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THE HEART RATE RESPONSE AS AN INDEX OF THE LIE-DETECTING TEST

- A STUDY OF HEART RATE RESPONSE ON SIMULATED LIE-DETECTING SITUATION -

By

Shoichi Watanabe and Akihiro Suzuki

Abstract

This study aims to provide information on heart rate responses in the lie-detecting situation. Twenty junior college women served as subjects in the experiment. The subjects were instructed to watch the numbers 1 to 5 appear in order on a screen and, following basal-level measurement of cardiac activity, were told they would be presented with a mild electric shock at each presentation of the number "3" slide. Actually, of four presentations of "3" slide, no one but the first was followed by a shock. Heart rate was recorded on each trial.

The results were as follows: 1) The results in long-term effects exhibited a significant deceleration during presentation of "3" slide on shock anticipation (no shock) trials. 2) Short-term phenomena represents a brief decrease in rate for about 4 beats following "3" slide and erratic increase for about 15 beats after "3". 3) In the present experiment, contrary to our expectation, averaging of heart rate per-unit interval did not obscure short-term responses as a result of cancellation. [author abstract.]

Introduction

The heart rate response is one of the physiological variables considered most important in psychophysiology today. It is expected that the heart rate would be a sensitive indicator of the activities in both the sympathetic and parasympathetic nervous system and, since it is influenced by substances coursing in the bloodstream, heart rate will reflect the functions of all systems. This is also suggested by the fact that the heart period receives the highest weight of the variables embracing the autonomic nervous system factors. Moreover, the heart rate can be recorded quite readily and, moreover, it is simple to evaluate accurately its characteristics. For this reason, the heart rate measure has been extensively used in psychology as an index of emotion and as a dependent variable in the study of classical conditioning.

The studies of the heart rate can be divided into two categories in terms of quantifying methodologies: short-term and long-term effects. Measures of mean heart rate and heart rate variance are appropriate when dealing

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with long-term effects. But any attempt to average the heart rate within a limited time necessarily obscures short-term changes. Therefore, for instance, in the study of the orienting response pattern heart rate, which must consider the short-term changes produced after stimulation, the use of the rate change waveform analysis is more suitable than the averaging technique. In order to carry this out, it is necessary to obtain a continuous recording of the intervals between successive heart beats. The method used frequently is to number successive IBIs (inter heart beat intervals) (Lang & Hnatiow, 1962). When applying the heart rate as an index of the lie-detecting test, the selection of the appropriate method depends on the response pattern after stimulation.

The typical heart rate response pattern to an exteroceptive stimulus shows a brief increase in the rate for about 4 beats after the stimulus and an erratic decrease for about 20 beats after the stimulus (Lang & Hnatiow, 1962; Hord et al, 1966; Roessler et al, 1969). This suggests that the so-called "peak-to-valley" difference is the most reliable measure of the heart rate response. If this diphasic waveform can be obtained in a lie-detecting test, the averaging of the heart rate over time would offset the acceleration and deceleration phenomena of the heart rate response producing obscured results.

There are only a few studies made on lie-detection based on the heart rate response. These studies show the comparison of the average heart rate. Ellson et al. (1952) calculated the average heart rate in experimental lie-detecting situations and reported that the heart rate becomes slower when a false answer is made. This report depends on the relevant-irrelevant question test, but a similar response can be anticipated during the critical question in the peak-of-tension test. Kassai (1965) examined the heart rate of suspects undergoing actual lie-detection tests. He reported that most suspects who registered over 100 beats per minute before, during and after the test were criminals. Hikita (1969) made a comparison of heart rates between the rates immediately after the card tests and after the completion of peak-of-tension tests in actual situations, and reported that about 97% of those whose heart rates increased by 10 beats showed positive responses. In both studies of Kasai and Hikita, the heart rate variance at critical question was not taken into account because the purpose was to distinguish between positive and negative from the general increase of the heart rate. In those methods, the percentage of correct classification depends greatly on the cutoff level of the heart rate. For example, a low cutoff level would increase the probability of making a false positive and a higher cutoff level would naturally increase the probability of positive being determined as negative. There is also a problem of how to treat each individual difference in the heart rate. In using the heart rate response as an index of the lie-detection test, one should take into account the changes in the heart rate during the critical question.

The pulse wave used in the lie-detection test shows the low responsivity in practice as compared to the other two indexes and the heart rate recorded by the pulse wave has been ignored completely by most of practioners. The purpose of this experiment is to examine the above mentioned heart rate response and study the response pattern occurring in the lie-detecting situation.

However, this experiment is not directly connected to lie-detection but to heart rate response in a simulated lie-detecting situation. In other words, certain types of emotional processes expected to occur during the peak-of-tension test have been established in this experiment to study the heart rate response.

Methods

Subjects

The subjects consisted of 20 healthy 18-21 years old junior college students hired on an hourly basis. Among them, five did not produce sufficient records and thus were eliminated from further analysis. The subjects were not given advance notice on the nature of the experiment and shock treatment.

Apparatus

An amplifier with a pen oscillograph (Sanei's polygraph EB-102), cardiotachometer (Nihon Koden's pulse rate tachometer RT-2), a constant current electric shocker and a slide projector were used. The subjects were seated in a room (2.0 x 3.7 x 2.3 meters) with a screen for projection of slides in the front, a one-way mirror in the back and an intercom on the right side. Shocks were presented by 2 electrodes attached to the first and second fingers of the left hand using a 1mA DC current for 1 second intervals. The slides were projected through the one-way mirror to the screen located about 3 meters in front of the subject. All the instructions were given through the intercom. Apparatus except electrodes for measuring heart rate, for shocks and intercom were placed outside the room.

Procedure

A part of the procedures and technology used in this experiment was based on the method described by Deane (1961, 1969).

Each subject was led to a soundproof and electrically shielded room with the screen for slide projection. After the subject was seated in the room facing the screen, cardiograph leads and shock electrodes were attached. About 5 minutes were provided for the subject to calm down, and during this period, an adjustment for recording was made.

In the first segment of this experiment, the subject was given the following instructions. The subject was told that the purpose of this experiment was to study the physiological changes that occur when people attend to a series of visual stimuli. He was told to watch the screen where he would see the numbers from 0 to 5 appear in order. It was explained that he would see the same series of numbers several times and that his task would be to continue to watch screen and to remain as still as possible during the experiment. About one minute after this instruction, the numbers from 0 to 5 were presented in sequence and repeated 4 times. Each number was shown for 20 seconds. The series were spaced at irregular intervals of from 30 seconds to 2 minutes. The cardiotachograph was recorded from the electrocardiograph. The series were used as a base-level in the second segment.

At the end of the base-level measurements, an instruction for the second segment was given. Each subject was told that he would continue to see the same series of numbers but when the number "3" appeared he would receive a mild electrical shock on the first two fingers of his left hand. However, the shock was not to be applied each time the number "3" appeared and the subject was instructed that the shock may be applied 3 times or none at all. The presentations of numbers were repeated four times as in the first segment. Actually, the shock was applied only when "3" appeared for the first time and was not repeated.

Results

The results of the 2nd, 3rd and 4th trials (B2-4) of the base-level measurements, shock trial (S1) and shock anticipation trials (A2-4) of the 3 presentations were arranged according to the long-term and short-term effects. The first trial (B1) of the base-level showed a higher mean heart rate than the other trials and thus was eliminated from further analysis. In regard to the long-term change, each subject's heart beats during presentations of numbers were calculated for every 10 seconds and converted to heart beats per a minute to obtain a mean heart rate of Trials B2-4, S1 and A2-4. In order to examine the short-term change, every R-R interval from 10 beats before to 40 beats after initiation of stimulus were converted into beat per minute and then averaged for the three conditions (B2-4, S1 and A2-4). The Figure 1 shows a cardiotachograph response in a base-level and a number "3" shock anticipation trial of two typical subjects.

The Figure 2 shows the mean heart rate for every 10 seconds during the stimulus presentations for the three conditions. The data of Trials A2-4 were pooled because the differences among the trials were small and unsystematic. The Trials B2-4 shows a change in the range of 80 to 83 beats per minute. The Trial S1 shows a heart rate acceleration of over the base-level. It is assumed that this effect results from the instruction given to the subjects regarding shocks. In the Trials A2-4, a higher heart rate than the base-level can be seen, but an average decrease of about 7 beats per minute is noted immediately after the number "3" was shown. An analysis of variance performed upon the differences of mean rate before and after the presentation of "3" in the Trials B2-4 and A2-4. The difference between B2-4 and A2-4 is significant at .01 level ($F=13.02$, $df=1$). However, both the Trials effect ($F=0.58$, $df=2$, $P > .05$) and the Condition X Trials interaction ($F=0.87$, $df=2$, $P > .05$) are not significant.

A change per beat before and after the stimulus number "3" is shown in Figure 3. The Trials B2-4 show a relatively small change in the heart rate caused by stimulus and only a slight deceleration is seen. In the Trial S1, the heart rate before the number "3" was presented shows relatively high level compared with the other conditions. A sudden increase of about 20 beats per minute is seen when the electrical shock was applied but the rate returned to a pre-stimulus level by the 3rd beat and accelerated again from the 4th beat after the electrical shock and then reduced by about 5 beats per minute after the 9th beat which is lower than the pre-stimulus level. In the Trials A2-4, heart rate prior to the presentation of number "3" increase about 1 to 5 beats per minute over the base-level. A decrease of about 7 beats per minute is seen by the 4th beat after the stimulus presentation and returned gradually

to a pre-stimulus level by the 15th beat. The variance in the average heart rate occurred up to about the 10th beat after the stimulus but remained constant thereafter. An analysis of variance of Trials B2-4 and A2-4 performed on the difference of heart rate before the showing of number "3" and 4th beat after. A difference between the conditions is significant at the .01 level ($F=20.15$, $df=1$) but the Trials effect ($F=0.06$, $df=2$, $P>.05$) and the Condition X Trials interaction ($F=1.07$, $df=2$, $P>.05$) are not significant.

Above mentioned results on long-term and short-term changes based on the average heart rate response pattern of all subjects. Furthermore, the direction of responses in the Trials A2-4 was analyzed individually. In terms of the directions of response, comparing with 10 seconds after the number "3" presentation to 10 seconds before, there were no subjects who showed acceleration of heart rate in all 3 trials, but there were two subjects who showed an acceleration in 2 of the 3 trials and two subjects who showed acceleration in only one of the 3 trials. In the light of short-term change, the differences in heart rate immediately before the number "3" presentation and 4th beat after were examined. None of the subjects showed acceleration of heart rate in the 2 trials and more, but 5 subjects showed acceleration in the one trial alone. There were two subjects who showed acceleration in both long-term and short-term changes in the first trial and one subject in the second trial. Three subjects showed acceleration in the long-term change and deceleration in the short-term change in the second trial. These results do not show a diphasic wave in short-term change causing acceleration and deceleration phenomena to be offset by long-term analysis.

Discussion

The results of this experiment suggest that the heart rate response during the critical question in the lie-detection test shows deceleration. Both the long-term and short-term changes of the heart rate show significant deceleration of heart rate per minute when the stimulus number "3" was shown in the Trials A2-4. In regard to the long-term change, a deceleration of heart rate was found immediately after the stimulus number "3" was presented and this deceleration recovered to pre-stimulus level within subsequent 10 seconds. This suggests that it is more suitable to measure the heart rate variance for 10 seconds or 10-15 beats after the stimulus presentation to assess the long-term effect. The tendency of deceleration coincide with the mock crime experiment carried out by Ellson *et al.* (1952) by means of long-term analysis.

The analysis of each heart rate interval (short-term effect) during the stimulus presentation using number "3" shows a sudden deceleration up to the 4th beat after the stimulus and a gradual return to the base-level in about the 15th beat. That is, as occurred in the orienting response pattern of heart rate, a diphasic wave is not found. The offsetting of acceleration and deceleration phenomena of heart rate response to the critical question occurred in the so-called mean heart rate (Watanabe, 1970) is not recognized in this experiment. Deane (1969) reported that the acceleration of heart rate shown at the beginning of a series of stimulus and deceleration when an aversive stimulus (electrical shock) was anticipated. The response trend of this experiment coincided with the findings reported by Deane.

From the above, it is assumed that the analysis of heart rate as an index of the lie-detection test can also be made by applying the long-term change.

The procedures used in this experiment differ in substance from the generally practiced method used for the lie-detection test. The mock crime situation and the card test procedure with motivational or stressful situation have been used in the study on experimental lie-detection in order to produce actual examination situations. However, no matter how well the simulated situation may be established, questioning can not be duplicated qualitatively as in the actual cases. A discriminating physiological response which occurs in the actual test is not from the false statement of the subject but comes regardless of whether the subject lies or not. This discriminating physiological response occurs during the critical question in actual test whether the answers are affirmative or not. Therefore, it is considered that it is not necessary to be too concerned about deception when conducting an experiment on the lie-detection test.

The emphasis placed by this experiment is on emotional processes of the subjects used, such as those occurring during the peak-of-tension test, gradual intensification of tension leading to critical question and a gradual decline in intensification. In present study, the heart rate responses of the subjects at the trials without shock or shock anticipation (first segment) have been recorded to be used as a basis for the second segment. This first segment responses may be considered as a response pattern of the innocent in an actual test. The relevant or critical question told in the actual test is a conditioned stimulus associated with its criminal experience if the past criminal experience can be taken as a kind of emotional conditioning. Because of this, an emotional conditioning was formed during the first trial of the second segment by means of paired presentation of aversive stimulus (electrical shock) and one of the slides used in the first segment. In subsequent trials after the second trial, effects were observed only by using the conditioned stimulus.

We intended to simulate the psychological process of the subject during a peak-of-tension test. It is supposed to achieve to some extent that an overall increase in the heart rate is found during shock anticipation trials and that a similar response tendency is observed as had been reported by Ellson et al. (1952). Further research is needed to examine the applicability of the heart rate response as an index of lie-detection through analysis of data obtained from actual polygraph examinations.

Summary

This study aims to provide information on the heart rate responses in the lie-detecting situation.

Twenty junior college women were served as subjects in the present experiment. The subjects were instructed to watch the numbers 0 to 5 appear subsequently on a screen and, following base-level measurement of cardiac activity, were told to be presented with a mild electric shock at each presentation of number "3" slide. Actually, of four presentations of "3" slide, no one but the first was followed by shock. Cardiotachogram was recorded on each trial.

Results were as follows:

1) The results in long-term changes exhibited a significant deceleration during presentation of "3" slide on shock anticipation (no shock) trials.

2) Short-term phenomena represents a brief decrease in rate for about 4 beats following "3" slide and erratic increase for about 15 beats after "3".

3) In the present experiment, contrary to our expectation, averaging of heart rate per-unit interval did not obscure short-term changes as a result of cancellation.

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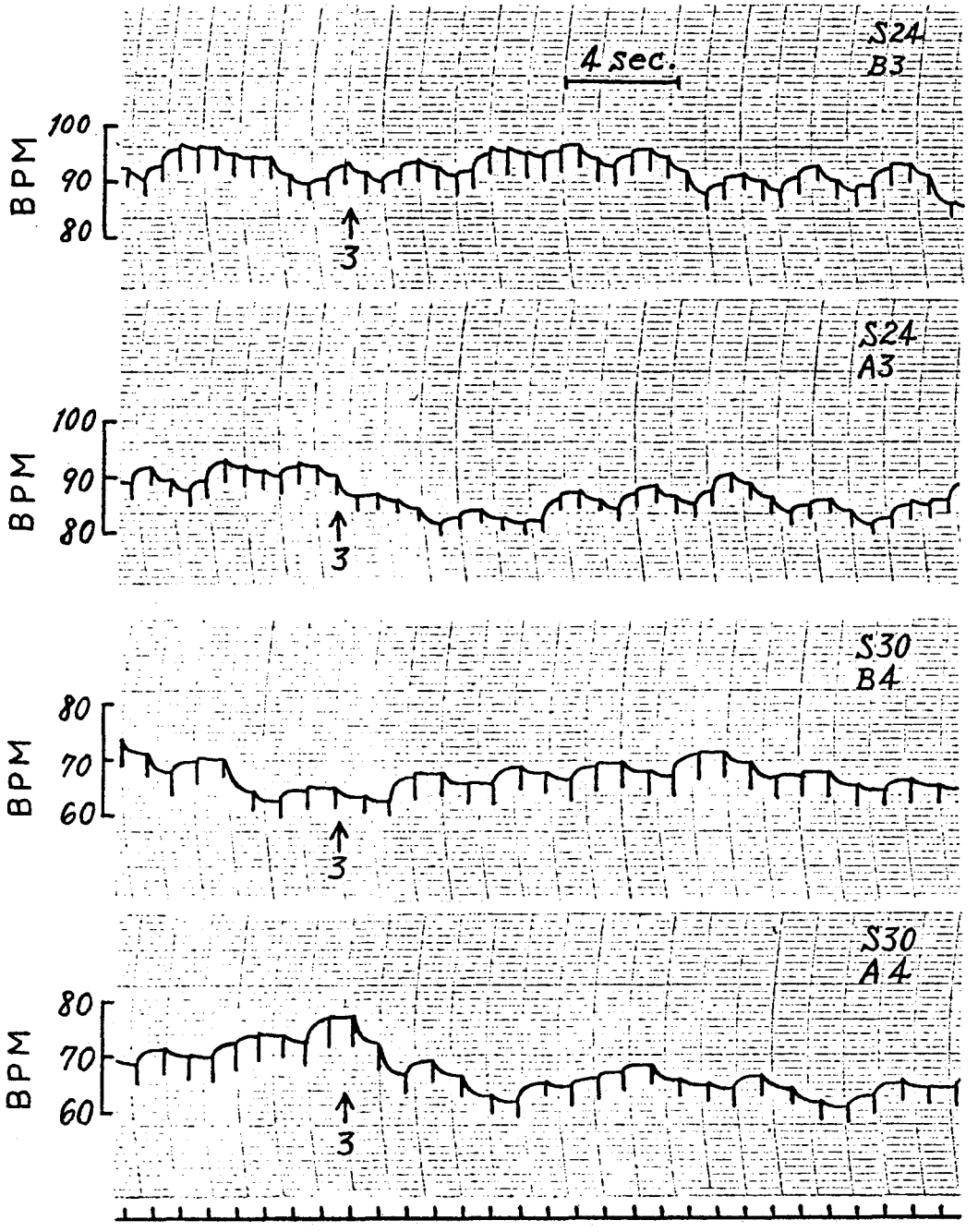

Fig. 1. Cardiotachometric recordings for two typical subjects (S24 and S30) in a base-level and shock anticipation trial during presentation of number "3".

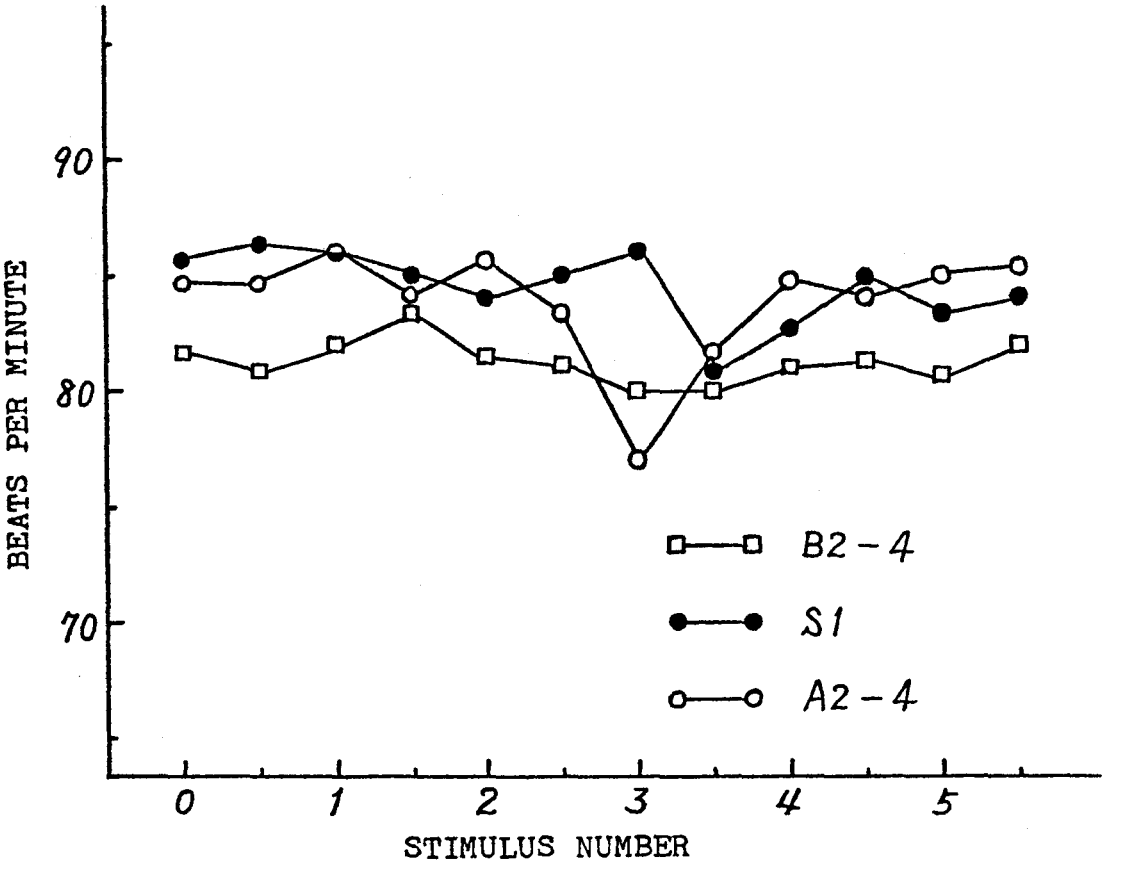

Fig. 2. Mean heart rate during the presentations of number stimuli.

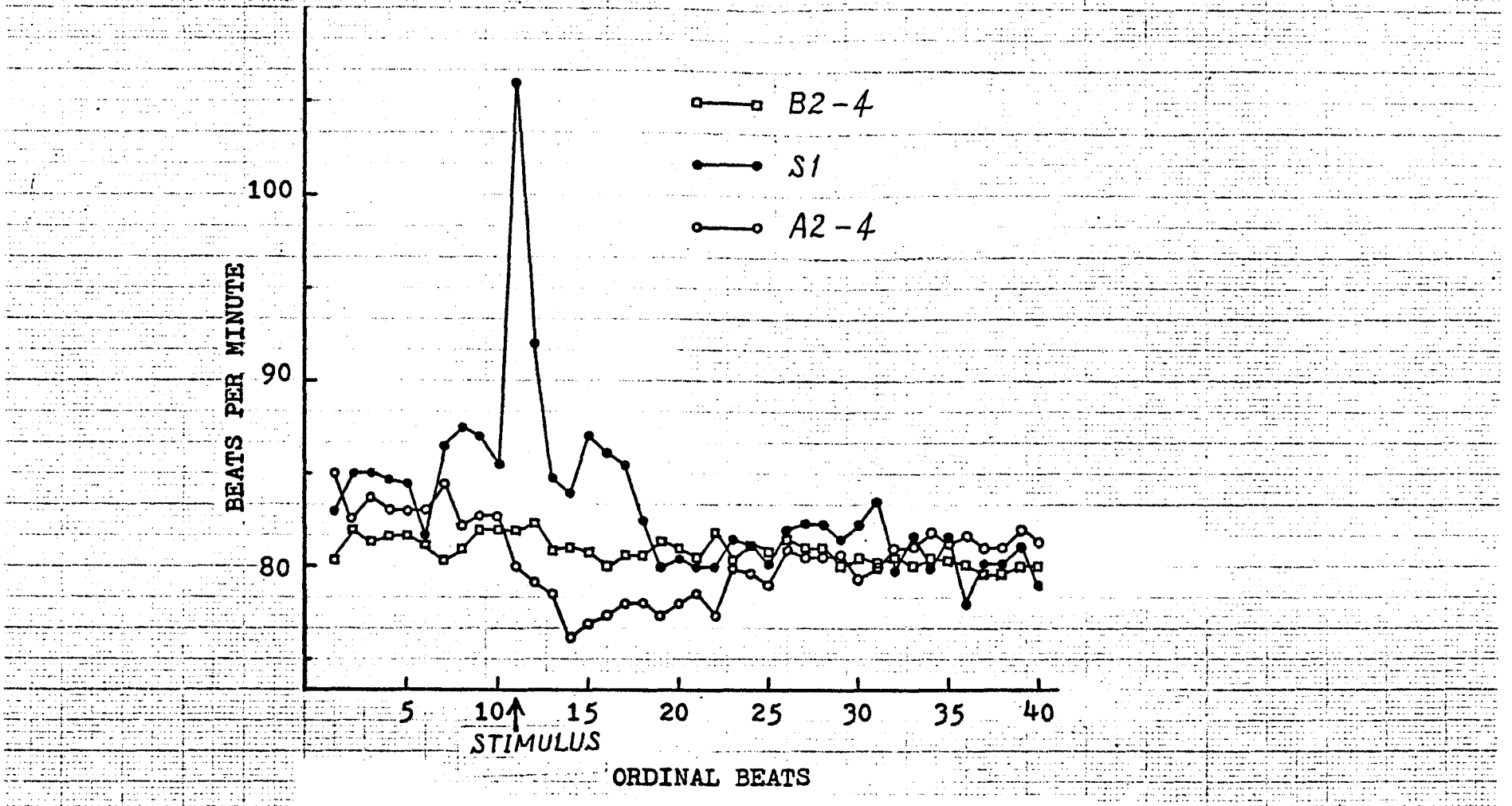

Fig. 3. Heart rate variance per beat during the presentations of number "3".

CUFF PRESSURE OSCILLATIONS IN THE MEASUREMENT OF RELATIVE BLOOD PRESSURE

By

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Abstract

The continuous relative blood pressure measure obtained with a partially-inflated arm blood-pressure cuff operates under the same principle as the oscillometric method of blood pressure determination. In psychophysiological studies the rise in blood pressure seen, for example, in response to an emotion-evoking question, produces a rise in cuff pressure, along with any of three pulse-amplitude changes: a decrease, no change, or an increase. These seemingly paradoxical responses which accompany an increase in blood pressure may be explained by considering the relationship of cuff pressure to the cuff pressure for maximum oscillations. Experiments were conducted in which cuff pressure and its oscillations were recorded. Indications of an increase in blood pressure, and the pulse-amplitude changes resulting therefrom, were obtained at different cuff pressures in the same subject. The results confirm the hypothesis that with cuff pressure below the point of maximum oscillation, an increase in blood pressure results in a decrease in pulse amplitude. With a cuff pressure just above the point of maximum oscillations, an increase in blood pressure results in an increase in pulse amplitude.

