alleged victims are under stress due to their fear of detection of their deception, changes from the expected structure may appear. Any such change requires further explanation. The analysis of written narratives offers a tool that can enable professionals to gain greater understanding of communication under stress.

The present study examined only 60 narratives and the results should, therefore, be interpreted with caution. As this was an exploratory study, additional research will be needed to validate the findings. The findings are most applicable to similar populations, in law enforcement settings.

Knowledge of relationships between narrative attributes and the likelihood of veracity or deception can assist law enforcement investigators when analyzing victims' and suspects' written narratives. Narratives containing attributes related to the likelihood of veracity can add support to victims' and suspect's accounts. By focusing on the writers' inclusion of attributes such as unique sensory details, particularly if they appear in the criminal incident partition of narratives, investigators can gain clues to veracity. A relatively long criminal incident partition can also provide insight to the likelihood of a veracious narrative.

Identification of attributes indicating the likelihood of deception can also provide valuable information for investigators. A long prologue partition followed by a short criminal incident partition is a signal to closely scrutinize the narrative for deception, as are increased use of

equivocation and negation. An interview of the writers of such narratives should follow, to gain information missing from the narrative. The narrative attributes of equivocation and negation go beyond contributing to the prediction of deception; they can identify specific areas of written narratives that need further expansion. This knowledge can be incorporated into interviewing strategies for comprehensive interviews of the narrative writers.

Deception detection methods are not ends in themselves, but are instead the means for gaining the full accounts of victims and suspects. The polygraph exam does not measure actual deception, but rather records physiological changes indicative of stress. The source of the stress can be explored during subsequent interviews with the victims and suspects. Iacono (2000) explained, "...a polygraph can more appropriately be considered an interview and interrogation assisted by the recording of psychophysiological data than a conventional, objective psychological test" (p. 777). The analysis of written narratives is a similar process, for the likelihood of veracity or deception is determined by linguistic and structural attributes of the narratives. If these attributes indicate the likelihood of deception, the next step is to conduct a structured interview with the writer. Bavelas et al. (1990) noted that deception clues do not reveal the source of the deception; they simply reveal that the individual is attempting to deceive. The subsequent interview can address the nature of the deception and its relevance to the matter in question.

Parker and Brown (2000) reminded investigators that the analysis of statements, valuable as it may be, "is not a substitute but a tool in the investigator's armoury" (p. 240). The investigator must be cognizant of the possibility that an individual whose written account was determined to be deceptive may not have committed the crime for which he is questioned. Several alternative explanations exist. The writer may have indirect knowledge of who

committed the crime, may have witnessed the crime, or may have previously committed a similar crime. By using the insight gained from the analysis of the narrative, interviewers have a greater chance of discovering the true account, of untangling what Vygotsky (1962) described as "the web of meaning" (p. 100).

This study was an attempt to progress from a heuristic approach to an empirical method of differentiating between veracity and deception. The findings of the present study offer the potential for investigators and other practitioners to use a more systematic process to determine the likelihood of veracity and deception in narratives written under stress. The answers to the study's six research questions suggest an increase in the understanding of potential indicators of veracity and deception in written narratives. A fuller understanding of written narratives holds promise for advancing understanding in oral discourse as well.

#### Limitations

The current study examined 60 narratives provided by law enforcement agencies. Examination of more than sixty narratives could yield additional information relating to linguistic and structural variables. Gathering data from sources in varied environments outside the field of law enforcement could also result in additional findings concerning the veracity and deception of written narratives.

Six selection factors limited the inclusion of narratives in the present study. Narratives selected for examination were from incidents with clear case resolutions and were written in response to open-ended instructions. They were legible and written in English; only one narrative was selected from each individual and from each incident. The selection factors were chosen to minimize confounding influences in the study. Examination of narratives not selected for study, however, may yield important results. For example, narratives written as the result of

direct, closed-ended questions may still contain important attributes for determining veracity and deception, but were beyond the scope of this study.

A consideration in deception field studies is the difficulty in accurately determining veracity and deception, even after criminal charges have been resolved. Smith (2001) noted that the absolute truth of statements can in fact rarely be determined. It is possible that a confession might be fabricated, or that a jury may convict an innocent person or absolve a guilty individual. The decisions by a judge or jury may also be confounded by legal maneuvering (Iacono, 2000). Bird (2001) recognized that in the courtroom, decisions must be made quickly, without the benefit of years of scientific research; a degree of uncertainty is therefore expected and accepted. In field studies, ground truth is difficult to establish with certainty (Horvath et al., 1994). The confession and case evidence must be carefully examined. However, field studies offer greater ecological validity than do laboratory studies, for they examine deception in realistic, stressful situations.

