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Chapter 3

Lie Detectors and the Law: The Use of the Polygraph in Europe

Ewout H. Meijer and Peter J. van Koppen

In the 1990s, the Belgian Police found themselves confronted with a number of major criminal investigations they had been unable to solve. In order to force a breakthrough, they decided to submit suspects to lie detection tests using the polygraph. Experienced polygraphers were flown in; from South Africa to test Flemish suspects, from Canada for suspects from Wallonia. The introduction of the polygraph in Belgium turned out to be successful. Not necessarily because the cases were solved by the polygraph per se, but because a number of suspects confessed during or after the test.¹ Following these successes, the Belgian Federal Police in Brussels had their own people trained. Currently, three dedicated polygraphers test over 300 suspects per year.

Belgium is not the only example of recent developments in the use of polygraph testing in Europe. In the United Kingdom and the Netherlands, the polygraph is used for periodical testing of sex offenders. The test is used to assess the veracity of sex offenders' self reports about both treatment compliance and sexual history. Again, practitioners are content with the results (Grubin, 2002).

These examples illustrate that polygraph testing is not exclusively an American affair. Several European countries have adopted the use of polygraph testing to some extent, but others have not. Meanwhile, the use of the polygraph tests is heavily debated. Arguments for this debate not only include scientific properties of the test, such as accuracy, but also legal and ethical issues, for example, whether it is alien to the right to remain silent. Legal systems in different European countries weigh these arguments differently, resulting in different legal restraints on polygraph test outcomes.

In this chapter, we will discuss the use of the polygraph in Europe, and how legal systems in various countries deal with the issues surrounding it. We do not pretend to give an exhaustive review. This is impossible, since polygraph testing is partially in the hands of the secret services and military, and thus confidential. Even information

¹ This effect is also referred to as the bogus pipeline effect. See Roese and Jamieson (1993).

that is not confidential is rarely published and often inaccessible. Therefore, only applications of the polygraph on which information is publicly available will be discussed.

For a better understanding of the issues affecting legal status, we will first discuss the basic principles of polygraph testing. After that, we will discuss how far polygraph testing has penetrated into the legal arena of several European countries.

Polygraph Testing

The Polygraph

The words 'lie detector' and 'polygraph' are often used synonymously. The term 'polygraph' refers to the recording device that is used for registering different physiological parameters. Polygraphs designed for lie detection tests used to be briefcase-sized machines, measuring physical signals from the subject and recording them with multiple pens on a lengthy roll of paper. Nowadays, they consist of a small amplifier/digitizer and a laptop recording the signals. The sensors attached to the subject are generally (1) two expendable bands positioned around the thorax measuring respiration, (2) two electrodes attached to the inside of the hand measuring palm sweating and (3) an inflatable cuff positioned around the upper arm registering blood pressure. An example of a recording is given in Figure 3.1.

The physiological parameters registered with a polygraph co-vary with a number of psychological processes, including emotions such as fear and stress. Although it is widely accepted that there is no unique physiological pattern associated with lying (Lykken, 1998), the tracings can still be used to infer guilt or innocence, as will be discussed below.

The Questions

Various forms of polygraph testing exist. The two main forms are the control question test (CQT, see Reid, 1947) and the Guilty Knowledge Test (Lykken, 1960). The method of choice in most applications is the CQT.² During a CQT, the suspect is asked three different types of questions, relevant questions, control questions, and irrelevant questions. The relevant questions deal directly with the incident under investigation, for example 'on the 25th of March, did you shoot Gordon Shumway?' The physiological reactions to each relevant question are compared with those accompanying the control question directly preceding or following it. These control questions have a more generic nature, but also deal with undesirable behaviour, for example 'In the first 25 years of your life, have you ever done anything illegal?' The irrelevant questions are neutral, and take the form of, for instance, 'Is today Wednesday?' They are used as fillers.

2 We will discuss the GKT later in the chapter.

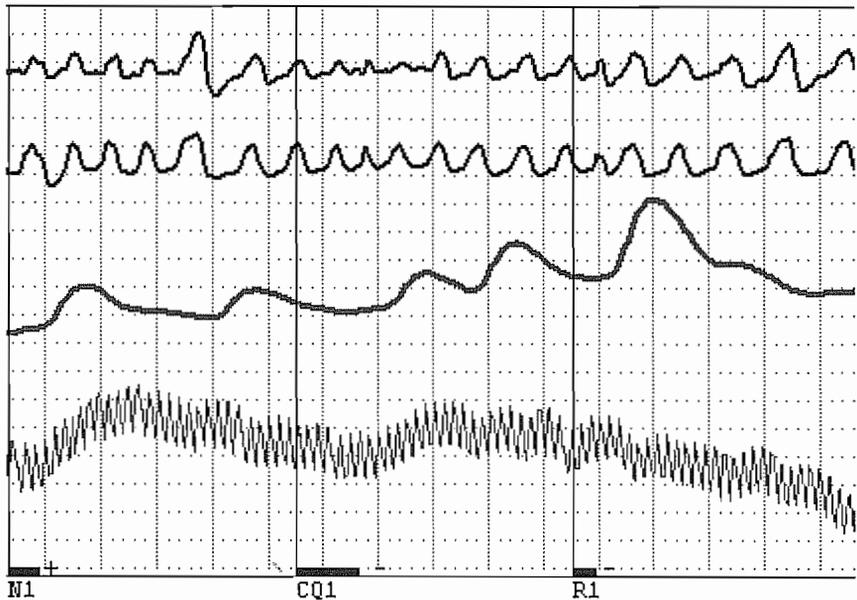


Figure 3.1 Computerized recording of physiological signals during a control question polygraph test

Note: From top to bottom, tracings represent thoracic respiration, abdominal respiration, skin conductance and blood pressure. Vertical lines represent the start of an irrelevant question (N1), a control question (CQ1) and a relevant question (R1).

Manipulation

A typical CQT starts with a lengthy pre-test interview. During this interview, the suspect is led to believe that lying is accompanied by involuntary changes in physiological activity, and that the polygraph registers these changes, and can thus determine whether he is lying or not. Most importantly however, the suspect is told that for the test outcome to be 'innocent' he needs to answer all questions truthfully.

