Analysis of the collection of relevant forensic literature
VERBUM SAT

PROJECT BACKGROUND

The project *VERBUM SAT: Developing forensic statement analysis standards to fight CAE: A victim-centered approach* was established as a collaborative effort to remedy secondary victimization of children in forensic procedures. To this end, a transnational partnership between law enforcement agencies, clinical institutions, prevention centers and academic research institutes was formed that has the required expertise, knowledge and research resources to analyze and evaluate all relevant aspects of this problematic.

Based on the current state of law enforcement procedures, legal proceedings and social service arrangements, there is an ever-growing need across these domains to establish an approach built upon victim's rights and well-being while maintaining the efficiency of instituted good practices. This is especially true for victimized children who are summoned to disclose acts of abuse and exploitation, which often lead to undue stress and confusion for the latter. The guidelines set forth in the UN Convention on the Rights of the Child, European Convention on the Exercise of the Children's Rights, Council of Europe Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse etc. and the Directives 2011/93/EU, 2011/92/EU, 2011/93/EU and 2012/29/EU of the European Parliament, are all aimed towards improving established practices that can contribute to retraumatisation of the children.

The general goal of the project is to establish an appropriate victim centered approach that is able to address the specific needs and provide protections needed by child victims of abuse and exploitation. The project proposes a thoroughly noninvasive method in the form a forensic statement analysis that would forego the need for repeated interviews and sessions with children. The object of investigation would be reduced to the initial statement given by the victim. This will exclude victims from the whole process and offer an objective technique to get relevant information needed to resolve the forensic and legal process in question. For successful implementation, the method requires specific case management protocols and standards for professionals that will be instituted by committing to a coordinated and multidisciplinary activity between partner institutions.

To achieve these objectives, project activities will be primarily directed towards the establishment and implementation of forensic statement analysis (FSA) by training law enforcement experts this innovative forensic tool specialized for combating CAE. By enhancing and strengthening their capacity to standardize collection and analysis of relevant information, they will be able to verify the veracity of the statements and thereby improve the efficiency of investigative and forensic procedures.

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CONTENTS

1 INTRODUCTION

The *collection of relevant literature* presents a comprehensive overview of the scientific forensic literature that has been used in the establishment of forensic statement analysis (FSA). The research and educational material is focused on the linguistic aspect of forensic investigation, but also includes general forensic topics, which need to be taken into account within the realization of the project. The topics addressed are the systematic analysis of language in the context of research into crime and justice. More specifically, research on police interview techniques, practices, and analytic methods that have been established as a collaborative effort between linguists, psychologists, psychoanalysts, and scholars of policing. The latest research initiatives are based on the vast quantities of language data that is affecting the development of social science research generally, and criminological research in particular. The collected forensic literature includes research material from the field of forensic linguistics, law, policing, justice, criminology, forensic psychology and psychoanalysis. The literature is being used in tasks of WP4 and WP5 research groups, but more importantly, as the fundament for the preparation of training modules in WP6 and WP7 project activities. The report is divided into three chapters and an introduction. The first chapter lists the individual units of the forensic literature, the second chapter presents a short overview of the forensic methods and protocols that are currently in use in forensic procedures and the third chapter contains an analysis of forensic methods concerning child development and linguistic capacity.

2 FORENSIC LITERATURE

The project work is based on the principles established within the field of forensic science. It is a broad discipline, which applies the methods of the natural and physical sciences to matters of criminal and civil law. In this regard, almost any science can be forensic science because almost any science can contribute to solving a crime or evaluating civil harm. More specifically, forensic scientists examine and analyze evidence from crime scenes and elsewhere to develop objective findings that can assist in the investigation and prosecution of perpetrators of crime or absolve an innocent person from suspicion. Common forensic science laboratory disciplines include forensic molecular biology (DNA), forensic chemistry, trace evidence examination (hairs and fibers, paints and polymers, glass, soil, etc.), latent fingerprint examination, firearms, and tool mark examination, linguistic analysis, fire and explosives examinations, forensic toxicology, and digital evidence. Some forensic disciplines practiced outside forensic laboratories include forensic pathology, forensic nursing, forensic psychiatry, forensic entomology, and forensic engineering. Some practices combine both approaches. For the aim of project realization, the focus was put on the purview of forensic linguistics and forensic psychology.

The project idea and the vision of VERBUM_SAT, both depended on quality analysis of forensic literature to also meet set objectives and targets. The research plan, therefore, required an in-depth analysis of the already existing literature, covering several overlapping areas, and based on this produce independent studies regarding the use of forensic interviewing methods in proceedings involving child victims. Since all partners were involved in the research work throughout all the stages of the project, with relevant findings and results being shared between them, it was important to properly cover individual interest areas. The literature is as a result divided according to specific objectives and planned outcomes and covers the following areas: forensic linguistics, forensic psychology, and criminology.

2.1 Forensic linguistics

Forensic linguistics is the primary research discipline on the project. It is the application of applied linguistic knowledge, methods, and insights to the forensic context of law, language, crime investigation, trial, and judicial procedure. While linguistics has a long tradition of describing written and spoken texts and so the description of legal texts and interactions in a legal context, forensic linguistics is essentially distinguished from linguistics by engaging with the socio-legal consequences of the written and spoken texts it describes. In the context of the project activities and set goals, forensic linguistics is essential for recognizing and analyzing individual characteristics and the success of forensic interview protocols that are adapted to traumatized children.

2.1.1 Language and forensic science

The focus of the VERBUM SAT project research is the linguistic aspect of victim, witness, or perpetrator testimony. Because of this, the initial emphasis was initially on forensics and language.

- Olsson, John (2008). Forensic Linguistics. Continuum.

  A monography on Forensic Linguistics. This is the discipline based on the application of linguistic knowledge to a particular social setting, namely the legal forum (from which the word forensic is derived). In its broadest sense we may say that Forensic Linguistics is the interface between language, crime and law, where law includes law enforcement, judicial matters, legislation, disputes or proceedings in law, and even disputes which only potentially involve some infraction of the law or some necessity to seek a legal remedy.

- Shuy W., Roger (2005). Creating Language Crimes: How Law Enforcement Uses (and Misuses) Language. Oxford University Press.

  The book is about language evidence, not the more commonly known physical evidence such as DNA, fingerprints, or hair and fiber analysis. Its major focus is on the language used in undercover operations, when cooperating witnesses and policemen wear hidden microphones and covertly tape-record their targets. The book is an effort to illuminate one area of forensic linguistics that should be understood and considered in certain types of criminal cases—the way conversational strategies can lead to indictments and affect the outcome of trials.

- Gibbons, John & Turell M., Teresa (2008). Dimensions of Forensic Linguistics. John Benjamins Publishing Company.

  The volume is to provide a guide to the multidisciplinary nature of Forensic Linguistics. The book seeks to address the links in Forensic Linguistics between theory, method and data, without neglecting the need for new research questions in the field.

- Picornell, Isabel (2013). Analysing Deception in Written Witness Statements. Linguistic Evidence in Security, Law and Intelligence. Vol.1. No. 1.

> The study examines the characteristic features of witness narratives and proposes a new approach to search for deception cues. Narratives are treated as a progression of episodes over time, and deception as a progression of acts over time.

- Coulthard, Malcom & Johnson, Alison (2010). The Routledge Handbook of Forensic Linguistics. Routledge.

  > The aim of the Handbook is to provide a unique work of reference to the leading ideas, debates, topics, approaches and methodologies in Forensic Linguistics, with chapters written by the world's finest academics, both established and up-and-coming.

- Coulthard, Malcolm; Johnson, Alison & Wright, David (2017). An Introduction to Forensic Linguistics: Language in Evidence. Routledge

- Gibbons, John & Turell M., Teresa (2008). Dimensions of Forensic Linguistics. John Benjamins Publishing.

  > A guide to the multidisciplinary nature of Forensic Linguistics – understood in its broadest sense as the interface between language and the law.

2.1.2 Forensic interviews

A substantial part of the project activities was focused on interview procedures. Different approaches to interviewing individuals can produce completely different results: on the one hand it is possible to have an intrusive approach with a high efficiency rate and on the other, a multi-phase interview, with several sessions tailored to the interviewee's wishes and requirements. But the project objectives required that special attention should be paid to interviews involving child victims, as in these cases it is not only the most relevant information that would help to resolve the case that is important, but especially the well-being of the child being interviewed. The collected literature provided an overview of forensic interviews currently in use, their positive and negative sides, and potential features and solutions for inclusion in the FSA method.

- Brubacher P., Sonja; Poole, Debra Ann & Dickinson J., Jason (2015). The use of ground rules in investigative interviews with children: A synthesis and call for research. Developmental Review 36. 15-33.

  > A review of the use of ground rules in investigative interviews, the developmental differences that likely underlie children's ability to make sense of these rules, and research pertaining to the effects of the ground rules commonly included in interview guidelines on the reports of 3- to 13-year-old children.

- Hershkowitz, irit & Terner, Anat (2007). The Effect of Repeated interviewing on Children's Forensic Statement of Sexual Abuse. Applied Cognitive Psychology. 21: 1131-1143.

  > A study on the effects of multiple interviews with children alleging sexual abuse. The research shows that that repeated investigations may create and preserve inaccurate details, however also indicating that repeated open-ended interviews are not necessarily harmful and may have certain advantages.

- Wells C., Robert (2008). The Art of Investigative Interviewing. Countering the Lie of Omission. FBI Law Enforcement Bulletin. 12.

  > A short overview of the challenges of forensic interviewing and guidelines to more accurately and successfully conduct interviews.

