Institution: University of Portsmouth

Unit of Assessment: 4 Psychology, Psychiatry and Neuroscience

Title of case study: Cognitive research leads to improved lie detection processes and training adopted by professionals in forensic, intelligence, security and commercial settings

1. Summary of the impact

The innovative Cognitive Load (CL) technique, based on cognitive theory, yields significantly superior lie detection results by capitalising on the fact that interviews can be devised that are more difficult for liars than truth-tellers. This CL technique, pioneered by Vrij, is used for ethical information-gathering interviewing and undercover and interrogation purposes by police, military and intelligence agencies worldwide. Training of these law enforcement professionals as a result of our research has been implemented. An insurance company has adopted a revised protocol as a result of applying our research and has implemented an industry-leading product for reducing fraudulent insurance claims.

2. Underpinning research

The successful detection of deception during investigative interviews with suspects is of paramount important in security and counter-terrorism contexts. However, research shows that the cues to deception that emerge in investigative settings are largely unreliable and that observers who rely on nonverbal cues distinguish truths from lies at 54% accuracy (i.e. just above chance). Traditionally, verbal and nonverbal lie detection has focused on the difference in emotions that liars and truth tellers experience. The approach has significant shortcomings and the US National Academies' National Research Council (2003) concluded that the level of arousal of interviewees could not reliably be used to discriminate between truth tellers and liars. Further, arousal-based approaches have been shown to elicit false confessions and inaccurate information due to pressure imposed on interviewees.

In contrast, our research has identified ethical, non-pressurising interview strategies that are more cognitively demanding for liars than truth tellers. The development of the innovative Cognitive Load (CL) technique, which was led by Professor Aldert Vrij (Professor of Applied Social Psychology, University of Portsmouth) from 2003 onwards in collaboration with international experts, yields significantly superior detection rates (72% in cognitive load experimental conditions versus 58% in standard conditions in 13 published studies to date) by capitalising on the fact that interviews can be devised that are more difficult cognitively for liars than truth tellers [1]. Several techniques have been derived, developed and empirically tested using the CL technique. The CL technique incorporates two core elements:

(i) The rationale underpinning the cognitive load approach is that lying is cognitively more demanding than truth telling [4, 5]. Our research demonstrates that interviewers can exploit the differential levels of cognitive load that truth tellers and liars experience during an interview to discriminate more effectively between them. As lying is more cognitively demanding than truth-telling, liars will have fewer cognitive resources available when the demands of the interview are increased. Cognitive demand can be increased in a number of ways (e.g., by eliciting the account in reverse order or requiring the interviewee to maintain eye contact with the interviewer during the interview). Under these conditions liars leak more cues to deceit and observers are better at detecting their lies [2].

(ii) The unanticipated questioning approach is based on the finding that liars prepare answers when anticipating an interview. Planning makes lying easier, and planned lies typically contain fewer cues to deceit than spontaneous lies. However, the positive effects of planning will only emerge if liars correctly anticipate which questions will be asked. Interviewers can exploit this limitation by asking questions about central aspects of the event that liars do not anticipate. We have demonstrated that asking unanticipated questions (e.g., questions about spatial and temporal information) or asking questions in an unanticipated format (e.g., request a drawing) result in more cues to deceit and facilitate lie detection [3]. We have also recently demonstrated that in an airport setting (when asking questions about a forthcoming trip) questions about transportation are more effective for lie detection purposes than questions about the purpose of the visit.

3. References to the research

[1] Vrij, A., Fisher, R., Mann, S., & Leal, S. (2006). Detecting deception by manipulating cognitive load. *Trends in Cognitive Sciences*, *10*, 141-142. (5-year IF: 14.86; 2011 IF: 12.58; 1/84 Psychology) DOI: 10.1016/j.tics.2006.02.003. This paper, in the top journal in general psychology, outlines the innovative idea that people can become better at lie detection by using specific cognitive-based interview protocols.

[2] Vrij, A., Mann, S., Fisher, R., Leal, S., Milne, B., & Bull, R. (2008). Increasing cognitive load to facilitate lie detection: The benefit of recalling an event in reverse order. *Law & Human Behavior, 32*, 253-265. (5-year IF: 2.65; 2011 IF: 2.16; 16/136 Law; 12/59 Psychology, social). DOI: 10.1007/s10979-007-9103-y. This paper, in a top journal in the psychology and law area, demonstrated for the first time that imposing cognitive load on interviews increases observers' ability to distinguish between truths and lies.

[3] Vrij, A., Leal, S., Granhag, P. A., Mann, S., Fisher, R. P., Hillman, J., & Sperry, K. (2009). Outsmarting the liars: The benefit of asking unanticipated questions. *Law & Human Behavior*, *33*, 159-166. (5-year IF: 2.65; 2011 IF: 2.16; 16/136 Law; 12/59 Psychology, social). DOI: 10.1007/s10979-008-9143-y. Another paper in a top journal in the psychology and law area demonstrated for the first time that asking unexpected questions increases observers' ability to distinguish between truths and lies. REF 2 Output: 4-AV-003.