Meanwhile, the polygrapher emphasizes the importance of answering both the relevant and the control questions with 'No'. This is achieved by giving the suspect the impression that disclosure of previous illegal behaviour will negatively influence the polygrapher's opinion of the suspect ('You don't look like somebody who would engage in illegal activities, do you?'). Assuming that somewhere in their youth everybody has overstepped the mark, the suspect will feel forced to give a deceptive answer to each control question. Supposedly, this results in a situation where for an innocent suspect the control questions become most stressful, since he is led to believe that his deceptiveness to this question will be picked up by the polygraph,

and will cause him to fail the test. A guilty suspect is thought to be less worried about the control questions. For him, his deceptive answer to the relevant questions poses the greatest threat of failing the test. This assumption underlying the CQT has also been referred to as the inference rule: 'each examinee will focus his or her concern on the questions that present the greatest threat of failing the test' (Elaad, 2003, p. 38).

Inference

The use of the CQT is continuously subjected to a long ongoing discussion. In particular, the validity of the inference rule has been debated since the 1970s (Ben-Shakhar and Furedy, 1990; Furedy and Heslegrave, 1991; Iacono and Lykken, 1997, 1999; Podlesny and Raskin, 1977; Raskin, 1989; Raskin *et al.*, 1997, 1999; Raskin and Podlesny, 1979; Saxe, 1991). The notion that guilty suspects show the greatest concern to the relevant questions while innocent show the greatest concern to the control questions has little foundation in psychological theory nor is it very compelling. Why would an innocent suspect be so much concerned with the control question, while being the subject of a murder investigation? Could the relevant question not be perceived as more threatening and thus elicit larger responses?

The control questions in the main interview are based on the discussion between polygrapher and suspect during the pre-test interview. According to proponents of the CQT, a skilled polygrapher is capable of both formulating control questions and creating an atmosphere in which an innocent examinee is most worried about these, whereas a guilty examinee is most worried about the relevant questions. Consequently, the quality of a test heavily depends on the intuition of the polygrapher in each and every case.

As a result, large differences in the quality of tests exist. This can be illustrated with a case one of the authors (EM) was confronted with. He was asked to give his opinion on the quality of a CQT in a sexual abuse case, and the weight that should be given to its outcome. The accused underwent a polygraph test with a private commercial polygrapher from London. The only documentation of the test consisted of a video tape directed at the ex-wife of the accused, on which the polygrapher stated 'There's no way that the accused is having any form of sexual contact with your children or with anybody else's children. He is not attracted to children. He is however very, very much in love with you.' When trying to get hold of more documentation, it turned out that there was no audio or video recording of any portion of the test, because this, according to the polygrapher, would distract the examinee (strikingly, during the test the examinee was seated next to a running washing machine). Furthermore, the polygrapher had disposed of the graphs because he maintained a paperless office. It should be plain to the reader that we needed little time to come up with a verdict on the quality of this specific test.

Accuracy

Estimations of the error margin of the CQT vary. This variation is in part due to difficulties that characterize research on the method's accuracy. In a typical laboratory study, subjects are instructed to commit a mock crime and are subsequently tested with a CQT. Their results are compared to tested subjects who did not commit the mock crime. The main problem of such laboratory studies is that the CQT is based on detecting the fear of being exposed. This fear is largely absent in laboratory studies. One may therefore expect huge differences between a murderer who is subjected to the CQT and may face life imprisonment, and an undergraduate psychology student who – serving as subject to gain study credits – is ordered to 'steal' something by the experimenter.

Field studies have more ecological validity, but face other problems. Most importantly, they lack an objective measure of guilt (i.e. ground truth). Whether the suspect was convicted afterwards is a suboptimal measure, since a conviction is, directly or indirectly, influenced by the results of the CQT. In particular, admissions or confessions made by suspects under the influence of a polygraph test result in a sampling bias overestimating the validity of the CQT (Iacono, 1991).

Keeping these limitations in mind, field studies typically show that guilty suspects are correctly classified as guilty by the CQT in 83–89% of the cases (and 10–17% as innocent, with 2–10% inconclusive), while innocent suspects are deemed innocent in 53–72% of the cases (and 12–47% as guilty, with 5–29% as inconclusive, see Ben-Shakhar Furedy, 1990; Carroll, 1991; Honts and Perry, 1992; Iacono and Patrick 1997; Lykken, 1998; Raskin and Honts, 2002). Besides highlighting the differences in accuracy rates between studies, these data also show that the probability for an innocent suspect to be classified as guilty is relatively high.³

Recently, the authoritative National Research Council (2003) reviewed the literature on the accuracy of the CQT. Strikingly, not a single study was found that met the criteria for good scientific research. The 37 laboratory studies and seven field studies that passed the minimum standards for review showed an accuracy index of 0.85 and 0.89 respectively, corresponding to an accuracy rate of around 80%. It led the National Research Council to conclude that specific-incident polygraph tests can discriminate lying from truth telling at rates well above chance, though well below perfection.

The National Research Council did make the reservation that these studies primarily included examinees that were untrained in countermeasures. Countermeasures refer to anything that a subject might do in an effort to defeat or distort a polygraph examination (Honts and Amato, 2002). They can be divided into

³ This means that the probability of a false positive result is much higher than the probability of a false negative result. This is alien to legal doctrine that prescribes that it should be the other way around, abbreviated in the so-called Blackstone Maxim: 'Better that ten guilty persons escape than that one innocent suffer.' See Blackstone (1882, Book 4, Ch 27). See also Volokh (1997).

two families, the *general state* countermeasures and *specific point* countermeasures. General state countermeasures are aimed at disturbing the subject's psychological and physiological state during the entire test, for example by taking drugs. Specific point countermeasures are aimed at augmenting or reducing the responses to different questions, for example through biting ones tongue or by mental imagery. In a laboratory setting, Honts and colleagues (Honts *et al.*, 1996, 1985) showed that a non-neglectable proportion of participants can successfully be instructed to defeat a polygraph test by using such countermeasures.

Sex Offenders

In the previous section, we focused on the use of the CQT in crime investigations. The CQT, however, is also used in post conviction management of sexual offenders. Although this application is only partially related to the legal issues, it may serve as a good example of how polygraph testing is used. The reported successes may result in grown confidence, and can in turn affect the legal status of polygraph test outcomes.

