

## CASE Challenge Annotated Bibliography

This is an annotated bibliography of key references for credibility assessment related to the IARPA CASE Challenge. It is not intended to be a comprehensive survey of the field, but a selective overview. This bibliography is aimed at those new to the field of credibility assessment who are interested in participating in the IARPA CASE Challenge. Most of the references are publicly available; however, some may be accessible only from academic domains with access to specific journal databases.

### Credibility Assessment Overviews

This first set of references attempts to provide a broad background on existing theory, practice, and research in the field of credibility assessment.

1. *National Research Council. The Polygraph and Lie Detection. Washington, DC: The National Academies Press (2003).*
  - <https://doi.org/10.17226/10420>
  - This widely cited report reviews the scientific evidence for polygraph deception detection, particularly as it relates to its use in criminal investigations, employment screening, and counter-intelligence. The report concluded that issue-specific polygraph tests could detect deception at rates well above chance but recommended additional research and investment in credibility assessment techniques for more ambiguous employment screening applications.
2. *Charles R. Hunts and Susan Amato. "Psychophysiological Credibility Assessment." Journal of Forensic Psychology Practice, 1 (1): 87-99 (2008).*
  - [https://doi.org/10.1300/J158v01n01\\_06](https://doi.org/10.1300/J158v01n01_06)
  - This article provides an overview of the most commonly used polygraph techniques for personnel security and forensic purposes and describes the scientific support and criticisms associated with each.
3. *K. Heckman and M. Happel. "Mechanical Detection of Deception: A Short Review." In Educing Information: Interrogation: Science and Art, R. Swenson (ed.), National Defense Intelligence College, Washington, DC, 63-94 (2006).*
  - [http://www.au.af.mil/AU/AWC/awcgate/dia/educing\\_info.pdf](http://www.au.af.mil/AU/AWC/awcgate/dia/educing_info.pdf)
  - This article provides a short review of technologies developed for credibility assessment over the past century, focusing on psychophysiological- and neurological-based methods. The article concluded that additional research needs to be done with respect to polygraph alternatives before any can be considered reliable enough to be used in operational settings.
4. *Intelligence Interviewing: Teaching Papers and Case Studies, A Report from the Study on Educing Information. Intelligence Science Board (2009).*
  - <http://www.fas.org/irp/dni/isb/interview.pdf>
  - This booklet focuses on non-coercive intelligence interviewing and the perspective that the United States, as well as other democracies, can benefit from exploring and learning more about this tactic. The booklet contains a series of

papers on interrogation and intelligence interviewing related topics, which include key points and questions for future research, as well as two brief case studies.

### Representative Credibility Assessment Studies

This set of references is included to provide examples of credibility assessment research; they have been selected to provide potential CASE participants with solid examples of well described study protocols.

5. *Stuart Senter, James Waller, and Donald Krapohl. "Air Force Modified General Question Test Validation Study." Polygraph 37 (3): 174-184 (2008).*
  - <http://www.polygraph.org/assets/docs/APA-Journal.Articles/Vol.37.2008/polygraph%202008%20373.pdf>
  - This article provides an example of a realistic credibility assessment study where deceptive participants were asked to arm and place a simulated bomb. Realistic elements included a simulated bomb explosion and the potential to have to "confess" in front of superiors and peers via the requirement to give a speech on honesty if found to be lying.
6. *D. A Pollina, A. B. Dollins, S. M. Senter, D. J. Krapohl and A. H. Ryan. "Comparison of Polygraph Data Obtained from Individuals Involved in Mock Crimes and Actual Criminal Investigations." Journal of Applied Psychology, 89 (6): 1099-1105 (2004).*
  - <http://dx.doi.org/10.1037/0021-9010.89.6.1099>
  - This study compared polygraph results from a laboratory mock crime study with polygraph results from actual field criminal investigations. The study concluded that although significant differences between field and similarly obtained laboratory polygraph data were found, laboratory studies can still provide useful information about field polygraph situations despite these differences.

### Ethical Considerations for Human Subjects Research

This reference provides an accessible overview of ethical considerations for human subject research.

