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Published Semi-annually
© American Polygraph Association, 2018
P.O. Box 8037, Chattanooga, Tennessee 37414-0037

Criminalistics Investigation Using a Polygraph: Russian Federation Experience

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Abstract

Luria (1928) first suggested focusing on the examination of traces in human memory of those who are suspected of crimes. This article outlines the theory behind the forensic polygraph examination technique aimed at searching for memory traces of the past events. The theory supports the application of polygraph techniques in the course of forensic psychophysiological examinations, which results may be admissible in Russian courts. Legal rules enacted in Russia recently have created a favorable environment for a wider use of the polygraph in criminal procedure practice. The Typical technique of forensic psychophysiological expertise using polygraph was created to advance this area of practice for the Investigative Committee of the Russian Federation.

Keywords: forensic polygraph examination, memory, traces in human memory, criminal procedure practice.

Criminal acts almost inevitably produce evidentiary traces that can conceptually fall into one of two categories. The first type is tangible or physical: fingerprints, explosives traces, tool marks, bullet striations, etc. The second one is the memory of the event imprinted in mind of the criminal (hereafter referred to as “ideal traces”).

In 1920s, when the well-known Russian psychologist A.R. Luria urged investigators to pay “serious attention to the investigation of the traces of crime that persist in the criminal itself, in his mind”, he believed “these

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Authors’ Note: This article was originally written in the Russian language by the first two authors, and subsequently translated into English. The third author strived imperfectly to make the paper approachable to native English speakers in the polygraph community, but some Russian concepts and terms may still not be immediately clear to readers unfamiliar with Russian science in general and Russian polygraphy in particular. In future articles we will expand upon the idea of memory traces in forensic and polygraph science to acquaint this concept to a larger professional readership. Questions and comments regarding this article should be sent to Dr. Kholodny at kholodny@yandex.ru.

2 In the 1930s the USSR made assessments of the application of the polygraph for law enforcement purposes solely on ideology grounds, stating that “no unscientific and unethical methods, as the lie detector and the like, frequently used in policing and court proceedings of imperialistic countries, may be used in the criminal proceeding” (Panteleev I. F., Selivanov N. A. (1984). Criminalistics. Moscow: Legal literature, p. 30).
traces are as feasible and objective as any other external traces" (Luria, 1928). For many decades, however, the former Soviet forensic science field totally dismissed the possibility of applying any device, polygraph in particular, to inquire into the ideal traces. Even now amateurs mislabel the polygraph as a "lie detector".

The fundamental changes in the life of Russian society since the beginning of the 1990s has revised the long-standing view of the impossibility of using the polygraph for law enforcement purposes. In 1993, according to federal law on Operational Search Activity (OSA), the Russian Ministry of Justice allowed interrogation using polygraph (IUP) to be implemented. A year later in Russia the first forensic science department was established to apply polygraph for law enforcement purposes: in this way IUP was incorporated into national forensic science (or, in Russian terminology – criminalistics). During the 1990s experience was accumulated for applying the polygraph to OSA investigations. Concurrently, considerable research was carried out to provide a theoretical footing for lawful use of this kind of interrogation in crime detection and investigation, which further promoted the incorporation of polygraph into crime investigation.

Finally, by the early 21st century a new branch was developed in the Russian forensic sciences: criminalistic study with the polygraph for testing for traces in human memory (criminalistics polygraphology). This branch of criminalistics deals with practical application of methods and programmed devices to diagnose the presence of traces of past events in human memory, and consequently extracting the information from the person which he conceals.

**Theoretical basis of forensic research using polygraph**

When conducting criminalistic studies on the use of the polygraph to uncover traces in human memory of a particular individual, it is his memory as well as documentary case information prompting such investigation that is the object of research.

An individual perceives the events in the outside world by means of various senses, and stores some internal representations of the sensations as "ideal traces", subject to the sensory channel in which the information was received – eye, ear or otherwise. Noteworthy occurrences (including details of a crime) induce human memory traces. However, different individuals will unavoidably have variations in their memory traces regarding the same event due to a range of subjective factors: the conditions under which the event was perceived by the individual, his physical and emotional condition, cultural and national background, etc.