- Green, Tracey (2012). The future of investigative interviewing: Lessons for Australia. Australian Journal of Forensic Sciences. Vol. 44. No.1. 31-43.
  > The article discusses the investigative interview and seeks to determine if the UK reform can be applied in the Justice system in Australia. The focus is on interviews of suspect rather than of witnesses and victims.
- Abbe, Allison & Brandon E., Susan (2013). The Role of Rapport in Investigative Interviewing: A Review. Journal of Investigative Psychology and Offender Profiling. 10: 237-249.
  > A study on the usefulness of rapport for the effectiveness of investigative interviewing. Empirical findings suggest that rapport building, preceding the information gathering stages, may be beneficial to such interviewing as it helps witnesses to recall more information, increase trust and lead to more cooperation.
- Evans D., Angela; Roberts P., Kim, Price L., Heather & Stefek P., Candyce (2010). The Use of Paraphrasing in Investigative Interviews. Child Abuse & Neglect 34. 585-592.
  > The study assessed the use of paraphrasing in 125 investigative interviews of allegations of maltreatment of children aged 4–16 years. Interviews were conducted by police officers and social workers. All interviewer prompts were coded into four different categories of paraphrasing. All children's reports were coded for the number of details in response to each paraphrasing statement.
- Westera J., Nina; Kebbell R., Mark & Milne, Becky (2016). Want a Better Criminal Justice Response to Rape? Improve Police Interviews with Complainants and Suspects. Violence Against Women. Vol.22(14). 1748-1769.
  > An outline how targeting variables, within control of the criminal justice system, can improve the quality of information police obtain from interviews with complainants and suspects. Analysis of how, by preserving these accounts on video, the criminal justice process can more adequately use this information to improve effective decision making from investigation through to criminal trial through to prevention.
- Guadagno L., Belinda; Hughes-Scholes H., Carolyn & Powell B., Martine (2012). What themes trigger investigative interviews to ask specific questions when interviewing children. International Journal of Police Science & Management. Vol. 15. No. 1.
  > The study aims to examine the themes in abuse-related interviews that trigger investigators to ask specific questions. Twenty police officers who were authorized to conduct investigative interviews with children completed a mock interview with an expert in child abuse interviewing who had been trained to play the role of an abused child.
- Powell B., Martine & Guadagno L., Belinda (2013). Workplace stressors for investigative interviewers of child-abuse victims. Policing: An International Journal of Police Strategies & Management. Vol. 36 No. 3.
  > The purpose of this study is to identify the nature and prevalence of workplace stressors faced by interviewers of child sexual assault victims.
- Cauchi, Rita & Powell B., Martine (2009). An examination of police officers notes of interviews with alleged child abuse victims. Policing: An International Journal of Police Strategies & Management. Vol. 11 No. 4.
  > The study provides a critical examination of handwritten records (notes) of interviews contained in a sample of 89 police case files about alleged child abuse.
- Feltis B., Brooke; Powell B., Martine; Snow C., Pamela & Hughes-Scholes H., Carolyn (2010). An examination of the association between interviewer question type and story-grammar detail in child witness interviews about abuse. Child Abuse & Neglect 34. 407–413.
  > The study compares the effects of open-ended versus specific questions, and various types of open-ended questions, in eliciting story-grammar detail in child abuse interviews.

- Powell B., Martine & Guadagno, Belinda (2008). An Examination of the Limitations in Investigative Interviewers' Use of Open-Ended Questions. Psychiatry, Psychology and Law. Vol. 15, No. 3, 382–395.

  The aim of the study is to identify the nature of investigative interviewers' limitations when using open-ended questions, and to compare how representative these limitations are in three distinct interview paradigms.

- Guadagno L., Belinda & Powell B., Martine (2014). An examination of the prevalence of temporally leading questions in child witness interviews. International Journal of Police Science & Management. Volume 16 Number 1.

  The study comparing the incidence of content and temporally leading question in field interviews conducted by police offices when eliciting accounts from children about abuse and a study that uses standardizes mock rather than field interviews, where there was a precise record of what events occurred.

- Pichler, Anne Sophie; Sharman J., Stefanie; Powell, Martine; Westera, Nina & Goodman-Delahunty, Jane (2020). Association between Interview Quality and Child Sexual Abuse Trial Outcome. Journal of Family Violence 35:395–403.

  The aim of the study is to explore the association between interview quality, interview inconsistencies raised during cross-examination, and trial outcome, while taking into account the strength of the prosecution case.

- Abbe, Allison & Brandon E., Susan (2014). Building and maintaining rapport in investigative interviews. Police Practice and Research. Vol. 15, No. 3, 207–220.

  This study identifies seven tactics for rapport building supported by empirical research, such as nonverbal mimicry and self-disclosure. Other considerations for practitioners include potential trade-offs of rapport-building tactics, source resistance, and the use of interpreters.

- Navarro, Carolina; Knight, Tess; Sharman J., Stefanie & Powell B., Martine (2019). Challenges in translating interview protocols for alleged child victims of sexual abuse to different languages: A case study. Child Abuse & Neglect 94.

  The article focuses on one previously unexplored issue related to applicability of IIPCs: how well they translate into other languages. This case study provides an in-depth analysis of an example of the translation of an IIPC to a new language and its adaptation to a particular cultural setting.

- Magnusson, Mikaela; Ernberg, Emelie; Landström, Sara & Akehurst, Lucy (2020). Forensic inerviewers' experiences of interviewing children of different ages. Psychology, Crime & Law. 26(10). 967-989.

  This mixed-methods study examined Swedish practitioners' views on different interviewing components (ground rules, rapport building, practice narratives, question types), props, strategies for adapting their methods for preschool-aged children, and perceptions of challenges interviewing children of differing ages.

2.1.3 Linguistics and deception

In arguing for a coherent method that can be applied in interviewing victims of abuse and exploitation, one of the most important aspects is the relation between linguistic characteristics and approaches to deception. This is especially relevant when dealing with unreliable witnesses or in the case of the project traumatized victims, whose testimony is often called into question

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or even disregarded as unreliable. Since the focus of the project is to determine the credibility of such statements and testimonies with as little direct impact as possible to the interviewee, it was vital to get together a set of linguistic literature that meets this challenge.

- Shuy W., Roger (1998). The Language of Confession, Interrogation, and Deception. Sage Publications.

    Detailed analysis of the discourse of interrogation and confession demonstrates that neither suspects nor law officers can afford to think that words mean just what they say. The condition of the speakers, whether they are asking or answering the questions, has much to do with the meanings of statements as those meanings are intended and inferred. The conditions under which statements are made also have much to do with their meaning.

- Colwell, Kevin (2007). Assessment Criteria Indicative of Deception (ACID): An Integrated System of Investigative Interviewing and Detecting Deception. Journal of Investigative Psychology and Offender Profiling. 4:167-180.

    The study describes the assimilation and validation of Assessment Criteria Indicative of Deception (ACID). ACID is derived from investigative interviewing, Criteria-Based Content Analysis, Reality Monitoring, and interpersonal deception.

- Newman L., Matthew; Pennebaker W., James; Berry S., Diane & Richards M., Jane (2003). Lying Words: Predicting Deception from Linguistic Styles. PSPB, Bol. 29. No. 5: 665-675.

    The study investigates the features of linguistic style that distinguish between true and false stories. In an analysis of five independent samples, a computer-based text analysis program correctly classified liars and truth-tellers.

- Knapp L., Mark; Hart P., Roderik & Dennis S., Harry (1974). An Exploration of Deception as a Communication Construct. Human Communication Research 1(1): 15-29.

    Through controlled observation and laboratory testing, the study attempts to determine what verbal and nonverbal behaviors were characteristic of intentionally deceptive communicators.

- Adams H., Susan & Jarvis P., John (2006). Indicators of veracity and deception: an analysis of written statements made to police. Speech, Language and the Law 13(1): 1-22.

    The study examines linguistic and structural features present in written criminal statements for predictive value in determining the likelihood of veracity or deception. Statements written by suspects and victims identified through the investigation of criminal incidents serve as the base of data.

- DePaulo M, Bella; Rosenthal, Robert; Rosenkrantz, Judith & Rieder Green, Carolyn (2010). Actual and Perceived Cues to Deception: A Closer Look at Speech. Basic and Applied Social Psychology.

    The study, we examined specific verbal and paralinguistic cues that might reveal when deception is occurring or that might be used by perceivers in their attempts to detect deception; also, we examined quantitatively the correspondence between actual cues to deception and perceived cues to deception.

2.2 Forensic psychology

The psychological aspect of forensic investigation is crucial in cases that involve child victims, since children and especially those who are traumatized, are more susceptible to further harm during forensic proceedings than adults.

- Crighton A., David & Towl J., Graham (2015). Forensic Psychology. Wiley.
  A textbook on the contemporary state of forensic psychological practice.
- Fanetti, Matthew; O'Donohue T., William; Happel N., Rachel & Daly N., Kresta (2015). Forensic Child Psychology: Working in the Courts and Clinic. Wiley.
  The overarching goal of this text is to provide an accessible and basic examination of psychology and law pertaining to children so that experts who will enter into or are a part of the workforce with need of this kind of information will be better prepared.
- Ward, Tony; Polaaschek L.L., Devon & Beech R., Anthony (2006). Theories of Sexual Offending. Wiley.
  The book is focused and centred on the topic of sex offenders. The primacy of theory in informing both practice and research is implicit throughout this book; the critical role of theory in understanding sex offending is made absolutely explicit.
- Grigorenko L., Elena (2012). Handbook of Juvenile Forensic Psychology and Psychiatry. Springer.
  The handbook offers insights and guidance illuminating the many points at which the practice of mental health and the juvenile justice system intersect today.
- Hughes-Scholes H., Carolyn; Powell B., Martine & Sharman J., Stefanie (2014). An Examination of Police Officers' Beliefs About How Children Report Abuse. Psychiatry, Psychology and Law, Vol. 21, No. 1, 127–138.
  The aim of the study is to examine police officers' beliefs about how children report abuse. Fifty-two officers read transcripts of nine interviews, which were conducted with actual children or adults playing the role of the child witness.
- Bromberg S., Daniel & O'Donohue T., William (2013). Handbook of Child and Adolescent Sexuality. Developmental and Forensic Psychology. Academic Press.
  The book synthesizes what is currently known about human sexual development early in the lifespan and about factors that derail sexual development. The Handbook should be of utility to a wide range of professionals including clinical, forensic, developmental psychologists and etc.
- Schwartz L., Lita & Isser K., Natalie (2012). Endangered Children. Homicide and Other Crimes. CRC Press.
  The book focuses on child endangerment, neglect, violence, abuse and other societal problems, or challenges, and attempts to resolve them.