7. *American Psychological Association. Guidelines for Ethical Conduct of Behavioral Projects Involving Human Participants by High School Students (2012).*
  - <http://www.apa.org/science/leadership/care/human-participants.pdf>
  - An easy-to-read overview of ethical considerations and federal regulations related to the responsible care and protection of human subject research study participants.

### Personnel Screening

This set of references addresses the challenges of pre-employment screening both with and without the use of the polygraph. Some address legal issues, others policy, and others provide examples of empirical support for various screening approaches. Personnel screening can be considered prospective credibility assessment as the intent is to determine suitability for employment and essentially predict whether or not someone will violate a normative behavior.

8. Donald Krapohl and Terry Rosales. "Decision Accuracy for the Relevant-Irrelevant Screening Test: A Partial Replication." *Polygraph* 41 (1): 20-29 (2014).
  - [http://www.polygraph.org/assets/docs/APA-Journal.Articles/2014/decision\\_accuracy\\_of\\_the\\_ri\\_screening\\_test.pdf](http://www.polygraph.org/assets/docs/APA-Journal.Articles/2014/decision_accuracy_of_the_ri_screening_test.pdf)
  - This article used real field data collected in the mid-1990s via a rare employment screening credibility assessment study. In the original study, from which the data used here is drawn, a security firm used polygraphs to screen employment candidates for security guard positions at an international airport.
9. Government Accountability Office Personnel Security Clearances: Opportunities Exist to Improve Quality Throughout the Process (2015).
  - <https://www.gao.gov/products/GAO-14-186T>
  - This report addresses the roles and responsibilities of executive branch agencies involved in the personnel security clearance process, describes the different phases of the process, and discusses the extent to which agencies actively assess process quality.
10. Government Accountability Office. Personnel Security Clearances: Full Development and Implementation of Metrics Needed to Measure Quality of Process (2015).
  - <https://www.gao.gov/products/GAO-14-157T>
  - This study addresses the overall security clearance process, the extent to which metrics are in place to help determine the quality of that process, and steps taken to initiate security clearance reforms.
11. Christopher M. Berry, Paul R. Sackett, and Shelly Wiemann. "A review of recent developments in integrity test research." *Personnel Psychology* 60 (2): 271-301 (2007).
  - <https://doi.org/10.1111/j.1744-6570.2007.00074.x>
  - The article summarizes research on integrity testing; a personnel selection approach used in non-US government organizations who cannot utilize the polygraph. The paper addresses both the conceptual evolution of integrity testing along with summaries of research in the field. For example, validation in integrity test research includes comparison to available ground truth related to counterproductive work behaviors, such as employee theft, violence, absenteeism, and tardiness.
12. Kelly D. Dages, Seth Zimmer, and John W. Jones. "Pre-employment risk screening: Comparability of integrity assessment technology platforms." *International Journal of Selection and Assessment* (2017).
  - <https://doi.org/10.1111/ijsa.12193>
  - This article examines the feasibility of integrating technological platforms, including prospective employees' mobile devices, into pre-employment integrity testing. While there are some usability challenges, along with control issues, technological means using mobile platforms present some interesting opportunities for integrity testing research and application.