The application of a partially-inflated, standard blood-pressure cuff to obtain a continuous measure of cardiovascular changes began with Erlanger's (1904) sphygmomanometer which recorded cuff pressure and its oscillations. With this use of the blood-pressure cuff one does not obtain an absolute measure of the subject's blood pressure, but rather an indication of relative blood pressure changes. Larson (1923) initiated use of the technique in lie-detection. Since then, polygraph examiners, and others who have used the method, have noticed that the response to an emotion-evoking question is an increase in blood pressure which results in a rise of the recorded cuff-pressure baseline. Accompanying this response there is usually a decrease in the amplitude of the pulsatile oscillations (Reid & Inbau, 1966). Sometimes, however, an increase in blood pressure results in no change or an increase in the amplitude of the pulsatile oscillations. Interestingly enough, why the slight elevation in blood pressure that occurs in response to stressful questions or during deceptive responses produces these distinctly different and somewhat paradoxical pulse-amplitude changes has never been investigated. Currently cited explanations of the relative blood pressure response are based upon notions of vasodilation and increased blood flow

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to the tissues beneath the cuff, resulting in swelling and increased cuff pressure (Orne, Thackray, & Paskewitz, 1972); however, this explanation is difficult to prove. It will be the purpose of this paper to show how these three different changes in pulse amplitude can be produced in the same subject experiencing the same type of stress. The explanation offered is based on a fundamental relationship between cuff pressure and the point of maximum oscillations in cuff pressure.

Theoretical Considerations

In order to understand how the pulsatile oscillations in arterial pressure appear in the cuff pressure, it is necessary to understand the factors underlying the principle of the oscillometric method of measuring blood pressure. Fig. 1 illustrates the equipment employed with the oscillometric method, i.e., a cuff applied to the upper arm, a squeeze bulb and valve to control inflation and deflation of the cuff at a desired rate, and a manometer to indicate cuff pressure.

Figure 1A

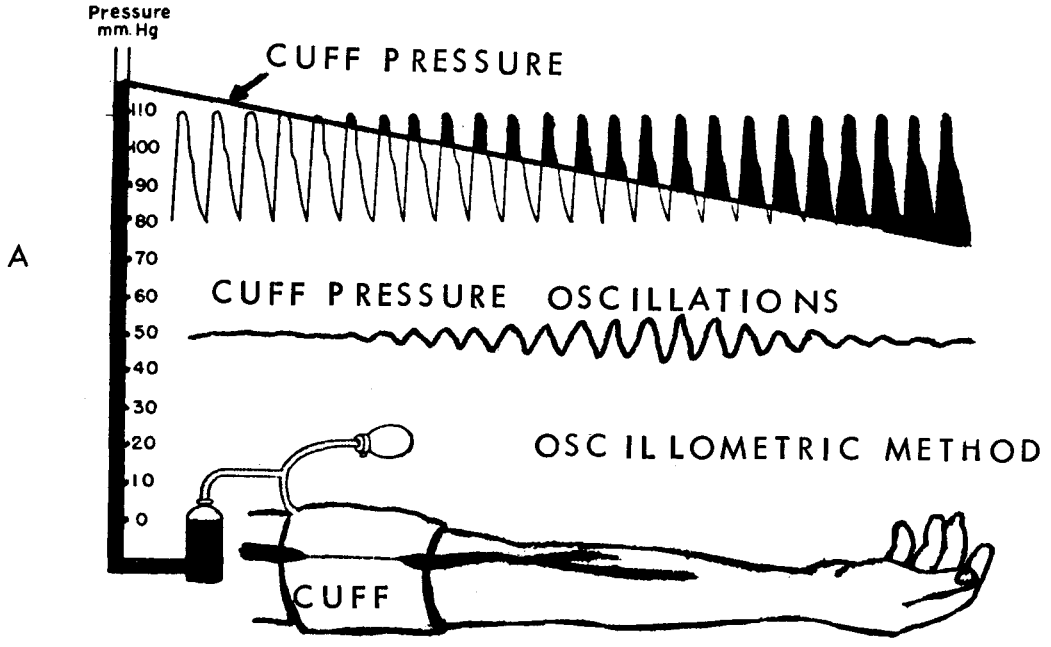
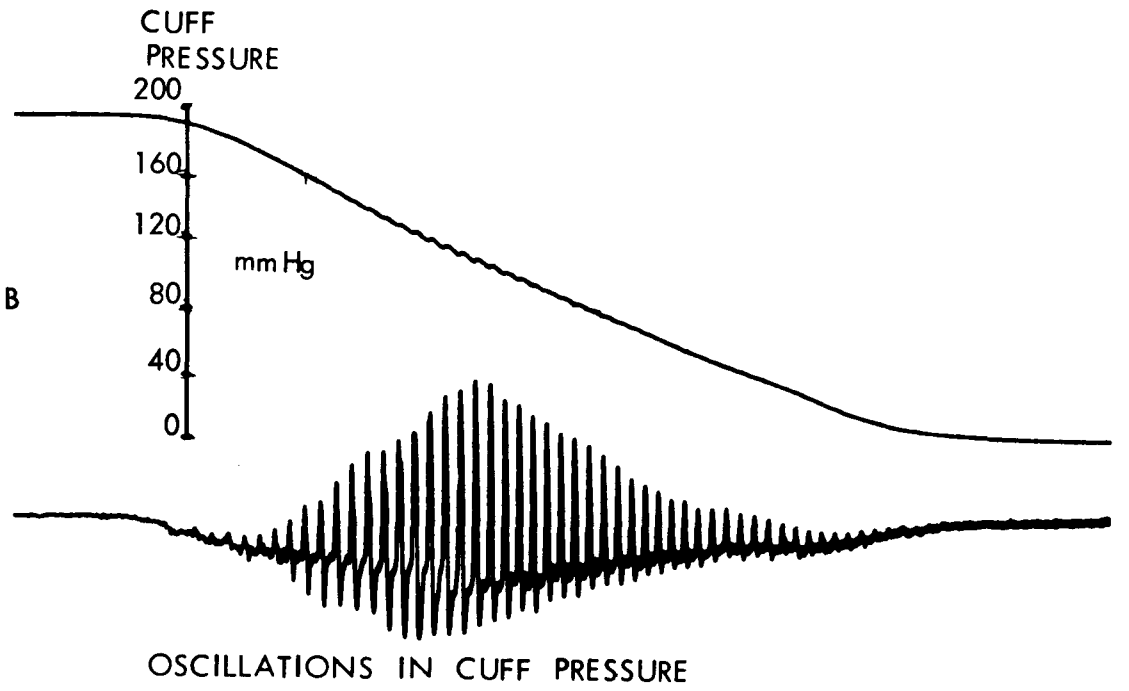


Fig. 1. Characteristics of the iscillometric method of measuring indirect blood press. 1A illustrates the fact that when cuff pressure is above systolic, the underlying artery is collapsed. Central to the cuff, the partially compressed artery pulsates with arterial pressure; these pulsations are communicated through the tissues to the cuff and cause very small amplitude oscillations to be visible on the cuff-pressure indicator. As cuff pressure is reduced, the length of the collapsed arterial segment becomes shorter and the pulsating artery communicates larger amplitude oscillations to the cuff. When cuff pressure falls below systolic pressure, blood spurts through the artery resulting in an increase in the amplitude of cuff-pressure oscillations. As cuff pressure continues to fall, the artery is open for a longer time in each cardiac cycle (as shown by the shaded area), and the artery oscillates with increasing amplitude, reaching a maximum and then decreasing as cuff pressure falls below mean arterial pressure.

Figure 1B



1B shows a typical record obtained from a human subject using a 12-cm cuff. Cuff pressure and the amplified oscillations in cuff pressure are presented in this two-channel record during cuff deflation.

Fig. 1A shows the situation when the cuff is inflated to a pressure that exceeds systolic blood pressure. In this condition, the underlying brachial artery is collapsed throughout the cardiac cycle. Under the upper edge of the cuff, the underlying artery is not collapsed and pulsates with arterial pressure. These small-amplitude pulsations are transmitted through the tissues to the cuff, and can be identified as small oscillations on the cuff-pressure indicator. As cuff pressure is reduced, less counter-pressure is applied to the underlying artery and the length of the occluded segment is decreased; in this situation the oscillations in cuff pressure are slightly larger. As cuff pressure is further reduced, a point is reached when cuff pressure falls just below systolic pressure; at this point cuff-pressure oscillations become larger. As cuff pressure is continually reduced, the artery opens for a longer time during each cardiac cycle; the arterial wall oscillates with a larger amplitude and cuff-pressure oscillations markedly increase in amplitude. With a continued reduction in cuff pressure, the underlying artery is open throughout the cardiac cycle, the arterial wall movement is less, the overlying tissues are compressed less, and smaller amplitude oscillations in arterial pressure are transmitted to the air in the cuff.

Finally, when cuff pressure is zero, there are no oscillations in cuff pressure. In Fig. 1A, the shaded areas on the arterial pressure waves identify the times when arterial pressure is above cuff pressure. Also shown diagrammatically are the oscillations in cuff pressure produced by the pulsating artery while cuff pressure is being reduced.

Fig. 1B presents a typical record of cuff pressure and the oscillations in cuff pressure amplified thirty-fold and displayed on a second channel. Starting with a cuff pressure of 190 mmHg, which was well above systolic pressure in this subject, the oscillations in cuff pressure are not visible in the cuff-pressure record. When amplified electronically and recorded on a second channel, their presence can be demonstrated more readily. Note that as cuff pressure is decreased, the oscillations in cuff pressure suddenly increase (when cuff pressure is just below systolic pressure); then they continue to increase as cuff pressure is decreased, reaching a maximum, then rapidly decreasing in amplitude. It can be seen that there is a cuff pressure for maximum oscillations. For a time it was thought that the cuff pressure at this point was equal to diastolic pressure. It was, however, conclusively proven that this is not the case (see review by Geddes, 1970). Although the meaning of the point of maximum oscillations has not been established, it appears to identify the point when cuff pressure is very near the true mean arterial pressure (Geddes, 1970; Posey, Geddes, Williams & Moore, 1969), when the correct cuff width is used in relation to arm circumference (Geddes & Tivey, 1976).

The important point to be gained from the preceding discussion is that there is a cuff pressure for maximum amplitude of oscillations. If the cuff pressure is set below this point, the amplitude of oscillations will be smaller. Note that with a cuff pressure below this point, an increase in blood pressure will result in a baseline rise and a decrease in pulse amplitude because mean blood pressure has moved away from the point of maximum oscillations. With cuff pressure above the point of maximum oscillations, an increase in blood pressure will bring cuff pressure closer to the point of maximum oscillations and the amplitude of cuff-pressure oscillations will increase. Moreover, if the cuff pressure is initially set for the point of maximum oscillations, either a decrease or an increase in blood pressure will diminish the amplitude of oscillations in cuff pressure.

The basic facts needed to explain an increase or decrease in cuff-pressure oscillation amplitude have now been presented. It is now possible to conduct a simple experiment to demonstrate these responses. The main requirement is a subject in whom blood pressure can be raised by a standard stimulus. In the experiments about to be described a short period of breath-holding was used as the stimulus to elevate blood pressure moderately (Sharpey-Schafer, 1965). Confirmation of the order of magnitude of blood pressure elevation with breath-holding was obtained by the standard auscultatory method to measure the subject's blood pressure at rest and just at the end of a breath-holding period.

Methods and Materials

A standard 12-cm blood-pressure cuff was wrapped around the upper arm

of the subject. Cuff pressure and the oscillations in pressure were recorded on a two-channel graphic recorder (Physiograph, Narco Bio-systems, Inc., Houston, Texas). The oscillations in cuff pressure were recorded using a time constant of 0.3 sec and an external amplifier with a gain of 30. In addition to recording cuff pressure and its oscillations as described, a T-tube connected the arm cuff to a conventional lie-detection polygraph (Lafayette Instrument Company, Lafayette, Indiana). This technique was employed to verify that the same responses could be recorded on a standard polygraph.

The method consisted of seating the subject comfortably and wrapping the cuff around the left upper arm. Initially the procedure illustrated in Fig. 1B was carried out, i.e. cuff pressure and its oscillations were recorded as cuff pressure was slowly reduced from 200 mmHg to zero. This procedure was performed to identify the cuff pressure for maximum oscillations. This information permitted selection of the pressures around which changes in blood pressure would most markedly alter the amplitude of cuff-pressure oscillations.

For each trial, the cuff was inflated to the selected pressure and the system was closed. Prior to the various trials, the pointer on the cuff-pressure indicator seldom showed more than a 2 mmHg drop due to system leakage and seating of the cuff. After about 20 sec of control recording at the chosen cuff pressure, the subject held his breath at the resting expiratory level. Breath-holding was continued for 30 sec; then the cuff was deflated and the subject was given a 3-min rest period before repeating the procedure with a different bias pressure in the cuff. The cuff-pressure values used in successive trials ranged randomly from 40 to 160 mmHg in increments of 5 mmHg.

Results

Fig. 2 presents typical results on a subject in whom cuff pressure was set at different levels throughout a range extending from 60 to 140 mmHg. In this subject, the cuff pressure for maximum oscillations was found to be about 95-100 mmHg. When the cuff was pressurized to 60 mmHg, the rise in blood pressure occasioned by breath-holding caused only a slight decrease in the amplitude of the pulsatile oscillations in cuff pressure. With 70, and particularly with pressure of 80 and 90, the control values for the pulsatile pressure oscillations were larger and with the increase in blood pressure due to breath-holding, the amplitude of the pulsations diminished. With cuff pressure set to 100 mmHg, the increase in blood pressure due to breath-holding barely altered the amplitude of the pulsatile oscillations. With 110 mmHg cuff pressure, and for all pressures above this value, the increase in blood pressure due to breath-holding resulted in an increase in amplitude of the pulsatile oscillations. Corresponding response relationships were recorded on the Lafayette Polygraph. Except for inter-individual variation in the cuff pressure for maximum oscillations, all subjects tested have exhibited these response relationships.

Fig. 2. Typical record of oscillations in cuff pressure obtained with different values of cuff pressure in the range extending from 60 to 140 mmHg. Blood pressure was elevated by breath-holding at the resting expiratory level for 30 sec. For this subject cuff pressure for maximum oscillations was about

Figure 2

CUFF PRESSURE OSCILLATIONS WITH BREATHHOLDING
AT DIFFERENT CUFF PRESSURES

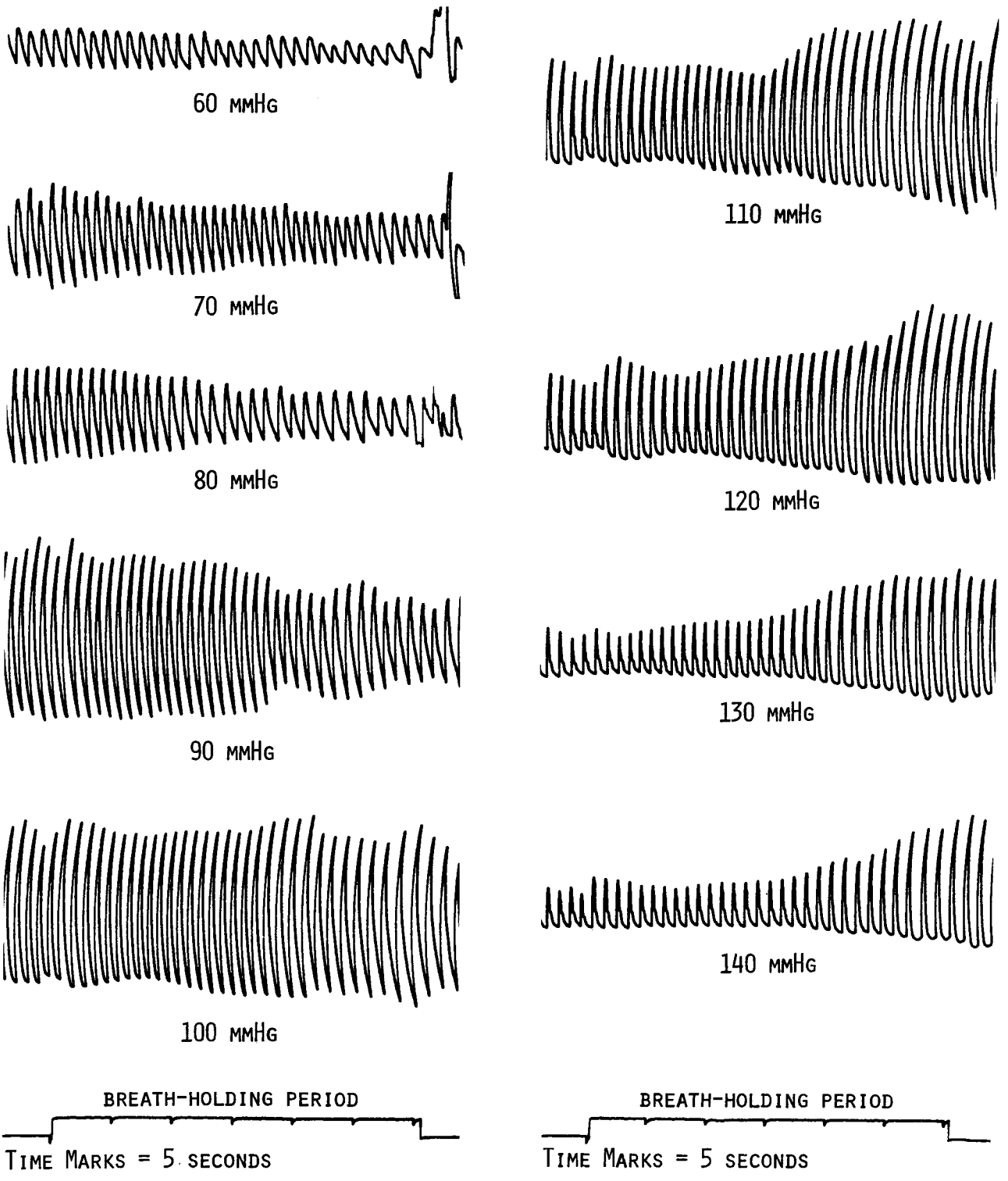
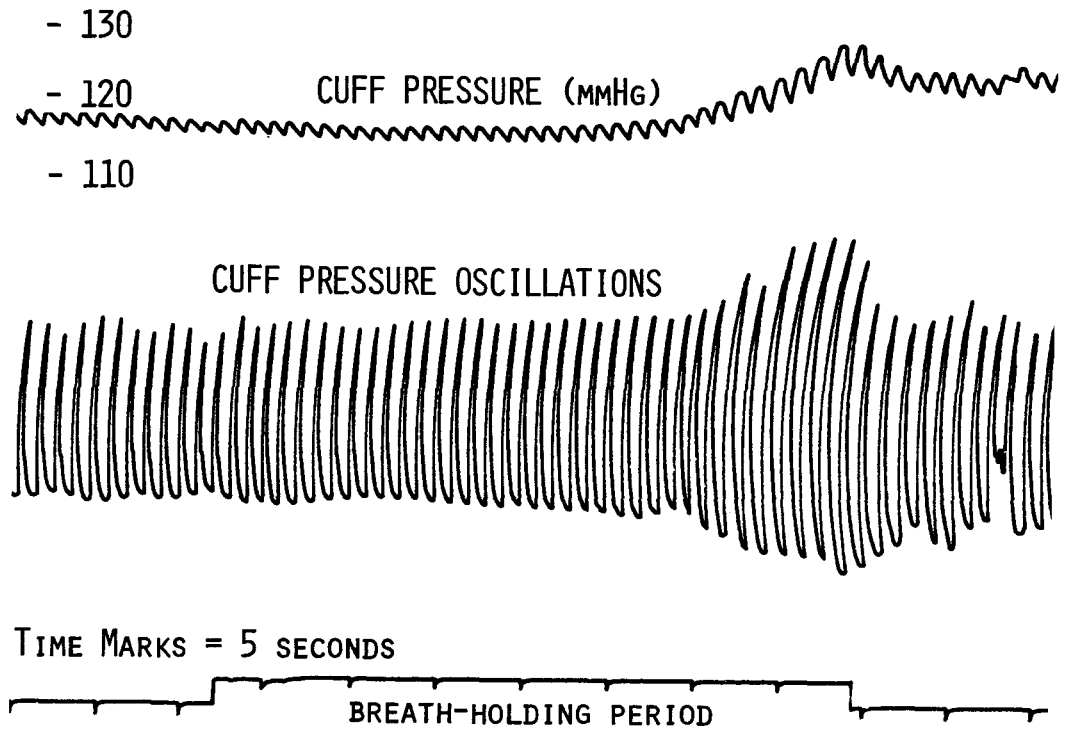


Fig. 3 is presented to illustrate the continuous spectrum of changes in cuff pressure and its oscillations during a breath-holding trial starting with cuff pressure above the point of maximum oscillations (Fig. 3A) and with cuff pressure below the point of maximum oscillations (Fig. 3B). Note that with cuff pressure above the point of maximum oscillations there was an increase in the amplitude of the cuff-pressure oscillations as blood pressure and cuff pressure increased due to breath-holding. In Fig. 3B, cuff pressure was set below the point of maximum oscillations. Note that an increase in blood pressure and cuff pressure due to breath-holding caused a decrease in the cuff-pressure oscillations. Toward the end of this illustration, blood pressure was increased further by adding a Valsalva maneuver which is easily capable of producing an initial arterial blood pressure increase of 40-60 mmHg (Sharpey-Schafer, 1965).

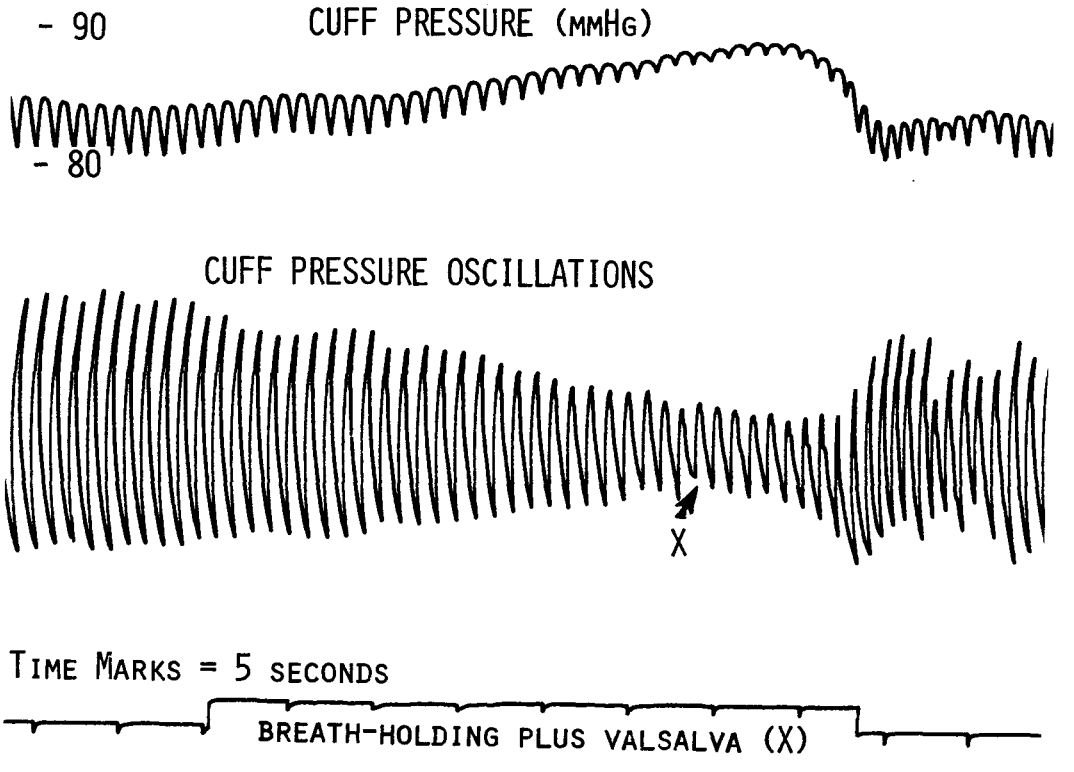
Fig. 2 (cont). 95-100 mmHg. His average resting blood pressure was 116/87 and average blood pressure after 30 sec of breath-holding was 140/108. Note that with all pressures below 100 mmHg in the cuff, the elevation of blood pressure by breath-holding decreased the amplitude of oscillations significantly. At 100 mmHg pressure in the cuff, an elevation of blood pressure did not alter the amplitude of oscillations significantly. With all pressures above 100 mmHg, an elevation of blood pressure increased the amplitude of oscillations.

Fig. 3. Typical records of cuff-pressure increase and resulting pulse-amplitude changes with cuff pressures above and below that for maximum oscillations. 3A shows an increase in pulse amplitude with an increase in blood pressure with breath-holding, using a cuff pressure above that for maximum oscillations. 3B shows a decrease in pulse amplitude with an increase in blood pressure with breath-holding. A small Valsalva maneuver (X) in the last 10 sec of the breath-holding period was used to augment the increase in blood pressure.

Figure 3


- 130
- 120
CUFF PRESSURE (MMHG)
- 110
CUFF PRESSURE OSCILLATIONS
TIME MARKS = 5 SECONDS
BREATH-HOLDING PERIOD

A


- 90
CUFF PRESSURE (MMHG)
- 80
CUFF PRESSURE OSCILLATIONS
X
TIME MARKS = 5 SECONDS
BREATH-HOLDING PLUS VALSALVA (X)

B

Discussion

From this study it is clear that whether a decrease, increase, or no change in the amplitude of pulsatile oscillations occurs with an increase in blood pressure is dependent on the level of pressure in the cuff in relation to the cuff pressure for maximum amplitude oscillations. If cuff pressure is set below the point of maximum oscillations, an increase in blood pressure results in a decrease in oscillation amplitude. If the cuff is pressurized slightly above the point of maximum oscillations, an increase in blood pressure will cause an increase in the amplitude of oscillations.

In this study arterial blood pressure was raised by a period of breath-holding. The amount of increase in blood pressure in a subject depends on the duration of breath-holding and the subject's age and capabilities. In the case of the subject shown in Fig. 2, averaged over 5 determinations, his resting blood pressure was 116/87 (mean blood pressure = 96.7 mmHg).[1] Averaged over 5 30-sec breath-holding periods, the subject's blood pressure was elevated to 140/108 (mean blood pressure = 118.7 mmHg). These values were obtained using the standard clinical auscultatory method.

In conclusion, from these studies it is shown that the level of inflation of the blood-pressure cuff is a critical factor in determining the type of indication that will be obtained whe cuff pressure and its oscillations are used to monitor relative blood pressure changes. With an increase in blood pressure, two types of indication can be obtained: 1) an increase in the baseline on which the oscillations ride, and 2) an increase or decrease in the amplitude of oscillations, depending on whether cuff pressure is set above or below the point of maximum oscillations in cuff pressure. Psychophysiologists interested in the relative blood pressure measure can easily perform experiments to quantitatively evaluate the response types which have been described in this paper. Furthermore, polygraph examiners are in an excellent position to investigate this phenomenon in the field. Careful measurement of each subject's resting blood pressure, the cuff pressure used, and the response types seen during the examination would yield the necessary data to conform these laboratory findings.