Successful treatment of sex offenders often poses special problems. The recidivism rates among this type of offenders are high (Hanson *et al.*, 2003; Prentky *et al.*, 1997) and cause public indignation and discussion. The frequent failure of the treatment is partly due to the fact that sex offenders, more than other offenders, have a long history of concealing their behaviour and lying about it. Having them tell everything, essential to many forms of therapy, is equally as important as it is difficult.

According to practitioners, using the polygraph aids breaking through this pattern of lying and deceit. According to English and colleagues it is akin to urine testing drug offenders: a method of validating offenders' self-reports of treatment compliance and monitoring very specific behaviours (English *et al.*, 2003). More precisely, the use of the polygraph in sex offender management serves three functions: (1) to verify the accuracy and completeness of the sexual history information an offender provides during treatment; (2) to verify the details of the conviction offence; and (3) to verify whether a probationer or parolee is complying with the conditions of community supervision and cooperating with treatment expectations (English *et al.*, 2003). The usefulness of the polygraph in sex offender management seems undisputed among practitioners who use it. Several studies show that it aids in having offenders disclose information about the number of previous offences, victims, and behaviours that increase the probability of recidivism (Ahlmeyer *et al.*, 2000; Emerick and Dutton, 1993; English *et al.*, 2003; Grubin *et al.*, 2004).

The use of the polygraph in sex offender management, however, has not remained free from criticism (Blasingame, 1998; Branaman and Gallagher, 2005; Cross and Saxe, 1992, 2001; Faller, 1997). It is argued that many sex offenders suffer from personality disorders that prevent them from experiencing anxiety when lying. This would make their physical responses during a CQT test meaningless. Additionally, these kinds of offenders routinely engage in cognitive distortions. These distortions

include perceiving children as wanting sex with adults, seeing sexual contact with children as socially acceptable and rationalization of their behaviour towards their victims ('This is not abuse, but in the interest of the child', see Ward *et al.* 1997). These cognitive distortions are likely to reduce feelings of guilt and anxiety, resulting in reduced detection during a CQT. Finally, many sex offenders are engaged in patterns of lying to conceal their pattern of abuse, often spanning many years. They are habituated to presenting lies, which again makes their lies less detectable during a CQT.

The biggest concern with the use of the CQT in sex offender management is the wording of the relevant questions. In criminal investigations, relevant questions deal with a known offence and are univocally worded (e.g. 'On the night of March 25th, did you shoot John Doe?'). In sex offender management, on the other hand, the relevant questions deal with unknown offences or behaviour. Consequently, the relevant questions are generic, for example 'Did you have any sexual contacts with children other than Kevin?' As a result of this, the relevant questions become more similar to the control questions.

This can be illustrated by the following example. To what extent does a relevant question like: 'Have you had unsupervised contact with children over the last 3 months?' differ from the adjacent control question: 'Have you done anything over the last 3 months that would concern your probation officer?' (Grubin *et al.*, 2004, p. 213). Comparing these questions is stressing the inference rule to its limits, because now both the control and the relevant questions focus on general, non-specific misconducts.

Notwithstanding the critique, the use of the polygraph in sex offender management is widespread in the United States. Over 70% of community-based sex offender treatment programs use the polygraph for adults and over 45% for juveniles (McGrath *et al.*, 2003). As mentioned earlier, the United Kingdom and the Netherlands are following suit. The reason for this popularity does not lie in the method's accuracy, but in the method's capability to elicit confessions. Abrams and Abrams (1993), for example, acknowledge that part of the disclosure of offences and behaviour is made before the actual testing takes place. Offenders disclose information upon learning that a polygraph test is going to be administered in the future and during the pre-test interview, well before the polygraph is actually attached. Data from the British pilot study by Grubin and his colleagues (Grubin *et al.*, 2004) corroborate this. They found that sex offenders admitted more sexual deviant behaviour as a result of polygraph testing, but a substantial proportion of these admissions were made during the pre-test interview.

Ambiguous Questions

The problem of ambiguous questions is not confined to sex offenders. To demonstrate this, we will use an example drawn from a Belgian murder case.⁴

4 One of the authors (PvK) served as expert witness in this case.

In the early morning of 2 June 1998, the Dutchman Ran Biemans, 58 years old, is found dead in his apartment in the Belgian town of Meerle. He is found lying next to his bed with his throat cut. He has evidently been tortured before he was killed. From the beginning, the Belgian police suspect his Dutch wife Els L. She claims having been in bed at the time the murder took place, but did not notice anything. She testifies she woke up with a very bad taste in her mouth and that her hands and feet were taped together. Consequently, she claims having been drugged by the killers. This claim is supported by shoe prints found on the bed and signs of a struggle. The police discover that Ran Biemans led a double or even triple life. He spent much time in the Amsterdam red light district and was involved in illegal trade of various kinds. It should also be noted that Els L. was not faithful to Ran either: she had a lover named Wilco. In police interrogation she evidently lied stating that she had no relation with Wilco at the time of the murder.

Els L. denies any involvement in the crime, and is subjected to a CQT by the Belgian Federal Police. The police hypothesis is that she benefited from the death of Ran Biemans, because of his wealth. Thus, according to the police, she either killed him herself, or was involved in some other way.

By the time Els L. had to undergo the polygraph test, she was convinced that Wilco committed the crime. The testing of Els L. consisted of two sessions. The first probed whether she killed Ran Biemans (see Box 3.1 for the questions asked). She came out truthful. In the second session however – completed the same afternoon – the questions were much more ambiguous. For example ‘Concerning the facts committed on Ran on the night of 1st to 2nd June 1998, do you know with certainty who did commit these?’ The outcome of this test was ‘not truthful’.

Box 3.1

An example of non-ambiguous (first session) and ambiguous (second session) relevant questions in one single case (our translation from Dutch).

First session with Els L.

Relevant 1: In the night of 1st to 2nd June 1998, did you slice open the throat of Ran?

Relevant 2: In the night of 1st to 2nd June 1998, are you the one who sliced open the throat of Ran?

Relevant 3: In the night of 1st to 2nd June 1998, are you the person who sliced open the throat of Ran?

Control 1: Apart from this case, do you remember ever telling an important lie?

Control 2: Apart from this case, do you remember ever hurting anybody?

Control 3: Apart from this case, do you remember ever doing something illegal for which you have not been caught?

Second session with Els L.

Relevant 1: Concerning the facts committed on Ran on the night of 1st to 2nd June 1998, do you know with certainty who did commit these?

Relevant 2: Concerning the facts committed on Ran on the night of 1st to 2nd June 1998, did you help in committing these?