13. Michael R. Cunningham, John W. Jones, and Brian W. Dreschler. "Personnel risk management assessment for newly emerging forms of employee crimes." *International Journal of Selection and Assessment* 26 (1): 5-16 (2018).
  - <https://doi.org/10.1111/ijsa.12202>
  - This paper addresses comprehensive risk management in employee screening and introduces the Reid Background Check Plus (RBCP), an online personnel risk assessment designed to assess high-risk work dispositions and job-relevant occupational characteristics of digital-age job applicants. The instrument is based on a combination of attitude and admission items. The RBCP includes five scales and an overall composite score. Aspects assessed include potential subject risk factors such as organized crime collusion, cyber-crimes, identity and credential misrepresentation, thrill-seeking tendencies and workplace violence, combined into an overall insider threat likelihood.
14. Adam Park and James S. Herndon. "Police Cadet Attrition and Training Performance Outcomes." *Polygraph* 44 (2) (2015).
  - [http://www.academia.edu/20714711/Police\\_Cadet\\_Attrition\\_and\\_Training\\_Performance\\_Outcomes](http://www.academia.edu/20714711/Police_Cadet_Attrition_and_Training_Performance_Outcomes)
  - This paper used linear and logistic regression to examine whether a variety of demographic variables and screening polygraph results could predict police cadet training completion success. Polygraph test results were found to be predictive of academy completion. Age, prior military service, and level of education were also found to be predictive.
15. S.F. Befort. "Pre-employment screening and investigation: Navigating between a rock and a hard place." *Hofstra Labor and Employment Law Journal* 14 (2) (1996).
  - <https://scholarlycommons.law.hofstra.edu/cgi/viewcontent.cgi?referer=https://scholar.google.com/&httpsredir=1&article=1282&context=hlej>
  - Overview of the use of the polygraph in pre-employment screening from a legal perspective, post Employee Polygraph Protection Act (EPPA) of 1988, which prevents most private employers from using the polygraph for pre-employment screening and/or during the course of employment.
16. S. N. Hurd. "Use of the polygraph in screening job applicants." *American Business Law Journal*, 22(4): 529-550 (1985).
  - <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1744-1714.1984.tb01491.x>
  - Outlines the history, operation, and use of the polygraph in pre-employment screening. Though dated, particularly since it precedes the Employee Polygraph Protection Act (EPPA), the article provides a legalistic perspective on the scientific background and corporate use of the polygraph in an objective manner; it is a useful reference for potential CASE Challenge participants to understand the rationale behind the use of the polygraph in employment screening.
17. H. H. Bancroft. "Polygraph screening." In D. Krapohl, and P. Shaw (Eds.), *Fundamentals of Polygraph Practice*. Cambridge, MA: Academic Press (2015).
  - <https://www.amazon.com/Fundamentals-Polygraph-Practice-Donald-Krapohl/dp/0128029242>

- Book chapter on the use of the polygraph in pre-employment screening from a comprehensive textbook on polygraph practice. Of particular interest, as it is not detailed elsewhere in the literature, is Weatherman’s Interview Route Maps (IRM) used in pretest interviews. It also has useful information about specific questioning protocols, including their scoring, and the use of multiple tests in the same interview. While specific to the polygraph, much of the logic can be applied to technology agnostic protocols.

### Issue-Specific Investigations

Issue-specific investigations are retrospective, and generally use structured interview techniques together with credibility assessment technologies to assess if a subject seems to have guilty knowledge about the specific issue in question.

18. J. P. Rosenfeld (Ed). *Detecting Concealed Information and Deception*. 1<sup>st</sup> Ed. Chicago: Academic Press (2018).

- [http://groups.psych.northwestern.edu/rosenfeld/documents/Rosenfeld,%20J.%20Peter.%20Detecting%20Concealed%20Information%20and%20Deception%20Recent%20Developments.%20\(PDF\).pdf#page=54](http://groups.psych.northwestern.edu/rosenfeld/documents/Rosenfeld,%20J.%20Peter.%20Detecting%20Concealed%20Information%20and%20Deception%20Recent%20Developments.%20(PDF).pdf#page=54)

- This anthology of research papers, edited by one of the foremost experts in detection of deception and information concealment, provides an excellent theoretical background on the concealed information test (CIT) along with empirical studies of the effectiveness of numerous variants. It provides not only the scientific underpinnings of the CIT and other retrospective credibility assessment techniques but also the legal implications of such research.

19. E. H. Meijer, N. K. Selle, L. Elber, and G. Ben-Shakhar. “Memory detection with the Concealed Information Test: A meta-analysis of skin conductance, respiration, heart rate, and P300 data.” *Psychophysiology*, 51(9): 879-904 (2014).

- <https://onlinelibrary.wiley.com/doi/full/10.1111/psyp.12239>

- Comprehensive meta-analysis of laboratory research involving the Concealed Information Test (CIT) and the traditional polygraph psychophysiological sensors, as well as the use of electroencephalography. Over the last decade, there has been considerable growth in research related to recognition signals and detecting concealed information. This recent work has produced a series of protocols aimed at improving the CIT using advances in neuroimaging.