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[1] Mean blood pressure equals diastolic plus one-third of pulse pressure.

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* * * * * *

Answers to Polygraph Review:

1. d.
2. b.
3. d.
4. c.
5. a.
6. True
7. False
8. True
9. False
10. False

A SURVEY OF ATTITUDES ON THE GUILT COMPLEX TECHNIQUE

By

Stanley Abrams, Ph.D.

This writer has found few major differences of opinion in polygraphy as compared to other professions. In psychology and psychiatry, for example, the theoretical foundations may vary considerably, therapeutic approaches differ dramatically, and diagnoses have been shown to have rather low reliability. One only has to sit in on a variety of court cases to hear the variations in interpretations of electroencephalograms, x-rays, and brain scans.

In polygraphy, one area in which definite disagreement exists relates to the guilt complex technique (G.C.T.). This writer has employed it only rarely in the last six years and obtained two verified cases of individuals who demonstrated highly deceptive charts, but were truthful. Other examiners, however, strongly disagree with the employment of this procedure, and in fact, this survey was motivated by one such debate. In contrast to the writer's belief that the G.C.T. should be utilized, Lieutenant Tony Teuscher felt that it should not be employed because it caused more difficulty than it was worth.

In an attempt at determining the general view of polygraphists, twenty-four were selected whose names frequently appeared as authoring journal articles or speaking at professional meetings. Eighteen of this group responded, but three were excluded because two communicated by telephone and one was unable to give a complete answer without permission from the agency that employed him. The final group consisted of fifteen examiners.

The following questions were asked:

1. Do you use the G.C.T. and how frequently?

2. Do you have any evidence through verified charts that it serves the purpose?

3. If you use it, what form does it take?

4. What value is this approach to you?

Of the fifteen polygraphists included in the survey, eight felt that this procedure was of value while seven disagreed with this. Those favoring the use of the G.C.T. included Dick Arther, Gordon Barland, Milton Berman, George Harmon, Frank Horvath, Fred Hunter, Clarence Romig, and Lincoln Zonn. The opposing view was held by Walter Atwood, Kirk Barefoot, Len Harrelson, Warren Holmes, Bob Musser, Pat Patterson, and David Raskin. Four of the seven examiners who indicated that they did not employ the G.C.T. stated that they felt that the reaction occurred so rarely that it was not worth wasting a question on its use and two others said that it did not accomplish what it purported to do. Raskin added to this that his research demonstrated that false positives could result, and that it was inferior to the standard controls.

Insofar as the frequency of G.C. responders, Barefoot reported that in the six years that he had utilized this approach, he had found only one or two individuals who reacted to the G.C.T. of the several thousand that he had examined. Holmes stated that in twenty-one years, he had never seen an individual of this nature unless the test was erratic in general. Coincidentally, Harrelson found only one G.C. responder in twenty-one years.

Patterson and Horvath who favored the use of this procedure, emphasized that proper question formulation and technique eliminates the need for the G.C.T. Even more strongly, Musser felt that it was inappropriate to resort to trickery and deceit to achieve our goals. Holmes reported that he does not utilize this procedure in the usual manner, but instead as an aid to interrogation for those subjects who claim that their deceptive reactions were due to anxiety rather than lying. Used in this manner, he believes it has merit. Holmes also pointed out that the G.C.T. is based on anxiety rather than guilt and should be labeled as such.

Consistent with the reports of those who do not employ the G.C.T., three of the eight polygraphists who feel it is of value still utilize it only rarely. In contrast to this, another three report that they make frequent use of it. Barland, Berman, and Romig have found this reaction to occur only infrequently. In this group's response to the question related to verified charts, Arther, Hunter, and Zonn have attained them. Horvath, however, has never obtained any verified charts himself, but had seen some at the Reid Laboratory. Research has been conducted by Arther in this area, and he reported that it is an highly effective approach if it is properly carried out.

The group was split on the particular technique used, with half employing the Arther procedure, and the others using Reid's approach.

This survey, although small in scale, does suggest that mixed feelings most certainly exist among polygraphists in regard to their use and the value they place on the guilt complex technique. Even some of those who use it indicate that there are few individuals of this nature, and except for reports from a few examiners, there is little verification of the findings.

The question that each examiner must decide is whether the expenditure of time and effort is worth the few cases that will appear over the years. However, one must also consider that if it serves to avoid mis-diagnosing one innocent man, then its use is not only appropriate but necessary, regardless of whether it is something within the subject, or faulty technique, that caused this response. The price of this omission may be that some deceptive subjects are called inconclusive.

Insofar as the author is concerned, anyone who demonstrated a guilt complex response neither can be cleared nor labelled deceptive, but must be considered inconclusive. The final decision as to whether the G.C.T. is used, and how much weight is to be placed on the results, however, must rest with the individual polygraphist.

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THE INFLUENCE OF DELAYED RESPONSES UPON VOICE STRESS AS MEASURED BY THE PSE

By

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University of Cologne

Introduction

Instruments designed to detect vocal stress for the purposes of lie-detection have been criticized because of the lack of basic research into the link between psychic stress and its correlates in vocalization (Almeida et. al. 1975), and the fact that these instruments have, in experiments, proved unreliable in the field of lie-detection (Kubis, 1973). However, there have been few experimental investigations using voice analyzers in the field of lie-detection; and the factors on which the results depend or by which they are influenced are not yet all known.

In this experiment the purpose was to determine to what extent delayed response influenced vocal stress. Stress in the voice as measured by the PSE, has been shown to be produced easily, but it also very quickly disappears. If it were to be established that the stress patterns are effected by the time interval preceeding answering, this fact would be of great practical importance in using this instrument in the field of lie-detection. However, experiments in lie-detection have a great weakness because experimental conditions are fundamentally different from those in the field. Many years ago, the German psychologist, Phillip Lersch (1941), considered the problem in the following terms:

> It is an indisputable fact that psychological experiments have produced valuable results and will continue to do so. On the other hand, everyone who has a deeper knowledge of human nature and man's psychic qualities knows that there are only a limited number of peripheral psychic processes which can be experimentally induced in the laboratory, and that is precisely the deeper, central experiences which can never be subjected to scientific control in experiments.

One of these "deeper, central experiences" must undoubtedly be that which is described as the "fear of detection", the preconditioned which apparently produces measurable physiological correlates. This fear of detection cannot be created in an experiment in exactly the same way or magnitude as it occurs in reality. As a consequence the physiological correlates may not appear at all or are barely perceptible in experiments. Experiments in the field of lie-detection, therefore, produce limited evidence of the reliability of the technique.

Method

The subjects that participated in this experiment were 40 graduate students of psychology at the University of Cologne. Their tasks were to remove, unobserved,

one of four displayed items from a room and to hide that item on their person. The items were: a coin, a paper clip, a key and a film cassette. When the subjects left the room an experimental assistant noted the choice to enable later comparisons. The items selected for the experiment are the same as those which appear in the manual accompanying the PSE, however, because it was assumed that the students were not familiar with tie clasps the film cassette was substituted for that item. Incidentally, it became apparent that these items had by no means the same value for the subjects. It was statistically significant that the coin was less often chosen than the other items. It may have been that the subjects regarded the coin as an object of recognisable value. To "steal" it was perhaps to risk turning the experiment into reality, and so they avoided it.

Immediately after the experimental "theft" the subjects were administered a Peak of Tension Test, using two lists of eight questions each. These two lists were similar in that the four most probably choices (one of which was known to be a chosen item) were padded at the beginning and the end by two additional undisplayed items. The second list differed from the first in that the sequence of all choices was modified, however, the four most probable choices remained in the center position.

The forty subjects were divided into two groups, each group consisted of ten male and ten female subjects. In one group the test was administered by displaying the first list to the subject, the subject was instructed to respond "no" to each question and was then asked if each item on the list (from top to bottom) was the item he had chosen. After completing one list in this manner, the list was repeated (from bottom to top). The same procedure was repeated with the second list. Four sets of questions and responses were obtained in this manner. The above procedure was then repeated except that the subjects were instructed to take three normal breaths prior to responding "no". In this manner a total of eight sets of questions and responses were obtained from each subject (four with an immediate response and four sets with a delayed response).

The second group of twenty subjects was tested in the same manner, except that this group was instructed to take three normal breaths prior to responding in the first set of four tests and was instructed to respond immediately after the question was asked in the second set of four tests.

The answers were recorded using a Uher 4000 Report L tape recorder at a tape speed of 7.5 inches-per-second and were charted with the Psychological Stress Evaluator (PSE-1) in mode III in the usual way (speed reduction of 4:1 in male subjects and 2:8 in female subjects).

Each chart was intially rated independently by two people trained in PSE analysis. As it is sometimes difficult to decide where the greatest degree of stress occurs on the charts when using the criteria established by the manufacturers of the PSE, the raters chose two of the four possibly correct responses which displayed the greatest stress. The choices of the raters were remarkedly similar; there were only a few cases in which they differed in the choice of just one item. In these few cases where they did not initially concur in their separate evaluations they were quickly able to reach a consensus which became the basis for later statistical procedures. The eight charts of each

subject were not evaluated as a unit and it was not decided which item a subject had chosen by studying the interrelationships of the charts; but one item was chosen on each chart independent of the others. The reason for this was that the main point of interest in the research was not to detect the chosen item correctly, but to decide whether delayed answering could alter or obliterate stress patterns. Where one of the two items showing the most stress as selected by the rating was actually the object chosen by the subject, this was counted as a correct detection. By this procedure the probability of correct detection was 50% (two out of four).

Results

Table 1 shows the results of the experiment. In general it must be stated that, although the probability of accurate detection was 50% with this kind of rating, the rate of detected "thefts" was very low. In the best group (those who answered immediately - with no pause, in the first part of the experiment) detections were 70%. This low rate of succesful detections cannot be entirely attributed to the experimental conditions and to the lack of "fear of detection", since Kubis (1973) achieved better results with the polygraph in an experiment that was similarly designed. As was expected, the rate of detected "thefts" was highest in that group of subjects which answered in the first part of the experiment without delay. When the same subjects answered after a short pause the accuracy of detected "thefts" went down by 12.5% It is recognized that repeated questioning and chart taking on the same subject may lead to lowered responsiveness by habituation, i.e., in the first and second charts the reactions may be clearly visible, but when the subject is repeatedly questioned the reactions may disappear even though the subject is deceptive. Therefore, in the first group of subjects the lower rate of detected "thefts", when the answer came after a pause, may be atributable to the lowered responsiveness of the subject, or the delay in answering, or to both. In other words there were two factors that may have been responsible for the decreased number of correctly detected answers in the second part of the experiment - habituation and delay of answering.

In the second group of subjects both methods of answering - with and without delay - produced an equal rate of detected "thefts". If it is assumed that the factor of habituation and the delay in answering influenced the results, it must be expected that in the first part of the experiment, when the subjects answered with a delay, it was this delay that causes an impediment to the correct detection of "thefts". In the second part of the experiment the subjects of this group were now under the influence of habituation and although they answered without delay the correct detection of "thefts" was in this instance impeded by the habituation factor.

The dependent t-analysis for the first group shows that the spontaneous answers are significantly better detected ($t = 5.56$; critical value for $t = 0.05\%$, $df = 19$, onetailed = 3.88). The dependent t-analysis for the second group of subjects between delayed and spontaneous answers = 0. In other words there is no statistical difference in detecting "thefts" between delayed and non-delayed answers in this group. If the delayed answers of the first group (those who answered delayed in the second part of the experiment) were compared with the delayed answers of the second group (those who answered in this way in the first part of the experiment) the independent t-analysis revealed $t = 0.49$

Table 1: Detected and non-detected answers with and without time delay in a Peak-of-Tension Test.

		group 1 (N = 20)					group 2 (N = 20)				
		detected answers		non-detected answers			detected answers		non-detected answers		
Without delay	list 1 f	14	70%	6	30%	with delay	13	65%	7	35%	
	list 1 b	12	60%	8	40%		8	40%	12	60%	
	list 2 f	15	75%	5	25%		12	60%	8	40%	
	list 2 b	15	75%	5	25%		10	50%	10	50%	
	Sum	56	70%	24	30%		43	54%	37	46%	
With delay	list 1 f	10	50%	10	50%	without delay	10	50%	10	50%	
	list 1 b	12	60%	8	40%		10	50%	10	50%	
	list 2 f	13	65%	7	35%		13	65%	7	35%	
	list 2 b	11	55%	9	45%		11	55%	9	45%	
	Sum	46	57.5%	34	42.5%		43	54%	37	46%	

f = forwards

b = backwards

Table 2

Comparison between group 1 and group 2 for correctly detected answers:

$t = 1.61$

Comparison between group 1 and group 2 for non-detected answers:

$t = 1.61$

Comparison between group 1 and group 2 for detected answers without delay:

$t = 1.76$

Comparison between group 1 and group 2 for non-detected answers without delay:

$t = 1.76$

Comparison between group 1 and group 2 for detected answers with delay:

$t = 0.49$

Comparison between group 1 and group 2 for non-detected answers with delay:

$t = 0.49$

The critical value for t, twotailed, df 38 on the 5% level is $t = 2.02$.

The differences between the 2 groups are in no case significant.

(critical value for t = 0.05%, df = 38, twotailed = 2.02). When viewed in this way, the fact that the two groups of subjects are not significantly different, shows it is of no importance whether the subject responded with delay at the end of the experiment while under the influence of habituation or at the beginning when habituation need not be considered. If both of these groups were compared for their detected answers without delay the independent t-analysis shows a value of t = 1.76 which also does not reach the critical value. The results allow the assumption that the habituation factor had not actually influenced the rate of detection. It therefore may be assumed that a delay prior to answered can indeed alter and even obliterate stress patterns as measured by the PSE.

Discussion

It should be mentioned in retrospect that it may not have been advisable to follow the proposals of the manufacturer's manual in formulating this experiment. Three of the items utilized for the experimental "thefts" had no intrinsic value for the subjects - consequently in the formulation of this experiment the subjects were not emotionally involved. This became apparent by the fact that the items were not randomly chosen; the coin was statistically less often chosen than the other items. Apparently the subjects regarded the coin as an object of recognisable value and to "steal" it would tend to turn the experiment into reality - so they avoided it. This allows the assumption that if more valuable items were offered in an experiment of this kind the subjects might become more emotionally involved, thereby generating quasi-guilt feelings which in turn might evoke more measurable responses.

Generally it may be stated that the rate of successfully detected "thefts" is very low in this experiment. This low rate cannot be entirely attributed to the experimental conditions and the lack of fear of detection, since in a similarly designed experiment, Kubis (1973), achieved a correct detection rate of 76% with the polygraph; whereas in this experiment the correct rate of detection is little better than chance. This leads to the assumption that the PSE may not be a very reliable instrument for lie-detection.

Summary

The purpose of this experiment was to test whether it is possible to exercise a deliberate influence on vocal stress patterns measured by the PSE by varying the response time before answering. To this end two groups of subjects underwent a Peak-of-Tension test shortly after they had carried out a simulated "theft" which was to be denied both immediately, and after a short pause. The results allow the assumption that it is possible to disguise and obliterate vocal stress patterns by allowing a pause before the answer.

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REPORT ON A NEW STIMULATION TEST

By

Joseph G. Law, Jr.

It is conventional wisdom among polygraph examiners that the electrodermal component is the most accurate component during a stimulation test, but not during relevant charts. Although most studies clearly show the effectiveness of the cardio and pneumo components in detecting deception, polygraphists as a group are divided on the utility of the skin resistance measure. Many consider the electrodermal component the least effective in detecting deception (Harrelson, 1974). However, laboratory experiments seem to indicate the electrodermal component to have very high validity (Lykken 1959, 1960). In addition, there are differing schools of thought about the comparative validities of the cardio and pneumo components. One group of polygraphists believes that the cardio element is the most accurate (Harrelson 1974) and another claims higher validity for the pneumo component (Arther 1970).

Because of the difficulty in validating the findings of polygraph tests conducted in the field, most controlled studies have been limited to mock crime situations created and tested in a laboratory on college students. Some of the recent studies conducted by psychologists have considered the effects of motivation on test results (Davidson 1968), the perceived role of the Subject on test outcome (Gustafson and Orne 1960), and the effects of attempted faking on ease of detection (Lykken 1960). The findings of these studies carried out by experimental psychologists are based primarily on interpretation of the electrodermal responses.

Most of the laboratory studies on the polygraph have suffered from one or more of three basic flaws. First, the level of stress has been much lower than that which is present in an actual field test. Since fear of detection is the prime requirement for autonomic arousal within the lie-detection paradigm, reduced stress results in smaller and harder to detect polygraph reactions. As a consequence, the claimed validities of field examiners are at variance with many of the findings of laboratory researchers. Laboratory studies tend to show lower validities than those claimed by professional polygraph examiners (Lykken 1974; Burack 1954).

Secondly, many experimental designs include only one or two criteria utilized by polygraphists. For example, an experiment by Kugelmass and Lieblic (1966) compared the accuracy of the electrodermal measure to that of the pulse rate in detecting deception and found the former to be better than pulse rate. However, another finding indicates that the pulse rate measure is more effective than GSR amplitude in detecting deception (Davis 1960). In the Kugelmass experiment, the researchers reported on only two of 12 possible criteria provided by the cardio and electrodermal components. To make an accurate test of the relative validities of the polygraph's components, all of the criteria normally available to the polygraphist should be available to the experimenter. Otherwise, the results are not as generalizable to field results.

Third, most studies are limited to undergraduate college students; hardly representative of the population as a whole. However, the arrested criminal suspects frequently tested by law enforcement examiners may not be truly representative of the population either. To correct for these deficiencies, an experiment was carried out to determine the relative validities of all three components of the polygraph, used in conjunction with each other, in the detection of deception. As a result of using the stimulation test for this validity study, a variation of the stimulation test was developed by the author which may be useful to the professional polygraph examiner.

Some examiners say the stimulation test is not a very valid or accurate technique. They report that there are occasions in which they are unable to determine which number or card a Subject actually selected based on chart interpretation alone. Others use the technique regularly, with apparent success. The author's own experience has caused him to divide reaction patterns into four categories: (1) people who react massively to most or every number asked on the test, (2) people who react little or none at all to any of the numbers on the test, (3) people who react significantly to the number which they actually selected, and (4) people who react significantly to a number which they did not select. Individuals in category 4 have often been deceptive Subjects intent on defeating the polygraph through countermeasures such as selective muscle tension or mental gymnastics. Individuals in the first three categories have not seemed to fit any particulary category as far as truth or deception to the relevant issue was concerned. The apparent greater case of interpretation of relevant charts may be due to the presence of relevant and control questions. On a relevant test the truthful Subject has a control question which may be used to direct his psychological set away from the relevant questions, but a stimulation test has no control question. It was hypothesized that truthful and deceptive reactions on a stimulation test might be more easily interpretable if a control question was incorporated into the test structure. In other words, the random responses often obtained for Subjects on stimulation tests might be eliminated if they were given a control question to psychologically attend to.

Method

Subjects. The Subjects of the experiment were 35 adults who were tested as part of the internal security procedures of several business firms in Mobile, Alabama. Cases involved cash shortages, inventory losses, etc. It is assumed that the Subject's level of stress in these cases was greater than that of college students who are offered a small sum of money if they successfully prevent detection by the polygraph.

No attempt was made to select age, sex, race, educational level, social status, or physical characteristics of the test Subjects. Thus, the experiment was similar to the problem of individual differences faced by the average polygraphist in the field. For example, some of our Subjects were extremely obese, and others had taken tranquilizing drugs. Thus, the author faced the problems common to other professionals, but not usually seen in laboratory-based experiments. The two exceptions to random selection, also common to the field, were that all of the Subject were 16 years of age or older and all were in good physical health to take the examination, as determined by the pre-test interview of medical history.

The age of the Subjects ranged from 16 to 41 years, with a mean of 25.3 years. Twenty-six of the S's were males (74.3%) and 9 were female (25.7%). Twenty-nine were Caucasian (82.9%) and 6 were Negro (17.1%). The educational level of the Subjects ranged from 8th grade to 4 years of college, with a mean of 11.9 years of formal education.

Apparatus. A LaFayette Model 76056-A polygraph was used in the testing situation. This model has an upper and lower Pneumo, a skin resistance component, and an electronically-enhanced Cardio component (EEC). During the testing, blood pressure cuff was placed on the Subject's left arm. The cuff itself was a Velcro Tourniquet cuff marketed by the Stoelting Company. The finger electrodes were placed on the ring and forefinger of each Subject's right hand. During testing, the GSR component was set in the automatic self-centering mode. The pressure setting on the blood pressure cuff was set at 45mm of mercury on all Subjects.

Procedure. A modified form of the standard stimulation test was the focus of experimental interest. Following the pre-test interview, one test was conducted in which questions concerning the alleged theft or thefts were asked. The stimulation test was conducted immediately following the first relevant chart. The Subject was asked to circle one of five numbers placed on a piece of paper, then to turn the paper over and cover it with his hand. Prior to the actual testing, the Subject was instructed to say "No" to each of the questions asked about which number he circled. The author then asked the following question about each number on the piece of paper: "Did you circle number ____?"

As previously mentioned, a control question was incorporated into the body of the stimulation chart. At the conclusion of questioning about the numbers, each Subject was asked: "During this polygraph sensitivity test, did you lie to me about the number you really circled?" Each Subject was instructed prior to the test to answer "No" to this question. The reactions to this question were later used for comparison with the number which the Subject actually circled. The question was termed by the author a "Known Lie Question" and marked "KLQ" on the charts.*

At the conclusion of each stimulation test, the author made three separate judgments of the number circled by the Subject. This was before the Subject revealed which number he had, in fact, circled. One judgment was made for each component, then written in the lower right side at the end of each chart. While interpreting each component's tracing the author covered the other two components with a piece of cardboard to prevent the reactions in one channel from influencing the examiner's determinations of reactions in another channel. Because of the marked increase in amplitude often exhibited in the galvanometer pattern, that component was interpreted last.

*Note: In the polygraph field, the term "Known Lie Question" and "KLQ" are exclusively associated with the Arther Technique control questions. The above was not edited out of the Text because that is the way the author marked his charts. However to avoid confusion and observe Arther's proprietary right, KLQ should not be used in describing other techniques. [Ed.]

After the author (Examiner A) had made his judgments, two other polygraphists studied the charts independently and made judgments based on access to the stimulation chart. These two polygraphists did not observe the polygraph examination or have access to any of the case facts. They had access only to the stimulation test charts. The three judgments for each examiner, by component, were later compared with the number which the Subject actually circled on the paper in order to determine the validity of each component.

Results and Discussion

The percentages of successful detection by each examiner, by component, are depicted in Table 1. The results of all three examiners' judgments in each component were greater than could be expected by chance alone. Since there were five possible numbers which could have been selected by each Subject, the probability that the examiner would correctly identify the number circled by chance alone would be 1 in 5. In thirty-five cases, we could expect a chance success rate of seven correct judgments if the examiner made random guesses about the number circled.

As Table 1 shows, the accuracy rate for all three examiners was above the chance level of seven. At first glance, it would appear that the Galvo was the most accurate component, followed by the pneumo and cardio components in that order. For example, Examiner A's accuracy rate was 60% in the galvo, 54.3% in the pneumo, and only 40% in the cardio. However, we must take into account the small size of the sample (35 Subjects). In considering the differences between components, a certain amount of tolerance must be allowed for chance fluctuations. When using small experimental groups this allowance for size can be corrected by statistical means.

Table 1

Validity Data

Successful Detection of Deception

Component	Chance Level:	Examiner A		Examiner B		Examiner C	
		Number Correct:	% Correct:	Number Correct:	% Correct:	Number Correct:	% Correct:
Pneumo	7	19	54.3	16	45.7	14	40.0
Galvo	7	21	60.0	20	57.1*	16	45.7**
Cardio	7	14	40.0	11	31.4*	13	37.1**

N = 35

* $p < .03$, two-tailed test

** $p < .05$, two-tailed test

A statistical test for correlated proportions (McNemar 1947) was used to test the significance of the differences between the success rates of each of the components. In the case of Examiner A, there was no statistically significant difference between the pneumo, galvo, and cardio components in

terms of their success rates in detecting deception. For Examiners B and C there was no statistically significant difference between the success rates of the pneumo and galvo components or pneumo and cardio components. However, for these two examiners, the galvo was significantly more accurate than the cardio component. For Examiner B, the galvo was 25.7% more accurate than the cardio component. Examiner C was 18.6% more accurate in the galvo than in the cardio component. In fact, there is less than one chance in a hundred that these differences between accurary rates for the galvo and cardio components could be due to chance fluctuations alone.

At first glance, some of the data in Table 1 may produce some confusion. For instance, the 18.6% difference between Examiner C's cardio and galvo validities is considered statistically significant while the 20% difference for Examiner A is not considered statistically significant. Examiner C's data are statistically significant because many of the incorrect judgments in the cardio are matched by correct judgments in the galvo component. Further, there was not one instance for Examiner C in which successful detection by the cardio was matched with successful deception by the Subject in the galvo component. On the other hand, in seven of the charts interpreted by Examiner A, successful detection in the cardio component was matched by successful deception in the galvo component. That is, in some cases Subjects were able to deceive Examiner A in the galvo, but not in the cardio. However, for Examiner C there was not a single test Subject who could deceive Examiner C in the galvo component, but this was not so in the cardio component. Statistically speaking, this tended to make Examiner C's 18.6% difference between galvo and cardio significant, while Examiner A's 20% difference does not reflect a statistically significant difference in accuracy rates.

The results tend to support the view held by some examiners that the galvo component should no longer be considered the least valid parameter of the polygraph. In fact, in the case of two of the examiners, the galvo was more useful than the cardio component.

However, several important points should be made in interpreting these data. First, Examiner A administered all of the tests and therefore had access to more data than the other two examiners. Second, Examiner A had been using the electronically enhanced cardio for approximately one year while the other two examiners employ mechanical cardio sections on their instruments. Thus, Examiner A's familiarity with the electronically enhanced cardio may have contributed to his higher success rate in interpreting that component.

As evidence in Table 2, there was also greater agreement among the three examiners regarding the interpretation of the electrodermal component. The inter-examiner agreement was greatest in the electrodermal, followed by the pneumo and finally the cardio component. As Table 2 shows, the highest degree of inter-examiner agreement achieved on the stimulation tests was 74.2% in the electrodermal component. The second and third highest percentages of agreement between examiners were also in the galvo component. Pneumo and cardio figures were lower.

The question naturally arises as to whether these data are accurate representations of the validity and reliability of polygraph results on relevant tests. Unfortunately, it was not possible to verify all of the relevant charts (for reasons which every professional examiner is quite well aware).