Relevant 3: Concerning the facts committed on Ran on the night of 1st to 2nd June 1998, did you organize these?

Control 1: During the first 40 years of your life, you remember if you ever told an important lie?

Control 2: During the first 40 years of your life, do you remember you ever hurt anybody?

Control 3: During the first 40 years of your life, do you remember if you did something illegal for which you have not been caught?

The ambiguity of the relevant questions in the second session introduces two problems. First, as in sex offender testing, the more generic wording makes the comparison with the control questions cumbersome. Second, even in case that the 'not truthful' outcome is correct, the generic wording makes interpretation difficult. In this case, the prosecution inferred that Els L. must have hired someone else to commit the killing. This inference is neither warranted nor logical, as there is reason to believe that she responded to the relevant questions only because at the time of the polygraph test she believed she knew who committed the murder: Wilco. This however does not mean that she knew it at the time of the killing or that she was in any way involved in organizing it.

Guilty Knowledge

There is a second polygraph technique, first described by Münsterberg (1908) and later named the Guilty Knowledge Test (GKT) by Lykken (1960). During a GKT, the physiological measures recorded are the same as those in a CQT, but the questions differ. All questions concern details of the crime, presumably only

known to the police and the perpetrator. These questions are presented with multiple answer alternatives. These answer alternatives include the correct answer, but also several plausible incorrect answers (e.g. 'Was the victim killed with a ... (a) gun, (b) knife, (c) rope, (d) bat, (e) ice pick?'). The suspect answers all alternatives with a 'No'. For an innocent suspect, all alternatives are equally plausible. Therefore, over the whole test, responses to the correct alternatives will not significantly deviate from those to the incorrect alternatives. A guilty suspect, however, will recognize the correct alternatives and show enhanced physiological responses to them. Thus, consistent stronger physiological responding to the correct alternatives is indicative of knowledge of intimate details of the crime and involvement can be inferred.

The most important advantage of the GKT is that it protects the innocent (Elaad, 1999). The probability that an innocent suspect will fail the test depends on the number of questions and the number of alternatives. Using the aforementioned example, the probability that an innocent suspect shows the strongest reaction to 'rope', while this is the true murder weapon, is 20%. If several of these questions are asked, this probability drops dramatically. The probability of an innocent suspect consistently showing the strongest reaction to the correct answer on five questions with five alternatives each is 0.03%.

The disadvantage of the GKT lies in the formulation of the questions. These questions need to fulfil two requirements: (a) the details asked need to be known to the culprit and the investigating authorities, and (b) the details asked must not be known to an innocent suspect. Thus, questions should concern aspects of the crime that are obvious enough for the perpetrator to have noticed, and also the culprit should not have been under the influence of alcohol or drugs impairing his/her memory. Furthermore, this means that once a suspect has gained knowledge through other means than being the perpetrator – for instance by extensive police interviews or by reading his case file – he or she can no longer be discerned from a guilty suspect. Therefore, the GKT can only be applied in the first stage of a police investigation, and construction of enough questions may be difficult in many cases (Podlesny, 1993; 2003).

The GKT is only used on a large scale in Japan (Hira and Furumitsu, 2002; Nakayama, 2002). Approximately 5000 tests are performed annually. They are performed by specially trained experts, who are not involved in the case. These experts are not police investigators but are employed as researchers by a forensic laboratory. If requested, they visit the crime scene in order to formulate questions. Provided the GKT meets certain requirements, it is admissible as evidence in Japanese courts (Ben-Shakhar *et al.*, 2002; Nakayama, 2002).

In sum, the term 'polygraph testing' covers a number of techniques. For practical rather than theoretical reasons, the CQT is the most widely used technique. Different tests serve different goals. These goals range from veracity assessment of a statement to the elicitation of a confession. Besides the accuracy of the different techniques, a number of ethical issues characterize the legal discussion on the use of polygraph testing. These include the manipulation during the pre-test interview of a CQT (is

one allowed to lie to a suspect during interrogation?), the voluntariness of the test (given that the physiological signals are largely involuntary) and the fact that the outcome of a test is often used to pressure an interrogee into confessing. How legal systems in various countries deal with these issues is the topic of the following section.

The Polygraph in Europe

Legal Systems

The application of the polygraph in different European countries varies considerably. It ranges from a significant role in the judicial system in Belgium to, for instance, Spain where the use of polygraph testing has apparently never been suggested.

Before we give a concise description of the application of the polygraph in a number of European countries, we should shortly venture into the manner in which courts treat evidence in many European countries.

In most common law countries – such as the United Kingdom and most of the states in the United States – the legal system is based on a jury trial. In a jury trial, the judge serves as the gatekeeper with respect to evidence: he or she decides which pieces of evidence are put before the jury. This has resulted in an extensive body of rules on the admissibility of evidence (e.g. Heydon, 2004; Strong, 1999). In most European countries however, the criminal trial is modelled after a bench trial. Here, the judge – or court – is both gatekeeper and finder of fact.

The latter system has resulted in a tradition where all potential evidence is presented to the fact finder. In these systems, rules on admissibility of evidence serve little purpose. The emphasis lies not so much on the admissibility of evidence,⁵ but on rules governing the use of evidence by the court in decision making. Since these rules tend to be scarce in many countries, this has resulted in a ‘free evidence’ system (Damaška, 1986).

The lack of admissibility rules is usually compensated by the rules that courts – in contrast to juries – have to argue their decisions. Two different versions of this exist in Europe. In the one system the final evaluation of evidence is governed by the *conviction intime*: the court convicts when it is convinced the suspect is guilty. In the other type – with *conviction raisonnée* – the court must argue its verdict in a manner that conforms to certain statutory standards, although also these standards tend to be rather lenient. Typically, in these systems, an appeal to the Supreme Courts can only concern matters of law, not the manner in which evidence was weighed by the lower court. This may explain why in some European countries, in spite of a policy or precedents that forbid the use of polygraph tests as evidence, it is used nevertheless.

⁵ Exceptions are rules on the admissibility of evidence obtained by the police unlawfully.