- Holmberg, Ulf & Madsen, Kent (2015). Interviewees' Psychological Well-being in Investigative Interviews: A Therapeutic Jurisprudential Approach. Psychiatry, Psychology and Law. Vol. 22, No. 1, 60-74.

  In this experimental study, 146 subjects were assigned to one of two groups: one undergoing humanitarian rapport interviews, the other undergoing non-rapport interviews. Each group underwent two interviews separated by a six-month interval.

2.3 Criminology

During the course of the project, we have used criminology, the scientific study of crime as an individual and social phenomenon, as a guide in researching the field of secondary victimization. Criminological research areas include the incidence and forms of crime as well as its causes and consequences. It is an interdisciplinary field in the behavioral sciences, drawing especially on the research of sociologists and psychologists, as well as on writings in law.

- Sumner, Colin (2004). The Blackwell Companion to Criminology. Blackwell.
  The book contains predominantly sociological criminology, to reflect contemporary thinking and current key issues within the discipline of criminology.
- Piquero R., Alex & Weisburd, David (2010). Handbook of Quantitative Criminology. Springer.
  The Handbook of Quantitative Criminology is designed to be the authoritative volume on methodological and statistical issues in criminology and criminal justice.
- DeKeseredy S., Walter (2010). Contemporary Critical Criminology. Routledge.
  The book introduces the most up-to-date empirical, theoretical, and political contributions made by critical criminologists around the world.
- P. Lynch P., James & Addington A., Lynn (2006). Understanding Crime Statistics: Revisiting the Divergence of the NCVS and the UCR. Cambridge.
  The book explores the issues surrounding divergence in the Uniform Crime Reports (UCR) and the National Crime Victimization Survey (NCVS), which have been the two major indicators of the level and of the change in level of crime in the United States.
- Morrison, Wayne (1995). Theoretical Criminology: From Modernity to Post-Modernism. Routledge.
  The book incorporates many of the exciting debates in the social sciences and philosophy of knowledge concerning the issues of modernity and post-modernism. It sets out a new project for criminology, a criminology of modernity, and offers a sustained critique of theorizing without a concern for social totalities.
- Froeling T., Karen (2007). Criminology Research Focus. Nova Science.
  The book presents the leading research on criminology, the interdisciplinary field in the behavioural sciences, drawing especially on the research of sociologists and psychologists, as well as on writings in law.
- McAlinden, Anne-Marie (2013). 'Grooming' and the sexual abuse of children: institutional, Internet, and familial dimensions. Oxford.
  The book argues that due to the difficulties of drawing clear boundaries between innocuous and harmful motivations towards children, pre-emptive risk-based criminal law and policy are inherently limited in preventing, targeting and criminalising 'grooming' behaviour prior to the manifestation of actual harm.

3 FORENSIC METHODS

Collection of relevant literature offers the forensic expert community and experts in related fields an overview of topic relevant to victim statement analysis method that can be used for distinguishing their veracity. This can be justifiably used in criminal cases.

Since the findings obtained from forensic literature are not meant to be just a pure analysis of relevant theories regarding forensic undertakings or an overview of the most current approaches to conducting interviews with traumatized child victims but are an integral part in the establishment of Forensic statement analysis, it was paramount to also address and include of methods that are being used by forensic officials in handling cases of abuse and exploitation of children. To enable a reliable forensic investigation to be carried out, by gathering relevant information, given statements need to remain uncontaminated, while same time providing a non-invasive and safe environment and procedure for the children who are included in the investigation. For this reason, the most compatible forensic interview methods have been evaluated and determine their effectiveness in achieving the main and specific objectives: 1) Enhancing the capacity of Law enforcement and judicial authorities to investigate child abuse and exploitation crime through an alternative investigative tool; 2) Increasing and facilitating reporting of child abuse and exploitation crime to law enforcement authorities; 3) Improving accuracy and effectiveness for the identification of victims of child abuse and exploitation; 4) Enhancing the cooperation between private entities and law enforcement/ child welfare/ criminal justice authorities, for detecting, reporting, and investigating child abuse and exploitation crime and taking remedial action.

The methods researched and analyzed as a part of the *VERBUM SAT* project activities are the Criteria-Based Content Analysis, Reality Monitoring, NICHD (interview protocol for children), Scientific Content Analysis, and additional literature that entails the comparison between these methods.

3.1. CBCA

Criteria-Based Content Analysis is based on the hypothesis, originally stated by Undeutsch (1967), that a statement derived from the memory of an actual experience differs in content and quality from a statement based on invention or fantasy (Undeutsch hypothesis). The presence of each criterion strengthens the hypothesis that the account is based on genuine personal experience. This means that truthful statements have more of the elements measured by CBCA than do false statements. Statement Validity Assessment (SVA) uses CBCA to assess the veracity of child witnesses' testimony in trials for sexual offenses.

- Vrij, Aldert (2005). Criteria-Based Content Analysis: A Qualitative Review of the First 37 Studies. Psychology, Public Policy, and Law. Vol. 11: 3-41.

    A review on the accuracy of Criteria-Based Content Analysis, interrater agreement between CBCA coders, frequency of occurrence of CBCA criteria in statements, the correlations between CBCA scores and (i) interviewer's style and (ii) interviewee's age and social and verbal skills, and issues regarding the Validity Checklist.

- Santtila, Pekka; Roppola, Heli; Runtti, Markus & Niemi, Pekka (2000). Assessmentof child witness statements using criteria-based content analysis (CBCA): The effects of age,verbal ability, and interviewer's emotional style. Psychology, Crime & Law, 6:3, 159-179.

    The study strives to determine what effects age, verbal ability, and interview's emotional style would have on the occurrence of Criteria-Based Content Analysis criteria.

- Amadoa G., Bárbara, Arcea, Ramón; Farina, Francisca; Vilarino, Manuel (2016). Criteria-Based Content Analysis (CBCA) reality criteria in adults: A meta-analytic review. International Journal of Clinical and Health Psychology. 16. 201-210.

    A meta-analysis that assess the Undeutsch Hypothesis and the CBCA checklist of criteria in discerning in adults between memories of self-experienced real-life events and fabricated or fictitious memories.

- Blandon-Gitlin, Iris; Pezdek, Kathy; D. Stephen, Lindsay & Hagen, Lisa (2009). Criteria-based Content Analysis of True and Suggested Accounts of Events. Applied Cognitive Psychology 23: 901–917.

    A study that encompasses two experiments that examine the effectiveness of the CBCA for discriminating between accounts of true events and suggested events believed to be true.

- Doris, John (1994). Commentary on Criteria-Based Content Analysis. Journal of Applied Developmental Psychology 15. 281-285.

    An overview of the state of research on Criteria-based content analysis.

- Blandon-Gitlin, Iris; Rogers, Martha & Brodie, Laura (2005). Detecting Deception in Children: An Experimental Study of the Effect of Event Familiarity on CBCA Ratings. Law and Human Behavior. Vol. 29. No. 2.

The study tests the description of familiar and unfamiliar events using an experimental design and assessed the joint effect of familiarity and veracity on CBCA ratings in cases of child accounts of a traumatic medical procedure.

- Horowitz W., Steven; Lamb E., Michael; Esplin W., Phillip; Boychuk D., Tascha; Krispin, Orit & Reiter-Lavery, Lisa (1997) Reliability of criteria-based content analysis of child witness statements. Law and Criminological Psychology. 2. 11-21.

   Assessment of inter-judge and test-retest reliability of criteria-based content analysis (CBCA), a system designed to evaluate statements of young victims and witnesses.

- Tully, Bryan (1998). Reliability of criteria-based content analysis of child witness statements: Cohen's kappa doesn't matter. Legal and Criminalogical Psychology. 3. 183-188.

   A review of Horowitz study on CBCA in case when child witness statements are given.

- Horowitz W., Steven (1998). Reliablitiy of criteria-based content analysis of child witness statements: Response to Tully. Law and Criminological Psychology. 3. 189-191.

   A response to Tully's review of Horowitz's study on CBCA.

- Amado G., Barbara; Arce, Ramon & Farina, Francisca (2015). Undeutsch hypothesis and Criteria Based Content Analysis: A meta-analytic review. The European Journal of Psychology Applied to Legal Context 7. 3-12.

   A meta-analysis to test the Undeutsch hypothesis using the CBCA Checklist of criteria to discern between memories of self-experienced real-life events and fabricated or fictitious accounts.

- Roma, Paolo; San Martini, Pietro; Sabatello, Ugo; Tatarelli, Roberto & Ferracuti, Stefano (2011). Validity of Criteria-Based Content Analysis (CBCA) at trial in free-narrative interviews. Child Abuse & Neglect 35. 613-620.

   An investigative study of the reliability of CBCA in discriminating allegations of child sexual abuse during court hearings, by comparing CBCA results with the court's final, unappealable sentence.

- González Amado, B., Arce Fernández, R., & Fariña Rivera, F. (2015). Undeutsch hypothesis and Criteria Based Content Analysis: a meta-analytic review. *The European Journal of Psychology Applied to Legal Context*, 7(*1*), 3-12. https://doi.org/10.1016/j.ejpal.2014.11.002

- Boychuk, T.D. (1992). Criteria-based content analysis of children's statements about sexual abuse: A field-based validation study. *Doctoral Dissertation*.

- Lamers-Winkelman, F., & Buffing, F. (1996). Children's testimony in the Netherlands: A study of Statement Validity Analysis. *Criminal Justice and Behavior*, *23*(2), 304-321. https://doi.org/10.1177/0093854896023002004

- Horowitz, S. W., Lamb, M. E., Esplin, P. W., Boychuk, T. D., Krispin, O., & Reiter-Lavery, L. (1997). Reliability of criteria-based content analysis of child witness statements. Legal and Criminological Psychology, 2(1), 11-21. https://doi.org/10.1111/j.2044-8333.1997.tb00329.x

To determine the viability and suitability of the forensic statement analysis method that has to be adapted for the specific needs of the victimized or abused children, the research teams is conducting two concurrent and interdependent analysis of forensic methods that are currently used in legal procedures. The WP4 research group is focused on the scientific confirmation of the FSA method and supporting the project with specific research findings regarding the veracity of victim's statements as such with an emphasis on the statements of abused and exploited children. This is especially relevant within the framework of legal proceedings where the child is often regarded as the one whose statement is questionable or ambiguous. Meanwhile, the WP5 research group was concentrating on the standardization of the FSA method for use in the area of CAE. The main activity consisted of comparing the effectiveness usability of individual linguistic investigative tools (CBCA, RM, SCAN, etc.) in the field of CAE cases. This real case material, (perpetrator and victim) statements provided by the law enforcement partners, were being used to make conclusive analysis regarding the use of an appropriate method. To preserve the integrity and ethical standards, the material was anonymized and stripped of identifying markers. Both research teams were regularly exchanging the ongoing research information and adjusting the work according to joint decisions made in line with project objectives.