Table 2

Percentage Agreement Among Examiners in Selecting Numbers Circled

Component	Examiners			
	A-B	B-C	A-C	Mean
Pneumo	52.9	52.9	38.2	48.0
Galvo	74.2	65.7	71.4	70.4
Cardio	37.1	42.9	17.1	32.4
Mean	54.7	53.8	42.2	

Eighteen of the 35 Subjects were called truthful and 17 were called deceptive. Within the truthful group, six of the tests were verified (33.3%). Within the deceptive group six were also verified (6 out of 17 equals 35.3%).

Although validity data are not available in complete form on the relevant charts, reliability information is available in the form of inter-examiner agreements between Examiner A and Examiner B. As previously mentioned, the highest inter-examiner agreement of stimulation tests between these two examiners was 74.2%.

The agreement between Examiners A and B for the relevant charts was measured in terms of truthfulness or deception: i.e., no inconclusive diagnoses were made. Inter-examiner agreement for the relevant charts was 100%. All relevant tests which Examiner A called truthful were also called truthful by Examiner B. The same was the case with the deceptive Subject's relevant charts. From this point of view, it appears that autonomic arousal was probably greater during the relevant charts than during the stimulation tests. This is an experimental verification of what one would normally expect to be the case.

Since stimulation tests are more difficult to interpret than relevant charts, the question arises as to what is the optimum strategy for interpreting such tests. In other words, which components or combinations of components should be relied on more closely in interpreting stimulation tests? Table 3 depicts the percentage of successful detection of the three examiners using combinations of various components. As one can see, combining the results of all three components did not improve the ability of the polygraphist to successfully detect which number a particular Subject circled in the majority of cases. In a little over 25% of the cases all three components reacted significantly at the point of deception. However, this is much less than the mean validity of the electrodermal, pneumo, and cardio components taken alone. Summing across examiners and obtaining a mean, it appears that the galvo component (with a mean validity of 54.3%) was the most successful indicator of deception during the stimulation tests.

Table 3

Percentage Successful Detection
Using Various Combinations
of Components

Component (s)	Ex. A	Ex. B	Ex. C	Mean
Pneumo Only	54.3	45.7	40.0	46.7
Galvo Only	60.0	57.1	45.7	54.3
Cardio Only	40.0	31.4	37.1	36.2
Pneumo + Galvo	34.3	38.2	38.2	36.9
Pneumo + Cardio	20.0	26.5	38.2	28.2
Galvo + Cardio	20.0	29.4	38.2	29.2
All 3 Components in Agreement	14.3	26.5	35.3	25.4

N = 35

It is obvious from these disappointingly low validities that blind interpretation of the stimulation test does not provide a very high accuracy rate. In order for such a test to stimulate the Subjects by increasing their belief in the accuracy of the polygraph, the examiner should be able to successfully identify the number which they circled. In order for such a test to work 100% of the time, the examiner himself would either have to know for certain which number the Subject picked or conduct an open test where the Subject and examiner know the result beforehand, and the Subject is shown how he reacted.

The question also arises as to the need for any kind of stimulation test. Some examiners believe that the stimulation test will increase the degree of responsiveness of a Subject on subsequent charts. Recent findings by Robbins and Penley (1974) tend to discount this position. Using 140 verified tests, they found a significant increase in reactivity of truthful Subjects (following a stimulation test) in only 3.5% of the cases. Analyzing 76 verified deceptive tests, they found a 6% decrease in reactivity following the stimulation test. In discussing the utility of stimulation tests, Robbins and Penley claim that:

> Data obtained in this study indicates that non-deceptive subjects respond to stimulation tests as well as or better than deceptive subject. It was noted that the GSR tends to be the most reliable indicator of deception in stimulation tests (p. 205, 1974).

Results of the author's experiment provide support for the contention that electrodermal is the most valid component in a stimulation test. However, the results of this experiment do not provide complete support for the belief that non-deceptive Subjects react as well as deceptive Subjects on stimulation tests. Table 4 shows the successful detection rates of the three examiners for the truthful and lying Subjects.

Table 4

Percentage Successful Detection of Number Selected "Truthful" versus "Deceptive" Groups

Component	Examiner A		Examiner B		Examiner C	
	T	D	T	D	T	D
Pneumo	55.6	52.9	27.8	64.7	33.3	47.1
Galvo	44.4	76.4	44.4	70.6	33.3	58.9
Cardio	27.8	52.9	16.7	47.1	27.8	47.1

N = 35

T: Truthful Group, N = 18

D: Deceptive Group, N = 17

Averaging across all three examiners and all components on Table 4, there was a mean increase in detectability of 22.9% in favor of the deceptive group. From a subjective point of view, the lying Subjects tended to react more strongly to the number which they selected in comparison to other numbers of the test than did the truthful Subjects. The difference in results in this experiment and Robbins and Penley's may be due, in part, to differences in the stimulation tests themselves.

In Robbins and Penley's stimulation tests, the Subjects were asked merely to lie about a number which they had selected. In the author's experiment, there was the addition of the Known Lie Question: "During this polygraph sensitivity test, did you lie to me about the number you really circled?". It is possible that the truthful people were so psychologically attuned to the impending KLQ that their reactivity was decreased to the preceding questions about which number was selected.

Perhaps the psychological set of each truthful Subject was more attuned to the Known Lie Question and the psychological set of each deceptive Subject was more attuned to questioning about the number which he had circled. To test this hypothesis, the author analyzed all 35 charts in order to compare

Table 5

Distribution of Largest Reactions Within Truthful and Deceptive Groups of Subjects

Examiner A

Component	Truthful (N = 18)			Deceptive (N = 17)		
	Known Lie Question	Number Selected	Inconclusive	Known Lie Question	Number Selected	Inconclusive
Pneumo	16.7%	38.9%	44.4%	29.4%	35.3%	64.7%
Galvo	50%	33.3%	16.7%	35.3%	52.9%	11.8%
Cardio	66.7%*	33.3%*	—	29.4%*	70.6%*	—

N = 35, Chi Square = 4.86, $p < .05$

the degree of reaction between the Known Lie Question and the number actually selected by each Subject. The results are depicted in Table 5.

The author measured each reaction in terms of one-quarter-inch chart divisions. For example, cardio reactions were measured from the height of a blood pressure increase vertically down to the baseline. Galvo reactions were also measured from highest to lowest point on the chart. Within the cardio component changes in heart rate, extra systoles, and so forth were not used as criteria. Only increases and decreases in mean blood pressure were used as criteria. Within the pneumo component, the single most marked reaction was counted. The author could not devise any uniform manner in which to physically measure and quantify pneumo responses. Therefore, in determining whether the KLQ or Number Selected response was largest in the pneumo the author was forced to fall back on past training and experience. In those cases in which no decision could be made (i.e., both reactions appeared to be of equal strength) the particular chart was entered in the category "inconclusive."

It should be noted that the highest inconclusive ratings were in the most subjectively interpreted component, the pneumo component. Surprisingly, there were also inconclusives results in the galvo component, though less than in the pneumo. There were no inconclusives in the cardio component.

After each chart was analyzed and evaluated, all of the results were divided between the truthful and deceptive groups of Subjects. Within the pneumo and galvo components there was no statistically significant difference between the KLQ and Number Selected for either the truthful or deceptive groups. However, within the cardio component, the results were significant. Of the truthful Subjects, 66.7% reacted more significantly to the KLQ than to the Number Selected. Within the deceptive group, 70.6% reacted more significantly to the Number Selected.

Thus, within the cardio component alone, truthful Subjects tended to react more strongly to the KLQ and the deceptive Subjects tended to react more strongly to the Number Selected. These findings are statistically significant ($p < .05$). The reasons for this phenomena may only be speculated on at the present time. In general terms, the truthful Subjects appeared to react quite a bit to all of the five numbers in the stimulation test while the deceptive Subjects' records were less labile.

Within the cardio component alone, the author measured all five number responses on each Subject's chart. Within the deceptive group the mean overall reactivity (for all 5 numbers) was 2.4. Within the truthful group, the mean overall reactivity was higher than the mean reactivity for the Number Selected, 3.2 compared to 3.0. That is, there was more lability and randomness of response within the cardio patterns of the truthful Subjects than in the patterns of the deceptive Subjects. The mean KLQ rating for the truthful Subjects was 4.7. This was significantly higher than the mean reactivity rating for Number Selected, 3.0. Figure 1 and Figure 2 illustrate the dramatic nature of this phenomenon. Figure 1 is the stimulation test of a Subject verified as deceptive on the relevant test questions. Notice that this Subject's reaction to KLQ is noticeably less dramatic than his reaction to the Number Selected (11).

Figure 2 is the stimulation test of a Subject verified as truthful on the relevant test. This Subject's reaction to the KLQ is significantly greater than his reaction to the number he actually circled (11).

These data clearly indicate that the author was able to successfully identify about 70% of the truthful and deceptive Subjects by merely analyzing the cardio reactions on their stimulation tests. It is not suggested that a stimulation test could be a substitute for a properly conducted relevant test. Far from it. However, the addition of this stimulus technique may provide additional useful data to the polygraphist.

Another experiment was carried out to determine the effectiveness of this technique in determining veracity. Examiners B and C were again asked to examine all of the charts. This time, they were instructed to categorize each Subject as deceptive or truthful based only on their interpretation of his stimulation test. They were not told the theory of comparing the KLQ to the Number Selected. Examiners B and C used such criteria as movement during the test (as shown by breaks in the cardio tracing), attempts to distort the charts by deep breathing, attempts at controlled breathing, and so forth. After completing this assignment, the two examiners were briefed on the theory of interpretation based on comparing KLQ to Number Selected. They were again asked to read each chart and assign the Subjects to truthful and deceptive categories. The results are depicted in Table 6.

The mean success rate of the three examiners in identifying verified truthful Subjects was 72.2%. The mean success rate in identifying verified deceptive Subjects was 66.7%. All three examiners were able to determine actual truthfulness or deception roughly 70% of the time by merely examining the stimulation test charts of each Subject. It is not proposed that this technique replace the use of relevant tests. While an examiner using this technique alone could successfully determine veracity about seven out of ten times, in three out of ten cases he would make a mistake. However, in those cases in which test results are borderline inconclusive, the use of this technique may provide the polygraphist with additional useful data.

Lie Pattern Recognition Test

While observing a graduate of Dick Arther's polygraph school administer what Arther calls the Polygraph Sensitivity Test (PST) the author was inspired to modify this technique for experimental purposes. Each examiner may wish to use his own manner for introducing a Known Lie into his stimulation testing routine. For want of a better name, the author has dubbed the stimulation test which includes a KLQ in its structure a Lie Pattern Recognition Test (LPRT).

It should be pointed out that Arther's Polygraph Sensitivity Test consists of three questions and is used as a stimulation test prior to administration of the first relevant chart. The LPRT is administered after the first and before the second relevant chart and is a modification of the traditional card or number test. Examiners not familiar with Arther's techniques should not confuse the LPRT with his Polygraph Sensitivty Test. While Arther deserves credit for inspiring some of this research, sole responsibility for the results rests with the author.

The author's own wording of the Lie Pattern Recognition Test is as

Table 6

Percentage Successful Detection of Veracity to Actual Crime

Question Based Only on Stimulation Test Interpretation

	Truthful				Deceptive			
	Ex. A	Ex. B	Ex. C	Mean	Ex. A	Ex. B	Ex. C	Mean
First Attempt:	- - -	38.9	55.6	47.3	- - -	43.8	37.5	40.7
Second Attempt (KLQ Analysis)								
Total 35 Charts:	66.7	72.2	66.7	68.5	70.6	50.0	40.0	53.5
*Validated Tests Only:	66.7	66.7	83.3	72.2	80.0	60.0	60.0	66.7

* Truthful validated, N = 6

Deceptive validated, N = 6

follows:

" _____, do you know anything about fingerprints. Well, I don't either. But I'm sure that you've heard or read that no two people anywhere on earth have the exact same set of fingerprints. Right? (wait for answer) That is, every individual has his own UNIQUE FINGERPRINT PATTERN (louder voice).

"The same thing is true about YOUR (point at Subject) polygraph reactions when you tell a lie, You, _____ _____, have YOUR OWN UNIQUE LIE PATTERN! In just a minute I'm going to give you a special type of test in order to determine what your own individual lie pattern looks like. Its called the Lie Pattern Recognition Test. Once I recognize your lie pattern I can compare it to the other tests (point to first relevant chart) to see if you lied to any of these questions.

"Basically, I'm going to give you a piece of paper with some numbers on it, and ask you to circle ONE NUMBER ONLY. Then, I'm going to give you a test in which you LIE about which number you circled. Here's the piece of paper . . . "

(At this point, have the Subject circle a number on the piece of paper and then cover it with his hand. Of course, the examiner should turn his back or leave the room while the Subject is selecting his number. When the Subject has circled his number, return to the room and say the following:)

"Now, _____, there's something else that I want you to do. At the end of this special test I am going to ask you this question: During this special sensitivity test, did you lie to me about the number you really circled? What would be the truthful answer to that question _____? (Wait for answer "Yes".) Right. But I want you to tell another lie and say NO. In other words, you are going to tell me TWO lies - - one about the number you circled and one about lying to me on the test. Right? Any questions?

Summary and Conclusions

1. There was no statistically significant difference between the validity of the pneumograph and galvanograph components in a stimulation test administered during real-life polygraph situations.

2. There was no statistically significant difference between the validity of the pneumograph and cardiosphygmograph components in a stimulation test administered during real-life polygraph situations.

3. There was a statistically significant difference in the validity of the cardiosphygmograph and galvanograph components for two of the three examiners, in favor of the electrodermal component.

4. There was no statistically significant difference between the validity of the cardiosphygmograph and galvanograph components for the examiner who administered the tests and was familiar with the electronically enhanced cardio (Examiner A).

5. Since the validity results comparing the electronically-enhanced cuff and the electrodermal component were mixed, the need for further research on the electronic cardio is pointed out.

6. Further, since Examiner A's training placed greater stress on the cardio component, and the other examiners' training stressed pneumo, the differences in cardio validities may have been due to the effect of training backgrounds in chart interpretation. Future research of this nature should make certain that examiner backgrounds in chart interpretation are the same.

7. Further research is needed to determine the applicability of the Lie Pattern Recognition Test to the following situations:

   a. high stress situations such as polygraph tests administered in police stations.

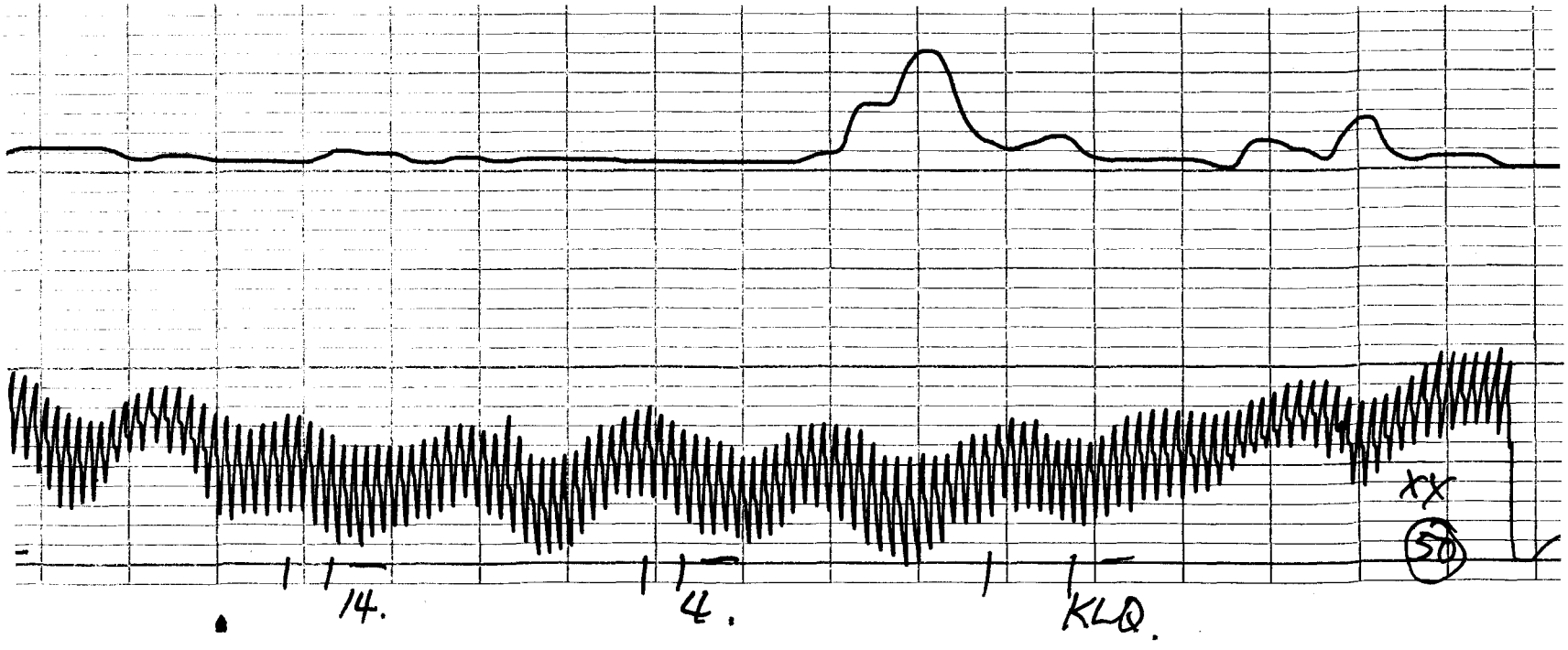
   b. low stress situations such as laboratory studies (e.g. mock crime experiments).

   c. populations in different geographical areas of the country.

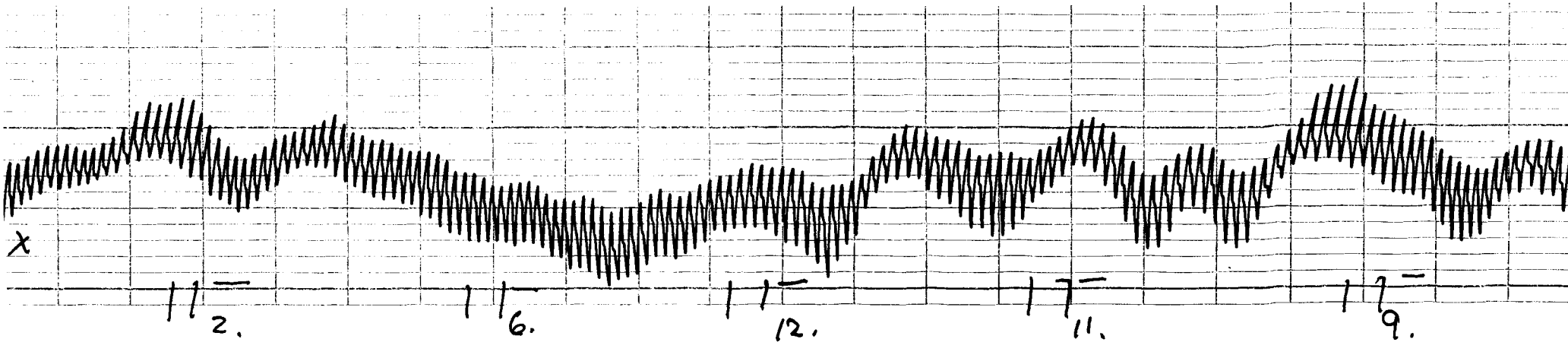
   d. on inconclusive tests in real-life crime situations.

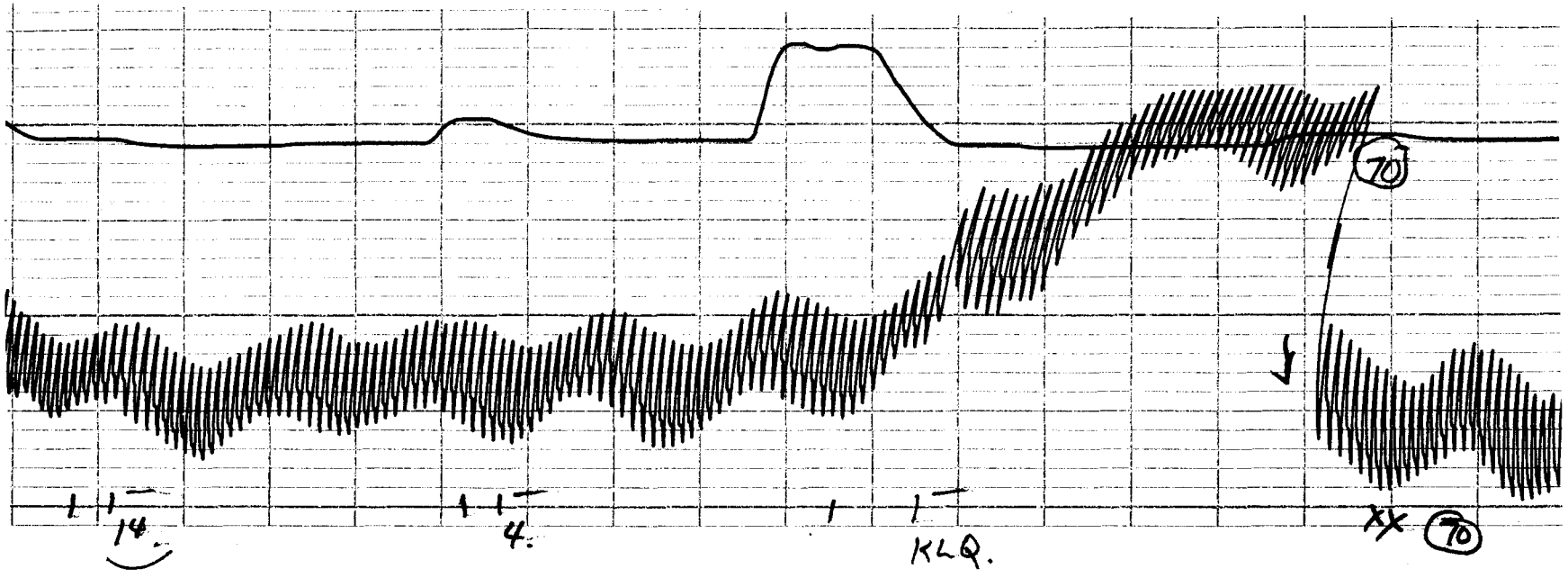
8. This experiment utilized an electronically enhanced cardio and a galvanometer component set on the automatic (a.c.) mode. Future research should test the validity of the galvo component on manual (d.c.) mode and should also examine the pneumatic cardio section.

9. Fellow polygraph examiners are urged to utilize this stimulation technique in their own testing and are cordially invited to inform the author of their results.



NOTE: Number selected by Subject was 11.





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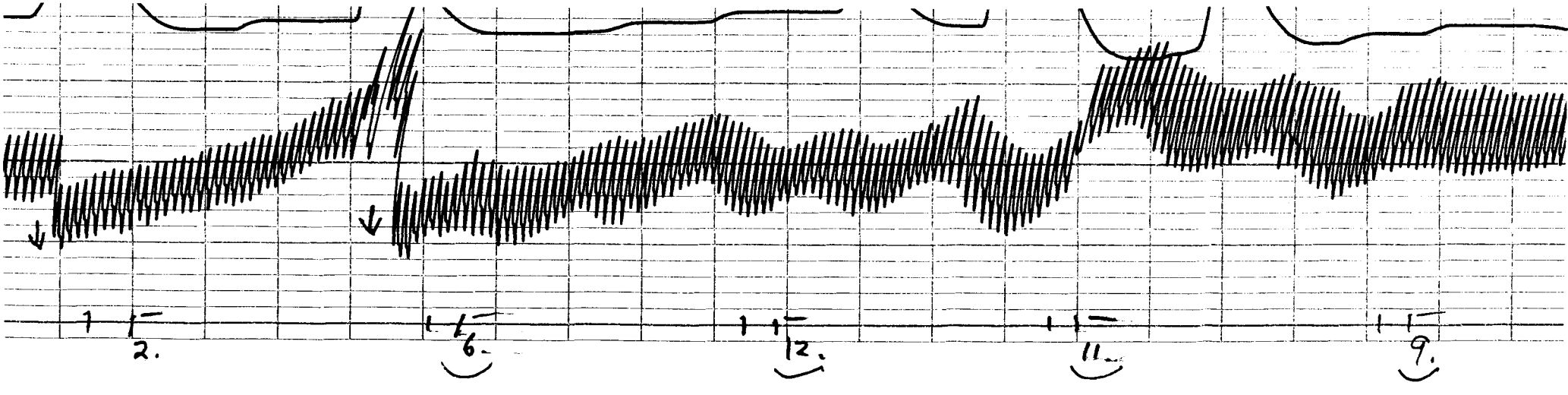

 Figure 2. Stimulation chart of a verified truthful subject.

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PSYCHOPHARMACOLOGIC AGENTS IN POLYGRAPH TESTING

By

Thomas T. Puckett

The use of drugs to influence the mind and alter or modify behavior is certainly not a twentieth century phenomenon. The use of opium and alcohol are recorded throughout man's history. These and other drugs with mind or mood-altering properties have played an important part in mankind's efforts to influence and control the passions of the mind. However, it was not until 1947, with the accidental discovery of the unusual psychotomimetic properties of lysergic acid diethylamide (LSD) and the subsequent demonstration that these effects were similar to those induced by mescaline, that the science of psychopharmacology was truly established. The extent to which this new science has pervaded our modern society has been truly astonishing. It has been estimated that each year in the United States along, more than 200 million prescriptions are filled by pharmacists for stimulants, major and minor tranquilizers, antidepressant drugs, sedatives, and hypnotics - the main types of psychotherapeutic and mood-altering drugs. Surveys have identified the tranquilizer as the most popular of the prescription drugs. A large-scale study published in the Archives of General Psychiatry in June 1973, based on a cross-section of adults between the ages of eighteen and seventy-four, concluded that one in five (13 percent of the men and 29 per cent of the women) had used psychotherapeutic drugs, primarily minor tranquilizers and daytime sedatives. The study included the use of amphetamines, which had not then (1970-71) been ruled a controlled substance. The study also pointed out that if certain other mood-altering drugs were included - notably alcohol and marihuana - men would surpass women as drug users.

Three major classes of psychotherapeutic drugs are commonly prescribed by physicians: antianxiety, antidepressant, and antipsychotic drugs. The antianxiety drugs - the minor tranquilizers - are commonly prescribed for such symptoms as anxiety and nervous tension. Authorities agree that they have a calming effect similar to that of barbiturates. The antidepressant drugs tend to stimulate rather than depress the central nervous system, although some of them may, in addition, have sedative or other effects. The antipsychotic drugs, which includes the major tranquilizers, are used in the treatment and management of schizophrenia and other psychoses.