*The Polygraph in Europe*⁶

In Belgium, over 300 CQTs are performed annually. Cases include murder, rape, theft and arson. The introduction of polygraph testing in Belgium raised some legal concern. When questioned in Parliament, the minister of Justice indicated that the results should only be used in police investigations, and would not be offered as evidence in court (see also Bockstaele, 2001; Verhaegen, 2000).⁷ Practice turned out to be different. Although refused as evidence by bench courts (Traest, 2001), the results of polygraph tests have been offered as evidence before the Court of Assisen, the Belgian jury, among which was the aforementioned case of *Els L.* Since juries do not have to explain their use of evidence, polygraph tests are *de facto* accepted as evidence in Belgium.

In the Netherlands, the outcome of a polygraph test is neither used as evidence in court, nor in police investigations. In the 1990s, it appeared to go the other way. The *Werkgroep Leugendetectie* (Taskforce Lie Detection, 1993), consisting primarily of police officials and policy advisors, concluded that 'the polygraph could have a certain value for the Dutch criminal law system'. According to the taskforce, lie detection could give an indication of the veracity of a statement and, as such, aid to defining the direction and priorities in criminal investigations. The taskforce, however, did acknowledge the technique's error margin and expressed reservations about using the outcome of a CQT as evidence in court. In 1996 this report was succeeded by two reports on the request of the Dutch minister of Justice by four professors of psychology (Boelhouwer *et al.*, 1996; van Koppen *et al.*, 1996). Their recommendations were generally similar to those made by the taskforce. They concluded that, provided certain conditions are met, application of the polygraph in criminal investigation could be meaningful. Still, the minister of Justice rejected the introduction of polygraph testing, primarily because it is alien to the right to remain silent,⁸ an argument that returns in other countries across Europe as well. More

6 Our gratitude goes to Anna Baldry, Vivi Bang Pallesen, Wolfgang Bilsky, Vicente Garrido Genoves, Pär Anders Granhag, Helinä Häkkänen, Andreas Kapardis, Martin Killias, Annika Melinder, Pekka Santtila, Sven Svebak, Peter Tak and Rita Žukauskienė, who served as informants for this section.

7 The minister of Justice wrote: 'but it should be emphasized that not so much the results of the test with the lie detector would enable the court to solve a criminal or other case, but the confession to which the test may lead, as far as the confession is believable and supported with other data in the investigation. The lie detector thus is a tool among others; as it has proved useful in certain cases – sometimes incriminating, more often exculpatory – investigating judges will continue to use it in the future.' Our translation from questions and answers Kamer (2000–2001), 22 May 2001, 12 (question number 4689 by Schoofs).

8 In that she followed Article 6 of the European Convention of Human Rights. This article reads as follows: (1) In the determination of his civil rights and obligations or of any criminal charge against him, everyone is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal established by law. Judgement shall be pronounced publicly by the press and public may be excluded from all or part of the trial

recently, a request for a polygraph test was rejected by the The Hague Appellate Court. This decision was upheld by the Dutch Supreme Court (Hoge Raad) because 'it is widely known that the use of polygraphs in criminal investigation is disputed because of its unreliability.'⁹ In contrast to criminal law, polygraph testing has been introduced in the Netherlands in sex offender management.

In the United Kingdom, polygraph testing is not used in criminal law either. The British government did announce the intention to initiate pilot studies on its effectiveness in the 1990s, but after a report by the Working Group of the British Psychological Society (British Psychological Society, 1996), the plans were abandoned. The British Psychological Society recently published a new report (BPS Working Party, 2004),¹⁰ concluding that 'the use of the polygraph has inherent weaknesses, and that the error rates can be high. [...] Polygraphic deception detection procedure should not be ascribed a special Status.' Meanwhile, the United Kingdom is serving as a pioneer in the use of the polygraph in sex offender management.

In Germany, the Supreme Court (Bundesgerichtshof) abandoned the CQT from penal procedures in 1998. This decision was based on a report written by three professors of psychology. There was however, less agreement among these experts than in the aforementioned countries. According to Professor Klaus Fiedler (1999), the CQT does not meet the standard criteria of scientific validity. Professor Max Steller (Steller and Dahle, 1999) was a little more lenient; acknowledging that polygraph testing should not be completely excluded from forensic application. Psychology professor and practicing polygrapher Udo Undeutsch was most lenient (Undeutsch and Klein, 1999). Nonetheless, based on these reviews, the German Supreme Court forbade the CQT from penal procedures (see also Burgsmüller, 2000; Fiedler 1999; Fiedler *et al.*, 2002; Offe, 2001; Steller and Dahle, 1999; Undeutsch

in the interest of morals, public order or national security in a democratic society, where the interests of juveniles or the protection of the private life of the parties so require, or the extent strictly necessary in the opinion of the court in special circumstances where publicity would prejudice the interests of justice. (2) Everyone charged with a criminal offence shall be presumed innocent until proved guilty according to law. (3) Everyone charged with a criminal offence has the following minimum rights: (a) to be informed promptly, in a language which he understands and in detail, of the nature and cause of the accusation against him; (b) to have adequate time and the facilities for the preparation of his defence; (c) to defend himself in person or through legal assistance of his own choosing or, if he has not sufficient means to pay for legal assistance, to be given it free when the interests of justice so require; (d) to examine or have examined witnesses against him and to obtain the attendance and examination of witnesses on his behalf under the same conditions as witnesses against him; (e) to have the free assistance of an interpreter if he cannot understand or speak the language used in court.

⁹ See Supreme Court (Hoge Raad der Nederlanden), 18 June 2004, *LJN* AU 5496 to be found on www.rechtspraak.nl. See also the The Hague Appellate Court Hof Den Haag, 14 March 2006, *LJN* AP 2846.

¹⁰ The Working Party consisted of Ray Bull, Helen Baron, Gisli Gudjonsson, Sarah Hampson, Gina Rippon and Aldert Vrij.

and Klein, 1999).¹¹ Still, the most widespread use of the polygraph in Germany used to be in civil cases, mainly child custody disputes with allegations of sexual abuse of the children. In a recent ruling however, the Bundesgerichtshof put the outcomes of a polygraph test in these cases on par with those in criminal cases.¹²

In the Nordic countries, only Finland has used the polygraph on a relatively large scale. The Finnish National Bureau of Investigation (NBI) has used it in around 300 cases since 1995, mostly homicides and sexual crimes. The NBI is the only institution within the Finnish police using the polygraph, primarily to give direction to the investigation. In addition, the GKT has been used in about five cases to detect the location of a hidden body in a homicide case. The use of the polygraph at the NBI is managed by two detectives.¹³ Even though the outcome of a test is not supposed to serve as evidence in court, evidence in Finland is also governed by the 'free evidence' system of presenting evidence in the courts we discussed above. This has resulted in occasional cases where the outcome of a polygraph test has been presented as evidence. At the time of writing, one case is under review by the Finnish Supreme Court (Korkein Oikeus). This procedure will likely set a precedent for future cases.