When reproducing or communicating past information from his memory an individual must remember the past and have his memory traces materialized by means of motor activity – for example, oral or written communication, drawing scenes, pictures, use of gestures or methods of communication. During recall some of the above mentioned primary subjective factors come to have a repeated and unpredictable effect for the owner of memory traces, and subsequently, for the outside observer (e.g. investigator). The explanation for this is simple: "Remembering the past experience can't be absolute. The level of discrepancy between the memories and the past event depends on the personality features – his or her purposes, motives, aims, remoteness of the event remembered, as well as its significance to the individual" (Psychophysiology, 2012). Moreover, the ability to access memory traces can be affected by an objective factor – such as oblivion (the partial or complete loss of memory traces).

Finally, when reproducing memory traces, subjective intervening personal interests of an individual may come into play. It is a volitional act that demonstrates either the intentional distortion during the materializing process of memory traces (misrepresenting the memory trace), or mere denial to materialize such traces. The latter may occur in two ways: 1) "I will say nothing", or 2) "I will say nothing as I know nothing". With the exception of where there is no memory trace to materialize, all the above-mentioned cases involve concealment of the information.

It is well known that numerous life events (especially particular life circumstanc-
es) are not remembered by an individual. However, those events which are of high personal value are imprinted in the individual’s memory automatically, quickly and create a “stable and long-lasting traces in emotional memory” (Danilova, 1999; p. 130) which are not deleted (unless special methods are applied), are preserved for all life (subject to healthy brain activity) and are not subject to oblivion (i.e. destruction).

At a particular time period some part of human memory activates and is accessible to an individual in his day-to-day activity. With current technology it is not possible to localize, describe and identify memory traces or “ideal traces” in the brain itself (in Russian psychology, psychophysiology and allied science it is characterized as an engram). Nevertheless, it is possible to diagnose the presence or absence of “ideal traces” of a particular event in human memory. This is because “the active memory is ... an aggregation of active engrams...which operate within the electric system” of an interlinked human brain structure (Psychophysiology, 2012). When a personally significant “ideal trace” of the event is found in the individual’s active memory, such as details to a crime, neural activity of the relevant brain structures increases. This activity can be externally detected as reactions displayed in some physiological systems of the human organism. The physiological reactions can be recorded with a polygraph for the purpose of the forensic diagnosis for the presence of “ideal traces”.

Longstanding practice has produced strong evidence that successful detection of personally significant memory traces in a healthy individual can be revealed by reactions appearing in breathing, the cardiovascular system and by the electrical conductivity of the skin. Hence, the primary objective of criminalistics polygraphology is to diagnose the presence or absence of “ideal traces” of the past events in an individual’s memory.

For convenience we use hereafter the acronym “CSTM” as shorthand for the more unwieldy “Criminalistics Studies on the use of polygraph Traces in human Memory.” In the course of the CSTM, stimuli are used to elicit responses evoked by the presence of “ideal traces” of personally significant events:

- In the case of visual perception, tangible objects are used: things, photographs of people, photographs of plots of land; maps, documents, printed words and statements etc.;
- In the case of audio perception, the CSTM uses semantic concepts (or ideal objects), e.g., verbally presented questions aimed at inquiring into a specific occurrence or a particular circumstance.

Stated another way, the stimuli in a CSTM can be objects (or images of objects) or spoken words, and their presentation during polygraph testing can induce physiological reactions that permit inference of the person’s complicity in a crime. As Russian practice shows, ideal objects (i.e. vocal presentation of questions) are used in the CSTM in over 99% of the cases, whereas it is less than 1% for tangible things (images or objects). So CSTM involves the presentation of both tangible and ideal target objects to help discern the presence or absence of relevant target objects in human memory. Experts in criminalistics polygraphology (hereinafter – polygraphologist [Russian terminology]) know well that target objects in the human memory during CSTM may be the acts that had been committed, the sequence of those acts, faces of the persons, their surnames and nick names, plots of land, addresses and names, maps and sketches, dates and time periods, etc.

Russian forensic science dealing with

3 In English this may be known as a polygraph examination.
4 In English this person would be called a polygraph examiner.
memory traces long ago proposed three distinctive features of "ideal traces" as compared to tangible (material) traces (Averjanova, Belkin, Korukhov & Rossinskaya, 1999):

1) "ideal traces", being intangible in themselves, are not accessible for direct investigation - they cannot be directly seen, touched, weighed, or measured;

2) investigating "ideal traces" is feasible only after their materialization (manifestation) in a form of motor activity;

3) materialized "ideal traces" can be as informative as tangible traces or evidence.