Many polygraph experts disagree on the potential effect of psychotherapeutic drugs in polygraph testing. In their excellent book, The Polygraph in Court, Ferguson and Miller, hold that the subject's behavior or the type of pattern produced in the first twenty to thirty seconds of chart recordings would alert the experienced polygraphist. They imply that a chronic alcoholic, a heroin addict, a person "stoned" on marihuana, or a

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person taking tranquilizers may be successfully tested. On the other hand, one of the major polygraph schools teaches that a competent examination cannot be conducted when the subject is unduly emotionally upset, intoxicated, under the influence of marihuana, a sedative or stimulant, or is known to be addicted to narcotics. "Any of these conditions work to the detriment of the polygraph technique through modification of the physical response."

These differences of opinion are not irreconciable and may arise from the broad spectrum of psychotherapeutic drugs being encountered and the empirical nature of reports of their effects on polygraph testing. No other biological system matches the human nervous system for complexity in its organization and function. While it is possible to identify systems concerned with sensory functions, motor activity, regulation of autonomic functions, control of respiration, and memory and association, these systems do not operate independently; rather, they interact with one another to a considerable degree. Furthermore, certain anatomical regions of the NCS may participate in several functions. Drug action is seldom, if ever, restricted to one anatomical or functional division of the CNS. It has been established that communication between neurons in the CNS is by chemical influence on the synaptic connections. Although selectivity of drug action may be generally predictable, a drug affects a variety of functions of the CNS in varying degree. The very complexity of the CNS and the problem of undergoing the mechanisms by which specific drugs affect its functions will probably always necessitate a considerable degree of empiricism in judging its influence on the polygraph technique. Most experienced polygraphists have observed the "flat" cardio patterns and the erratic pneumograph recordings which suggest that the subject may be influenced by some drug. In many of these cases, however, we learn that these suspicious charts were not caused by drugs, but by some other and often transitory factor. In the face of these contradictions it appears that each case should be decided on its own merit. Where the presence of tranquilizing or mood-altering drugs is known or admitted, a successful test may be accomplished in some cases. Most pre-test procedures include questioning the subject about any "drugs, pills, or medications" taken within an arbitrary time span prior to the test. Frequently the subject is quite candid in describing what he or she may have taken and the purpose for which it was taken. It is not uncommon for a subject to confirm having taken medication to help calm down before the test. This may have been taken within minutes or hours before the interview. It may be an over-the-counter medication or it may be a controlled substance specifically prescribed for the relief of tension and anxiety. Since these are precisely the feelings that the polygraphist is trying to evaluate, through their physiological concomitants, he must be cautious of any factor which may effect the subject's "normal" response patterns.

Unfortunately, in many cases the subject does not know the generic or trade name of the medication; or the polygraphist is not sufficiently informed as to its potential effect. Since new products are constantly being introduced a current Physicians' Desk Reference (PDR) is an invaluable aid in the product identification, action, and uses of approximately 2500 drug products. It may be helpful to review some of the common psychotherapeutic drugs presently being used and their physiological effects.

Antianxiety Drugs (The Minor Tranquilizers)

The minor tranquilizers, like other sedatives and hypnotics, are used

primarily in the treatment of transient tension states and simple neuroses. They commonly produce a mild sedation in doses unlikely to effect the quality of psychomotor performance. They are sometimes prescribed for the management of allergic conditions, cardiac arrhythmias, and nausea and vomiting associated with motion sickness and pregnancy. The side effects are often unpredictable and in some instances habituation and physical dependence are reported to follow prolonged administration with high doses of certain of these agents.

Generic name	Trade name
Azacyclonol Hydrochloride NF XII	Fenquel Hydrochloride (Merrell)
Buclizine Hydrochloride	Softran (Stuart)
Chlordiazepoxide NF	Libritabs (Roche)
Chlordiazepoxide Hydrochloride USP	Librium (Roche)
Diazepam NF	Valium (Roche)
Emylcamate	Striatran (MSD)
Hydroxyphenamate	Listica (Armour)
Hydroxyzine Hydrochloride NF	Atarax (Roerig)
Hydroxyzine Pamoate NF	Vistaril (Pfizer)
Mebutamate	Capla (Wallace)
Mephenoxalone	Lenetran (Lakeside) Traupoise (Whittier) Trepidone (Lederle)
Meprobamate USP	Equanil (Wyeth) Miltown (Wallace) Viobamate (Rowell)
Methaqualone	Parest (Park-Davis) Quaalude (Rorer) Sopor (Arnar-Stone)
Oxanamide	Quiactin (Merrell)
Oxazepain NF	Serax (Wyeth)
Phenaglycodol	Ultran (Lilly)
Tybamate NF	Solacen (Wallace) Tybatran (Robins)

Antipsychotic Drugs (The Major Tranquilizers)

These drugs act primarily on the lower brain areas to produce emotional calmness and relaxation without significant sedation, hypnosis, motor impairment,

or euphoria. Probably the best known and most widely used is Chlorpromazine, marketed under the trade name Thorazine. According to one estimate it has been prescribed for at least fifty million patients the world over. The patients for whom these antipsychotic drugs are generally prescribed present a wide variety of symptoms. Patients benefited by these drugs may still show signs of mental or emotional distress, but many do not. Dr. Murray E. Jarvik of the University of California at Los Angeles School of Medicine has reported that "Some patients are so benefited by the drugs that psychopathology is not detectable even by highly skilled observers." The antipsychotic drugs are relatively safe although a variety of side effects have been reported. The most frequent include neurological symptoms such as slurred speech, a course tremor, restlessness, and jerkiness of movement, however, these generally improve by reducing the dosage. These drugs do not cause addiction and may be withdrawn should serious side effects develop. The use of alcohol, barbiturates, or antihistamines in combination with any psychotherapeutic drug is contra-indicated. The combination can produce a synergistic effect in which the response can be greater than that produced by either drug alone, "a 1 + 1 = 3 effect."

Generic name	Trade name
Acetophenazine Maleate NF	Tindal (Schering)
Butaperazine Maleate	Repoise Maleate (Robins)
Chlorpromazine Hydrochloride USP	Thorazine Hydrochloride (SK & F)
Chlorprothixene NF	Taractan (Roche)
Fluphenazine Hydrochloride NF	Permitil Hydrochloride (White)
	Prolixin Hydrochloride (Squibb)
Haloperidol NF	Haldol (McNeil)
Lithium Carbonate	Eskalith (SK & F)
Perphenazine NF	Trilafon (Schering)
Piperacetazine	Quide (Dow)
Prochlorperazine	Compazine (SK & F)
Promazine Hydrochloride NF	Sparine Hydrochloride (Wyeth)
Thiopropazate Hydrochloride NF	Dartal (Searle)
Thioridazine Hydrochloride USP	Mellaril (Sandoz)
Thiothixene Hydrochloride NF	Navane (Roerig)
Trifluoperazine Hydrochloride NF	Stelazine Hydrochloride (SK & F)
Trifluprom azine Hydrochloride NF	Vesprin (Squibb)

Antidepressant Drugs

Antidepressant drugs enhance alertness and may result in an increased output of behavior. They have been used in a variety of emotional and psychiatric disorders where the predominant symptom is depression. Some of the more common side effects are dizziness, ataxia, hypotension, accomodation disturbances, sweating, euphoria, confusion, restlessness, and depression. These agents also potentiate the action of alcohol and barbiturates.

Generic name	Trade name
Amitriptyline Hydrochloride USP	Elavil Hydrochloride (MSD)
Deanol Acetamidobenzoate	Deaner (Riker)
Desipramine Hydrochloride NF	Norpramin (Lakeside) Pertofrane (Geigy)
Doxepin Hydrochloride	Sinequan (Pfizer)
Imipramine Hydrochloride USP	Tofranil (Geigy)
Isocarboxazid NF	Marplan (Roche)
Methylphenidate Hydrochloride USP	Ritalin (Ciba)
Nialamide NF	Niamid (Pfizer)
Nortriptyline Hydrochloride NF	Aventyl Hydrochloride (Lilly)
Phenelzine Sulfate USP	Nardil (Warner-Chilcott)
Protriptyline Hydrochloride	Vivactil Hydrochloride (MSD)
Tranylcypromine Sulfate NF	Parnate (SK & F)
Pipradrol Hydrochloride NF XII	Meratran (Merrell)

Sedatives, Hypnotics, and Psychogenic Agents

Because of the frequency with which they are encountered in today's society some consideration must also be given to the potential effects on polygraph testing of other common sedatives, hypnotics, and the psychogenic agents. These drugs have in common the ability to induce a nonselective, reversible depression of the central nervous system. As sedatives, these drugs are often used in the management of neuroses and to allay the anxiety and apprehension which accompanies various diseases, such as hypertension, cardiac failure, and coronary artery disease. As hypnotics, they are frequently used to induce sleep. Both sedative and hypnotic actions usually reside in

the same drug; a small dose may act as a sedative, whereas a large dose may act as a hypnotic. It is generally agreed that prolonged overdosage or abuse of these drugs can result in habituation and physical dependence liability. The barbiturates are among the most common of the hypnotic and sedative drugs. The barbiturates produce all degrees of depression of the CNS, ranging from mild sedation to coma. The degree of depression depends on the particular barbiturate, the dose, the route of administration, the degree of excitability of the CNS at the time of administration, and the extent of tolerance produced by previous experience with the drug. Sedative doses that exert no effects obvious to the untrained observer can cause impairment in judgment, learning, short-term memory, and fine motor movements. Subtle distortions of mood and impairment of judgment may last for many hours and the after effects may appear as overexcitement. They are respiratory depressants, affecting both the drive and the mechanism responsible for the rhythmic character of respiratory movements. In oral sedative or hypnotic doses they do not produce significant cardiovascular effects, except for a slight decrease in blood pressure and heart rate similar to that produced in normal sleep.

The psychogenic drugs, i.e., marihuana, LSD, and mescaline, produce major disturbances of sensory perception or alter the subject's ability to organize his perceptions. Marihuana may produce aggressive tendencies and a stimulation of the senses so that external stimuli are magnified and distorted. Because of differences due to dose, setting, and the experience and expectations of subjects, precise behavioral responses are difficult and often misleading. An average marihuana cigarette delivers the equivalent of 2.5 to 5 mg. of Tetrahydracannabinal (THC). Doses in this range produce changes in mood, memory, motor coordination, cognitive ability, time sense, and self-perception. Usually there is a feeling of well-being and relaxation when the subjects are alone. Larger doses may produce temporal disintegration with a tendency to confuse past, present, and future. The most consistent effects on the cardiovascular system are in increase in heart rate. Increases of 20 to 50 beats per minute are usual but a tachycardia of 140 beats is not uncommon. There are no consistent changes in respiratory rate and contrary to popular opinion pupillary size is not significantly changed. The ingestion of LSD or mescaline may produce hallucinogenic effects with depersonalization and perceptual distortions but, otherwise, the sensorium is normal and insight is retained. The somatic effects of LSD and mescaline are usually sympathomimetic, e.g., pupillary dilation, increased blood pressure, tachycardia, hyperreflexia, nausea, piloerection, and muscular weakness. Recovery is usually complete within eight to twelve hours, however, some residual depression may persist for 12 to 14 hours after taking the drug.

(Barbiturates)

Generic name	Trade name
Amobarbital USP	Amytal (Lilly)
Aprobarbital NF	Alurate (Roche)
Calcium Cyclobarbital NF XII	Phanodorn (Winthrop)
Mephobarbital NF	Prominal (Winthrop) Phemitone (Winthrop) Mebaral (Winthrop)

Generic name	Trade name
Pentobarbital USP	Nembutal
Phenobarbital USP	Phenobaritone (Winthrop) Gardinal (Winthrop) Luminal (Winthrop)
Secobarbital USP	Seconal (Lilly)
Sodium Amobarbital USP	Amytal Sodium (Lilly)
Sodium Butabarbital NF	Butisol (McNeil)
Sodium Pentobarbital USP	Embutal (Abbott) Nembutal (Abbott) Pental (Mallinckrodt) Napental (Massengill)
Sodium Phenobarbital USP	Luminal Sodium (Winthrop)
Sodium Secobarbital USP	Seconal Sodium (Lilly)
	Tuinal (Lilly)
Talbutal	Lotusate (Winthrop)
Vinbarbital NF	Delvinal (MSD)

(Non-Barbiturates)

Chloral Betaine NF	Beta-Chlor (Mead-Johnson)
Chloral Hydrate USP	Kessodrate (McKesson) Noctec (Squibb) Somnos (MSD)
Disulfiram	Alcophobin (Consolidated)
	Antabuse (Ayerst)
Ethchlorvynol NF	Placidyl (Abbott)
Ethinamate NF	Valmid (Lilly)
Glutethimide NF	Doriden (Ciba)
Methyprylon NF	Noludar (Roche)

Summary

Few, if any, well controlled studies have been made of the effect of psychopharmacologic agents in real-life polygraph testing. It is clear, however, that there are many drugs which are specifically designed to effect the nervous system and which would in turn, logically, may be expected to

effect the physiological processes being monitored in the polygraph procedure. Empirical data suggests that when the use of these drugs is known or suspected, a successful test may still be accomplished as long as control/relevant discrimination is discernible. No medication is selective. It cannot effect the response to one question, but not another. The polygraphist should caution each of his clients that testing may be deferred or declined in the presence of unnecessary psychopharmacological agents, and stress the desirability of a drug-free test environment. However, no subject should ever be instructed to disregard his physician's orders or to even temporarily refrain from taking prescribed medication. On those occasions when precautionary instructions about unnecessary drugs are not possible, or they are deliberately violated, each case must be decided on its own merit. The pre-test procedure should invariably include close questioning about any drugs, pills, capsules, injections, or medications taken within the preceding 24 hours. Every effort should be made to identify the drug, dosage, use and purpose. A judgment decision may then be made of its potential effect on the test program. Where the clandestine use of drugs is suspected the polygraphist should be especially alert for any evidence of flattened or inappropriate affect in the subject's pre-test behavior. These suspicions should also be applied to the chart analysis, and re-testing scheduled at a later date if they appear to have been effected to any degree. Where the use of drugs is known or suspected and there is any sign of emotional blunting the test should be diagnosed inconclusive and a re-test suggested. Drug avoidance instructions should be given and the subject advised that each subsequent test will include a specific drug use question.

Conclusion

While the known presence of a psychopharmacologic agent may not preclude a successful polygraph examination, the tests should be approached with a high index of caution. Where the use of drugs is merely suspected the polygraphist may also wish to incorporate a drug use question into the initial test format. In either case one should not hesitate to re-test as a control or conformation measure.

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POLYGRAPH RESULTS ADMITTED BY A NEW YORK COURT

By

Rene Moreno

In the matter of People vs. Lawrence Vernon, New York County, Supreme Court, Criminal Term, Part 105, Justice Levitan.

The facts leading to the arrest and subsequent court findings are as follows:

Arrest circumstances: On November 16, 1974, about 1:30 a.m., a police patrol unit with two officers directed by radio communication to investigate a report of "shots fired - man with a gun in the street", in the vicinity of the 2400 block on Seventh Avenue, New York County. This area is better known as Central "Harlem". As the officers arrived at the scene, they observed several persons entering 2413 Seventh Avenue (a local tavern) at a rather rapid pace. Observing no one in the area with a gun, the officers entered this bar. At a quick glance they noticed almost everyone was by the bar area except one male (Lawrence Vernon) who was the only occupant in a bench booth. Mr. Vernon was sitting on one bench, his body leaning over the table, his arms on table and head to one side on top of his hands, apparently "dozing off." A search of the premises by these police officers resulted in the recovery of a .38 caliber revolver from the space between the wall and the end of the booth that Mr. Vernon was seated at.

At this point, Mr. Vernon was placed under arrest and charged with violation of 265.02 of the Penal Law of New York State (Possession of said recovered revolver).

Mr. Vernon emphatically denied ownership possession or any knowledge as to how this revolver came to be lodged where the police recovered it.

Mr. Vernon was represented by the Criminal Defense Division of the Legal Aid Society of New York City by Ms. Ellen Schall, attorney, at two separate hearings at which both police officers testified. Mr. Vernon was held by the Court and later indicted by the Grand Jury on the officers' testimony. Mr. Vernon continued denying charges and voluntarily agreed to undergo a polygraph examination. On November 14, 1975, Mr. Vernon was examined by Mr. Rene Moreno, Chief Polygraph Examiner, of the Legal Aid Society of New York City. It was Mr. Moreno's opinion that Mr. Vernon was being truthful when he denied possession or ownership of this weapon. At this point, Ms. Schall approached the District Attorney with the test results and the reply was to have the subject tested by a private examiner. Mr. Richard O. Arther was contacted to give this test. About three weeks later Mr. Vernon was examined by Mr. Arther, again the results were truthful, supporting Mr. Moreno's initial findings.

A change of prosecuting attorney brought a refusal to hear the polygraph results.

Mr. Moreno, an APA Member, is a polygraph examiner for the Legal Aid Society of New York City.

It was at this time that attorney for defense, Ms. Schall, submitted an application to the Court to receive in evidence the results of a polygraph examination at a "Clayton hearing."* On the morning of February 3, 1977, Mr. Richard O. Arther testified for the defense and the rest of that day and most of February 4th, Mr. Moreno gave testimony and was subjected to cross-examination by Mr. Paul Morgenstern, Assistant District Attorney. During the course of Mr. Moreno's testimony, reference was made (both by him and Ms. Schall) to the August 30, 1976 Final Report on the Validity and Reliability of Detection of Deception, of Dr. David C. Raskin, Ph.D., Dr. Gordon H. Barland, Ph.D., and Mr. John A. Podlesney, M.A., all from the Department of Psychology, University of Utah, and sponsered by the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Arr. Adur., and U.S. Department of Justice.[1]

The hearing continued for another day or so, and after hearing all the evidence including that from the police, the case against the defendant on the issues before the Court was dismissed.

Opinion of the Court

Supreme Court of the State of New York
County of New York : Part 105

The People of the State of New York

- against -

LAWRENCE VERNON,

Defendant.

Indictment Nos.
5890/74
N 132/75

Appearances:

For the Defendant:
William Gallagher, Esq.
The Legal Aid Society
By: Ellen Schall
of counsel

For the People:
Robert M. Morganthau, Esq.
District Attorney, New York County
By: Paul Morgenstern
Assistant District Attorney

LEVITTAN, J.:

The issue now ruled on is narrow and ad hoc. It is whether on the

[1]Note: Since then, John A. Podlesney has been awarded a Ph.D.

*Despite the findings of this Clayton Hearing, which admitted polygraph evidence, the District Attorney declined to have the defendant polygraphed by his examiner as suggested by the Judge, and persisted in prosecution. At the subsequent trial, which did not include polygraph evidence, the defendant was acquitted.

prospective hearing of the particular motion to be held pursuant to Criminal Procedure Law, section 210.40(1) to dismiss the indictment or one court of it in furtherance of justice, on the ground that dismissal is required as a matter of judicial discretion by the existence of some compelling factor, consideration or circumstances demonstrating that conviction or prosecution of the defendent would constitute or result in injustice, colloquially labelled a "Clayton hearing," People v. Clayton, 41 A D 2d 204, the court is prohibited from granting a preliminary application by the accused that the court receive in evidence on the Clayton hearing testimony of the results of a polygraph examination to which the accused submitted, on his own initiative, and testimony of a second such test by another polygrapher, also procured on the defendant's initiative but on notice to the People and by a polygrapher whose credentials are unassailed by the People (Richard O. Arther, Editor of the Journal of Polygraph Studies).

Equally significant are the issues not adjudged on this ruling: whether the accused is guilty or not; whether such polygraph evidence is admissible on a trial, by jury or court, by consent or over objection, by either party; whether such evidence is admissible in Clayton hearings on offer of the People over the defendant's objection; or whether the Clayton motion to dismiss the indictment or count should be granted or denied.

The defendant justified the reception of the evidence under the second of the discretionary criteria enumerated in Clayton, namely, "available evidence of guilt," where, he argues, the only truly reliable evidence of guilt in the case at bar is circumstantial but not insufficient to sustain conviction, inviting a practical need to prove a negative; this the defendant is helpless in this action to attempt because of a self-inflicted but nonetheless effective incapacity. The negative is that he did not possess a weapon, Penal Law section 265.02, which was found beside him; the circumstantial evidence is that it was there; and his disability to adduce facts affirmatively disproving his possession arises from the fact that he was incapacitated by intoxication.

The court was made aware (by both sides) that the defendant was arrested in a tavern when two police officers entered, responding to a report (later found unsubstantiated) of a shooting. Dining booths, partitioned by plexiglass enclosures, lined a wall, and the defendant was seated in one with his head slumped on the table, cupped in his folded forearms, in an alcoholic stupor. One officer, it appears, believes and will testify that he saw the defendant conspicuously and with deliberation remove a revolver from his pocket, transport it in a sinuous mid-air arc to the right, and carefully drop it between the seat of the booth and the wall. The vitality of this evidence, it is to appear, will be diluted by the failure of the officer's partner, who immediately preceded him, to observe the revolver on the defendant's person or in transit, or to see anything more than a vague movement lacking probative force. But it appears that the revolver was there between booth and wall; and this circumstantial evidence is to be the only substantial proof bearing probative value. Although the offense would otherwise be a misdemeanor, the defendant is a predicate felon.

The defendant's position is that where his disability prevents him from disproving the only substantially probative available evidence of guilt,

which is circumstantial, the opportunity to avoid injustice if he is innocent need not be sacrificed, when, in addition to that situation, some extraneous compelling factor, consideration or circumstance demonstrates that conviction or prosecution would result in injustice, C.P.L. section 210.40(1). Responding to that call, another judge of this court directed a Clayton hearing. The accused now argues that before the court, upon such hearing, determines the question whether the extraneous compelling factor, consideration or circumstance exists, it ought first be persuaded that conviction would result in injustice. As to such injustice, innocence is not extraneous. Conviction of an innocent person is an injustice. Such innocence, argues the defendant, ought to be demonstrable by whatever means, independently of the extraneous factors. Differently stated, the defendant's argument is that there are two elements to the issue as applicable to his fact situation: the compelling factor, consideration or circumstance, to which guilt or innocence is concededly irrelevant, and the injustice resulting from conviction or prosecution. As to the latter element, as distinguished from the former, the issue is whether the only relevant injustice is that demonstrated by the extraneous factors, and whether evidence of innocence is necessarily irrelevant. The defendant argues that where he, in fact, has the means to persuade the court on a Clayton hearing as distinguished from a trial, that injustice would result, the court should not anaesthetize itself to such persuasion, even though it be by means impermissible on a trial—and, perhaps even more so because it is unavailable on the trial. People v. Leone, 25 N Y 2d 511; People v. Forte, 279 N.Y. 204; Pereira v. Pereira, 35 N Y 2d 301. Obviously, he offers the results of the two tests, because they are both persuasive of his innocence.

The People argue that the polygraph evidence should be excluded because the Clayton motion is in the nature of a demurrer, and evidence of innocence is, therefore, irrelevant, and because governing authority in New York State holds that polygraphy is too unreliable for use by either party on a trial, wherefrom it follows that it is too unreliable for any other purpose. The court is aware, also, of argument that since a defendant cannot be compelled to submit to polygraphy, it is unfair to allow him to use it when he would be advantaged.

As to the argument that the motion is in the nature of a demurrer, historical prohibition strictly forbidding the supplementation of demurrer with evidence, has retreated to more flexible procedure. Even in civil practice, the supplementation is explicitly now authorized CPLR 3211(c). Moreover, in the motion before the court, there are two elements, one of which, namely, the compelling factor, consideration or circumstance, is in nature of a demurrer, but the other one of which, namely, injustice resulting from conviction or prosecution, does not rigidly require hypothetical assumption of guilt, nor obligate the court to desensitize itself to the possibility of innocence.

As to the argument that binding New York precedent holds polygraphy unreliable for trial purposes, and, a priori or a fortiori, unreliable for any probative purpose whatsoever, I do not find the Court of Appeals decisions to go so far. While one court of nisi prius jurisdiction coordinate with this court did so remark, it was en passant and en route to a finding of other grounds for discretionary dismissal which did take into account the possibility of innocence; and that court was impressed by the extent of the defendant's

efforts to exonerate himself, including an offer of voluntary polygraphy, People v. Hargrove, 80 Misc 2d 317. However, the majority, concurring and dissenting opinions of the Court of Appeals judges rendered just about a month prior to the hearing of this preliminary application in People v. Belge, 41 N Y 2d 60, illustrate the disparity of purpose between a trial on the merits and a discretionary dismissal in the interest of justice under C.P.L. 210.40(1). Disparity of purpose is not well served by unyielding uniformity of evidentiary limitations. A different destination may commend a different road. Here the issue is whether before the court considers if some compelling factor, consideration or circumstance extraneous to guilt or innocence exists, the court is limited to such factor in finding that there would be an injustice in the event of conviction, upon which to predicate discretionary dismissal.

In exercising the "residium of inherent discretion to act in the unusual case that cries out for fundamental justice beyond the confines of conventional considerations of 'legal or factual merits of the charge or even on the guilt or innocence of the defendant'", People v. Belge, supra at pp. 62-3, and in its grasp for recognition of injustice upon which to predicate discretionary dismissal, the court is liberated from consideration of innocence, but not quarantined from it.

Use of polygraphy is controversial and its arguments widely disseminated in legal literature and professional bibliography. The state of its art is not static. We are not here required to re-evaluate its reliability for any but the narrow ad hoc purpose of the specific application sub judice. For that confined use the court examined such literature; see, e.g., Validity and Reliability of Detection of Deception, Final Report, Contract 75-NI 99-0001, National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice (Department of Psychology, University of Utah, David C. Raskin, Ph.D., Gordon H. Barland, Ph.D., John A. Podlesky, M.A.), August 30, 1976, which indicates that if the recommended conditions are met, an accuracy rate of approximately 90 per cent may be expected. Indeed, amongst the plentiful literature, the court was seriously and favorably impressed by the scholarship of the senior polygraphic expert of the Office of the District Attorney of New York County its own Natale Laurendi, whom it justifiably regards as one of the nation's foremost polygraphers, see e.g., Laurendi, Memory and Lie Detection: Some Unresolved Aspects and Troublesome Cases, Journal of the American Polygraphic Institute(sic). The District Attorney uses Mr. Laurendi for the same function it would deny the court. Indeed, the court has been given to understand that Mr. Laurendi will be at counsel table with the Assistant District Attorney at the Clayton hearing, if polygraph evidence is allowed.

As to the view that since a defendant cannot be compelled to submit to polygraphy, it is unfair to allow him to use it when he is advantaged and to impose it on the People, it has not been an invariable principle of our criminal jurisprudence that every evidentiary right of or restriction upon one party must be matched by a symmetrical right of or restriction upon the other party. On its ascent from the tyrannies of its antecedants, our criminal justice system has ordained disparities in the rights and burdens of accuser and accused. Thus, by way of illustration, while a defendant is entitled to be confronted with the witnesses against him and to cross-examine

them, he is privileged to remain mute himself. Avoidance of injustice enjoys-and must enjoy-higher priority than achievement of criminal justice.