3.2. Reality monitoring

Johnson and Raye (1981) proposed that the origin of someone's memories may be known based on the *characteristics* of those memories. The authors differentiated between two possible origins of memories: an external origin, based on perceptual processes (memories of experienced events), and an internal origin, based on reasoning, imagination, and thought processes. The strategies used by individuals to differentiate one type of memory from the other were labeled by these authors ''reality monitoring''. In the context of obtaining child victim statements, it is important that reality-monitoring theory presupposes that memories of experienced and imagined events are qualitatively different, and can be distinguished by children from the age of 3.

- Bogaaed, Glynis; Meijer H., Ewout, Vrij, Aldert, Broers J., Nick & Merckelbach, Harald – Contextual Bias in Verbal Credibility Assessment: Criteria-Based Content Analysis, Reality Monitoring and Scientific Content Analysis
  > An analysis whether methods for evaluating the credibility of statements by examining their content are sensitive to contextual bias.
- Johnson K., Marcia; Foley, Mary Ann; Suengas G., Aurora; Raye L., Carol (1988). Phenomenal Characteristics of Memories for Perceived and Imagined Autobiographical Events. Journal of Experimental Psychology: General 1988, Vol. 118, No. 4, 371-376.
  > The article includes two studies, which are used to verify the potential of reality monitoring in the case of recollection of autobiographical events.
- Kensinger, A., Elizabeth and Schacter L., Daniel (2006). Reality monitoring and memory distortion: Effects of negative, arousing content. Memory & Cognition, 34 (2), 251-260.
  > Individuals often claim to vividly remember negatively arousing information. This study examines whether this emotional information is remembered more accurately than non-emotional information. The study is raises the question whether the emotional content of items modulates the accuracy with which individuals make reality-monitoring decisions.
- Johnson, M. K. & Raye, C. L. (1981). Reality monitoring. Psychological Review, 88, 67/85.
- Nahari, Galit & Vrij, Aldert (2015). Systematic errors (biases) in applying verbal lie detection tools: richness in detail as a test case. Crime Psychology Review, 1:1, 98-107.
  > The analysis describes potential systematic errors (or biases) that may appear while applying content-based lie detection tools, by focusing on richness in detail. Reality monitoring, criteria based content analysis and scientific content analysis verbal tools are used in gathering the data.
- Roberts P., Kim and Lamb E., Michael (2010). Reality-Monitoring Characteristics in Confirmed and Doubtful Allegations of Child Sexual Abuse. Applied Cognitive Psychology. 24: 1049-1079.
  > Reality-monitoring based studies on the capacity to distinguish experienced and imagined events. A total of 119 allegations of sexual abuse by younger (aged 3–8) and older (aged 9–16) children were analysed for developmental differences in the presence of reality-monitoring criteria, which should characterise descriptions of experienced events.

- Sporer L. Siegfried and Sharman J., Stefanie (2006). Should I Believe this? Reality Monitoring of Account of Self-Experienced and Invented Recent and Distant Autobiographical Events. Applied Cognitive Psychology. 20: 837-854.
  > An examination of personal and interpersonal reality monitoring on a sample of 240 participants. Reality monitoring distinguishes invented and experienced autobiographical events based on the abundance of sensory and perceptual qualities and information about time and spatial locations. The more detail there is, the more likely it is that it is an experienced event.
- Masip, Jaume; Sporer L., Siegfried; Garrido, Eugenio & Herrero, Carmen (2005). The detection of deception with the reality monitoring approach; a review of the empirical evidence. Psychology, crime & Law. 11:1: 99-122.
  > A review of all available studies conducted in several countries in order to yield some general conclusions concerning the discriminative power of reality monitoring approach to the area of deception. Regarding individual criteria, the empirical results are not encouraging. However, recent studies show accuracy rates similar to those of criteria-based content analysis.
- Ward, Genevieve & Carroll, Marie (1997). Reality Monitoring for Sexual Abuse Memories. Applied Cognitive Psychology, vol. 11: 293-304.
  > The study examines the reality monitoring strategies utilized by subjects when remembering sexual abuse, and compared them with the strategies utilized for other types of events.
- Santtila, Pekka, Roppola, Heli & Niemi, Pekka – Assessing the truthfulness of Witness Statements Made by Children (Aged 7-8, 10-11 and 13-14) Employing Scales Derived from Johnson and Raye's Model of Reality Monitoring
  > A study focused on determining whether children's true and false witness statements could be differentiated using the model of reality monitoring.
- Otgaar, Henry & Baker, Alysha (2017). When lying changes memory for the truth. Memory.
  > An analysis based on existing literature on the ways that deceptive strategies influence the manner in which memory events are formed.
- Johnson, M. K., & Raye, C. L. (1981). Reality monitoring. *Psychological review*, *88*(1), 67. https://doi.org/10.1037/0033-295X.88.1.67

3.3. NICHD

NICHD Investigative Interview Protocol (the National Institute of Child Health and Human Development Protocol) is a modern interviewing guideline that is designed to provide interviewers with an evident structure, guiding them through each phase of the interview and helping to avoid poor questioning strategies that may lead to contamination or memory distortions. This linear, completely scripted training protocol tool was developed through the intensive efforts of US Government Scientists at the National Institutes of Health.

- Benia, Luis Roberto; Hauck-Filho, Nelson; Dillenburg, Mariana & Milnitsky Stein, Lilian (2015). The NICHD Investigative Interview Protocol: A Meta-Analytic Review. Journal of Child Sexual Abuse. 24(3). 259-279.

    A systematic review and meta-analysis of literature examining the effectiveness of the National Institute for Child Health and Human Development Investigative Interview Protocol in improving the quality of child forensic interviews. Online databases were searched for journal articles published between the years 2000 and 2013. Findings corroborate results from previous studies that suggested the benefits of the protocol on the interviewers' performance and how informative the children are. However, protocol did not show the same performance with regard to preschool children.

- La Rooy, David; Brubacher P., Sonja; Aromäki-Stratos, Anu; Cyr, Mireille; Hershkowitz, Irit; Korkman, Julia; Myklebust, Trond; Naka, Makiko, Peixoto E., Carlos, Robers, Kim; Stewart, Heather, & Lamb E., Michael (2015). The NICHD Protocol: A Review of an Internationally-Used Evidence-Based Tool for Training Child Forensic Interviewers Evidence-Based Tool for Training Child Forensic Interviewers. Journal of Criminological Research, Policy and Practice. 1(2). 76-89.

    A review of an evidence-based tool for training child forensic interviewers called the NICHD Protocol, and the relevant research on: children's memory development; communication; suggestibility; the importance of open-prompts, and challenges associated with interview training.

- Coulborn Faller, Kathleen (2020). The Cutting Edge of Forensic Interviewing. Journal of Child Sexual Abuse. 29(2). 129-137

    This article contextualizes new knowledge about forensically interviewing and assessing children when there are concerns about child abuse. The lack of interview guidelines and shortcomings in child interview procedures encouraged the innovation of forensic interview structures to be used when there is alleged child sexual and other abuse and the strong preference for one interview by a skilled interviewer, who is nevertheless a stranger to the child. The article addresses the cutting-edge issues, which arose with these innovations.

- Otgaar, Henry; De Ruiter, Corine; Sumampouw, Nathanael & Muris, Peter (2020). Protecting Against Misinformation: Examining the Effect of Empirically-Based Investigative Interviewing on Misinformation Reporting. Journal of Police and Criminal Psychology. In press.

    The study analysis whether earlier interviews of children involved in legal cases may protect them from reporting misinformation. The goal of the experiment is to assess whether empirically-based interviewing by means of the National Institute for Child Health and Development (NICHD) Protocol would affect the reporting of misinformation in children.

For the appropriate validation and application of the FSA method, it is not just necessary to develop a reliable investigative toolkit and protocol, but all the more important to ensure that relevant information, experience, and practices of one partner are shared with others. Such an exchange will not only ensure the proper use of the method but will also make it possible to improve forensic and legal procedures at all levels. The experience from the use of the method isn't limited to the area of CAE, since it is already successfully implemented into Serbian and Slovenian law enforcement procedures. Application to one area can therefore have an immediate impact on other ones.

The objective has already been met as the project partners have offered an in-depth insight into their particular experience and work practices in the field of CAE. These were in the form of educational and training meetings, but also by providing working material. Throughout the project, individual partners will continue to do so and offer full support to the project consortium. The main training activity was carried out in Belgrade where the representatives of individual partner organizations were trained in SCAN statement analysis on which FSA is based.

In the last phase of the project, the objective was to consolidate the acquired expertise and know-how, which formed the basis for the training sessions of law enforcement experts who are the first to use the FSA method in the line of work.

3.4. S.C.AN

Scientific Content Analysis (SCAN) has been developed by Avinoam Sapir as a verbal veracity assessment tool. Being a polygraph examiner, he recognized, through numerous examples, that suspects who told lies differed in their language from suspects who told the truth. The SCAN method emphasizes that the analyst can investigate the statement without any further knowledge about the subject that is being analysed. The approach is as follows. SCAN analyst starts with asking the alleged suspect, witness, or victim to write down 'everything that happened' during a critical time. Sapir (2005) refers to this as the 'pure version' of the event, produced without any interference from a police officer or other qualified professional. The 'pure version' is thereafter matched against criteria such as the extent to which there are gaps in the chronology or the extent to which pronouns (e.g., my, him) are avoided (e.g., when the interviewee mentions "the house" instead of "my house"). It is also important to consider that the list of SCAN criteria is extensive and there are different approaches to their systematization.