Norway and Sweden are only modest users of the polygraph. In Norway, it has been used in the pre-trial phase in at least three cases during the last 10 years. The admission to use polygraphs as an evidence gathering method for the trial itself was questioned however, and the Norwegian Supreme Court (Høyesterett) rejected the use of polygraphs in 1996.¹⁴ More recent cases have been met with the same scepticism and reference to this verdict. In one of the three cases, the defence made considerable efforts to convince the Appellate Court (Lagmannsrett) to accept polygraph testing as evidence. They failed, and the Court decided on traditional evidence and witness testimony only. However, the Norwegian evidence rules are also characterized by the 'free evidence' system. As such, the precedent set by the Høyesterett does not prevent use in court because of evidential reasons, but because it violates the civil rights of the suspect. It could, the court argued, be an imperative for others (e.g. other suspected, victims, etc) as well and, as such, threatens civil rights and reflects an unhealthy pressure. In addition to criminal cases in Norway, the polygraph is also used in civil cases.¹⁵

In Sweden, the polygraph is not used on a regular basis either. It was used two or three times during the 1990s in cases where men were accused of molesting children. The results were offered as evidence by the defence, to prove that the suspect was innocent. In one of these cases, the court held a small hearing with one expert pro

¹¹ Bundesgerichtshof, 10 February 1999 (3 StR 460/98; NSZ-RR 2000, 35).

¹² See Bundesgerichtshof, 24 June 2003 (VI ZR 327/02).

¹³ The equipment was originally developed at the University of Jyväskylä by professor Karl Hagfors.

¹⁴ Høyesterett (Supreme Court). Kjennelse (verdict). Rt-1990114 (343-96).

¹⁵ Sven Svebak, a university professor, reports that he, as far as he knows, is the only one conducting polygraph examinations in Norway. He conducted some 100 polygraph tests, almost exclusively in civil cases.

and one expert con the polygraph. The court decided to give very little weight to polygraph evidence, which had a precedential effect. Therefore, even though there is no formal ban and free examination of evidence, the use of the polygraph is still limited. In Denmark, the polygraph is not used at all. It has, however, also not been forbidden on statutory grounds or through precedents set in legal decisions of courts.

In Switzerland finally, the use of the polygraph is considered an unlawful means of investigation. In this, the Swiss follow Article 6 of the European Convention on Human Rights (see above). The courts interpret this in a manner that nobody can be forced – directly or indirectly – to accuse themselves, even if the suspect complies (Piquerez, 1987; Schmid, 1993).¹⁶

The Future

The search for a more accurate lie detection procedure continues. Many think that with the advancement of technology, polygraph tests will become more accurate. The review by the National Research Council, however, contradicts this idea. In their review, they plotted the accuracy of the selected polygraph studies against the year of publication (National Research Council, 2003, p. 346). If technological advancement would lead to an increased accuracy, a positive trend should be apparent. This was not the case. As we have seen earlier in the chapter, erroneous outcomes of a CQT can be the result of an unsuccessful pre-test interview, a problem that is not solved by technologically more sophisticated measuring devices. In other words, even the most sophisticated machine will not pick up an emotional state that is absent. In all, it led The National Research Council to conclude that ‘Almost a century of research in scientific psychology and physiology provides little basis for the expectation that a polygraph test could have extremely high accuracy’.

Also relatively new are measures of brain activity, such as functional magnetic resonance imaging (fMRI) and electro encephalography (EEG). The idea is that these measures more directly tap into the process of deception. EEG, however, has not yet been shown to outperform the simple and cheaper skin conductance measure, while fMRI has not yet been shown even to be reliably able to detect deception in individual cases. Nonetheless, at the time of writing, at least two commercial companies offer fMRI-based lie detection tests, and one offers an EEG-based lie detection test. Even when these new technologies turn out to be highly accurate, they will be subjected to the same ethical and legal restraints as current polygraph tests.

¹⁶ Schweizerisches Bundesgericht, 26 April 1994, *BGE* 118 Ia, that can be found on <http://www.oefre.unibe.ch/law/dfr/a1120031.html>.

Conclusion

Lie detection by means of the polygraph is a form of applied psychology that should be handled with care. The different techniques each have their strengths, but also inherent weaknesses and dangers. In general, courts around Europe seem to be aware of that. Although many courts have rejected the results of a polygraph tests as evidence, due to the 'free evidence' system that governs evidence in most countries, this has almost never been a general ban. Moreover, besides serving as evidence, polygraph test outcomes are also used to direct police investigations, without ever reaching the courtroom. A general ban on polygraph testing might result in tossing the baby out with the bathwater. If supervised by research psychologists, polygraph testing, particularly the GKT, can serve as a valuable addition to the police's and courtroom's toolkit.

References

- Abrams, S. and Abrams, J.B. (1993) *Polygraph Testing of the Paedophile* (Portland: Ryan Gwinner).
- Ahlmeyer, S., Heil, P., McKee, B. and English, K. (2000) Impact of polygraph on admissions of victims and offences in adult sexual offenders. *Sexual Abuse: A Journal of Research and Treatment*, 12, pp. 123–138.
- Ben-Shakhar, G. and Furedy, J.J. (1990) *Theories and Applications in the Detection Of Deception: A Psychophysiological and International Perspective* (New York: Springer).
- Ben-Shakhar, G., Bar-Hillel, M. and Kremnitzer, M. (2002) Trial by polygraph: reconsidering the use of the guilty knowledge technique in court, *Law and Human Behavior*, 26, pp. 527–541.
- Blackstone, W. (1882) *Commentaries on the Laws of England*, 3rd edn (London: Murray).
- Blasingame, G.D. (1998) Suggested clinical uses of polygraphy in community-based sexual offender treatment programs, *Sexual Abuse: A Journal of Research and Treatment*, 10, pp. 37–45.
- Bockstaele, M. (Ed.) (2001) *De Polygraaf* (Brussel: Politeia).
- Boelhouwer, A.J.W., Merckelbach, H., van Koppen, P.J. and Verbaten, M.N. (1996) *Leugendetectie in Nederland* (Rapport aangeboden aan de minister van Justitie).
- BPS Working Party (2004) *A Review of the Current Scientific Status and Fields of Application of Polygraph Deception Detection*. s.l. (British Psychological Society).
- Branaman, T.F. and Gallagher, S.N. (2005) Polygraph testing in sex offender treatment: a review of limitations, *American Journal of Forensic Psychology*, 23, pp. 45–64.