This court in the proceeding before it, where apparently the probative evidence of guilt is essentially circumstantial and the defendant is without means to controvene it, does not find itself restrained from auditing the factual and expert testimony of the polygraphers produced by the People, subject to cross-examination by the People and production of their own experts if they desire.

The preliminary application for reception of such testimony is granted. Such ruling is no indication of the outcome of the motion for dismissal itself.

Dated: February 17, 1977

SHIRLEY E. LEVITTAN
J.
Justice of the Supreme Court of the State of New York, County of New York

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THE VALIDITY AND RELIABILITY OF THE ELECTRODERMAL RESPONSE
AN ANNOTATED BIBLIOGRAPHY

By

Stanley H. Craddock

Barland, G. H. and Raskin, D. C. "An Evaluation of Field Techniques in Detection of Deception", Psychophysiology 12 (3)(1975): 321-330.

The purpose of the study was three fold: (1) To evaluate the accuracy of Major Field Techniques used in the detection of deception which had not been subjected to extensive laboratory verification. (2) To investigate the effects of manipulating one of the numerous aspects of the polygraph examination which may contribute to subject's belief systems regarding the accuracy of the polygraph techniques. (3) To evaluate various methods of chart interpretation. The study was conducted using 72 college volunteers, a Control Question Technique and a Keeler, Model 6317, Field Model Polygraph Instrument which recorded a Pneumograph (Pneumo), Cardiospygmograph (Cardio), and a Galvanograph (GSR). The charts obtained were evaluated using semi-objective field criteria, quantitative methods and blind evaluation of the charts by five additional examiners. The authors state that "Using quantitative scoring, significant discrimination between guilty and innocent was obtained with ... Skin Resistance best." The authors note that the GSR was the only measure which reliably differentiated, overall, between guilt and innocence independent of question type. And that all laboratory studies which have compared the Cardio and the GSR have found the GSR to be the superior index. (The authors discuss various other important aspects of the study which are beyond the scope of this annotation.)

Cutrow, R. J., Parks, A., Lucas, N. and Thomas, K. "The Objective Use of Multiple Physiological Indices in the Detection of Deception", Psychophysiology 9 (1972): 578-588.

The authors report a study in which the physiological indices: Palmar Galvanic Skin Response (P-GSR); Volar Galvanic Skin Response (V-GSR); Finger Pulse Volume (FPV); Heart Rate (HR); Breathing Amplitude (BA); Breathing Cycle Time (BCT); Eye Blink Rate (EBR); Eye Blink Latency (EBL) and Voice Latency (VL) were examined and evaluated for effectiveness in detecting deception with 63 college students. The authors advise that they utilized a forced lie procedure coupled with a Relevant-Irrelevant technique and that all physiological indices were objectively measured, separately and in combination. The results of the study reflect that P-GSR was ranked as the best indicator of deception. It was followed, in order of effectiveness, by FPV and VL which were equal, BA, BCT, EBR, HR, EBL, and V-GSR.

Davidson, P. O. "Validity of the Guilty Knowledge Technique: The Effects of Motivation", Journal of Applied Psychology 52 (1968): 62-65.

Paper presented at the University of Baltimore, May 1, 1976.

The author conducted this study with 45 volunteer college students, and a mock crime paradigm. The purpose of the study was to determine the difference in detection indices between subjects who were highly motivated, and those who were only mildly motivated, to attempt deception. Using only the Galvanic Skin Response (GSR) and a Guilty Knowledge Technique (GKT) the author correctly classified 92% of the Guilty subjects and 100% of the Innocents subjects. The author reports that no significant differences were found due to level of motivation for deception between subjects.

Edel, E. C. and Jacoby, J. "Examiner Reliability in Polygraph Chart Analysis: Identification of Physiological Responses", Journal of Applied Psychology, 60 (1975): 632-634.

The purpose of this study was to assess the reliability of judgements among 10 experienced and practicing polygraph examiners in independently judging the significance, or lack of significance, of Cardiovascular (Cardio), Galvanic (GSR), and Respiratory (Pneumo) responses recorded on polygraph charts during Applicant Screening Interviews at a large U.S. Government Agency. The authors note that the case material utilized in this study was obtained by the random selection of 40 cases, from among several thousand, which were conducted during actual Job Applicant Interviews. Each examiner acted as the polygraph examiner on four cases and as an independent rater on eight different cases which yielded a total of 7,590 judgements for each examiner. The number of agreements/percentages, with respect to the significance of each response was: Cardio 7,264 or 96%, Pneumo - 7,264 or 96% and GSR - 7,098 or 93%. Further analysis of the data disclosed that the subjectively, the GSR was considered the most sensitive response, that it was the most productive response, and that the GSR produced the largest number of responses judged significant by the examiners.

Ellison, D.T. "A Report of Research on Detection of Deception", Indiana University contract #N6 ONR-18011, Office of Naval Research, September, 1952.

A study comparing the effectiveness of the physiological measures: Galvanic Skin Response (GSR); Breathing Amplitude (BA); Breathing Rate (BR); Pulse Volume (PV); Systolic Blood Pressure (SBP); Diastolic Blood Pressure (DBP); Pulse Pressure (PP); Pulse Rate (PR) in discriminating deception. The author states that he achieved a detection index of 80% utilizing the GSR alone and that the GSR was by far the best single index of deception. The author notes that detection of deception was most effective when subject responded truthfully to all questions except the crucial issue and that the accuracy of detection increased with the amount of charts run.

Fisher, L. E. and Kotses, H. "Race Differences and Experimenter Race Effect in Galvanic Skin Response," Psychophysiology 10 (1973): 578-582.

The objective of this study was to determine whether racial differences exist in the several components of the Skin Resistance Response (SRR) and to assess the importance of the role of the Experimenter's race in determining subject's responsivity. The authors report significant Subject-Race effects

but no Experimenter-Race effects were found for basal measures of SRR. Negro subjects exhibited significantly higher basal resistance levels than their White contemporaries. The authors state there were Experimenter-Race effects but no Subject-Race effects apparent in the GSR Magnitude data, and that White subjects, in trials where they were paired with Black experimenters, showed a significantly slower rate of response magnitude decrease. The authors note that a significant decrease in spontaneous activity, over time, was observed for all subjects. The authors attribute the Experimenter-Race effects noted in the GSR magnitude data to the lack of social interaction between Whites and Blacks, and the resultant Novelty Effect which was created when White subjects were paired with Black experimenters.

Guertin, W. H. and Wilhelm, P. L. "A Statistical Analysis of the Electrodermal Response Employed in Lie Detection", The Journal of General Psychology, 51 (1954): 153-160.

The author's report the statistical analysis of the factors underlying the reactions of subjects to the Burn and Wilhelm (B & W) Lie Detector. The B & W Lie Detector is a monograph instrument which displays only the Electrodermal Response (GSR). The authors advise that the test records employed in the study were selected as typical from among cases of verified Guilty or Innocent subjects and that the records utilized in this study were obtained in the course of routine examinations of suspects in criminal investigations. The authors note that the tests reported in their study were conducted utilizing the GSR and a Relevant-Irrelevant test technique. The authors advise that there is usually a substantial difference in the quantity of GSR responses to Relevant questions by deceptive subjects as opposed to non-deceptive subjects. The authors state that through the proper application of the prescribed technique a 94% accuracy rate could be attained in determining guilt by GSR quantity alone.

Johnson, L. C. and Corah, N. L. "Racial Differences in Skin Resistance", Science 139 (1963): 766-767.

The authors present a phenomenon for which no satisfactory explanation could be offered. The authors state that during the course of investigating other problems in St. Louis and San Diego they noted, separately, that there was a significant difference in basal skin resistance levels between White and Black subjects. In St. Louis the subject population consisted of 164 Black and White Children, Male and Female between the ages of 83 and 92 months. In San Diego the subject population consisted of 42 Black and White Adults, Male and Female, between the ages of 18 and 39 years. The authors noted that the mean basal Skin Resistance level, across the entire subject population, was 171.000 Ohms for Whites as compared to 373.000 Ohms for Blacks. The authors state that there were no significant differences between Black and White subjects with respect to other autonomic variables. The authors advise that they were unable to account for the differences in basal skin resistance levels reported herein.

Kugelmass, S. and Lieblich, I. "Effects of Realistic Stress and Procedural Interference in Experimental Lie Detection", Journal of Applied Psychology 50 (1966): 211-216.

The authors report a laboratory study which involved two different groups of Police Department trainees. Two experiments were conducted for the purposes of determining: (1) The effectiveness of the Galvanic Skin Response (GSR) as a discriminating index of deception in a stressful situation with high personal meaning. (2) To investigate the possible interference of the Blood Pressure measurement system with the measurement of the GSR. These studies were also an attempt to resolve the controversy between Field Polygraph examiners and Experimental Scientists concerning the validity of the GSR as an index of deception. The GSR has been found to be the best indicator of deception in laboratory deception detection situations but because of the high stress levels generally encountered in field operations, Field Polygraph examiners have tended to question the value of the GSR as an indice of deception. The authors concluded from the studies that the GSR detection efficiency, under stress, was essentially the same as that found in mild experimental analysis of Heart Rate Changes. The authors note that within a considerable range of stress no necessary decrease in the detection efficiency of the GSR channel need be expected. The authors continue that inflation of the Blood Pressure Cuff to 80 mm hg for a 90 second period did reduce the efficiency of detection of the GSR channel.

Kugelmass, S., Lieblich, I., and Bergman, Z. "The Role of Lying in Psychophysiological Detection," Psychophysiology 3 (1967): 312-315.

The authors conducted this study using 17 college students and 10 army officers, in an effort to determine (1) What role the act of lying plays in the detection of deception. (2) To evaluate that role with respect to answering truthfully. (3) To determine the effectiveness of the Galvanic Skin Response (GSR) under two conditions, that of responding "yes" to all questions and comparing the results with that of saying "no" to all questions. In the YES condition the authors attained an accuracy index of 70% and to the NO condition they attained an accuracy index of 60%. The authors advise that they found no statistically significant difference in detecting deception regardless of whether the subjects lied or responded truthfully to the key item. They suggest that other psychophysiological mechanisms may be responsible for the successful detection of deception.

Kugelmass, S., Lieblich, I., Ben-Ishai, A., Opatowski, A., and Kaplan, M. "Experimental Evaluation of Galvanic Skin Response and Blood Pressure Change Indices During Criminal Interrogation", Journal of Criminal Law, Criminology and Police Science 59 (1968): 632-635.

This study is one of a series of studies conducted by the authors in an effort to resolve the controversy between Field Polygraph Examiners and Laboratory Experimenters concerning the validity of the Galvanic Skin Response (GSR) as an index of deception. The subject population of the present study consisted of 62 criminal suspects who were interrogated in connection with serious criminal offenses during routine police operations. None of the subjects were aware of the experimental aspect of the polygraph examinations

which were administered nor were they aware that the results were to be used for scientific purposes. The present study was conducted utilizing a standard three channel field model Stoeling polygraph instrument. The study was conducted under two conditions (1) GSR with the Blood Pressure Cuff Inflated to 90 mm hg for 90 seconds. (2) GSR with Deflated Blood Pressure Cuff. The results of this study reveal the detection indices of the Cardiospygmograph and the GSR to be significantly above chance and approximately equal under both conditions.

Lykken, D. T. "The GSR in the Detection of Guilt", Journal of Applied Psychology 43 (1959): 385-388.

The author reports a study of 49 male college students who, after random assortment into four groups, were required to enact one, both, or neither of two mock crimes. Utilizing the Guilty Knowledge Technique and the GSR alone, the author reports that 89.8% of the subjects were correctly identified, as to which group they belonged. Further that when considering each crime separately, all innocent subjects were correctly identified and that 44 of 50 examinations of guilty subjects gave guilty classifications. The author reports an overall accuracy index of 93.3%.

Lykken, D. T. "The Validity of the Guilty Knowledge Technique: The Effects of Faking", Journal of Applied Psychology 44 (1960): 258-262.

The purpose of this study was to test the hypothesis that with a more comprehensive examination and a more subtle, although objective scoring system, the Guilty Knowledge Technique could give nearly perfect validity. And that the hypothesis would still be true even if the subject population consisted of sophisticated persons who were motivated and instructed in the means of subverting the test. Using only the Galvanic Skin Response (GSR) as an index of deception, the author tested 20 subjects with the Guilty Knowledge Technique. The author reports that he attained 100% correct classification of these cases without ambiguity, using an objective scoring of the GSR protocol alone.

MacNitt, R.D. "In Defense of the Electrodermal Response and Cardiac Amplitude as Measures of Deception", Journal of Criminal Law and Criminology 33 (1942): 266-275.

MacNitt's paper is essentially a review of research conducted by Frederick H. Lund, Reverend Walter G. Summers and Paul V. Trovillo and their respective comments in support of the electrodermal response and cardiac amplitude as valid indices of deception. MacNitt's paper gives insight into the developmental history of cardiac amplitude and electrodermal responses. With respect to the GSR the author states that in his study of 194 experimental cases, 17 laboratory tests of imaginary crimes and 59 actual embezzlement cases the GSR provided an accuracy index of 99%. In a later study of 36 Card Tests he reported that the GSR provided an accuracy index of 75%.

Robbins, N. E. and Penley, W. J. "Review of the Polygraph Charts of Non Deceptive Subjects," Polygraph 4 (3)(September 1975): 199-206 and

Robbins, N. E. and Penley, W. J. "Polygraph Progress Study: The United States Postal Service," Polygraph 3(3)(September 1974): 247-255.

The authors report the analysis of 140 polygraph examinations of Confirmed, Non-Deceptive, subjects. These subjects were polygraphed between January 1974 and June 1975 in conjunction with criminal investigations which were conducted by the U.S. Postal Inspection Service. Stoelting Polygraph Instruments, recording the Pneumograph (Pneumo), Cardiosphygmograph (Cardio) and the Galvanograph (GSR) were used in conjunction with Control Question Tests(Zone), Reid Mixed Question Tests, and in three examinations, Peak of Tension Tests. The authors report that in 95 (68%) of the 140 tests good or excellent GSR responses were noted, in 40 (28%) of the 140 tests some GSR could no noted and that in on 5 (4%) of the tests was there no GSR noted in any of the test charts. Referring to their prior study of Deceptive subjects, the authors report that the GSR was noted to be the prominent component in 8% of the tests while in the later study it was noted to be the prominent component in 16.4% of the tests. Referring again to their previous study the authors state that the GSR tended to be the most reliable indicator of deception in stimulation tests. In recapping the deception criteria common to both studies the authors note that a sudden increase with the most common GSR reaction. (This writer acknowledges that the authors presented other relevant data in their work, and advises that only the data relating to the GSR was extracted for the purposes of this annotation.)

Rourke, F. L. and Kubis, J. F. "Studies in the Detection of Deception: I. Determination of Guilt or Innocence From Psychogalvanic (PGR) Records of Delinquents and Non-Delinquents), American Psychologist 3 (1948): 255-256.

One of the purposes of this experiment was to determine under what conditions the PGR can be used as a valid index of deception. The other purpose of the experiment was to determine whether delinquents are less subject to detection when lying than non-delinquents. The test population consisted of 80 delinquent and 90 non-delinquent boys. Members of each group were divided into pairs. Each pair was then offered money with instructions that one of them should keep it, to deny possession of the money to the examiner and if successful in their denial, they could keep the money. The subjects were warned that if they were detected they would be penalized. Each subject was questioned while a simultaneous recording of his PGR was made. A minimum of two recordings of the PGR was made for each subject. Judgements of guilt or innocence were made at the end of each session by the examiner. Four months later, the examiner and another judge, who had not taken part in the experiment, made independent analyses of (1) Isolated single records. (2) All the records of each subject. (3) The records of each pair. The authors concluded from the study that when the number of records deemed necessary by an experienced examiner were obtained from each subject, the PGR proved a reliable and highly valid index of deception.

Thackray, R. I. and Orne, M. T. "A Comparison of Physiological Indices in Detection of Deception," Psychophysiology 4 (1968): 329-339.

The authors report a study of the physiological measures: Breathing Amplitude (BA); Breathing Cycle Time (BCT); Galvanic Skin Response (GSR); Skin Potential Response (SPR); Systolic Blood Pressure (SBP); Oxygen Saturation Level (O2S); Finger Volume (FV) and Pulse Volume (PV) and their relative efficiency in discriminating deception in a lie detection experiment. Thirty subjects were tested in a mock crime paradigm. The authors note that only GSR, SPR and FV consistently discriminated better than chance, with GSR and SPR being the superior measures. GSR was slightly superior to SPR.

* * * * * *

BUSINESS: VICTIMS OF CRIME

By

Brian Parker

The impact of criminal activity on business operations takes many varied forms. The spectrum of such activity ranges from simple property loss, as when a shoplifter or employee takes property belonging to the business, to property loss by physical violence, as in robbery or simulated burglary accompanied in some instances by injury or death to customers, clients, and/or personnel. The human agents involved may be unrelated to the business, acting with personnel, or individuals on the staff. Variations on the theme of misappropriated property, property damage, and associated personal injury or death within the business community are extensive. Measuring those impacts is both a much desired goal and a frustrating challenge. Current attempts to measure criminal activity against businesses indicate the importance of such measurements and the difficulties to be overcome in making them reliable.

Burglary and robbery are quick attention-getters. Part of the criminal victimization studies by the Law Enforcement Assistance Administration and the Bureau of the Census deals with these commercial crimes. Recent findings show: Table 1.

TABLE 1: CRIME RATES

Year	Personal Robbery (per 1,000 individuals age 12 and over)	Commercial Robbery (per 1,000 employees)	Commercial Robbery (per 1,000 businesses)	Household Burglary (per 1,000 households)	Commercial Burglary (per 1,000 businesses)
1973	6.7	8.0	38.8	91.5	203.7
1974	7.1	-	38.8	92.6	226.1

These figures suggest that a businessman engaged in a business related purpose on the public streets is only slightly more likely to be robbed than an ordinary citizen. The businessman, on the other hand, is almost six times as likely to suffer a robbery of or within his establishment as he (or any other citizen) is on the public street. For these two crimes, at least, the impact of the criminal activity on the business community is substantial. The 1969 report of the Small Business Administration (SBA) showed that, as far as costs are concerned, for every dollar lost from criminal activity, thirty-one cents was from burglary and three cents was from robbery. That report was the first well-documented study of business losses from crime, and

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The author is a Professor of Criminal Justice and Forensic Science at California State University, Sacramento. Reprinted from Security Management March 1977, pp. 28-30, with permission of the author and the magazine.

it concluded that U.S. business was losing over $3 billion per year from burglary, robbery, shoplifting, vandalism, employee theft, and bad checks.

For every dollar lost from criminal activity, the SBA report found twelve-and-one-half cents accounted for by employee theft. This was acknowledged as understated since the figures "are probably low, given difficulties in detecting employee theft." In a 1976 report for the Business Intelligence Program of the Stanford Research Institute, a different approach was taken to account for employee theft. A determination of the losses from external crimes such as burglary and robbery was related to losses from internal crimes such as employee theft and embezzlement. Bank crime statistics collected by the American Bankers Association and the Federal Bureau of Investigation provided the means for this determination. Similar determinations are possible from data collected by the Interstate Commerce Commission on motor freight loss and by the Civil Aeronautics Board on air freight loss. In the latter two instances, the term "shortage" was considered a loss from "internal" crimes: Table II.

The figure of 4.98 for banking means that about $5 is taken by someone inside for every $1 taken by a bank robber. It translates into better than 80% of total losses committed by personnel. The extensive collection of bank statistics since the 1930's allows a closer look at current changes. In the last ten years the internal loss from fraud and embezzlement has jumped tenfold compared to the external loss from robbery, burglary, larceny and extortion. From 1970 to 1975, the internal loss doubled every two years while the external loss doubled every ten years. For internal losses of $10,000 or more the doubling rate is three years, with internal losses less than $10,000 remaining fairly constant. An interpretation of these current changes is an increasing loss attributed to higher level personnel. The internal loss averages out to about $100 to $200 per individual over all personnel; however, the actual number of personnel involved is small, that is, in 1970 bank defalcations of $10,000 or more numbered 245 cases with a total loss of $32,736,018. The figures of 3.83 for air freight and 7.50 for motor freight are contingent upon accepting shortage as criminal activity. Obviously, shortage as a category of unknown loss includes losses from legitimate causes. Nevertheless, criminal activity is believed to be the cause for a substantial portion of shortage or shrinkage.

Viewed against the documented data from the banking industry and considering the extensive security controls in banking, a five-to-one loss ratio of internal to external criminal activity was taken as a reasonable basis for examining other industrial categories. The ratio was applied to existing data on external crime against business and then averaged out for annual loss per business. Separate estimates by the U.S. Department of Commerce for the years 1971, 1973-75 along with an estimate from Indiana for 1972 were calculated for individual business loss: Table III. As a total, these individual losses to businesses approach an amount just under 10% of profits and incomes and just over 1% of the Gross National Product (GNP). By 1985, the combined losses are estimated to reach $42 billion, representing almost 1.3% of the GNP. Since only the direct losses of money, material, equipment, merchandise, and personnel expense are represented in this combined estimate, an overall loss, both direct and indirect (replacement costs, time costs, liability costs and others), approaches the level of profits and incomes.

In fact, business losses from criminal activity may well match business gains after taxes, dollar for dollar.

TABLE II

INDUSTRIAL LOSSES FROM CRIMINAL ACTIVITIES

(Calendar Years)*

Industry	Fraud Embezzlement ($000)	Shortage ($000)	Robbery Burglary, Larceny, Extortion ($000)	Hijacking Robbery, Theft, Pilfrage ($000)	Ratio of "Internal" Losses to "External" Losses
Banking (1974-75)	368,391		73,949		4.98
Air Freight (1973-74)		9,354		2,441	3.83
Motor Freight		132,974		17,721	7.50

	"Internal" and "External" Combined Losses ($000)	Operating Revenues ($000)	Net Income ($000)	Net Income After Taxes ($000)
Banking	442,340	134,718,281	14,345,875	10,859,095
Air Freight	11,796	2,132,087**	-	-
		23,779,483***	774,233***	449,390***
Motor Freight	150,695	32,551,953	1,521,226	806,813

	Ratio of Operating Revenues to "Internal" and "External" Combined Losses	Ratio of Net Income to "I" and "E" Combined Losses	Ratio of Net Income After Taxes to "I" and "E" Combined Losses
Banking	304.6	32.4	24.5
Air Freight	180.7	-	-
Motor Freight	216.7	10.1	5.4

* Figures rounded to nearest $1,000.
** Cargo
*** Passenger and Cargo

This approach again shows the significance and size of the problem of businesses as victims of crime. The multitude of different data sources used in the determinations makes the actual figures imprecise although the ratios

are thought to be somewhat accurate. Better measurements for crimes such as shoplifting and employee theft are needed. When these measurements are established, a basis will exist for determining the related costs, both direct and indirect, and overtime, determining the effectiveness and efficiency of various countermeasures for reducing crime against businesses. That achievement is likely to come about from techniques similar to those used in estimating populations of wild life substituting "banded" property in place of "banded" fowl.

TABLE III

"INTERNAL" AND "EXTERNAL" COMBINED LOSSES IN GOODS AND SERVICES*

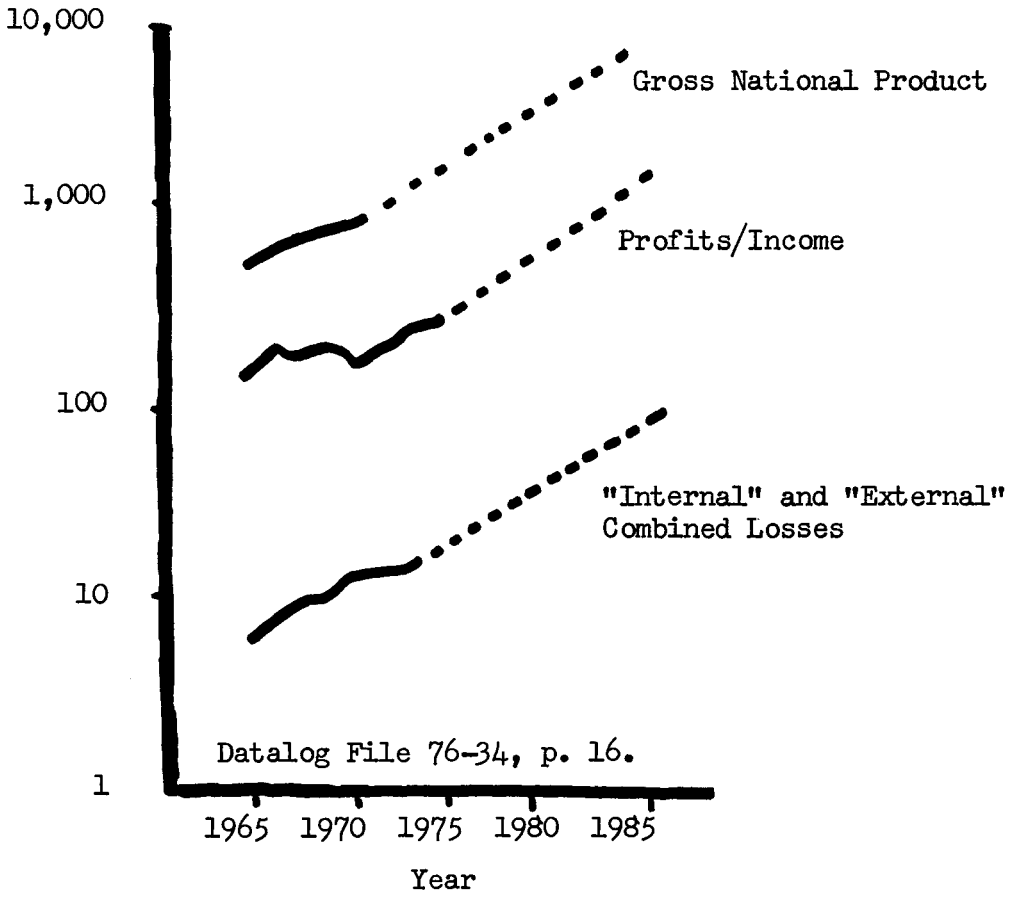
(in Dollars per Business per Year)

Industry	1970 U.S.	1971 U.S.	1972 Indiana	1973 U.S.	1974 U.S.	1975 U.S.	1970 Security Personnel pe 1,000 full time em- ployees**
Manufacturing	1,600 - 7,300	4,100	2,700 - 7,000	6,000	6,600	7,500	5.6
Services	500 - 2,300	900	-	1,300	1,400	1,700	4.9
Finance	530 - 2,400	-	-	-	-	-	7.2
Retail	1,900 - 9,200	2,000	18,500 -25,300	2,600	2,900	3,200	3.8
Wholesale	2,600 -12,800	2,600	1,900 - 5,800	3,500	4,500	5,200	2.3
Transportation	1,900 - 9,300	3,800	6,400 -13,500	4,500	5,500	6,600	4.3
Construction	1,500 - 7,100	-	4,600 -11,300	-	-	-	2.8
Mining	1,200	-	-	-	-	-	5.1
Agriculture	200 - 1,000	-	-	-	-	-	0.8

* Brian Parker, Business Countermeasures to Crime Losses, Stanford Research Institute, Business Intelligence Program, Datalog File 76-34, June 1976, p. 9.