#### Recommendations for Further Research

The incorporation of eclectic strategies in future deception studies, as recommended by Porter and Yuille (1995), can further add to the growing body of knowledge. By drawing from varied fields such as memory research, additional attributes can be identified to inform the analysis of written narratives.

Further study of partitioned written narratives may reveal additional insight. Findings from the present study appear to indicate that the location of the narrative attributes within the prologue, criminal incident and conclusion partitions affects their value as predictors of veracity and deception. Additional research is needed to validate the findings and to further investigate the effect of location of attributes within written narratives.

The positive relationship between veracity and the relative length of the criminal incident partition was an unexpected finding in the current study. Future studies could examine the effect of changes in the relative length of the incident partition, the section of the narrative that addresses the issue in question. The relative length of the incident partition may be more informative in predicting veracity than the relative length of the prologue partition is in predicting deception.

In the present study, a difference was found between the use of quoted discourse with and without quotation marks. A closer examination of types of quoted discourse within written narratives may provide additional information relating to the correlation between quoted discourse and the determination of veracity or deception of the narrative.

Finally, the further division of deception into two components -- deception by omission and deception by commission -- may reveal additional information. With such a division, the accuracy and inaccuracy of the narratives can be examined as a dependent variable.

### Insights

In addition to gaining information directly from the data in the present study, insights were also garnered from the process of the study. Analysis of demographic variables, a qualitative approach to word analysis, and the examination of electronic communication are examples of future research ideas that emerged during the research process.

The demographic data of the writers may influence writing styles, and, therefore, affect the determination of veracity or deception of narratives. For example, do women use more equivocation words in communication, both truthful and deceptive, than do men? Do individuals with less education include fewer unique sensory details than those with more education? In addition to education levels, stages of development may affect individuals' written

narratives. Stage development theories such as Kohlberg's levels of moral development may provide insight to future deception studies. The age and race of narrative writers may also have an effect, particularly on the linguistic features of the narratives. The analysis of demographic variables of narrative writers may reveal additional information relative to how individuals deceive.

Qualitative aspects of communication may also contribute to the discernment of veracity and deception. Certain sensory details may be more predictive of veracity than others. The description of smells, for example, may be more predictive of veracity than are visual descriptions. Future qualitative studies could also explore meanings of individual words in narratives. Specific equivocation or negation words may be highly significant in discerning deception, while others may be of lesser value.

The examination of multiple narratives from the same person may reveal additional clues to veracity and deception. One narrative, written before the individual was under stress, could serve to establish the individual's personal and cultural norms in communication style. The analysis of the changes that occur in the person's second narrative, written while under stress, may lead to greater understanding of patterns of deception.

Falsely alleging victims and guilty suspects may tell their fabricated story so many times that a clear delineation between fabrication and reality starts to disappear. Could a re-framed reality emerge, in which the fabrication actually becomes more real than the truth itself? If so, would the level of stress be reduced, since these individuals might not believe they are deceiving? Would indicators of deception, therefore, be absent? The concept of deception detection in re-framed reality situations may also have application to professionals outside the law enforcement context. Marriage counselors and therapists may work with individuals and

couples who have created their own reality. When two people live within such a co-created reality and continually reinforce it, might they come to believe that it is true, and no longer exhibit indicators of deception related to stress?

Indicators of the likelihood of veracity or deception could also be examined within computer-mediated communication. Indicators present in electronic messages may differ from those found in traditional written narratives, particularly with the addition of new forms of expression, such as emoticons. The study of veracity and deception in written narratives is a relatively new field, offering researchers a wide range of opportunities for further study of both traditional and innovative forms of communication.

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## Endnotes

<sup>1</sup> In the present study, the terms "truthful" and "veracious" are used to indicate that the narrative in question contains accurate information concerning the writer's involvement in the criminal incident.