- Nahari, Galit; Vrij, Aldert & Fisher P., Ronald (2012). Does the Truth Come Out in the Writing? SCAN as a Lie Detection Tool. Law Hum Behav. 36(1). 68-76.
  > A study on the accuracy of Scientific Content Analysis (SCAN) method, which is made by comparing the results of Reality monitoring.
- Armistead W., Timothy (2011). Detecting deception in written statements. The British Home Office study of scientific content analysis (SCAN). Policing: An International Journal of Police Strategies & Management. Vol. 34. No. 4. 588-605.
  > The study reviews the most recently published and most comprehensively designed study of scientific content analysis (SCAN), a widely used but rarely researched method of content analysis for detecting deception in written statements.
- Smith, Nicky (2001). Reading between the Lines: An evaluation of the Scientific Content Analysis technique (SCAN). Police Research Series Paper 135.
  > An exploratory study designed to assess the effectiveness of the SCAN technique in detecting instances of potential deception within written statements.
- Bogaard, Glynis (2017). Catching liars by listening carefully: Promises and challenges for verbal credibility assessment. Dissertation.
  > The dissertation evaluates three verbal credibility assessment methods, namely Scientific Content Analysis, Criteria Based Content Analysis, and Reality Monitoring. Its aim is twofold: to evaluate the usefulness of SCAN as a lie detection method, and to investigate boundary conditions and possible improvements for all three methods.

- Bogaard, Glynis; Meijer H., Ewout; Vrij, Aldert; Broers J., Nick & Merckelbach, Harald (2014). SCAN is largely driven by 12 criteria: results from sexual abuse statements. Psychology, Crime & Law. Vol. 20. Issue 5.

     The study investigates which SCAN criteria are represented in actual statements. To this end, 82 sexual abuse cases were analysed.

- Bogaard Glynis; Meijer H., Ewout; Vrij, Aldert and Merckelbach, Harald (2016) Scientific Content Analysis (SCAN) Cannot Distinguish Between Truthful and Fabricated Accounts of a Negative Event. Frontiers in Psychology. 7:243.

     The study tests whether SCAN is able to accurately discriminate between true and fabricated statements. To this end, 117 participants were asked to write down one true and one fabricated statement about a recent negative event that happened in their lives.

- Porter, Stephen & Yuille C., John (1996). The Language of Deceit: An Investigation of the Verbal Clues to Deception in the Interrogation Context. Law and Human Behavior. Vol. 20. No.4. 443-458.

     The study examines the hypothesis that reliable verbal indicators of deception exist in the interrogation context. Participants in the study were recruited for addressing "security effectiveness" and either committed a theft "to test the effectiveness of a new security guard" or carried out a similar but innocuous task.

- Vanderhallen, Miet; Jaspaert, Emma & Vervaeke, Geert (2016). SCAN as an investigative tool. Police Practice and Research. Vol. 17. No. 3. 279-293.

     Two studies are presented. The first on the accuracy of SCAN to detect deception by three groups of raters with a different level of experience. The second study investigates the inter-rater reliability as a possible explanation for the poor validity results.

- De Saussure, Ferdinand (1959). Course in General Linguistics. New York: The Philosophical Society.

     Its central notion is that language may be analyzed as a formal system of differential elements, apart from the messy dialectics of real-time production and comprehension. Examples of these elements include his notion of the linguistic sign, which is composed of the signifier and the signified. Though the sign may also have a referent, Saussure took that to lie beyond the linguist's purview.

- Driscoll, L. N. (1994). A validity assessment of written statements from suspects in criminal investigations using the scan technique. *Police Stud.: Int'l Rev. Police Dev.*, *17*, 77.

In conjunction with relevant institutions and stakeholders, the project consortium is expanding the cooperation with key institutions in policymakers that have already been or are going to be involved in the process of policy decisions regarding the processing and procedures of CAE victims. To goal is: (i) to offer them a proper overview of the subject and acquaint them with the

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progress we have made ourselves in this area, (ii) to preserve the implementation of good practices and protocols into procedures after the end of the project, and (iii) to inform the responsible institutions regarding the shortcoming of current practices and advantages of our proposals and solutions regarding FSA method.

These objectives were at the forefront of activities carried out during the project. The completed conference "Sexual abuse and exploitation of children - from the report to final judgment" in Zagreb was the first time where the general public had the opportunity to get an insight into the activities and goals of the project and offer feedback to the state of CAE treatment and procedures, but also the possibilities that the FSA method presents. Similarly, a series of online lectures presented the activities and results of the work accomplished with the *VERBUM SAT* project.

3.5 Comparison between methods

- Kleinberg, Bennet; Arntz, Arnoud & Verschuere, Bruno (2019). Being accurate about verbal credibility assessment. PLoS ONE 14(8).

  Verbal credibility assessment, or verbal deception detection, plays an important role in legal proceedings when physical evidence is absent or inconclusive. A study and empirical data that show that the procedure of verbal assessment produces overoptimistic accuracy rates that, especially for small sample size studies typical of this field, yield misleading conclusions.

- Bogaard, Glynis; Meijer H., Ewout; Vrij, Aldert; Broers J., Nick & Merckelbach, Harald (2014). Contextual Bias in Verbal Credibility Assessment: Criteria-Based Content Analysis, Reality Monitoring and Scientific Content Analysis. Applied Cognitive Psychology. 28: 79-90.

  Verbal credibility assessment encompasses several methods used to evaluate the credibility of statements by examining their content. In two experiments, the study tests to what extent these methods are sensitive to contextual bias.

- Porter, Stephen & Yuille C., John (1996). The Language of Deceit: An Investigation of the Verbal Clues to Deception in the Interrogation Context. Law and Human Behavior, Vol. 20, No. 4. 443-458.

  An examination of the hypothesis that reliable verbal indicators of deception exist in the interrogation context.

- Sporer, Ludwig Siegfried (1997). The Less Travelled Road to Truth: Verbal Cues in Deception Detection in Accounts of Fabricated and Self-Experienced Events. Applied Cognitive Psychology. Vol11. 373-397.

  The study links forensic CBCA credibility criteria to the reality monitoring approach and tests the relative validity of CBCA and RM criteria in discriminating between fabricated and self-experienced video recorded accounts of adult participants.

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3.6 CAE specific literature

- Piaget, Jean and Inhalder, Barbel (1969). The Psychology of the Child. New York: Basic Books.
  The book offers a definitive presentation of the developmental psychology Piaget has elaborated over the course of forty years. This comprehensive synthesis traces each stage of the child's cognitive development, over the entire period of childhood, from infancy to adolescence.
- Werner, Jairo, Milaner Werner, Maria Cristina (2008). Child sexual abuse in clinical and forensic psychiatry: a review of recent literature. Curr Opin Psychiatry, Vol 21(5). 499-504.
  Evaluation of sexually abused children and adolescents requires an accurate procedure to ensure legal validity and be performed with diligence so that alleged victims do not experience recurrence. Practitioners' actions must be referenced against appropriate instruments and they must be prepared for the ethical and forensic dilemmas and new demands that arise in this field.
- Jänisch, Stefanie; Meyer, Hildrun; Germerott, Tanja; Schulz, Yvonne; Albrecht, Urs-vito; Scmidt, Anke; Solveig Debertin, Anette (2010). Analysis of clinical forensic examination reports on sexually abused children. Arch Kriminol 225 (1-2). 18-27
  The evaluation of the article shows that early clinical forensic examination of children suspected of having been sexually abused is crucial to document evidence that is highly significant for the investigation and court proceedings.
- Von Klitzing, Kai (1990). Credibility examination of children and adolescents on the question of sexual abuse. Acta Paedopsychiatrica, 53(3). 181-190.
  Evaluation of credibility of sexually abused child and adolescents' statements.
- Denne, Emily; Sullivan, Coleen; Ernest, Kyle; et al (2019). Assessing Children's Credibility in Courtroom Investigations of Alleged Child Sexual Abuse: Suggestibility, Plausibility, and Consistency. Child Maltreatment, Vol.25, Issue 3. 224-232.
  The article examines 134 CSA victim testimonies for children aged 5-17 and explores how attorneys assess child credibility through specifically targeting children's suggestibility/honesty, plausibility, and consistency. The results show that while prosecutors examine plausibility more often to establish credibility, defence attorneys focus their assessments on suggestibility/honesty and potential inconsistency.
- Lee, Kang (2013). Little liars. Child Development Perspectives. 7(2). 91-96.
  The article reviews two decades of empirical evidence about lying in children from the perspective of speech act theory. Children namely begin to tell lies in the preschool years for anti- and prosocial purposes, and their tendency to lie changes as a function of age and the type of lies being told. The article identifies typical and atypical development courses of verbal deception in children.
- Lamb, M. E., Sternberg, K. J., Esplin, P. W., Hershkowitz, I., Orbach, Y., & Hovav, M. (1997). Criterion-based content analysis: A field validation study. *Child Abuse & Neglect*, *21*(3), 255-264. https://doi.org/10.1016/S0145-2134(96)00170-6
- Pezdek, K., Morrow, A., Blandon-Gitlin, I., Goodman, G. S., Quas, J. A., Saywitz, K. J., & Brodie, L. (2004). Detecting deception in children: event familiarity affects criterion-based content analysis ratings. *Journal of Applied Psychology*, *89*(1), 119. https://doi.org/10.1037/0021-9010.89.1.119
- Davies, G. M. (1994). Children's testimony: Research findings and policy implications. Psychology, Crime, & Law, 1, 175–180. https://doi.org/10.1080/10683169408411951

The latter has highlighted the need for a new research agenda which would include the impact of biased or repeated questioning, and requests to children from abusers to lie or keep secrets.