** Ibid., p. 25.

One major difference in approach will be an orientation towards regulating the criminal processes rather than the criminals. An extensive study by Marilyn Walsh on the criminal receipt of stolen property illustrates this orientation. The burglar-fence interaction as an illicit marketing process suggests that tighter regulation is achieved by "an interdiction of the fence." This orientation is being followed by a number of states with good results according to a report of the National Association of Attorneys General. A model act, developed as part of that report, focuses on reducing theft by taking the profit out of the stolen property market. While the attention is on the fencing of burglarized property, the ratio of five to one for internal crime to external crime indicates that fencing of stolen property by business personnel is of similar or greater magnitude. As work continues in understanding the relationship of burglar to fence and how to break it, the techniques developed are going to be useful in dealing with the relationship between the fence and the employee.



BUSINESS GAINS AND LOSSES

PSE MAY NOT BE USED IN OREGON

James A. Redden, the Attorney General of Oregon, was asked by Paul Bettiol, the Executive Director of the Board on Police Standards and Training for an opinion on the legality of the use of Psychological Stress Evaluation devices (PSE) in Oregon because a PSE operator and a Mark II operator had opened businesses in Oregon. The opinion of the Attorney General, dated March 18, 1977, is as follows:

RE: Opinion Request OP-3850.

You have requested an opinion regarding the legality of the use of Psychological Stress Evaluation devices (PSE) in Oregon. More specifically, you framed your request in the form of the following two questions:

(1) Does the Polygraph Examiners Act (ORS 703.010-990) permit the use of Psychological Stress Evaluation devices (PSE) in Oregon?

(2) Does Oregon law permit the recording of an interrogation or conversation within the State of Oregon which is subsequently sent or otherwise transmitted out-of-state for Psychological Stress Evaluation device analysis?

In response to your first question, the Polygraph Examiners Act (ORS 703.010-990) does not permit the use of PSE devices in Oregon.

We understand that the Psychological Stress Evaluation device is an instrument which is designed to detect deception or to verify the truth of statements. The device records the voice of the person being tested and traces on a chart the frequency modulations of that person's voice. In theory, a trained examiner can then analyze the presence or absence of stress in the tested person's answers to the questions. Interpreting the results, the examiner presumably can reach an opinion as to whether or not the tested person is being truthful in his responses to the question.

ORS 703.310 provides, in part:

> "(1) All instruments or mechanical devices that are used to test or question individuals for the purpose of detecting deception or of verifying the truth of statements made by the individauls at least shall record visually, permanently and simultaneously the cardiovascular pattern, the respiratory pattern and the galvanic skin response of each such individual. The patterns of each such logical changes of any such individual also may be recorded.
>
> "(2) No person may use any instrument or mechanical device to test or question individuals for the purpose of detecting deception or verifying the truth of statements made by the individuals that does not comply with the minimum requirements therefor under subsection (1) of this section."

The language of the statute is clear and unambiguous. "All . . . devices shall record . . . the cardiovascular pattern, the respiratory pattern and the galvanic skin response." As used within this statute, the word "shall" is mandatory and not directory in nature. State v. Flynn, 137 Or 8, 299 P 694, Rehearing Denied 300 P 1024 (1931). The statute expressly prohibits the use of any instrument or device" . . . that does not comply with the minimum requirements: set forth in subsection (1).

Since the Psychological Stress Evaluation device does not record the three physiological indicators required by ORS 703.310(1), it may not be used in Oregon.

With regard to the second question which you pose in your letter, we understand that an ordinary transcription of a person's voice is made by a tape recorder. The tape is then sent out of state where it is connected to the PSE device and a trace chart prepared and analyzed. The actual use of the PSE device, in this instance, would be outside the State of Oregon.

Tape recording of a conversation or interrogation is legally permissible in Oregon as long as it is done in conformity with ORS 165.540. This statute provides, in part, as follows:

> "(1) Except as otherwise provided in ORS 133.725 or subsection (2) to (5) of this section, no person shall:
>
> "(a) Obtain or attempt to obtain the whole or any part of a telecommunication or a radio communication to which such person is not a participant, by means of any device, contrivance, machine or apparatus, whether electrical, mechanical, manual or otherwise, unless consent is given by at least one participant.
>
> " . . .
>
> "(c) Obtain or attempt to obtain the whole or any part of a conversation by means of any device, contrivance, machine or apparatus, whether electrical, mechanical, manual or otherwise, if all participants in the conversation are not specifically informed that their conversation is being obtained."

Assuming the recording of the conversation or interrogation is legally obtained under ORS 165.540, one must next address the issue of whether it is legal to send the recording out of state for PSE analysis. The Oregon statutes have no controlling effect on the use of the PSE device in another state. Therefore, it is not illegal under Oregon law to send the tape recordings out of state for PSE analysis. However, an opinion based on the PSE analysis obtained out of state would not be admissible in any court in the state of Oregon.

JAMES A. REDDEN
Attorney General

* * * * * *

CANADIAN SUPREME COURT REJECTS APPEAL ON EXCLUSION OF POLYGRAPH EVIDENCE IN AN UNUSUAL CASE

Abstract

The Canadian Supreme Court denied an appeal in which the defendant claims that the trial court erred in not allowing the polygraph expert, Mr. John E. Reid, to testify to the results of an examination which he said would support his claim that his confession was false. The Supreme Court reasoned that in this case admission of the polygraph results would have violated the hearsay rule, as it is interpreted in Canada. The court took due notice of the opposite view of hearsay expressed by Judge Joiner in U.S. v. Ridling. The court also took note of the admission of polygraph testimony in the recent Canadian case, Regina v. Wong.

Although the appeal was dismissed, it is interesting to observe that the results of the polygraph examination were actually made known to the Jury by the testimony of Dr. Arboleda, a psychiatrist for the defense, who discussed the polygraph results. The results of a sodium amytol test, and other psychological tests administered to the defendant in support of his pschiatric opinion. [Editor.]

In The Supreme Court of Canada

Romeo Phillion

V.

Her Majesty the Queen

Coram: The Chief Justice and Martland, Judes Ritchie, Spence, Pigeon, Dickson, Beetz, and de Grandpré JJ.

RITCHIE J.:

This is an appeal brought with leave of this Court from a judgment of the Court of Appeal for Ontario dismissing an appeal from the verdict of guilty of non-capital murder entered against the appellant after a trial before Madame Justice Van Camp sitting with a jury. Leave was granted on the following question of law:

> Did the Ontario Court of Appeal err in holding that the trial judge did not err in refusing, especially in the particular circumstances, to permit the polygraph expert to testify about the operation of the polygraph machine and to give his opinion as to the accused's veracity when he confessed to the murder.

The circumstances giving rise to this prosecution are somewhat singular in that the alleged murder was committed on the 9th of August 1967, whereas the trial was not held until November 1972.

The murdered man, Leopold Roy, was the superintendent of an apartment house at 275 Friel Street in Ottawa and was also employed by the City of Ottawa as a fireman. In the afternoon of the 9th of August, 1967, his wife, who had been engaged in housework in the apartment house, observed a suspicious man lurking in corridor and, as she thought, attempting to enter one of the apartments. She noticed that the man was holding an alligator wallet which raised her suspicion and she called out to her husband who was working in the basement. The prowler appeared to be nervous and didn't move, but when she called out to her husband a second time and could hear him coming upstairs, the man ran through the hallway to the back stairs, jumped over the railings to the landing and Mr. Roy caught him and shoved him back into a corner and called out to his wife "You know what to do". Mrs. Roy then went down to her apartment and left her husband holding the man on the stairway. The next thing she heard was a call from her husband saying: "Don't call the police, call a doctor".

The next person to see Roy was Mr. Herbert, the oil burner serviceman who had come to clean the furnace and who had been talking to Roy when his wife first called out to him. After finishing his work this man found Roy lying on the basement stairs covered with blood and with a knife wound immediately below his heart. Herbert went outside to his truck and radioed his company to send the police but Roy was dead by the time the first policeman arrived.

Shortly after these events, Mrs. Roy, who had seen the prowler's face three times, made several attempts to identify him in "line-ups" where the appellant was present and in photographs, but she was unable to make any positive identification and the appellant was released.

It was not until January, 1972, that the appellant told his friend, Neil Miller, that he had stabbed the superintendent in the apartment house on Friel Street in 1967 with a knife which he had taken from the kitchen of an apartment that he had broken into. Neil Miller took this story to the police and on January 11th and 12th, 1972, the appellant was interviewed by the police, and after having been duly cautioned, made a statement of his actions on the afternoon of the 9th of August, 1967. The learned trial judge found this confession to be admissible after having conducted a voire dire concerning the circumstances under which it was made, and it will be seen that the appellant's actions on the afternoon in question as recounted to Miller and to the police, bear striking resemblance to the actions of the "prowler" in the apartment building as described by Mrs. Roy, as is illustrated by the following brief excerpt from the appellant's confession to the police:

> . . . then I drove around, looking for an apartment that I could go into, to steal. I got into one apartment on Friel Street, looked around inside, in which I did not find any money. I had taken a knife from the kitchen of that apartment. Going down the back stairs I notice a man and a woman. The man started coming down at me, I stabbed him. From there I ran to my car . . .

In any event, there is no denial of the fact that the appellant's statement related to the murder on 275 Friel Street on the 9th of August 1967. The appellant elected to give no evidence, but in lieu thereof expert witnesses

were called for the defence, including a psychiatrist and a psychologist whose evidence was directed to showing that the appellant had a deranged personality and particularly that he would have a tendency to invent and attest to circumstances which never happened in order to satisfy his desire to attract attention to himself. The witnesses, together with John Edward Reid, an experienced polygraph examiner, were obviously called to support the contention that the appellant had been lying when he confessed to the police; this was the opinion expressed by the latter at trial on the basis of his interpretation of readings shown on the polygraph machine when he administered a polygraph test to the appellant and it is this evidence which was excluded by the learned trial judge.

The evidence of Dr. Girodo, a clinical psychologist from the Faculty of Psychology at the University of Ottawa, was to the effect that he had subjected the appellant to a number of standard tests, no one of which is ever 100% reliable, and as a result of these tests he had formed the opinion that the appellant was psychologically unstable and had a tendency to present himself in the worst possible light.

Dr. Arboleda, who is a specialist in psychiatry, based his opinion on two psychiatric interviews which he had personally had with the appellant, in one of which the appellant had been given some sodium amytol, sometimes loosely referred to as a truth drug. The witness also considered the psychological tests administered by Dr. Girodo and the results of the polygraph test. Dr. Arboleda testified that the results of Mr. Reid's test with Mr. Phillion indicated that he had lied to the police when he confessed to the offence in question and he expressed his opinion in the following terms:

> From the results of the two tests given him, I would say they support to the idea that he was actually lying to the police. That is all I can.

The evidence of both these medical witnesses was admitted by the learned trial judge in reliance on such cases as The Queen v. Lupien, 1970 S.C.R. 264, Wilband v. The Queen, 1967 S.C.R. 14, Toohey v. Metropolitan Police Commissiner, 1965 A.C. 595 and Reg. v. Rosik, 2 C.C.C. 2d 351. No appeal was asserted from this ruling and any issue which it may raise form no part of the question upon which leave to appeal was granted in the present case.

It is well settled that second hand evidence is not admissible when the object of calling it is to establish its truth. This was clearly stated in the Privy Council in the case of Subramaniam v. Public Prosecutor, 1956 1 W.L.R. 965 where it was said, at p. 970:

> Evidence of a statement made to a witness by a person who is not himself called as a witness may or may not be hearsay. It is hearsay and inadmissible when the object of the evidence is to establish the truth of what is contained in the statement. It is not hearsay and is admissible when it is proposed to establish by the evidence, not the truth of the statement, but the fact that it was made.

Statements made to psychiatrists and psychologists are sometimes

admitted in criminal cases and when this is so it is because they have qualified as experts in diagnosing the behavioral symptoms of individuals and have formed an opinion which the trial judge deems to be relevant to the case, but the statements on which such opinions are based are not admissible in proof of their truth but rather as indicating the basis upon which the medical opinion was formed in accordance with recognized professional procedures.

Entirely different considerations, however, apply to the evidence of Mr. Reid who was neither a psychiatrist nor a psychologist and does not appear to have had any other medical training. The evidence indicates that he only saw the accused on the occasion when he administered the polygraph test which was the day before he gave his evidence. This means that the appellant was subjected to the test on the 3rd of November 1972, during the closing days of his trial for murder which was opened on the 16th of October.

The polygraph evidence which was sought to be introduced is accurately recorded in the judgment of the Court of Appeal as follows:

> Q. Mr. Reid, on the basis of your experience and the recordings that you made of Mr. Phillion, during the course of the polygraph test, did you form an opinion as to whether he was telling the truth when he answered no to the relevant question?
>
> A. I am of the opinion that he is telling the truth when he answered no to the relevant question.

Among the relevant questions were the following:

'Did you stab Leopold Roy on August 9th, 1967?

Did you kill Leopold Roy on August 9th, 1967?'

In my view, Mr. Reid had neither the qualifications nor the opportunity to form a mature opinion of the propensity of the man he was subjected to the test either as to truthfulness or otherwise. His opinion, however, was not based on the statements made by the appellant, but on his own expertise in interpreting the recordings of the machine. If the statements had been made to Mr. Reid alone, there is in my opinion no doubt that they would have been inadmissible as self-serving, second hand evidence tendered in proof of its truth on behalf of an accused who did not see fit to testify and I am not prepared to hold on the evidence of this case that the presence of the polygraph machine or the expertise of its operator made them admissible. The admission of such evidence would mean that any accused person who had made a confession could elect not to deny its truth under oath and substitute for his own evidence the results produced by a mechanical device in the hands of a skilled operator relying exclusively on its efficacy as a test of veracity.

The elementary right of an accused not to give evidence is in no way at issue here, but that right having been exercised, it appears to me to run contrary to the basic rules of evidence to permit the substitution of the opinion of a polygraph technician for the evidence which could have been given by the appellant himself. I do not consider that this view conflicts in any way with that expressed by Gale, C.J.O. in Regina v. Dietrich, 1977 1 C.C.C. 2d 49 at p. 65, but if I thought otherwise I would have to say, with great

respect, that that case, was to that extent, wrongly decided.

For these reasons alone I am satisfied that the learned trial judge was correct in excluding the results of the polygraph test.

I should not leave this matter, however, without indicating that I have had an opportunity to read a great many American authorities on the subject of the reliability and hence the admissibility of such answers given in the course of polygraph examinations. I find that in the vast majority of cases the American courts have excluded this type of evidence except in cases where both parties to the proceeding have stipulated that they are prepared to have the answers accepted.

There can be no doubt that improved polygraph techniques have been developed over the years, but this does not appear to have altered the attitude of the American courts. I cite in this regard the case of State v. Bowen, 449 P 2d. 603 (1969), a decision of the Court of Appeals of Arizona where the then current position with respect to polygraph evidence was characterized at p. 606 in the following terms:

> There is no question but that evidence of, or reference to, a polygraph test is inadmissible for any reason. All authorities are in accord. Schmerber v. California, 384 U.S. 757, 86 S.Ct. 1826, 16 L.Ed 2d 908 (1966); State v. McGee, 91 Ariz. 101, 370 P. 2d 261 (1962).

The present attitude of the American courts towards the acceptance of polygraph evidence is discussed in the following passage from the evidence of Mr.Reid:

> Well, it has been admitted a number of times over the objection of opposing counsel, but not a great number of times. Now, I have had the experience of possibly three different cases where it was admitted over the objection of opposing counsel, but most times it is done under stipulation by both sides.

And he later said:

> Well, it appears that the attitude of the Courts of our country is greatly changing. True, up until the present time it was hardly even considered by stipulation. I don't know what number of cases it is accepted at the present time under stipulation, it might be five or six.

These are the opinions expressed by a polygraph examiner from the United States with thirty-two and one half years' experience who was presented to the court as a definitive authority on the operation of the polygraph machine and its reliability and acceptability.

In the comparatively recent care of U.S. v. Ridling, 350 Fed. Supp. 615, Mr. Justice Joiner, District Judge of the U.S. District Court of Michigan, wrote a lengthy opinion in which he finally concluded that polygraph evidence should be admitted as an exception to the hearsay rule. In the course of rendering these reasons, the learned judge said at p. 618:

> Judicial opinions pertaining to the admission of polygraph testimony seem all to point toward exclusion.

and he proceeds to cite seventeen cases in support of this statement. Finally, Mr. Justice Joiner deals with the hearsay rule in connection with this kind of evidence and says of the polygraph expert there called:

> In another sense, he must report to the jury the statements made by the subject so as to make his opinion relevant to the issue in the case, and as a result of his expertise and the tests conducted he must indicate his opinion of the truthfulness of the statement. In this sense the statements supported by the opinion of the expert appear to be hearsay but since the very purpose of the test is to determine truthfulness, the evidence should be admitted as an exception to the hearsay rule because of its high degree of trustworthiness.

No such exception to the hearsay rule exists in this country and notwithstanding the fact that I have had the benefit of reading the exhaustive reasons for judgment delivered by Mr. Justice Meredith in the case of Reg. v. Wong, 1977 1 W.W.R. at page 1, I am nevertheless unable to agree with the view that polygraph evidence should be admitted. As I am satisfied in the present case that the learned trial judge was not in error in refusing to allow the polygraph expert to give his opinion as to the accused's veracity, it follows that his evidence about the operation of the machine is irrelevant, and was also properly excluded.

For all these reasons I would dismiss this appeal.

In The Supreme Court of Canada

Romeo Phillion

vs.

Her Majesty The Queen

Coram: The Chief Justice and Martland, Judson, Ritchie, Spence, Pigeon, Dickson, Beetz and de Grandpré JJ.

SPENCE J.:

I have had the opportunity of perusing with considerable care the reasons for judgment which are being delivered by Mr. Justice Ritchie. Since those reasons contain a detailed analysis of the facts and issues in the present appeal, I need not repeat them.

The polygraph expert John Reid was presented to give evidence on behalf of the accused, who had not testified in his own defence, and to give his opinion that this accused, when examined by him during the course of the trial and with the aid of the polygraph equipment, was telling the truth when he stated that he had lied earlier in his statement to the police. I am

ready to agree that such evidence under those circumstances was not admissible. I reserve my view as to whether, under other circumstances, evidence given by an operator of a polygraph apparatus could ever be admissible. There may be circumstances where such evidence should be admitted but certainly the evidence to be given by Mr. Reid in this appeal was hearsay evidence of the worst self-serving type.

Were I in any doubt as to the correctness of the view which I have expressed, I would certainly be of the opinion that it would be proper to apply the provisions of s. 613(1) (b) (iii) of the Criminal Code.

The defence was permitted to adduce the evidence of Dr. Julio Arboleda, a duly qualified medical practitioner specializing in the field of psychiatry. After a lengthy voir dire, Dr. Arboleda was permitted to give his opinion based on two psychiatric interviews he had with the appellant, on certain psychological tests which had been given to the appellant by a Dr. Michael Girodo who also testified for the appellant, and upon the results of the polygraph test taken by John Reid. Therefore, the result attributed by the expert defence witness to the polygraph tests was already before the jury and, in my view, before that jury in a much more persuasive fashion than it could ever have been put by a non-medical witness. It is very evident that the jury refused to accept the opinions expressed by Dr. Arboleda and Dr. Girodo and one could not therefore have expected them to have had any regard for the polygraph results which were only one of the materials upon which the expert witness Dr. Arboleda based his opinion.

For these reasons, I would dismiss the appeal.

* * * * * *

MARYLAND COURT OF APPEALS SUSTAINS CONFESSION AFTER POLYGRAPH

Abstract

The Maryland Court of Special Appeals sustained the confession received after a polygraph examination. The subject was given a Miranda warning, but his counsel was not present at the time of the examination, despite the attorney's earlier advice to his client that he should be present. The Court noted that the right to have counsel present during an interrogation is a right of the defendant and not a right of defendant's counsel, despite Massiah v. U.S. Although notice was taken of the recent Johnson v. State, the Court did not discuss the element of complete disclosure of the polygraph proceedings as required by Johnson, and seemed to undermine that decision by quoting from a different aspect of the case, dealing with the ability of the defendant to assert his innocence when confronted with results of a polygraph test.[1] [Editor abstract.]

Court of Special Appeals of Maryland

No. 740, September Term, 1976 - Filed March 16, 1977

DONALD RAY WATSON

vs.

STATE OF MARYLAND

Appeal from the Circuit Court for Baltimore County, Edward A. DeWaters, Jr., Judge.

Argued by Gerald A. Kroop, Assigned Public Defender, for appellant.

Argued by Gilbert H. Robinette, Assistant Attorney General, with whom were Francis B. Burch, Attorney General; Sandra A. O'Connor, State's Attorney for Baltimore County and Thomas Morrow, Assistant State's Attorney for Baltimore County on the brief, for appellee.

Argued before POWERS, MOORE, and LISS, JJ.

Effect of Polygraph Examination on Appellant's Subsequent Confession Given After Miranda Warnings; Effect of Absence of Counsel At Time of Appellant's Voluntary Confession.

Judgments affirmed.

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[1] For a commentary on Johnson v. State and a copy of the complete text see Ansley, Norman. "Van Gregory Johnson v. Maryland, A Paradoxical Precedent," Polygraph Review 3 (1)(April 1977): 1-6.

LISS, J.—

The appellant, Donald Ray Watson, was convicted at a court trial by Judge Edward A. DeWaters of robbery with a deadly weapon and use of a handgun. It is from those judgments that this appeal is filed.

The case arises out of an armed robbery which occurred in Baltimore County on the afternoon of January 5, 1976. Ms. Gertrude Libowitz, office manager for Bond Distributing Company, had just returned from the bank to the parking lot adjoining her employer's building when she was accosted by two men - one a tall man armed with a gun, the other, shorter in height—who ordered her to get back into the car. She refused and the taller man pushed her against the car knocking off her glasses. He then reached into the car and grabbed her purse and two empty bank bags which she had picked up at the bank. The two robbers then got into a car which was some 40 or 50 feet away from Ms. Libowitz's car, and a third man drove them away from the scene. Ms. Libowitz had the presence of mind to note the license tag of the getaway vehicle and the police were called. She gave the investigating officer a description of the persons involved in the incident and the information concerning the car.

Later that same day Donald Ray Watson, the appellant, was arrested. The appellant did not raise the issue of probable cause for the arrest at the trial below nor was the issue raised in this appeal.

Detective John W. Hopkins of the Baltimore County Police Department gave Watson his Miranda warnings, advised him of the reason for his arrest and ultimately transported him to police headquarters. At police headquarters Detective Hopkins called the appellant's mother, explained why her son was being held and that he would be charged. Mrs. Watson asked whether her son needed a lawyer and the detective replied in the affirmative. Hopkins then told Watson that he was hunting for three suspects and that if Watson told the truth, he, Hopkins would advise the state's attorney of Watson's cooperation. Watson then gave a statement to Hopkins in which he said that his mother had left for work at 6 a.m. and had left the car because she could not start it. At about 12:15 p.m. he persuaded a friend to give the car a "hot shot" and the appellant left the keys in the car, the motor running, and when he returned the car had been moved. He walked around the neighborhood and located the car in an apartment house parking lot three or four blocks away from his home. He was just driving the car off the lot when the police stopped him. Over objection the appellant's motion to suppress this statement was denied. No issue as to the admissibility of this statement was raised on this appeal.

In the interim, the appellant employed counsel who represented the appellant in the trial below and on appeal. A second preliminary hearing was scheduled, and at this hearing Detective Hopkins suggested to defense counsel the he was not sure of the appellant's involvement in the robbery and that it might be useful if the appellant would submit to a polygraph test.

Defense counsel discussed the suggestion with the accused and he agreed to take the test. Counsel advised his client not to give any statements beyond that required by the polygraph examination and instructed Detective Hopkins not to question his client after the completion of the test. The detective agreed to call defense counsel after the examination and let him know the result of the test.

A few days later the appellant took the test and was advised by the examiner that he had failed it.[2] The appellant then advised the examiner that he wanted to talk to Detective Hopkins. Hopkins attempted to reach appellant's defense counsel by telephone on two occasions, but he was unable to do so. He told this to the appellant and then stated, "I understand you have something to tell me, but, first of all, I'm going to read you your rights again." Hopkins testified that he advised the appellant of each of his rights and that appellant stated he understood them. The appellant said that he wanted to talk to Hopkins because he "had something to get off his chest."

The appellant took the stand and testified that he did not request to see Hopkins and that he gave Hopkins no statement at all. The trial court ruled that the appellant's oral statement allegedly made after the polygraph examination was admissible into evidence. In that statement appellant allegedly admitted to being with the two men who robbed Ms. Libowitz, but he denied knowing that they intended to commit the robbery.

The sole question raised by the appellant on this appeal is whether, under all the circumstances, the inculpatory statement made by the accused was the product of a free and unconstrained will which had not been overborne or compelled. We believe the statement was voluntarily made after the accused had been fully advised of his rights and we shall affirm.

The appellant suggests five grounds as the basis for his contention that the statement given to Officer Hopkins was not a free and voluntary statement made by the accused after he had been advised of his rights under Miranda vs. Arizona, 384 U.S. 436, 86 S.Ct. 1602, 16 L.Ed.2d 694 (1966), and had knowingly waived those rights. The first and third grounds will be considered together because they essentially allege the same basis for error on the part of the trial court. The appellant suggests that the statement was involuntarily made by him as a result of the coercive atmosphere generated by the lie detector examination. Johnson vs. State, 31 Md. App. 303, 305, 355 A.2d 504, 506 (1976), is dispositive of this contention. In that case Judge Lowe for this Court in discussing a similar factual situation said:

> "It is apparent that the use of the deception testing device was intended to produce a psychological effect upon the accused in order to obtain the relevant facts if known by appellant. Appellant's expressed reason for confessing does not gainsay the test's effectiveness. It is clear, however, that the use of such a procedurefor that purpose would not as a matter of law require the exclusion of a confession so obtained . . . " (Citations omitted)

We are not impressed with his contention that the polygraph examination undermined his belief in his own innocence and his ability to assert that innocence. The appellant admits that he voluntarily agreed to take the lie detector test. He argues, however, that once he was advised that he had

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[2] At argument counsel agreed that appellant did in fact fail the polygraph test.

failed the polygraph test the adverse psychological effect made it impossible for him to exercise his free and unconstrained will, and that any waiver of his rights could not have been voluntarily and intelligently made. We point out, however, that even under the burden of his alleged hopeless position, occasioned by his failing of the test, the statement given to Officer Hopkins was at least partially exculpatory. While the accused admitted being with the perpetrators of the robbery, he maintained that he had no knowledge that a robbery was going to be committed. Such an ingenious statement is hardly to be characterized as that of an individual who does not grasp the meaning of his right to counsel and is therefore incapable of voluntarily waiving that right. In any case, the trial court was charged with the responsibility of considering the evidence and determining whether the State had met its burden of proof in establishing beyond a reasonable doubt that the statement was freely and voluntarily made, and that the accused's Miranda rights were intellignently waived. It evidenced its conclusion as to voluntariness and waiver when it entered the guilty verdicts.