- British Psychological Society (1996) Report of the Working Group on the use of the polygraph in criminal investigation and personnel screening, *Bulletin of the British Psychological Society*, 39, pp. 81–94.
- Burgsmüller, C. (2000) Das BGH-Urteil zu den Glaubhaftigkeitsgutachten: Eine späte Folge der sog. Wormser Strafverfahren vor dem Landgericht Mainz? *Praxis der Rechtspsychologie*, 10, pp. 48–59.
- Carroll, J.D. (1991) Lie detection: lies and truths, in: R. Cochrane and D. Carroll (Eds) *Psychology and Social Issues: A Tutorial Text*, pp. 160–170 (London: Falmer).
- Cross, T.P. and Saxe, L. (1992) A critique of the validity of polygraph testing in child abuse cases, *Journal of Child Sexual Abuse*, 1, pp. 19–33.
- Cross, T.P. and Saxe, L. (2001) Polygraph testing and sexual abuse: the lure of the magic lasso, *Child Maltreatment*, 6, pp. 195–206.
- Damaška, M.R. (1986) *The Faces of Justice and State Authority: A Comparative Approach to the Legal Process* (New Haven: Yale University Press).
- Elaad, E. (1999) A comparative study of polygraph tests and other forensic methods, in D.V. Canter and L.J. Alison (Eds) *Interviewing and Deception*, pp. 211–231 (Aldershot: Ashgate).
- Elaad, E. (2003) Is the inference rule of the ‘control question polygraph technique’ plausible? *Psychology, Crime, and Law*, 9, pp. 37–47.
- Emerick, R.L. and Dutton, W.A. (1993) The effect of polygraphy on the self report of adolescent sex offender: Implications for risk assessment, *Annals of Sex Research*, 6, pp. 83–103.
- English, K., Jones, L., Patrick, D. and Pasini-Hill, D. (2003) Sexual offender containment: use of the postconviction polygraph, *Annals of the New York Academy of Sciences*, 989, pp. 411–427.
- Faller, K.C. (1997) The polygraph, its use in cases of alleged sexual abuse: an exploratory study, *Child Abuse and Neglect*, 21, pp. 993–1008.
- Fiedler, K. (1999) Gutachterliche Stellungnahme zur wissenschaftlichen Grundlage der Lügen-detektion mithilfe sogenannter Polygraphentests, *Praxis der Rechtspsychologie*, 9, pp. 5–44.
- Fiedler, K., Schmid, J. and Stahl, T. (2002) What is the current truth about polygraph lie detection, *Basic and Applied Social Psychology*, 24, pp. 313–324.
- Furedy, J.J. and Heslegrave, R.J. (1991) The forensic use of the polygraph: a psychophysiological analysis of current trends and future prospects, in: J.R. Jennings, P.K. Ackles and M.G.H. Coles (Eds) *Advances in Psychophysiology*, Vol. 4, pp. 233–245 (London: Kingsley).
- Grubin, D. (2002) The potential use of polygraphy in forensic psychiatry, *Criminal Behaviour and Mental Health*, 12, pp. S45–S53.
- Grubin, D., Madsen, L., Parsons, S., Sosnowski, D. and Warberg, B. (2004) A prospective study of the impact of polygraphy on high-risk behaviors in adult sex offenders, *Sexual Abuse: A Journal of Research and Treatment*, 16, pp. 209–222.

- Hanson, R.K., Morton, K.E. and Harris, A.J. (2003) Sexual offender recidivism risk: what we know and what we need to know, *Annals of the New York Academy of Sciences*, 989, pp. 154–166; discussion 236–146.
- Heydon, J.D. (2004) *Cross on Evidence*, 8th edn (London: Butterworths).
- Hira, S. and Furumitsu, I. (2002) Polygraphic examinations in Japan: application of the guilty knowledge test in forensic investigations, *International Journal of Police Science and Management*, 4, pp. 16–27.
- Honts, C.R. and Amato, S.L. (2002) Countermeasures, in: M. Kleiner (Ed.) *Handbook of Polygraph Testing*, Vol. 251–264 (San Diego, CA: Academic).
- Honts, C.R. and Perry, M.V. (1992) Polygraph admissibility: changes and challenges, *Law and Human Behavior*, 16, pp. 357–379.
- Honts, C.R., Hodes, R.L. and Raskin, D.C. (1985) Effects of physical countermeasures on the physiological detection of deception, *Journal of Applied Psychology*, 70, pp. 177–187.
- Honts, C.R., Devitt, M.K., Winbush, M. and Kircher, J.C. (1996) Mental and physical countermeasures reduce the accuracy of the concealed knowledge test, *Psychophysiology*, 33, pp. 84–92.
- Iacono, W.G. (1991) Can we determine the accuracy of polygraph tests? in: J.R. Jennings, P.K. Ackles and M.G.H. Coles (Eds) *Advances in Psychophysiology*, Vol. 4, pp. 201–207 (London: Jessica Kingsley).
- Iacono, W.G. and Lykken, D.T. (1997) The validity of the lie detector: two surveys of scientific opinion, *Journal of Applied Psychology*, 82, pp. 426–433.
- Iacono, W.G. and Lykken, D.T. (1999) Update: the scientific status of research on polygraph techniques: the case against polygraph tests, in: D.L. Faigman, D.H. Kaye, M.J. Saks and J. Sanders (Eds) *Modern Scientific Evidence: The Law and Science of Expert Testimony*, Vol. 1, Pocket Part, pp. 174–184 (St. Paul, MI: West).
- Iacono, W.G. and Patrick, C.J. (1997) Polygraphy and integrity testing, in: R. Rogers (Ed.) *Clinical Assessment of Malingering and Deception*, pp. 252–281 (New York: Guilford).
- Lykken, D.T. (1960) The validity of the guilty knowledge technique: the effects of faking, *Journal of Applied Psychology*, 44, pp. 258–262.
- Lykken, D.T. (1998) *A Tremor in the Blood: Uses and Abuses of the Lie Detector*, 2nd edn (New York: Plenum).
- McGrath, G.J., Cumming, G. and Burchard, B.L. (2003) *Current Practices and Trends in Sexual Abuser Management: The Safer Society 2002 Nationwide Survey* (Brandon, VT: Safer Society Press).
- Münsterberg, H. (1908) *On the Witness Stand: Essays on Psychology and Crime* (New York: Doubleday, Page).
- Nakayama, M. (2002) Practical use of the concealed information test for criminal investigation in Japan, in: M. Kleiner (Ed.) *Handbook of Polygraph Testing*, pp. 49–86 (San Diego, CA: Academic).