<sup>2</sup> Undeutsch's (1989) Reality Criteria are as follows:

### Fundamental Criteria:

1. Anchoring
2. Concreteness
3. Wealth of details
4. Originality
5. Internal Consistency
6. Mentioning of details specific to the type of case

### Manifestations of the Criteria

7. Reference to details exceeding the child's capability to understand
8. Reporting of subjective experiences
9. Mentioning of unexpected complications
10. Spontaneous Corrections
11. Self-deprecating Interspersions

<sup>3</sup> Steller and Koehnken's (1989) Criteria-Based Content Analysis criteria are subdivided into the following five categories:

### 1. General Characteristics

- Logical Structure
- Unstructured Production
- Quantity of Details

### 2. Specific Contents

- Contextual Embedding
- Descriptions of Interactions
- Reproduction of Conversation
- Unexpected Complications during the Incident

### 3. Peculiarities of Content

- Unusual Details
- Superfluous Details
- Accurately Reported Details Misunderstood
- Related External Associations
- Accounts of Subjective Mental State
- Attribution of Perpetrator's Mental State

### 4. Motivation-Related Contents

- Spontaneous Corrections
- Admitting Lack of Memory
- Raising Doubts about One's Own Testimony
- Self-deprecation
- Pardoning the Perpetrator

### 5. Offense-Specific Elements

- Details Characteristic of the Offense

<sup>4</sup> Electrodermal response is the skin resistance or conductance, measured as the galvanic skin response (Iacono, 2000).

<sup>5</sup> Iacono's (2000) research data results from control-question polygraph examinations, in which responses to questions relating to the crime are compared to responses to unrelated but emotion-eliciting questions.

<sup>6</sup> Undeutsch's first article was written in German, in 1967, titled Beurteilung der Glaubhaftigkeit von Zeugenaussagen (Assessing Validity of Testimonial Statements). It was published in a book that he edited, Handbuch der Psychologie. DBd. II: Forensische Psychologie. Goettingen: Hogrefe.

<sup>7</sup> Two decision rules are currently used to indicate veracity. Both rely on Criteria-Based Content Analysis criteria (Steller and Koehnken, 1989; See Endnote 2). In Yuille's (1989) decision rule, criteria 1-5, plus any other two criteria must be present. Raskin and Steller (1989) use the presence of criteria 1-3, plus any other four criteria.

<sup>8</sup> The Validity Checklist incorporates case material and the results of investigative procedures. Examples include comparing the forensic evidence with the actions described in the victim's narrative and comparing the victim's behavior with the emotions included in the narrative (Parker & Brown, 2000).

<sup>9</sup> The structural criteria adapted by Honts and Devitt (1993) from Kaster are as follows:

- Verb choice
- Use of connectors
- Failure to answer questions
- Inconsistent speech style
- Changes in verb tense
- Improper use of pronouns
- Use of generic terms
- Definite and indefinite articles
- Change of terms used to describe the same object or person
- Use of others to attest to one's honesty
- Inconsistent subjective chronometry (length of statement segments relative to time elapsed)

<sup>10</sup> Spelling variation of Koehnken and Kohnken is due to translation from the original German.

<sup>11</sup> The six additional criteria used by Kohnken et al. (1995, p. 676) are as follows:

- Reporting style
- Display of insecurities
- Providing reasons for lack of memory
- Cliches
- Repetitions
- Comments and interpretations regarding the event

<sup>12</sup> The 13 Scientific Content Analysis criteria used in the Smith (2001) study (p. 30) were as follows:

- Change in language
- Emotions
- Improper use of pronouns
- Lack of commitment
- No denial
- Out of sequence information
- Social introduction
- Spontaneous corrections
- Structure
- Tense change
- Time
- Use of unimportant information
- Unnecessary connections

<sup>13</sup> The full listing of hedges provided by Wade (1993, p. 16) is as follows:  
guess, maybe, think , believe, sort of, kind of,  
something like, apparently, seemed, appeared,  
probably, assume, about, approximately, around,  
or whatever, or something, don't know, not sure, like

<sup>14</sup> Rudacille's (1994) entire listing (p. 77-78) of the sixteen categories of verbal evasion are as follows:  
Unfinished Business  
"I can't" phrases  
Hypothetically Structured Phrase  
Hard Question  
Objection  
Non Reflective Denial of Knowledge  
Maintenance of Dignity  
Interrogatory  
Projection  
No Proof  
Accusatory  
The Answer is ...  
Rambling Dissertation  
The Answer Does Not Equal the Question  
Denial of Presence  
Speech Errors

<sup>15</sup> In the present study, the gustatory category included both the sense of taste and the kinesthetic actions of eating and drinking.

<sup>16</sup> See endnote 10.

## Vitae

Susan Adams received her undergraduate degree from Springfield College and Masters Degrees from Montclair State University and Virginia Tech. She taught for twelve years, then became an FBI Agent in 1983. Ms. Adams currently serves as an instructor at the FBI Academy, where she teaches courses in Interviewing, Interrogation, and Statement Analysis. She is also an adjunct professor for the University of Virginia and teaches a graduate course in Statement Analysis to police officers at the FBI National Academy.

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