Investigative technology of the CSTM has discovered three other features of "ideal traces", not yet described in forensic science (Podshibiatkin & Kholodny, 2001; 2002). Specifically, "ideal traces" can be:

1) willfully misrepresented by the owner of memory traces when materializing them;

2) discovered without materializing by the person (i.e. absent his volitional motor activity), e.g. through physiological recording;

3) lost by the person (i.e. forgotten) but is not subject to being deleted from memory purposefully.

Using the CSTM imposes a number of requirements and restrictions. The crucial condition for using the polygraph is the voluntary consent of the examinee to conduct the CSTM, obtained in writing in a prescribed form. Voluntary participation is made necessary both by observance the constitutional rights and freedoms of the examinee, on the one hand, and specific CSTM technology on the other hand. A person cannot be forced to undergo testing: either he won't allow having sensors placed on him, or he won't follow the instructions given by the polygrapholog. Moreover, the polygrapholog is required to notify the person from the very beginning of his right to terminate the CSTM at any time.

The health and psychological condition of the person at the time of testing is crucial for successful diagnostics of the examinee's "ideal traces". Legal restrictions in applying CSTM were specified long ago, and are well known and strictly complied with by polygraphologs.

Preparing for the CSTM, the polygrapholog is bound to research the target event and select those facts and circumstances, "ideal traces" of which he is to determine whether they exist in the memory of the examinee. To have successful diagnostics and a fruitful CSTM, only those facts or circumstances should be offered for investigation which must be known to the person if he was involved in some event (reliably preserved by means of his emotional memory). Practical experience confirms the fact that "ideal traces" of personally significant past events imprinted in emotional memory can be preserved for many years. The principal authors' personal experience has been that a CSTM can successfully diagnose the examinee as having concealed information as many as 10-15 years after he had committed the crime.

Criminalistics study of human memory traces and the criminal procedure law.

Unquestionable efficiency in using the polygraph in the OSA prompted the investigators to look for the ways to implement it in actual investigative procedures. The first procedural application of the polygraph in Russia was made by Y.I. Kholodny in 1994. In the late 20th century there were many CSTM's conducted by the investigator, but using polygraph for investigative purposes in this way was reasonably criticized by procedural law experts and was soon discontinued.

The Federal Law on "Forensic Examination in Russian Federation" (enacted on May, 31, 2001, № 73-FL) was crucial in promoting polygraph into criminal procedural practice. That summer was the first time Russian specialists conducted a CSTM as an expert examination. It was called forensic psychophysiological expert examination using polygraph (hereafter – FPPPE).

In general, the central construct for the FPPPE is that human memory is an inherent part of the psyche. The object for a specific FPPPE is the memory of the person submitted
to expert examination on a particular case, as well as case materials. The subject matter of a specific FPPeE is the information kept in the examinee’s memory i.e. real data which are meaningful for the investigators or the trial in a criminal case and are formulated as questions, the answers to which must be given by the polygrapholog conducting the FPPeE (Kholodny, 2002).

Since 2002 the number of FPPeE in Russia had been steadily growing, which required specific methods to conduct. In 2006 a group of specialists proposed a “Technique for examination using the polygraph” (hereinafter – “Technique”) which later was widely advertised for conducting FPPeE (Komissarova & Khmazin, 2016). However, by 2008 it was obvious that “Technique” had a range of drawbacks and produced bad mistakes (Kholodny, 2008).

It should be noted that “Technique” misidentified the FPPeE object, scope of expert-polygrapholog’s authority and failed to show the list of tests which might be used, which resulted in erroneous conclusions, both procedurally and methodologically, based on the results of the expert examination (Orlov & Kholodny, 2012; 2013a). Therefore, results of an expert examination using a “Technique” could be easily dismissed by the court (Podshibiakin & Kholodny, 2013).

Moreover, a textbook on forensic science for the experts of the Investigative Committee of the Russian Federation (hereinafter – IC RF) stressed that “federal agencies and all polygraphologs were recommended to abstain from conducting FPPeE using the “Technique” until a scientifically grounded counterpart was created” (Podshibiakin & Kholodny, 2014).