20. C. A. Meissner, F. Surmon-Böhr, S. Oleszkiewicz, and L. J. Alison. “Developing an evidence-based perspective on interrogation: A review of the US government’s high-value detainee interrogation group research program”. *Psychology, Public Policy, and Law*, 23 (4): 438-457 (2017).

- <http://psycnet.apa.org/record/2017-49224-003>

- This paper summarizes the research funded by the High-Value Detainee Interrogation Group (HIG) which has focused on social and behavioral science approaches to rapport-based interrogation, many of which have focused on linguistic approaches. Some of these projects included variants of the Cognitive Interview, a

method originally developed in child clinical psychology that has evolved to applications in intelligence and law enforcement, which involves techniques designed to improve the subject's memory retrieval processes.

### Polygraph Research

This section of references is included to provide potential CASE participants with some background on relevant research performed using the polygraph instrument as the central focus of a study. The idea is to demonstrate both strengths and limitations of existing methods so that novel protocols may be developed and submitted.

21. G. Barland, C. R. Honts, and S. D. Barger. *Studies of the accuracy of security screening polygraph examinations. Research Division, Department of Defense Polygraph Institute (1989).*
  - [https://www.researchgate.net/profile/Charles\\_Honts/publication/278027519\\_Studies\\_of\\_the\\_Accuracy\\_of\\_Security\\_Screening\\_Polygraph\\_Examinations/links/5579d29d08ae7521587179e3/Studies-of-the-Accuracy-of-Security-Screening-Polygraph-Examinations.pdf](https://www.researchgate.net/profile/Charles_Honts/publication/278027519_Studies_of_the_Accuracy_of_Security_Screening_Polygraph_Examinations/links/5579d29d08ae7521587179e3/Studies-of-the-Accuracy-of-Security-Screening-Polygraph-Examinations.pdf)
  - This volume outlines a series of studies conducted by the Department of Defense Polygraph Institute or DoDPI (now the National Center for Credibility Assessment or NCCA); it provides a helpful resource for examples of how polygraph procedures are tested under various conditions.
22. M. Handler, C. R. Hunts, D. J. Krapohl, R. Nelson, and S. Griffin. "Integration of pre-employment polygraph screening into the police selection process." *Journal of Police and Criminal Psychology*, 24 (2): 69-86 (2009).
  - <https://link.springer.com/article/10.1007%2Fs11896-009-9050-2>
  - This article provides a thorough overview of using polygraph for pre-employment screening of police officers. This includes discussion that the polygraph seems most effective for credibility assessment to "screen-out" potential candidates who have behaviors that are not compatible with the high integrity necessary for employment as a police officer.
23. C. R. Hunts and S. Amato. "Automation of a screening polygraph test increases accuracy." *Psychology, Crime & Law*, 13: 187-19 (2007).
  - <https://www.tandfonline.com/doi/full/10.1080/10683160600632843>
  - This mock employment study had eighty student subjects. Deceptive participants first filled out an employment application, and then were instructed to fill out a second form falsifying two items on their application: one of last name, date of birth, college major, or make of automobile; and one of address, social security number, high school, or checking account information. The study found automated polygraph examinations were more accurate than human polygraphers at detecting those who were deceptive on these employment forms.
24. Vance MacLaren. "Can we trust counterintelligence Polygraph Tests?" *Polygraph*, 29 (2): 151-155 (2000).
  - <http://www.polygraph.org/assets/docs/APA-Journal.Articles/Vol.29.2000/polygraph%202000%20292.pdf#page=16>