The appellant next argues that the statement was improperly admitted into evidence because it was made in violation of his right to counsel. He testified that he had asked for his attorney before giving the final statement to the police. Officer Hopkins stated that before he took the statement from the appellant he again read to him his Miranda rights which included the right to counsel and the right not to answer any questions. The officer denied that Watson had asked for his lawyer and stated that after the Miranda rights had been reread to the appellant, "[H]e understood, and he wanted to talk with me, he wanted to get something off his chest." This conflict in the testimony raised an issue of fact to be determined by the trier of the facts who is the judge of the credibility of witnesses. Williams vs. State, 22 Md. App. 714, 325 A.2d 427 (1974); Szewczyk vs. State, 7 Md. App. 597, 256 A.2d. 713 (1969); Watson vs. State, 6 Md. App. 134, 250 A2d 311 (1969). The trial court believed the officer, and upon our own independent review we agree.

The appellant's final arguments may be combined into the contention that once an accused is represented by counsel he cannot be questioned out of counsel's presence absent a waiver by the accused in the presence of counsel. Appellant suggests that ethically and morally it was improper for the officer to take a statement from him when he knew that counsel had cautioned appellant not to do anything other than answer the questions of the polygraph examiner. Appellant is on untenable ground legally as well as morally and ethically.

The right to have counsel present during an interrogation is a right of the defendant and not a right of defendant's counsel. If a waiver occurs, it is the accused's waiver of his right to counsel which must be determined. We believe the trial court was correct when it stated:

> "Now simply because one has an attorney, that does not mean that he cannot ignore the advice of counsel. It does not mean that he cannot call the police and ask to give a statement, and the testimony of Detective Hopkins is that this is what occurred, that he did, again, advise him of his rights, and that a statement was given, and I accept the testimony of Detective Hopkins . . . "

Sabatina vs. State, 14 Md. App. 431, 287 A.2d 511 (1972), cert. denied, 265 Md. 742 (1972); Lamb vs. Commonwealth, 227 S.E.2d 737 (Va. 1976).

In the recent case of State vs. Blizzard, 278 Md. 556, 366 A.2d 1016 (1976), rev'g, Blizzard vs. State, 30 Md. App. 156, 351 A.2d 443 (1976), Judge Smith speaking for the majority of the Court discussed the conflict which has arisen in the interpretation of the holdings of the Supreme Court in Massiah vs. United States, 377 U.S. 201, 84 S.Ct. 1199, 12 L.Ed.2d 246 (1964), and McLeod vs. Ohio, 381 U.S. 356, 85 S.Ct. 1556, 13 L.Ed.2d 682 (1965). He pointed out that the minority view holds that:

> "[O]nce a criminal defendant has either retained an attorney or had an attorney appointed for him by the court, any statement obtained by interview from such defendant may not be offered into evidence for any purpose unless the accused's attorney was notified of the interview which produced the statement and was given a reasonable opportunity to be present."

United States ex rel. O'Connor vs. New Jersey, 405 F.2d 632 (3rd Cir. 1969), cert. denied, 395 U.S. 923 (1969).

The majority of this country's courts, however, have adopted the position that Massiah does not taint all post-indictment statements made be a defendant without the presence of his counsel. As was stated in United States vs. De Loy, 421 F.2d 900, 902 (5th Cir. 1970), "Police officers are not made constitutionally deaf to the uncoerced, insistent and untricked statement of a properly warned defendant."

After a thorough analysis of the conflicting cases, the Court of Appeals reached the conclusion that Maryland would follow the majority and hold that in the absence of coercion or trickery, which would of themselves negate complete voluntariness, a volunteered statement given in the absence of defendant's counsel is admissible.

In this case the accused chose to ignore the advice of his counsel. Once advised that he had failed the polygraph test it might well have appeared to the accused that it was in his own self-interest to offer an explanation for his presence at the scene with the other participants in the robbery. The trial court found that the statement made by the appellant was his free and voluntary statement made after an intelligent waiver of his right to counsel. The record sustains that conclusion.

Judgments affirmed; costs to be paid by appellant.

* * * * * *

GLOSSARY OF POLYGRAPH TERMS

Edited by

Blair Eckert and Michael B. Lynch

Afferent Nerve Fibers . . . . . Those neural fibers which carry nerve impulses toward the central nervous system. See: Efferem Nerve Fibers

All Or None Law . . . . . The principle of observed psychophysiological responses recorded on a polygraph chart for the purpose of forming an expert opinion. A statment reflecting the results of the evaluation of a polygraph chart. See: Numberical Evaluation
Spot Analysis

Anti-Climax Dampening . . . . . The principle of psychological focus which holds that a person will establish an emotional priority for that stimulus which he perceives to represent the greatest threat to his immediate well-being. See: Super Dampening

Anxiety . . . . . A state of mental uneasiness or concern. Abnormal apprehension or fear, often accompanied by psychological signs, behavior symptoms or doubt concerning the nature and reality of a threat; real or imagined. Unfounded self-doubt. See: Behavior Symptoms

Apnea . . . . . The transient cessation of breathing which follows forced breathing. On a polygraph chart, apnea is generally represented by a blocking pattern in the pneumograph tracing. See: Eupnea

Applied Stimulus . . . . . An intentionally applied external stimulus, normally in the form of a question, directed to a person undergoing a polygraph examination. An applied stimulus may be employed for the purpose of demonstrating a persons response capabilities at the time the stimulus is applied.

Autonomic Nervous System . . . . . That part of the peripheral nervous system consisting of the sympathetic and the parasympathetic nervous systems.

Accepted as the official Glossary of the California Association of Polygraph Examiners.

Axon	The central core which forms the essential conducting part of a nerve fiber. An extention from and a part of the cytoplasm of some nerve cell. See: Dendrites
Backster Zone Comparison Technique	A structured series of questions designed by Cleve Backster for use by qualified polygraphists. The sequential order of this structure is: 14-Yellow 39-Yellow/Red 25-Black 46-Green 33-Red 47-Green 35-Red 26-Black 44-Yellow/Red
Behavior Symptoms	Those subjectively observable non-verbal manifestations of a person at the time of an applied stimulus which may or may not be indicative of that persons veracity.
Blood Pressure Change	The visual representation of an increase or decrease in blood pressure or volume on a polygraph chart by the cardio component of a polygraph instrument.
Cardio Component	The component of a polygraph instrument which records, either mechanically or electronically, the variations of a persons blood pressure and pulse rate.
Cardiosphygmograph	The tracing on a polygraph chart, made by a pen moved by a bellows device in connection with a closed air pressurized circuit and an in-line cardiosphygmomanometer, which reflects blood pressure and radial pulse in response to an applied stimulus.
Cardiosphygmomanometer	An in-line pressure dial in a closed air pressurized circuit capable of representing the pressure in that circuit in units of millimeters of mercury.
Cardiovascular System	Those portions of an organism which contain the heart, arteries, veins and capillaries. The functional means by which blood is transported throughout the body.
Cerebellum	That portion of the brain which projects over the medulla and is especially concerned with the coordination of muscular activity and body equilibrium.

Cerebrum . . . . . The enlarged front and upper part of the brain which contains the higher nervous centers.

Chart . . . . . The graphic recorded representations of a persons psychophysiological responses to a set of carefully controlled stimuli presented to him in the form of a valid and reliable question structure. See: Test Technique

Chart Identification . . . . . Any information placed on a polygram which identifies the person examined, the polygraphist conducting the examination as well as any other data, time and place of the examination, including the signature of the examiner, if obtainable. See: Chart Markings

Control Stimulation Test . . . . . A modified peak of tension test used to relax the non-deceptive examinee and stimulate the deceptive examinee by empiracal evidence of the effectiveness of the polygraph technique.

Control Question . . . . . That question within a structured technique which is broad in scope and depth, generally limited by mutually exclusive time parameters, which relates to a wrong doing of the same general nature as the one under investigation and one to which the examinee will, in all probability, lie or to which his answer will be of dubious validity in his own mind.

Counter Measures . . . . . Deliberate chemical, mental or physical attempts by an examinee to affect the polygraph tracings or the final outcome of a polygraph examination.

Cuff Pressure. . . . . The air pressure in the inflatable bladder in the blood pressure cuff as indicated on the sphygmomanometer of the polygraph instrument in units of millimeters of mercury.

Dendrites . . . . . An extension or process of a neuron which serves to conduct impulses toward the cell body. See: Axon

Dicrotic Notch . . . . . A graphic representation within the cardio tracing of a polygraph chart caused by a backward surge of blood against the semilunar valve in the left ventricle of the heart.

Distortion. . . . . A change in polygraph tracings caused by artifact stimulus. A disturbance of normal polygraph tracings not attributable to an intended stimulus within a test structure.

Dyspena . . . . . Abnormal breathing characterized by either labored breathing, shortness of breath, suppression or serrated exhalation.

Efferent Nerve Fibers . . . . . Those neural fibers which carry impulses away from the central nervous system. See: Afferent Nerve Fibers

Ego Defense Mechanisms . . . . . Those psychological defenses used by a person to shield himself against that which he perceives to represent a threat to his immediate well-being.

Endocrine Glands . . . . . Those ductless glands which discharge their secretions directly into the blood stream. In general, the endocrine glands coordinate and control body activities at a slower rate than the nervous system and thus promote long term adjustments.

Enveloping Question . . . . . A question used at the beginning and end of a searching peak of tension test which deals with an issue or subject which is beyond the realm of possibility of the information being sought. See: Padding Question

Eupnea. . . . . Regular or normal breathing

Examinee . . . . . An individual who has volunteered for and undergoes a polygraph examination.

Excitability . . . . . The potential ability of a neuron to respond to any given stimulus.

Extrasystole. . . . . A premature contraction of the heart which is independent of the normal rhythm and which arises in response to an impulse in some part of the heart other than the sinoauricular node, or from some abnormal stimulus. An extrasystole appears in the cardio tracing of a polygraph chart as a break in the normal rhythm of the heart. An Extrasystole occurs during or at the end of a diastole and is characterized by the lack of a systolic stroke and a following lower pressure diastole (compensatory pause). An extrasystole recovers with a strong systolic stroke followed by a period of rising cardio pressure in recovery to a normal rhythm.

Fight Or Flight Syndrome. . . . . The activation of involuntary sympathetic neural activity upon conscious recognition of a threat to the immediate well-being of an organism. A group of neural symptoms which enable an organism to cope with a stressful or threatening situation by taking that organism from a normal relaxed state to an emergency state of preparedness for the sake of survival.

Galvanograph . . . . . The tracing on a polygraph chart by a pen moved by a galvanometer controlled by an examinees psychophysiological responses to stimuli.

Galvanometer Component . . . . . The instrument used to determine the presence of a current in a conductor, the direction of flow and the strength of the current. In a polygraph instrument, the galvanometer component is controlled by a Wheatstone Bridge which in turn is controlled by the psychogalvanic reflex of the examinee. See: Psychogalvanic Skin Reflex

Ganglia . . . . . Groups of nerve cell bodies found in the autonomic plexuses composed primarily of sympathetic postganglionic neurons.

General Series Test . . . . . A structured series of questions designed for use by a qualified polygraphist in which the sequential order is:
1 - neutral question
2 - neutral question
3 - relevant question
4 - neutral question
5 - relevant question
6 - neutral question
7 - relevant question
8 - neutral question
9 - control question

Guilt Complex . . . . . A group of associated ideas or attitudes which have a common emotional tone of feelings of universal responsibility. These ideas or attitudes may be conscious or unconscious; however, they may significantly influence an individuals behavior or psychophysiological responses when confronted with an accusation.

Guilt Complex Question . . . . . A question included in a structured polygraph test designed to identify a person who may be inappropriately responding to relevant and control questions due to a guilt complex. This question is usually one which concerns a non-existant crime

or circumstance which an examinee is led to believe did exist in which he is suspect but which he knows he could not have committed.

Hidden Key. . . . . An item of evidence known only to the victim, perpetrator, investigator and polygraphist. See: Known Peak of Tension Test

Homeostasis . . . . . The tendency of an organism to maintain a state of equilibrium between interrelated psychological and physiological stimuli.

Hypothalamus . . . . . That portion of the brain which contains centers for the regulation of body temperatures, sleep and water balance. It also appears to be the center for the integration of emotions, visceral activity and neural impulses which trigger the sympathetic division of the autonomic nervous system.

Integrated Control Question Technique See: General Series Test

Irrelevant Question . . . . . See: Neutral Question

Known Peak of Tension Test . . . . . A polygraph test in which a series of questions, all similar in nature and scope, only one of which, known only to the perpetrator of the crime and the polygraphist, has any bearing upon the matter under investigation. This one pertinent question (Hidden Key) may appear as a peak of tension in any one or more of the polygraph tracings.

Lie Detector. . . . . An archaic term no longer used in polygraphy. A generic term commonly used to describe either a polygraph instrument or a person who administers a polygraph examination.

Mechanical Adjustment . . . . . The manual centering of the ink pens on a polygraph instrument in order to maintain the individual component tracings within their appropriate physical parameters.

Medula Oblongata. . . . . The lowest or hindmost part of the brain continuous with the spinal cord. Contains centers of respiratory, cardio-inhibitory, cardi-acceleratory, vasoconstrictor, vasodilator, swallowing, salivary and vomiting functions.

Midbrain. . . . . The middle segment of the brain containing the centers for certain visual and auditory reflexes. See: Hypothalumus

Name Test . . . . . A controlled peak of tension test utilized to establish an examinees response capability to a known lie in which the name of a person upon whom the examinee places emotional significance is used as a known peak of tension.

Nerves. . . . . Those strands of tissue which specialize in the transmission of impulses to and from the brain and spinal cord and all parts of the body.

Neuron. . . . . A single nerve cell.

Neutral Question . . . . . A question which does not pertain to the issue under investigation the answer to which is recognized as universally correct by both the examinee and the polygraphist. A neutral question is intended to elicit a minimal response from the examinee and provide the polygraphist with a valid graphic representation of the examinees non-stress response patterns.

Numerical Evaluation . . . . . Any valid and reliable system of numerical evaluation which employs a consistant set of values to describe the observable physiological responses graphically represented on a polygraph chart.

Opinion. . . . . .The expert conclusion expressed by a qualified polygraphist concerning the veracity of the statements made by the examinee.

Outside Issue . . . . . .A circumstance unrelated to the primary issue which poses a greater threat to the immediate well-being of the examinee than does the primary relevant issue.

Padding Question. . . . . Those questions placed before and after the known relevant question in a known peak of tension test. Padding questions are similar in nature to the known relevant question and fall within the realm of possibility of the information being sought. See: Enveloping Question

Parasympathetic Nervous System . . . That part of the autonomic nervous system which tends to induce secretion, to increase the tone and contractility of smooth muscle and to cause the dilation of blood vessels. That division of the autonomic nervous system responsible for the normal "house keeping" functions of the body; i.e., digestion and body temperature.

Peak of Tension Test. . . . . See: Known Peak of Tension Test
Searching Peak of Tension Test

Peripheral Nervous System . . . . . That portion of the nervous system lying outside the central nervous system. See: Autonomic Nervous System

Plethysmograph. . . . . The tracing on a polygraph chart made by a pen moved by a photo-optical system controlled by an examinees psychophysiological responses to controlled stimuli.

Plethysmograph Component . . . . . A photo-optical component of a polygraph instrument capable of electronically observing and recording changes in blood volume, pulse rate and blood oxygen content.

Pneumograph . . . . . The tracing on a polygraph chart made by a pen moved by a bellows devise controlled by an examinees psychophysiological responses to controlled stimuli.

Pneumo Component . . . . . The component of a polygraph instrument which records, either mechanically or electronically, the variations of an examinees breathing, specifically the total volume of the lungs.

Polygram. . . . . One or more polygraph charts. The cumulative recorded representations of an exminees psychophysiological responses to a set of controlled stimuli presented to him in the form of a properly constructed question technique upon which an expert opinion is formed.

Polygraph . . . . . A generic term generally used to refer to the polygraph instrument or the polygraph technique. See: Lie Detector

Polygraph Examination . . . . . The entire environment within which a qualified polygraphist renders an expert opinion as to the veracity of an examinees statements concerning the primary issue of the matter under investigation.

Polygraphist . . . . . An individual who, by virtue of his education, training and experience, is capable of conducting a valid and reliable polygraph examination for the purpose of determining whether or not an examinee honestly believes that his own statements and answers concerning a questioned issue are in fact truthful.

Polygraph Instrument . . . . . An instrument containing three or more components, each capable of accurately and reliably recording human psychophysiological events on a permanent record

in the form of a moving graph. An instrument used by a qualified polygraphist for the purpose of forming an expert opinion concerning the veracity of an examiners statements.

Pons. . . . . A band of nerve fibers in the brain connecting the lobes of the cerebellum, the medulla and the cerebrum.

Pre-Examination Interview . . . . . That portion of a polygraph examination during which information is obtained by the polygraphist from the examinee regarding the facts and circumstances which form the basis of the examination and from which the polygraphist develops appropriate questions for the polygraph technique to be employed.

Psychogalvanic Skin Response . . . . The recordable changes of body tissue polarization (neural discharge), sweat gland activity or circulatory variations which occur as a result of work, emotion or a combination of either. In polygraphy, these changes are recorded on a polygraph chart by apen attached to a galvanometer driven by the variations of electric conductivity introduced into a Wheatstone Bridge by the body tissues of an examinee.
See: Wheatstone Bridge
Galvanometer Component

Psychological Set . . . . . The theory which holds that a person fears, anxieties and apprehensions will be directed toward that situation which presents the greatest immediate threat to his self-preservation or general well-being; generally to the exclusion of all other less threatening circumstances within his environment.
See: Super Dampening

Psychosis . . . . . A form of severe personality disorder involving loss of contact with reality, generally characterized by delusions and hallucinations.

Question Spacing . . . . . The elapsed time (not less than 15 seconds) between an answer given by an examinee and the following question asked by the polygraphist during a polygraph test.

Receptors . . . . . Those specialized cells sensitive to incoming stimuli. See: Sensors

Reflex Action . . . . . The cumulative product of stimulus, receptor, afferent nerve, connecting neuron, efferent nerve and effector action. A simple reflex arc.

Refractory Period . . . . . That period of time in which a neuron is unable to conduct an impulse.

Reid Control Question Test . . . . . A structured series of questions designed by John E. Reid for use by a qualified polygraphist. The sequential order of this test is:
1 - neutral question
2 - neutral question
3 - relevant question
4 - neutral question
5 - relevant question
6 - control question
7 - neutral question
8 - relevant question
9 - relevant question
10 - control question

Relevant Question . . . . . That question within a structured polygraph test which pertains directly to the matter under investigation.

Residual Air. . . . . That volume of air which remains in the lungs after the deepest possible exhilation. See: Tidal Volume

Respiratory System . . . . . That portion of function of an organism which absorbs oxygen into the body so that nutrients can be changed into usable form. The system responsible for the interchange of oxygen and carbon dioxide in the lungs and body tissues.

Sacrifice Relevant Question . . . . . A question used in the Zone Comparison Test designed for and intended to dissipate initial tension anticipated by an examinee in response to the target issue.

Searching Peak of Tension Test . . . A polygraph test in which a series of questions, usually similar in nature and scope, are asked and in which the answer to only one of them may evoke a response from the examinee.

Sensor. . . . . Any attachment made to the human body for the purpose of measuring and/or recording a psychophysiological response during a polygraph test.

Specific Response . . . . . A diviation from an examinees normal state of homeostasis as evidenced by the tracings on a polygraph chart. Consideration must be given to overall chart interpretation with emphasis on the nature of the question asked, the sequential position of the question within the structure used and the manner in which the question was presented to the examinee.

Spot Analysis Technique . . . . . A system of chart interpretation whereby analysis of response capability may be made at each location on a polygraphy chart wherein a relevant question is either preceeded by or followed by a control question. See: Zone Comparison Test
Analysis
Numberical Evaluation

Super Dampening . . . . . The principle of psychological focus which holds that if a person considers an outside issue to be a greater threat to his well-being than the main relevant issue, and that if he anticipates an unreviewed question concerning this outside issue, he may tune out all relevant and control questions by focusing his psychological set on the outside issue. The presence of an outside issue usually results in poor responses or no responses. See: Symptomatic Questions
Anti-Climax Dampening

Suppression . . . . . An involuntary reduction in the respiratory amplitude of the pneumograph tracing in response to a stressful stimulus, usually recorded as a trend of four respiratory cycles.

Sympathetic Nervous System . . . . . That part of the autonomic nervous system which tends to depress secretion, decrease the tone and contractility of muscle not under direct voluntary control, and cause the contraction of blood vessels. See: Parasympathetic Nervous System
Fight or Flight Syndrome

Symptomatic Question. . . . . A question contained within a structured question technique which is designed to identify the presence of an outside issue upon which a person may be focusing during the course of a polygraph examination. See: Zone Comparison Test

Synapsis. . . . . The chemical junctions where nerve impulses pass from one neuron to another.

System. . . . . A group of body organs which combine to form a whole and to cooperate for the purpose of carrying on some vital function.

Test Technique . . . . . A valid and reliable question structure employed by a qualified polygraphist for the purpose of verifying an examinees statements or answers during a polygraph examination. The sequential order in which questions are asked during a polygraph

examination. The foundation of expert opinion.

Thalamus. . . . . The middle part of the brain through which sensory impulses pass to reach the cerebral cortex.

Tidal Volume. . . . . The volume of air moved in or out of the lungs with each respiratory cycle. See: Residual Air

Tissues . . . . . Cells of a like nature grouped together for a common purpose.

Wheatstone Bridge . . . . . A specially devised electronic circuit for the measurement of electrical resistance in a conductor. The conductor of unknown resistance is included in the circuit with three known resistances. When the unknown resistance (Rx) is balanced with three known resistances (R1, R2, R3) it can be calculated mathmatically since it becomes one term in a proportion.

$$\frac{Rx}{R1} = \frac{R2}{R3}$$

Zone Comparison Test. . . . . A structured series of questions designed for use by a qualified polygraphist in which the sequential order is:

1 - neutral question
2 - sacrifice relevant question
3 - symptomatic question
4 - control question
5 - primary relevant question
6 - control question
7 - primary relevant question
8 - symptomatic question
9 - control question
10 - secondary relevant question

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POLYGRAPH REVIEW

By

Bobby J. Daily

How would you score on a licensing examination? Are you sufficiently up-to-date about such subjects as psychology, physiology, instrumentation, test question construction, chart interpretation, interview techniques, etc? Are you prepared to undergo direct and cross-examination on polygraph subjects in court? A score of 9 or 10 is excellent, 7 or 8 is good, and below 7 may indicate some review is warranted. The review in this issue is on interviews. (Answers are on page 122.)

1. Broadening your knowledge in many fields plays a role in polygraph by:

   a. Improving your judgment of people.
   b. Increasing your self-confidence.
   c. Providing flexibility in examinations.
   d. All of these.

2. A policeman questioning a burglary suspect notes that the man has been practicing masturbation during the interrogation. It can be concluded that:

   a. The suspect must also be involved in sex offenses.
   b. The burglary might, or might not, involve a sex factor.
   c. The suspect is, or is in danger of becoming, mentally ill.
   d. The suspect's criminal tendencies would be eliminated if he got married.

3. If an examinee persistently maintains a condition of anger and resentment, the examiner should:

   a. Conduct a test as with any normal subject.
   b. Conduct one test that is unrelated to the primary offense.
   c. Change the question sequence.
   d. Abandon the test.

4. You can sympathize with a subject by doing all but one of the following:

   a. Condemn his victim.
   b. Condemn his accomplice.
   c. Tell him you will testify in his behalf.
   d. Place yourself in his position.

5. If the examiner must deal in a personal or embarrassing matter, he should:

   a. Explain to the subject why he is doing so.
   b. Ask the questions on the test without review to avoid anticipation.
   c. Use only technical terms to prevent undue embarrassment.
   d. Have another person present in the examination room as a witness.

6. (T) (F) A good interrogator must be a chameleon.

7. (T) (F) A person of high intelligence seldom becomes involved in crime.

8. (T) (F) An individual's IQ remains relatively constant throughout life.

9. (T) (F) A suspect should not be permitted to elaborate too extensively on a crime prior to the examination as this may tend to dampen reactions.

10. (T) (F) Since it is not material to the case, an examiner should not listen to a subject's tale of misfortune.

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A B S T R A C T S

Commercial Application

Hindle, Kathleen B. "The Use of the Polygraph in Private Industry," Polygraph Review 3 (1)(April 1977): 7-12.

The author notes that there are several important and legitimate applications of the polygraph in the corporate context. For large and small employers alike, the task of selecting good employees from among hundreds of applicants is an overwhelming one with fewer and fewer of the traditional aids to rely on. The use of the polygraph is of great help to the employer in protecting his business and protecting his employees, when used with care and with the rights of the employees in mind.

Interrogation

Inbau, Fred E. "Legally Permissible Criminal Interrogation Tactics and Techniques." Journal of Police Science and Administration 4 (3)(1976): 249-251.

An assessment of the status of the rules governing police interrogations of criminal suspects laid down by the U.S. Supreme Court in Miranda v. Arizona (1966). Inbau provides guidance to police interrogators with respect to the compliance of their tactics and techniques with the 'voluntariness' test for admissibility of confessions.

Instrumentation

Lowry, Richard. "Active Circuits for Direct Linear Measurement of Skin Resistance and Conductance." Psychophysiology 14 (3)(May 1977): 329-331.

Passive voltage-divider circuitries typically used for measuring skin resistance and conductance provide only indirect measures of these variables. Although the resulting errors of nonlinearity may not be critical for some research purposes, there is no reason why they should be tolerated, because it is possible to design simple active circuitry which avoids the errors by measuring skin resistance and conductance directly. Two such circuits are presented: a) a variable-gain voltage amplifier for direct linear measurement of skin resistance; and b) a current-to-voltage transducer for direct linear measurement of skin conductance. A combined working circuit, suitable for practical research applications, is also presented. [author abstract.]

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