[4] Vrij, A., Granhag, P. A., & Porter, S. B. (2010). Pitfalls and opportunities in nonverbal and verbal lie detection. *Psychological Science in the Public Interest*, *11*, 89-121. DOI: 10.1177/1529100610390861. This unique official journal of the American Psychological Society features comprehensive reviews of issues relevant to the general public. This paper provided an overview of what typically goes wrong in lie detection and how people can improve their lie detection skills, including using our cognitive load approach.

[5] Vrij, A., Granhag, P.A., Mann, S. & Leal, S. (2011). Outsmarting the liars: Towards a cognitive lie detection approach. *Current Directions in Psychological Science*, *20*, 28-32. 5-year IF: 5.131; 2011 IF: 3.92; 12/125 Psychology, multidisciplinary). DOI: 10.1177/0963721410391245. An article in the official general psychology journal of the American Psychological Society, which provided an overview of our innovative cognitive approach to lie detection.

Grants:

(1) Vrij, 1/10/2003 – 31/12/2006: £136,182: Interviewing to detect deception. Economic and Social Research Council, Research Grant, RES-000-23-0292.
(2) Vrij, 1/11/2005-30/4/2007: £44,555: Cognitive load, arousal and lying: Arousal-suppression and compensatory response. Economic and Social Research Council, Research Grant, RES-000-22-1632.
(3) Vrij & Fisher, 2006-2009: £352,000: Eliciting and detecting cues to deception in brief interactions .UK Ministry of Defence and US Department of Defense.
(4) Vrij, 2009: £156,482: Lying about intentions. UK Ministry of Defence.
(5) Vrij, 1/2/2010-31/7/2013: £1,050,296 (£222,854 to Portsmouth). Detecting Terrorist Activities: Shades of Grey - Towards a Science of Interventions for Eliciting and Detecting Notable Behaviours. Engineering and Physical Sciences Research Council, Standard Research, EP/H02302X/1
(6) Vrij, 2010: £133,470: *Lying about intentions II*. UK, Ministry of Defense.
(7) Vrij, 2010: £112,000: *Lying in insurance claims*. Innovation Group.
(8) Vrij, 2010: £78,200: *Lying about intentions III*. UK, Ministry of Defense.
(9) Vrij, 2010: $165,000 (£107,142). *Interviewing to elicit cues to deception I*. American Federal Bureau of Investigation, J-FBI-10-009.
(10) Vrij, 2011: $165,000 (£107,142). *Interviewing to elicit cues to deception II*. American Federal Bureau of Investigation, J-FBI-10-009.
(11) Vrij, 2012: $250,000 (£164,474). *The effect of using interpreters on rapport, eliciting information*

and cues to deceit I. US High Value Detainee Interrogation Group, J-FBI-12-194.

(12) Vrij, 2012: $125,000 (£82,237). *Interviewing to elicit cues to deception III*. American Federal Bureau of Investigation, J-FBI-10-009.

(13) Vrij, 2013: £935,031 of which £192,669 to Portsmouth. *'The deterrence of deception in socio-technical systems'.* Engineering and Physical Sciences Research Council, EPSRC. Collaboration with University of Cambridge, University College London and Newcastle University.

(14) Vrij, 2013: $257,500 (£160,938): *The effect of using interpreters on rapport, eliciting information and cues to deceit II*. US High Value Detainee Interrogation Group, J-FBI-12-194.

(15) Vrij, 2013: $152,000 (£96,202): *The effect of cognitive load lie detection training on practitioners' ability to detect deceit*. American Federal Bureau of Investigation, FBI, J-FBI-10-009)

4. Details of the impact

Professional law enforcement training and practice has been influenced by Cognitive Load research

The reach of our innovative Cognitive Load (CL) techniques is global. Since 2003, Vrij has delivered over 50 training sessions on using the cognitive load approach to police (Belgium, Canada, Italy, Norway, South Korea, The Netherlands, US, UK), intelligence services (Australia, Israel, Singapore, UK, US), judges (New Zealand, US), legal professionals (The Netherlands, UK, US), bankers (UK), psychiatrists (Italy, UK), social workers (Denmark, Finland, South Korea, The Netherlands, UK) and insurance agencies (The Netherlands, UK).

Since 2010, Vrij has worked with the US Federal Law Enforcement Training Center (FLETC) to incorporate the cognitive load approach into the training of law enforcement personnel. FLETC is a Congressionally-mandated organisation responsible for providing initial and advanced training to all 91 US Federal law enforcement agencies and trains almost 70,000 law enforcement personnel per year. Vrij's CL technique has been included in the FLETC Introduction to Criminal Investigation Training Program (January 2013), the Advanced Interviewing for Law Enforcement Investigators Training Program (June 2012) and the basic interviewing course for criminal investigators (January 2013) [1].