- Lee, Kang (2013). Little liars. Child Development Perspectives. 7(2). 91-96.
- Davies, G. (1991). *Research on children's testimony: Implications for interviewing practice*. In C. R. Hollin & K. Howells (Eds.), Wiley series in clinical approaches to criminal behaviour. Clinical approaches to sex offenders and their victims (p. 93–115). John Wiley & Sons.
- Fivush, R., Haden, C., & Adam, S. (1995). Structure and coherence of preschoolers' personal narratives over time: Implications for childhood amnesia. *Journal of experimental child psychology*, *60*(1), 32-56. https://doi.org/10.1006/jecp.1995.1030

  The study explores whether developmental changes in the structure and coherence of preschoolers' personal narratives might provide some clues about childhood amnesia. In particular, it hypothesizes that early memories may not be organized as coherent narratives and would therefore become less accessible and less likely to be integrated into the autobiographical life story that each of us creates.

- Flavell, J. H., Botkin, P., Fry, C., Wright, J., & Jarvis, P. (1968). *The development of role-taking and communications skills in children* (Vol. 10). New York: Wiley.
- Walker, A. G., & Warren, A. R. (1995). The language of the child abuse interview: Asking the questions, understanding the answers. In T. Ney (Ed.), True and false allegations of child sexual abuse: Assessment and case management (p. 153–162). Brunner/Mazel.
- Lamb, M. E., Malloy, L. C., Hershkowitz, I., & La Rooy, D. (2015). Children and the law. *Handbook of child psychology and developmental science*, 1-49. https://doi.org/10.1002/9781118963418.childpsy312
- Brown, A. L., & DeLoache, J. S. (1978). Skills, plans, and self-regulation. In R. S. Siegler (Ed.), Children's thinking: What develops? (p. 3–35). Lawrence Erlbaum Associates, Inc.
- Hakes, D. T. (2012). *The development of metalinguistic abilities in children* (Vol. 9). Springer Science & Business Media.
- Hutson-Nechkash, P. (2001). *Narrative toolbox: Blueprints for storybuilding*. Thinking Publications.
- Simcock, G., & Hayne, H. (2002). Breaking the barrier? Children fail to translate their preverbal memories into language. *Psychological Science*, *13*(3), 225-231. https://doi.org/10.1111/1467-9280.00442
- Simcock, G., & Hayne, H. (2003). Age-related changes in verbal and nonverbal memory during early childhood. *Developmental Psychology*, *39*(5), 805. https://doi.org/10.1037/0012-1649.39.5.805

  The study assesses age-related changes in verbal and nonverbal memory performance by 2- to 4-year-old children.

- Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological bulletin*, *114*(1), 3.
- Roberts, K. P., & Blades, M. (1998). The effects of interacting in repeated events on children's eyewitness memory and source monitoring. *Applied Cognitive Psychology: The Official*

Journal of the Society for Applied Research in Memory and Cognition, *12*(5), 489-503.
https://doi.org/10.1002/(SICI)1099-0720(199810)12:5<489::AID-ACP535>3.0.CO;2-%23

- Poole, D. A., & Lindsay, D. S. (2002). Reducing child witnesses' false reports of misinformation from parents. *Journal of Experimental Child Psychology*, *81*(2), 117-140. https://doi.org/10.1006/jecp.2001.2648

    The study explores whether a source-monitoring training (SMT) procedure, in which children distinguished between events they recently witnessed versus events they only heard described, would help 3- to 8-year-olds to report only experienced events during a target interview.

- Friedman, W. J., Reese, E., & Dai, X. (2011). Children's memory for the times of events from the past years. *Applied Cognitive Psychology*, *25*(1), 156-165. https://doi.org/10.1002/acp.1656

    This study tested 8–12-year-olds' ability to localize in time parent-reported events from four time intervals ranging from 6 months to 4 years ago.

- Piaget, J. (1971). *The theory of stages in cognitive development.* In D. R. Green, M. P. Ford, & G. B. Flamer, *Measurement and Piaget.* McGraw-Hill.

- Flavell, J. H. (Ed.). (1977). *Cognitive development.* Prentice-Hall.

- Watson, M. W. (1984). Development of social role understanding. Developmental Review, 4(2), 192-213. https://doi.org/10.1016/0273-2297(84)90007-8

    Because the children's social competence in terms of developing role concepts has not been systematically delineated, the study reviews few developmental studies that have been performed in this area, and thereupon discusses the systematic developmental sequence of role understanding in children from 1 to 13 years of age and finally describes a method for assessing such sequences.

- Fischer, K. W., & Bullock, D. (1984). Cognitive development in school-age children: Conclusions and new directions. *Development during middle childhood: The years from six to twelve*, 70-146.

- Davies, G. M., Westcott, H. L., & Horan, N. (2000). The impact of questioning style on the content of investigative interviews with suspected child sexual abuse victims. *Psychology, Crime and Law*, *6*(2), 81-97. https://doi.org/10.1080/10683160008410834

    The study explores the influence of question type and interviewer style on the quantity and quality of responses offered by children in interviews for suspected sexual abuse.

4 COMPARATIVE ANALYSIS OF FORENSICE MATERIAL IN THE CONTEXT OF CHILD CREDIBILITY ASSESSMENT

Since the main project goal is to prevent secondary victimization by relying on the statement of child victims that are involved in an investigation, the research activities focused on the specifics of verbal credibility assessment. Their role is namely essential in legal proceedings when physical evidence is absent or inconclusive and even more so when the involvement of child victims in the proceedings should be reduced to a minimum. Statement analysis by means of which verbal credibility can be determined is primarily used as an investigative tool to obtain accurate and useful information from victims, witnesses, and suspects and to assess the credibility of the information obtained. Credibility assessment determines whether a statement possesses the characteristics associated with accurate recall for an experienced event or whether a statement possesses the cue that indicates deception or concealing information. However, within the project framework where the well-being of the child victim is prioritized, the analysis is intended to shorten the forensic procedure, as reports are often rejected because of a lack of credibility.

The subject of the review and comparative analysis are three most commonly used verbal lie detection tools: Criteria-Based Content Analysis (Porter & Yuille, 1995; Steller & Koehnken, 1989; Undeutsch, 1982), Reality Monitoring (Masip, Sporer, Garrido, & Herrero, 2005), and Scientific Content Analysis (Sapir, 1987). Verbal lie detection tools are different in the set of criteria and scoring methods applied, but all these statement credibility assessment methods share a standard procedure: suspects, victims, or witnesses are asked to provide a statement about an event, which is then transcribed and analysed by experts on a range of criteria. A key element, especially for children's interviews is that the examinee tells his or her own story without any influence from the interviewer to obtain as much information as possible in a free narrative style without inappropriate prompts or suggestions.

4.1 Criteria-Based Content Analysis (CBCA)

Criteria-based content analysis (CBCA) was developed to evaluate statements from children who may have witnessed or been victims of crimes, most commonly child sexual abuse, as a central component of the Statement Validity Assessment (SVA) procedure (Raskin & Esplin, 1991). Forensic psychologists and expert witnesses in Germany, the UK, and the Netherlands currently use Criteria-based Content Analysis (CBCA) as a means to determine the veracity of allegations of child sexual abuse. SVA evaluations are not accurate enough to be admitted as expert scientific evidence in criminal courts but might be useful in police investigations. The development of CBCA was based on the Undeutsch hypothesis, which states that an account derived from the *memory of a self-experienced event* will differ in content and quality from an account based on fabrication or imagination (Undeutsch, 1989). CBCA was based on two main assumptions reflecting that both cognitive and motivational factors influence the credibility of the statement. First, it is assumed that because lying is more cognitively demanding, it typically too difficult to fabricate all the information and details usually obtained in truthful statements from a genuine experience. Second, the person who lies will put more effort into impression management to appear more convincingly than those who tell the truth. A truthful person will not be as concerned with impression management as a deceiver is. Therefore, a person who fabricates a statement will avoid behavior (corrections, insecurities, inability to remember something) that in their opinion reduces convincingness and can be interpreted as a cue of lying (Kohnken, 2004). CBCA consists of criteria that represent general characteristics of the narrative, specific contents, and motivation-related criteria.

Nineteen criteria were selected on the basis of these two assumptions whose presence in the statement is judged on a three-point scale (0 – the absence of criterion, 1 - the presence of criteria, 2 - the strong presence of criteria). A person whose statement derives from memory of an actual experience will have more CBCA criteria present than a deceiver. The presence of each of the criteria increases the probability that the statement is truthful. The total score was obtained by summing the presence score of the single criteria. Although a high score on the CBCA is expected in the case of true, a lower score on false statements, the score alone received a criterion-based content analysis, not sufficient to determine whether a person is lying or not. Other factors may affect CBCA scores alongside the veracity of the statement. Therefore, the Validity Checklist should be used after CBCA scoring to examine whether any of these alternative explanations (for example, cognitive ability of persons, context, interviewee's susceptibility to suggestion, suggestive, leading questioning) might have affected the presence of the CBCA criteria.

Even though the assessment of the credibility of children's statements based on the CBCA criteria has been used as evidence in court, it was only with Vrij, who reviewed and analyzed the first 37 CBCA studies in the laboratory, that a comprehensive study has been carried out. In 80% of these studies, it was found that truthful statements have significantly higher scores on CBCA compared to deceptive statements, while in none of these studies fabricated statements had a higher average total score on CBCA than truthful statements. Most of the studies have confirmed its underlying assumption that more criteria are present in accounts of true events than in accounts of false events and many CBCA criteria were more often present in truthful statements than in fabricated reports (Vrij, 2008). Certain criteria were more effective than others at discriminating between true and false reports:

- "Quantity of details" received the most support, with 80% of the studies reporting more details in truthful than in deceptive statements.
- "Unstructured production", "Contextual embedding" and "Reproduction of speech" were found to be effective in 69% of the studies.
- The motivational-related criteria received less support than most cognitive criteria.
- Several researchers did not examine "Admitting lack of memory", "Raising doubts about one's testimony", "Self-deprecation", and Pardoning the perpetrator because of interrater reliability concerns (Lamb, Sternberg, Esplin, Hershkowitz, Orbach, & Hovav, 1997) or they believed these criteria are theoretically less related with Undeutsch hypothesis (Raskin & Esplin, 1991).
- "Accurately reported details misunderstood" and "Raising doubts about one's testimony" received little support as well, probably because these criteria are not frequently present in statements.