CSTM may be used for detecting crime as a IUP in OSA, or as FPPeE in criminal procedure practice, but both are based on the uniform methodology guidelines. At the same time, despite the uniformity of those guidelines, the polygrapholog, when detecting the crime in OSA, has more discretion in choosing methods and tactics of the investigation. On the contrary, criminal procedure practice requirements impose substantial restrictions, and a lot of polygraphologs, who did IUP in OSA, are unaware about these restrictions, when conducting FPPeE.

In Russia, upon terminating an expert examination a polygrapholog issues an “Expert Opinion” and submits FPPeE’s conclusion which is inevitably probable by virtue of the “ideal traces”. The probabilistic method for detecting concealed “ideal traces” from a person’s past information he tries to conceal fails to detract from the applied efficiency of such expert examination. And if when examining human memory applying proper methodology some reaction follows to the questions involving the event scrutinized, it shows “ideal traces” of that event in human memory, in which case the polygrapholog states his opinion in the following language: “the examinee’s memory contains information that … (for example, “A” /the victim/ was stabbed in the back). Such fact has been established by the expert with 0.95 (95%) probability”. Otherwise, the polygrapholog states his opinion in the following language: “there is no information in the examinee’s memory that … (for example, “D” /the examinee/ stabbed in the back of “A”). Such fact has been established by the expert with 0.95 (95%) probability” (Orlov & Kholodny, 2009).

The Federal Law enacted on March 4, 2013 (№ 23-FL), amended the Russian Federation Criminal Code (hereinafter – RFCC) and provided that “when verifying the information about the crime committed pretrial, the inquiring officer, investigative authority, investigator, the chief of the investigative branch … are authorized to order a forensic expert examination” (Article 144, section 1). The RFCC specified that a “forensic expert examination may be ordered and held prior to bringing a criminal case” (Article 195, section 4). As a result, investigative authorities faced an absolutely different situation inasmuch as they could resort to using polygraph when necessary. Amendments to the RFCC, having enabled the conduct of an expert examination before bringing a criminal case, has in fact rendered FPPeE an exclusive method of using the polygraph in investigations and preliminary inquisitions. That is why demand for a comprehensive scientifically-based FPPeE methodology continues to grow.

The above-mentioned “Technique”, actually being the sole document to conduct
FPpE, was subject to scientifically based criticism and found inappropriate to be implemented (Orlov & Khолодny, 2013b; Khолоднy, 2014a). In 2014 the “Typical technique of forensic psychophysiological expertise using polygraph” (Kholodny & Orlov, 2014) was developed to replace the “Technique”.

Unable to provide herein a detailed survey of the “Typical technique of forensic psychophysiological expertise using polygraph” (hereinafter - “Typical technique of FPpE”), some of its provisions shall be mentioned. For example, “Typical technique of FPpE” attracted attention to:

- the procedure of an implementing order to conduct the FPpE, with recommendations for the wording of the questions to ask in the course of the examination;
- the procedure for obtaining the examinee’s consent to have the FPpE conducted;
- selection of tests (Kholodny, 2014a; 2014b) to be used in the polygraph examination, optimizing the number of those to provide proper solutions to the questions the FPpE had to answer;
- identifying the length of time for the expert to interrogate the examinee;
- procedural requirements to conduct the FPpE and the order of interaction between an expert and an investigator at the preparatory stage of organizing expert examination;
- the procedure for video recording the expert examination;
- restrictions imposed on the FPpE, and many other issues.

The “Typical technique of FPpE”, among other issues, made corrections for the “Technique” faults, and, in particular, stated that “the FPpE object is the examinee’s memory” (Kholodny & Orlov, 2014, p. 16). It should be mentioned that the FPpE technology, which are presented in the “Typical technique of FPpE”, was actually developed in Russia early in 2003 (Orlov & Kholodny, 2015).

The “Typical technique of FPpE” is a work of authorship; i.e. it is not officially recognized, not compulsory, however it has been recommended by the authors for professional application for expert purposes. Should it be adopted and obtain practical recognition, a proposal might be submitted to have it formally approbated and adopted. Twenty experienced polygraphologists from the IC RF had been professionally trained in FPpE under “Typical technique of FPpE”, from 2014 to 2015, to have it tested in practice. Moreover, the authors of such a technology “recommend to implement “Typical technique of FPpE” in other Federal Agencies and professional bodies dealing with FPpE” (Orlov & Kholodny, 2015; p. 257).

Overall, it may be stated that the new type of expert examination turned out to be in demand and tens (or even hundreds) of FPpE results have been admitted as evidence in various courts.
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