- National Research Council (2003) *The Polygraph and Lie Detection* (Washington, DC: National Academy Press. Committee to Review the Scientific Evidence on the Polygraph. Division of Behavioral and Social Sciences and Education).
- Offe, H. (2001) Fallbericht: Polygraphentest im Familienverfahren, *Praxis der Rechtspsychologie*, 11, pp. 55–57.
- Piquerez, G. (1987) *Précis de procédure pénale Suisse* (Lausanne: Payot).
- Podlesny, J.A. (1993) Is the guilty knowledge polygraph technique applicable in criminal investigation? A review of FBI case records, *Crime Laboratory Digest*, 20, pp. 57–61.
- Podlesny, J.A. (2003) A paucity of operable case facts restricts applicability of the guilty knowledge technique in FBI criminal polygraph examinations, *Forensic Science Communications*, 5.
- Podlesny, J.A. and Raskin, D.C. (1977) Physiological measures and the detection of deception, *Psychological Bulletin*, 84, pp. 782–799.
- Prentky, R.A., Lee, A.F.S., Knight, R.A. and Cerce, D. (1997) Recidivism rates among child molesters and rapists: a methodological analysis, *Law and Human Behavior*, 21, pp. 635–659.
- Raskin, D.C. (1989) Polygraph techniques for the detection of deception, in: D.C. Raskin (Ed.) *Psychological Methods in Criminal Investigation and Evidence*, pp. 247–296 (New York: Springer).
- Raskin, D.C. and Honts, C.R. (2002) The comparison question test, in: M. Kleiner (Ed.) *Handbook of Polygraph Testing*, pp. 96–110 (San Diego, CA: Academic).
- Raskin, D.C. and Podlesny, J.A. (1979) Truth and deception: a reply to Lykken, *Psychological Bulletin*, 86, pp. 54–58.
- Raskin, D.C., Honts, C.R. and Kircher, J.C. (1997) Polygraph tests: B. Scientific status, in: D.L. Faigman, D.H. Kaye, M.J. Saks and J. Sanders (Eds) *Modern Scientific Evidence: The Law and Science of Expert Testimony*, pp. 565–582 (St. Paul, MI: West).
- Raskin, D.C., Honts, C.R., Amato, S.L. and Kircher, J.C. (1999) Update: the scientific status of research on polygraph techniques: the case for the admissibility of the results of polygraph examinations, in: D.L. Faigman, D.H. Kaye, M.J. Saks and J. Sanders (Eds) *Modern Scientific Evidence: The Law and Science of Expert Testimony*, Vol. 1, Pocket Part, pp. 160–174 (St. Paul, MI: West).
- Reid, J.E. (1947) A revised questioning technique in lie detection tests, *Journal of Criminal Law and Criminology*, 37, pp. 542–563.
- Roese, N.J. and Jamieson, D.W. (1993) Twenty years of bogus pipeline research: a critical review and analysis, *Psychological Bulletin*, 114, pp. 363–375.
- Saxe, L. (1991) Lying: thoughts of an applied social psychologist, *American Psychologist*, 46, pp. 409–415.
- Schmid, N. (1993) *Strafprozessrecht: Eine Einführung auf der Grundlage des Strafprozessrechtes des Kantons Zürich und des Bundes* (Zürich: Schulthess).
- Steller, M. and Dahle, K.-P. (1999) Wissenschaftliches Gutachten: Grundlagen, Methoden und Anwendungsprobleme psychophysiologischer Aussage-

- bzw. Täterschaftsbeurteilung ('Polygraphie', 'Lügendetektion') *Praxis der Rechtspsychologie*, 9, pp. 127–204.
- Steller, M. and Volbregt, R. (1999) *Wissenschaftliches Gutachten: Forensisch-aussagepsychologische Begutachtung (Glaubwürdigkeitsbegutachtung)*.
- Strong, J.W. (Ed.) (1999) *McCormick on Evidence* (St. Paul, MI: West).
- Traest, P. (2001) Recente tendensen in het bewijsrecht in strafzaken, in: Vlaamse Conferentie der Balie van Gent (Ed.), *Straf recht?: Strafrecht* (Antwerpen: Maklu).
- Undeutsch, U. and Klein, G. (1999) Wissenschaftliches Gutachten zum Beweiswert physiopsychologischer Untersuchungen, *Praxis der Rechtspsychologie*, 9, pp. 45–126.
- van Koppen, P.J., Boelhouwer, A.J.W., Merckelbach, H. and Verbaten, M.N. (1996) *Leugendetecie in actie: Het gebruik van de polygraaf in de praktijk* (Leiden: Nederlands Studiecentrum Criminaliteit en Rechtshandhaving (NSCR). Rapport aangeboden aan de minister van Justitie).
- Verhaegen, P. (2000) *De polygraaf en zijn potentiële plaats in het Belgisch strafrechtelijk bewijsstelsel: Advies voor de heer Minister van Justitie en het College van Procureurs-generaal inzake het gebruik van de polygraaf in de Belgische strafrechtprocedure* (Brussel: Ministerie van Justitie, Dienst voor Strafrechtelijk Beleid).
- Volokh, A. (1997) *n* Guilty men. *University of Pennsylvania Law Review*, 146, pp. 173–211.
- Ward, T., Hudson, S.M., Johnston, L. and Marshall, W.L. (1997) Cognitive distortions in sex offenders: an integrative review, *Clinical Psychology Review*, 17, pp. 479–507.
- Werkgroep Leugendetecie (1993) *De leugendetector: Een verkennend onderzoek naar de mogelijkheden van de polygraaf* (Den Haag: Ministerie van Justitie).