There are, however, several limitations to the CBCA method. Reasons for lower accuracy of criteria-based content analysis in assessing the credibility of a statement may be that the method is not standardized and fact that other factors affect the overall score as well. It is often very difficult to identify and assess the impact of these other factors on the validity of a method, but if we mention just a few, variables age, sex, and verbal ability have a significant effect on the overall CBCA score (Vrij, Akehurst, Soukara & Bull, 2002; Blandon-Gitlin, Pezdek, Rogers & Brodie, 2005). The CBCA scores are affected by the familiarity of the event being described (Blandon-Gitlin, Pezdek, Rogers, &Brodie, 2005). This is a forensically important finding because it suggests that in real-world cases, to the extent that a subject is familiar with and has available information about an event, their reports of event likely to have characteristics that produce a high CBCA score, indicating that the event did occur (Pezdek et al. 2004). Meanwhile, a shortcoming was identified in Training children on the CBCA criteria can lead to increases in total scores and lower overall discriminability (Vrij, Akehurst, Soukara, & Bull, 2002).

4.1.1 Applicability of CBCA criteria on the statements of children

Gonzalez, Amado, and Fernandez (2015) conducted a meta-analysis to test the Undeutsch hypothesis using the CBCA criteria to distinguish between memories of actually experienced real-life events and fabricated reports in children under 18 years of age. An essential finding of the meta-analysis was that the CBCA criteria can be applied and generalized to younger age groups. Furthermore, all of the CBCA criteria can distinguish real-life memories from fabricated events. In this regard, the criteria "quantity of details" and "details characteristic of the offense" are most effective in distinguishing actually experienced real-life events from fictitious events. Cognitive criteria (the first 13 criteria) have a larger effect than motivational criteria (criteria 14-18). Besides the smaller contribution of motivational criteria, a great number of studies omitted criteria 15-18 (Admitting lack of memory, Raising doubts about one's own testimony, Self-deprecation, and Pardoning the perpetrator) due to greater subjectivity in assessment, lower agreement between independent assessors (Sternberg, Esplin, Hershkowitz, Orbach, & Hovav, 1997) and because of critique that motivation-related criteria theoretically less related to the assumptions of Undeutsch hypothesis (Raskin & Esplin, 1991). The criterion "Accurately reported details misunderstood" also received little empirical confirmation because it very rarely appears in statements.

4.1.2. The relationship between age on CBCA score

The main verdict of several general studies is that the overall score on the CBCA method is positively related to the age of the child (Anson et al., 1993; Boychuk, 1991; Buck et al., 2002; Davies et al., 2000; Horowitz et al., 1997; Lamers-Winkelman & Buffing, 1996; Santtila et al., 2000; Vrij et al., 2002). To verify these findings transcripts of statements from 103 children who reported sexual abuse were evaluated by two trained experts in the CBCA method. Children were divided into four age groups (2–3 years, n=17; 4-5 years, n=39; 6–8 years, n=26; 9–11 years, n= 21). The results showed that six criteria were positively correlated with the child's age (Contextual embedding, Descriptions of interactions, Reproduction of conversation, Superfluous details, Admitting lack of memory, and Details characteristic of the offense). In the Horowitz et al. (1997) study, results from randomly selected one hundred cases of child sexual abuse showed a positive correlation between age and total CBCA score. In addition, the study compared the presence of criteria in the statements of 25% of the youngest children and 25% of the oldest children. In the older group, almost twice as many criteria were registered (M = 11.7) than in the younger group (M = 6.28). Buck et al. (2002) registered significantly fewer criteria in younger children than in older children as well. In children aged 2 - 3 years, six criteria never were registered. As expected, it was confirmed that with the development of cognitive abilities and command of language throughout childhood, it becomes gradually easier for children to give detailed accounts of what has been witnessed (Davies, 1991, 1994a; Fivush, Haden, & Adam, 1995). Therefore, all sorts of details are less likely to occur in the statements of young children. Also, children under 8 years

old may have difficulty in viewing the world from somebody else's perspective (Flavell, Botkin, Fry, Wright, & Jarvis, 1968). Finally, younger children have less developed metacognitive capabilities (i.e., knowing whether or not they know or remember an answer; Walker & Warren, 1995), so they are less likely to be aware of gaps in their memories. Based on all mentioned above, the CBCA criteria are significantly less present in younger children's reports, which is to be expected considering their cognitive development. These findings suggest that younger children, that is, children with less developed verbal abilities, are at a disadvantage when the CBCA method is used to assess their statements' credibility.

4.2 Reality monitoring (RM)

A different cognitive model for statement veracity assessment was proposed by Johnson and Raye called Reality Monitoring. It explains the processes by which people decide whether some information was originally obtained from an external or internal source (Johnson & Raye, 1981), external being experiences gained through sensory processes and internal are experiences created as a result of thought, imagination, insight. More specifically, the rationale behind Reality Monitoring is that memories of real experiences differ in quality from memories based on fiction and that these differences in memories are reflected by differences in speech. They tested the model empirically by creating a Memory Characteristic Questionnaire (MCQ) consisting of 39 items. Participants were tasked with recalling one real-life event they actually experienced and one fictitious event that took place in their minds and imagination. Using factor analysis, they extracted 8 criteria on the basis of which it is possible to distinguish memories of real events and fabricated events (Johnson & Raye, 1988). Johnson and Raye determined that the memories of experienced real-life events are clearer, more concrete and more vivid than the memories of imagined events, and they contain more sensory, contextual, and affective information and fewer cognitive operations. Although the model was created based on memory research and was not developed for lie detection, it has been used in use by many researchers in this way as well. Similarly, as with CBCA, the trained personnel analyze the transcript of the statement by assessing the presence of the 8 criteria.

Research typically reveals satisfactory agreement between raters in RM coding, similar to CBCA coding, the interclass correlation coefficient is approximately above .71 (Sporer, 2004). According to Vrij (2008) accuracy rates for truthful statements vary in the range from a modest 53% to a very high 88%. The lie accuracy scores are more consistent and vary from 61% to 83%. The average truth accuracy is 69%, comparable to CBCA accuracy. In the studies that applied both CBCA and RM on the same statements, the findings are inconclusive. CBCA had a higher classification rate in three studies, and in the other five studies, the best accuracy rates were achieved with RM criteria. The average total accuracy rate for RM in those eight studies is slightly higher (68.13%) than the average total accuracy rate for CBCA (63.63%). There were also attempts to combine these two methods. The combined methods yielded better results than the CBCA alone in all three studies but were more accurate than the RM alone in only two of the three studies. Classification of statements based on both methods increased accuracy to 74%. In 10 studies where the credibility of statements was assessed using Reality Monitoring criteria, the average accuracy of detecting truthful statements was 72%, while the average accuracy of detecting deceptive statements was 66% (Vrij, 2008). In the second meta-analysis, approximately the same average accuracy was registered - 71% of the classification accuracy of truthful and 63% of the success of detecting fabricated statements (Nahari, Vrij & Fisher, 2014). Clarity is not

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always a diagnostic sign of truthfulness, but it is always found that truthful statements are clearer than deceptive statements. Findings for sensory information are unclear. Sound details in particular, are more likely to be present in truthful accounts than in deceptive accounts. The findings about contextual embeddings are inconsistent. Many studies did not find a difference between truth-tellers and liars in terms of reporting how they actually felt during the event. Several studies have revealed that truthful events are easier to reconstruct than deceptive ones. Most researchers did not find a difference between experienced and fabricated events in terms of cognitive operations, and in one study, it was found that fabricated reports included more cognitive operations, which contrasts Reality Monitoring predictions. Reality monitoring is not a standardized tool and different researchers seem to code the criteria somewhat differently. Like CBCA scores, RM scores are dependent on age and personality traits. People who are more socially anxious will achieve a lower score on the RM criteria, regardless of whether they are telling the truth or not (Vrij, Akehurst, Soukara, & Bull, 2004).

4.2.1 Applicability of RM for forensic analysis of children's statements

There is a lack of field studies with established ground truth regarding statements of children suspected of being victims of sexual abuse. Roberts and Lamb (2010) conducted three studies in which they analyzed a total of 119 statements from real cases of child sexual abuse using RM criteria. Based on the existence of material and medical evidence, the statements were divided into statements in which the reported event most likely occurred (confirmed statements) and statements where there was probably no actual sexual abuse (unconfirmed statements). On the basis of this, they compared the classification accuracy of confirmed and unconfirmed statements based on the RM criteria between younger children (3-8 years) and older children (9-16 years). It has been shown that there are differences in the presence of RM criteria in children's statements depending on cognitive development. There was a significantly larger number of registered RM criteria in older children's statements (9-16 years) than in younger children's statements (3-8 years), regardless of whether they were confirmed or unconfirmed statements. In the confirmed statements of younger children, a higher presence of RM criteria was registered comparing to the unconfirmed statements. The confirmed statements of the younger children were assessed as clearer, more complex and richer in details than the unconfirmed statements of younger children. However, in older children, no difference was found in the presence of RM criteria between confirmed and unconfirmed statements, although both types of statements contained more detail and were clearer and more complex than the statements of younger children. The impossibility of distinguishing confirmed and unconfirmed statements using RM criteria in older children can be explained by the fact that older children are much better at monitoring reality than younger ones, and thus we can expect lesser differences between reports of actually experienced and reports of fabricated events in older than in younger children. These

results suggest that children aged 9-10 years can know what kind of information is consistent with actual events and to include this information to a greater extent when they want to describe fictitious events as convincingly as possible. Younger children's statements contained the characteristics predicted by the reality monitoring theory, although they are still developing the capacity and ability to observe their memories. The authors state that older children are probably more aware of the connection of certain types of knowledge with a specific type of experience. It is possible that older children inadvertently or unintentionally emphasized details that are characteristic of actually experienced events (e.g., perceptual details). Roberts and Lamb (2010) emphasize the importance of findings that younger children can also provide forensically relevant information, especially when an interview with younger children is conducted in an adequate way. The results suggest that RM criteria are more useful in distinguishing plausible and suspicious statements in younger children, from 3 to 8 years. In contrast, the criteria for the CBCA method appear to better distinguish plausible and suspicious statements from older children than from younger children (Lamb et al., 1997). The criteria that successfully discriminate confirmed reports and unconfirmed reports are Clarity, Complexity, and Event Detail.

