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## Police Science Technical Abstracts and Notes

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## POLICE SCIENCE TECHNICAL ABSTRACTS AND NOTES

M. Edwin O'Neill

### Pupillary Responses During Deception

In a recent number of the "Journal of Experimental Psychology," (Vol. 32, No. 5, May, 1943, pages 443-449), F. K. Berrien and G. H. Huntington reported on a study which they call, "An Exploratory Study of Pupillary Responses During Deception," which should be of interest to workers in the police science field in general, and lie detection experts in particular.

It has long been known that pupillary changes accompany emotional disturbances. The authors of this study were interested in discovering, first, what kinds of pupillary responses accompany the tension and emotional excitement incident to deception, and second, whether these responses show sufficient consistency in any respect to permit them to be used as valid indications of attempted deceit. Furthermore, since considerable validating evidence is already at hand, both from laboratory and field studies pertaining to the use of blood pressure changes as indicators of deception, a comparison of these changes with pupillary was made.

The apparatus consisted of a constant speed polygraph using capillary pens for purposes of recording: (a) the moment when questions were given and answers received; (b) the pulse wave; and (c) the pupillary response. The pulse record was obtained in the conventional manner. The pupillary responses were recorded by means of a short-focus telescope mounted on a horizontal rack and pinion in such a manner that the vertical cross hair could be brought tangent to the subject's pupil as seen in the field of the telescope. As the pupil dilated or constricted, the telescope was moved right or left by the examiner; the action of the telescope was transmitted to, and amplified mechanically by, a recording pen. The subject's head was held rigid by means of a comfortable head clamp. The fixation point of the subject was 22 in. from his eye. A 10-watt incandescent lamp enclosed in a dome-shaped metal shade covered with architect's cloth was located beside the subject's face so that the pupil was adequately illuminated and yet moderately dilated. A penemograph was strapped around the subject's chest but the records of breathing were not considered in the present study.

The subjects consisted of college students. Only 32 records were found to be satisfactory. The subjects reported to the laboratory in pairs, took their instructions from envelopes. One set of instructions told the subject to do nothing and answer truthfully all questions on the test. The other set instructed the subject to commit a "crime" which consisted in taking some money and in not telling the truth on the test. The partners had no knowledge of each others guilt or innocence.

In the examination room the subjects were examined singly. A somewhat novel feature is introduced by instructing the subject to delay his answers to all questions until the examiner said, "Now." The delay in answering was imposed upon the subjects in order to provide time during which the tension stemming from the question itself could be recorded. This arrangement tended to prolong any tension so that it could be clearly recorded. The signal for answering was given after three complete respiratory cycles on the part of the subjects.

On the basis of the 32 records considered, the authors found that: "(1) A slow dilation followed by a very rapid constriction is probably indicative

of the emotion usually accompanying deceit. (2) A sudden change in the stability of the pupil is found more frequently among those attempting deceit than those not attempting deceit when critical questions are first introduced. (3) The pupillary records are no more indicative of deceit than are the pulse records, each giving the same percentage of error in identifying the 'criminals.' When the identification is based on interpretation of the combined records, an error of approximately 20 percent is obtained. (4) The pupillary responses do not ordinarily correspond in any way with the vascular responses recorded in this study. However, in 48 percent of the falsehoods both the vascular system and the pupil give indications of emotional tension. This compares with 18 percent when truthful answers are given to critical questions. (5) A number of known factors operated to decrease the application to criminal investigations the techniques described may prove slightly more valid than the present study indicates."

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