- This paper gives a review of open-source literature (as of the year 2000) on polygraph security screening procedures of the DoD. It also describes challenges of translating lab validity to field validity, and the impacts of false negatives.
25. D. Grubin and L. Madsen. "Lie detection and the polygraph: A historical review." *The Journal of Forensic Psychiatry & Psychology*, 16 (2): 357-369 (2005).
- <https://www.tandfonline.com/doi/full/10.1080/14789940412331337353>
  - This article reviews the development of polygraphy, focusing on its emergence in the United States and to some extent in England, but also considers its role in newer applications, particularly sex offender treatment and supervision.
26. *Counterintelligence Field Activity (CIFA) Federal Psychophysiological Detection of Deception Examiner Handbook* (2006).
- [http://www.polygraph.org/assets/docs/APA-Journal.Articles/2011/federal-polygraph-handbook-02-10-2006\\_2.pdf](http://www.polygraph.org/assets/docs/APA-Journal.Articles/2011/federal-polygraph-handbook-02-10-2006_2.pdf)
  - This 2006 handbook describes Psychophysiological Detection of Deception (PDD/polygraph) procedures for US government polygraph examiners.
27. Donald Krapohl, Mark Handler, and Shirley Sturn. *Terminology Reference for the Science of Psychophysiological Detection of Deception* (2012).
- [http://www.polygraph.org/assets/docs/APA-Journal.Articles/published%20terminology\\_reference\\_update\\_for\\_2012.pdf](http://www.polygraph.org/assets/docs/APA-Journal.Articles/published%20terminology_reference_update_for_2012.pdf)
  - This document provides an explanation of terminology associated with the Psychophysiological Detection of Deception (PDD/polygraph) published by the National Center for Credibility Assessment. It provides a comprehensive set of terms and concepts associated with polygraphy by the only United States Government accrediting body for polygraph examiners. It may provide potential CASE Challenge participants useful context to develop technology-agnostic evaluation approaches.

### Representative Research on Non-Polygraph Approaches to Credibility Assessment

Similar to the previous section, this set of references is included to provide potential CASE participants with some background on relevant credibility assessment research; however, these were performed without the use of the polygraph instrument as the central focus of a study.

28. Virginia Hughes. "The Other Polygraph." *A Blog by Virginia Hughes, National Geographic Phenomena website* (2014).
- <http://phenomena.nationalgeographic.com/2014/09/30/the-other-polygraph/>
  - This blog describes two credibility assessment evaluation studies utilizing electroencephalography (EEG) technology to aid in assessing an individual's credibility. The first study took place in an artificial laboratory environment where participants were asked to pretend they were involved in a terrorism plot and later showed key words associated with that plot such as "bomb," while the second study utilized a far more realistic situation where participants wore a small video camera while going about their normal routine and were later showed words pertinent to what they experienced.

29. John C. Kircher and David C. Raskin. "Laboratory and Field Research on the Ocular-motor Deception Test." *European Polygraph* 10 (4): 159-172 (2016).

- <https://www.polygraph.pl/vol/2016-4/european-polygraph-2016-no4-kircher-raskin.pdf>

- This paper presents a pre-employment screening field study for credibility assessment via an Ocular-Motor Deception Test (ODT). The applicants were applying for positions in the office of Mexico Attorney General's, immigration, and federal police. Questions used covered areas of interest including corruption, arms trafficking, or affiliation with a religious terrorist organization. Ground truth used was admissions of such involvement on subsequent polygraph tests.

30. Satoris S. Culbertson, William S. Weyhrauch, and Christopher J. Waples. "Behavioral Cues as Indicators of Deception in Structured Employment Interviews." *International Journal of Selection and Assessment* 24 (2): 119-131 (2016).

- <https://onlinelibrary.wiley.com/doi/abs/10.1111/ijisa.12135>

- This paper performed two studies to see whether certain behavioral cues could be detected (by a person) when subjects were given Mock Interviews and told to either lie or not lie. They also studied differences between using situational interview (SI) and behavioral description interview (BDI) questions. Study 1 concluded that trained coders could see some more deceptive cues for questions where participants were told to lie. However, Study 2 showed that general participants were not as easily able to distinguish lies from truths, even when informed to watch for deceptive behavioral cues.

31. Leann Schneider, Deborah M. Powell, and Nicolas Roulin. "Cues to deception in the employment interview." *International Journal of Selection and Assessment* 23 (2): 182-190 (2015).

- <https://onlinelibrary.wiley.com/doi/abs/10.1111/ijisa.12106>

- This study looked at micro and macro-level behavioral cues for deception in 109 mock employment interviews of students. They found deceptive interviewees had different "impression management" behaviors such as restrained facial behavior (less smiling) and unrestrained verbal behavior (more speaking errors, less silences).