4.3 Scientific Content Analysis (S.C.AN)

The S.C.AN method was developed by Avinoam Sapir by relying on statistical analysis, observations, and comparison of adult perpetrators, victim's and witnesses' truthful and deceptive statements collected. The uniqueness of the SCAN technique is that it considers only the subject's own words regarding the incident. This is why it is important to obtain a "pure" statement instructing the subject to write down in free narrative, using their own words, for instance, what happened from the time they woke up until they went to sleep on the date when the critical event happened. After that, the trained expert analyzes the written statement by marking and interpreting the presence of each criterion in a predefined way (with a certain color, underlining or rounding). There are generally two ways to be deceptive - by adding fabricated content or omitting truthful information. Sapir claims 90% of the subject in forensic practice choose to be deceptive by omitting compromising information because it is cognitively less demanding than fabricating. This means that the majority of deceptive statements are actually incomplete truthful statements. The reason for this is that when people are given a choice to give their own explanation in their own words, they will choose to be truthful. However, this does not mean that they will simply tell everything. A guilty person would give truthful information but would omit one point: that they committed the crime. For that reason, we need to have "a total belief in the subject" and believe what the subject said is true. In essence, the only thing that we have to check for is what the subject did not tell us, what did not want us to know. But there is still a fundamental question to be answered: is it possible that the subject is truthful, while the subject still committed a crime. Compared to CBCA and RM in which the object of analysis is the content, S.C.AN method focuses on the structure of the statement concerning the subject's vocabulary. The underlying assumption is that conscious content manipulation leads to unconscious changes in statement structure and word choice. In this regard, the SCAN criteria is applicable in the following instances: indicate deception in the means of the unreliability of a certain part of statements or particular sequence; provide evidence that statement is credible if the presence of specific criteria framework is justified by content; identify places in statements when subject conceal some information. SCAN criteria are based more on a contextual approach than a structural one and need to be interpreted in the context of statement content.

The S.C.AN method is by far the most commonly used method for assessing the veracity of statements in forensic practice, however, because of its specific approach to analysis, which is difficult to quantify, there are currently only two field studies (Driscoll, 1994: according to Nahari, Vrij & Fisher, 2012; Smith, 2001) and 5 laboratory studies (Porter & Yuille, 1996; Nahari, Vrij & Fisher, 2012; Bogaard, Meijer, Vrij , Broers & Merckelbach, 2014; Vanderhallen, Jaspaert & Vervaeke, 2016; Bogaard, Meijer, Vrij & Merckelbach, 2016) which tested the validity of SCAN method in lie detection. Unfortunately, conclusions from the Driscoll field study are limited

because it is not possible to establish ground truth, for each statement, it is unknown whether it is actually truthful or deceptive (Driscoll, 1994) The Smith's study has a similar shortcoming as the ground truth was not defined properly. Laboratory studies have also had major deficiencies. For example, Porter and Yuille (1996) analyzed three criteria of the S.C.AN method in subject statements of a mock crime, however a focus on only three criteria made it inappropriate for verification. Another study assessed the presence of 13 identified criteria of the S.C.AN, which showed that it was not possible to distinguish deceptive from truthful statements (Nahari, et al., 2012). Similarly, the Bogaard study didn't register differences between truthful and fabricated statements based on 12 criteria (Bogaard et al., 2014). In contrast to field studies, most laboratory studies' results suggest that the S.C.AN method cannot discriminate between deceptive and truthful statements. However, given the small number of studies and certain limitations they face, no conclusion can yet be drawn on the validity of the S.C.AN method. The issue for such discrepancies is that the method is not standardized, that there is no defined list of criteria, and it is not completely clear how to identify and interpret each of the criteria. Although the studies are based on the quantification of criteria, there is no standardized scoring system as the analysis is based on a structural approach: meaning is gained from the relationships of criteria (or signs) and contrasts with other signs. As concisely explained by Saussure "there are only differences 'without positive terms" (de Saussure, 1959). While different analyst experts may give different significance to different criteria and come to different conclusions when analyzing the same statement, the real achievement of SCAN is to use criteria as a relational sign not a marker of a factual match. It is therefore necessary to further examine the inner workings and validity of the SCAN method using on one hand ecologically valid real-case statements with well-established ground truth and on the other after completing comprehensive SCAN training and after each of the criteria are more precisely defined and standardized.

4.3.1 Applicability of S.C.AN method for forensic analysis of child statements

It is important to point out that children's ability to *verbally* recall events determines the outcome of a forensic interview. Whether young children are able to verbally recall what they remember is closely linked to their cognitive and language development. This insight can be traced back to Piaget's theory of cognitive development, a child in the preoperational stage (up to seven years) cannot take into account the position of another person or look at a certain event or object from perspectives different from one's own (Piaget, 1969). Preoperational children's thought is characterized by centration, they being able to attend to only one aspect of a given situation at a time—that generally being the most salient perceptual aspect instead of taking into account several aspects of the situation and problem. Also, the lack of reversibility is a related characteristic of children's thoughts in this stage of development. Pre-schoolers often use language not as the means of communication but as a verbal accompaniment to their autistic

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thoughts. According to other studies, children below the age of six have more difficulty focusing their attention and may not understand, only responding to the words or simple phrases they recognize (Lamb, Malloy, Hershkowitz, & La Rooy, 2015). As children get integrated into society, egocentric speech weakens more and more, and at age 7 or 8 years, it almost completely disappears.

Besides the development of primary linguistic skills, i.e., understanding and producing language, an essential part of child's adaptation to society is the emergence of metalinguistic skills, the ability to reflect consciously upon nature and properties of language. Metacognitive skills make it possible to monitor the success of the goal of using language, i.e., to communicate, rather than focusing directly on the language itself. For example, such skills are the ability to (a) predict consequences, (b) check results, and (c) monitor ongoing activity (Brown, 1978, 1980; Brown & DeLoache, 1978). Research generally shows that children begin having success on a wide variety of metalinguistic tasks at around 6 or 7 years of age. This is the same age they would be expected to be the transition into concrete operations (Hakes, 1980). Children's narrative skills to use language to tell true narrative that contains a central theme, character, and plot and include motivations behind the characters' actions and logical and/or temporally ordered sequences of events develop at the age of 5-7 years (Hutson-Nechkash, Peg, 2001). In a study by Simcock and Hayne's (2002, 2003), children did not once use a word that had not been a part of their productive vocabulary at the time of the critical event in their later verbal recall. Preschool children's (2-5 years old) verbal recall of events lags behind their verbal abilities. For preschool children, even after they have obtained basic language skills, their verbal reports of the event reflecting their language ability at the time of the encoding, not retrieval. Therefore, the age and language skills of the child when the critical event occurred are important factors to consider when assessing the child's ability to recall experiences.

Specific studies also show that preschool children's memory reports can also become inaccurate due to faulty source monitoring, which is the process of determining the origin (or source) of their knowledge, memories, or beliefs, thus making it difficult to distinguish between real event details and suggested details (Johnson, Hashtroudi, & Lindsay, 1993). In contrast to under six-year-old children, older children (6 -to 9-year-olds) were more accurate and made fewer source monitoring errors answering questions about activities they had performed versus those they observed (Roberts and Blades, 1998). Also, explicit training in source monitoring appears to be beneficial for older (i.e., 7- to 8-year-old), but not for younger (3- to 6-year-old) child witnesses (Poole & Lindsay, 2002). Also, preschool children are not able to locate or count past events in time (Friedman, Reese, & Dai, 2011). Based on the findings so far, it can be therefore concluded that the application of the S.C.AN method in the forensic analysis of the statements of children under the age of seven is not recommended.

It is only with the acquirement of concrete operations (7-11 years) that the child's cognitive development is able to perform logical or operational thought. This means the child can work things out internally in their head (rather than physically try things out in the real world). Central to the transition from preoperational to concrete operational thought is the ability to decenter—the ability to monitor multiple aspects of the situation simultaneously and consider the relationship between these aspects. Reasoning skills of the concretely operational child enable her to experience success regarding metalinguistic tasks, which require, for example, comparing two conventional meanings of a particular disembedded linguistic form or manipulating form and simultaneously retaining semantic content. For instance, eight-year-old children can reconstruct the correct and irreversible order of events (Piaget, 1971. Children develop the capacity to deal with complex problems about perspectives as well (Flavell, 1977) and to coordinate multiple social categories, understanding, for example, role intersections, such as that a man can simultaneously be a doctor and a father to a girl who is both his patient and his daughter (Watson, 1981). The stage of formal operations begins at approximately around the age of eleven or twelve. During this time, children develop the ability to think about abstract concepts or to think hypothetically, to draw conclusions based on abstract assumptions, to understand metaphors. Also, children develop a new ability to generalize across concrete instances and to handle the complexities of some tasks requiring hypothetical reasoning. For example, a child can now understand and use a general definition of a concept such as addition or noun (Fischer et al., 1983).

The development of S.C.AN criteria was based on statistical analysis and comparison of adults' statements, both truthful and deceptive. These are registered deception cues from adults and seem to require a more advanced ability to manipulate content and conceal or fabricate information. Therefore, established S.C.AN criteria and their interpretation based on adults' statements cannot be generalized and considered valid for the analysis of children's statements due to differences in cognitive and language development that undoubtedly exist. However, the least significant difference in cognitive and language abilities exists between adolescents and adults, which may suggest that the S.C.AN method may be applicable to statements of adolescents between 12 and 18 years of age, similar to forensic analysis of adult statements. Also, in children under the age of 12, it is much more difficult or impossible to obtain a longer free narrative without contamination with closed and concrete questions (Davis et al., 2000) Furthermore, based on our analysis of false statements of children of different ages and the assessment of how cognitively demanding each of the SCAN psycholinguistic criteria are, there is a high probability that criteria "Pronouns" and "Social Introduction" can be applied in assessing statements of children aged 8 to 12 years. They might indicate the reliability of the different parts of the statement and the quality or social relationship and attitude of the child towards other persons stated in the statement.