The Singapore Police Force's entire training in lie detection is based upon Vrij's work, which they find highly applicable in practical contexts. They have used CL lie detection techniques successfully in several high profile and sensitive cases, and share their lie detection knowledge with Indonesia, Malaysia and Brunei. [2].

In Canada, The Edmonton Police Service and other police forces in Alberta (e.g., Calgary Police Service) have included Vrij's CL lie detection techniques in their interview and interrogation training programs. To date 600 officers have been trained in CL lie detection and the approach is considered to be a valuable addition to an investigator's toolkit, used on a regular basis [3].

Intelligence training and practice has been influenced by Cognitive Load research

Since 2006, UK and US intelligence agencies have funded research across 11 projects into the Cognitive Load lie detection approach, to the value of £1,447,474 (Grants 3, 6, 8-15, section 3). Vrij's CL lie detection techniques have been adopted and are in use by intelligence organisations worldwide including in the UK, US, Australia, Israel and Singapore. Adopters include the Centre for the Protection of National Infrastructure (CPNI, Defence, UK), which provides advice to a range of organisations responsible for the national security infrastructure. According to the CPNI they "have found the research useful in advising a number of organisations on interviewing strategies across a range of security contexts, and has received positive feedback on the usefulness of the research findings and their practical application to investigative and security interviewing" [6].

US intelligence end-users include the High Value Detainee Interrogation Group (HIG) and Federal Bureau of Investigation (FBI). The HIG/FBI have agreed that, on request, confidential information can be provided on the impact of Vrij's work regarding HIG/FBI highly sensitive operational activities. [7]. For security reasons, intelligence services cannot reveal their sensitive activities. However, the significance of the CL lie detection approach to these US and UK end users is demonstrated by the sustained funding for this research.

A business has adopted the Cognitive Load lie detection techniques

CL lie detection techniques (adopted since 2009) are an important aspect of training delivered by New Intelligence, an Australian company that delivers interview training to Australian police, and other public sector organisations including Australian Tax Office, Australian Customs and Border Protection Service, Australian Defence Force, Commonwealth Department of Immigration and Citizenship, and Commonwealth Department of Infrastructure. New Intelligence delivers CL lie detection training to more than 1200 trainees per year. The CL techniques are used frequently in the field and provide distinct advantage to investigators [4].

A new service has been commercialised as a result of applying Cognitive Load research

The Innovation Group PLC (IG) is an international organisation that *inter alia* provides commercial services to insurance companies. Their activities include conducting telephone interviews with potential claimants on behalf of motor insurance companies. Since 2010, Vrij and Leal have worked with IG to implement the CL lie detection approach into their processes and commercial services, in order to assess the veracity of insurance claims during telephone interviews with claimants. As a result of employing a CL lie detection based interview protocol the percentage of claimants who decide to drop their claim after being interviewed by IG has risen to 65-72% (compared to an industry average 30%). This gives IG the competitive advantage of a unique product in their marketplace [5].

5. Sources to corroborate the impact

(1) Federal Law Enforcement Training Center (US) – letter from Chief, Behavioral Science Division confirms details about how our work has been integrated into federal law enforcement training and practice.

(2) Singapore Police Force – letter from Chief Psychologist and Director, Home Team Behavioural Sciences Center (Home Land Security and Home Affairs) provides details how our work is used by Singapore Police, Security, Intelligence and Border Control services.

(3) Edmonton Police Service (Canada) – letter from Detective, Homicide Section – Major Crimes Branch gives information about how our research findings have been incorporated into police training for Canadian Police officers.

(4) New Intelligence (Australia) – letter from the Managing Director (former Detective Sergeant, a Criminal Intelligence Analyst and former head of the Violent Crime Analysis Unit within the Queensland Police) who oversees the provision of Interview Training to Immigration, Customs, Welfare, Private Insurers. The letter confirms the adoption of our research into training provision and products of the company. http://www.newintelligence.com.au

(5) The Innovation Group PLC (UK) – a letter from the Head of Technical Claims, describing the impact of the adoption and commercialisation of CL research by the company and the unique selling point and industry leading service which has resulted. http://www.innovation-group.com/uk/about-us

(6) Centre for the Protection of National Infrastructure (CPNI, Defence, UK). enquiries@cpni.gov.uk can provide details on a confidential basis about how CL lie detection techniques are employed by government and law enforcement agencies in the UK, including in an aviation and border security context.

(7) The High Value Detainee Interrogation Group and Federal Bureau of Investigation (US) have sponsored Vrij's research since 2006. Chief for Research, Defense Counter-Intelligence and Human Intelligence Center - Behavioral Science Program can provide details about how these US intelligence agencies are using the cognitive lie detection research in their professional training and practice. Can corroborate the information provided in (1).

NB. In considering the evidence, please note that the majority of our intelligence service contacts are not permitted to reveal their identity and/or discuss or allude to highly sensitive security activities, even to a confidential REF panel.