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STATISTICAL STUDY ON THE USE OF THE POLYGRAPH
AS A PERSONNEL SECURITY SCREENING AID

1. An agency of the government which uses the Polygraph as a personnel security screening aid submits herewith a detailed study of their Polygraph operation for the period 1 November 1951 to 31 December 1952. The study covers the polygraph interview of 5056 individuals.

2. Of the 5056 individuals concerned, 5012 volunteered for a Polygraph interview, and 44 refused to do so. The 5012 who volunteered are further broken down into two distinct categories: 3865 who were interviewed prior to employment and 1147 who were recruited in the field and were interviewed after they were employed. Of those who refused to take a Polygraph test, 42 were applicants and 2 were employees.

3. All figures in the attached tabulations relating to "Admissions" or "Reactions without Admissions" are derived from a tabulation of actual case results. A total of 784 background investigations, (230 field recruitments, 554 local recruitments) which had been completed for individuals covered by this study, were reviewed and correlated with the results of the Polygraph interviews. In addition, close correlation of terminations and resignations, as reflected in the latest roster of personnel, and mandatory reports of discrepancies between background investigations and Polygraph reports assure that the results of this study are accurate.

4. Of the 1147 employees who were interviewed, 506 indicated no deception and gave no information requiring evaluation, while 641 indicated deception or gave information which required evaluation. Of this latter group 111 were terminated or permitted to resign in lieu of termination. 67 of these terminations and resignations were on grounds of sex deviations. A total of 70 were held pending receipt of background investigations, and the remaining

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460 were determined to be qualified for employment. Therefore, a total of 966, or approximately 84% of the total field recruitments, were retained in Agency employ.

5. Of the 3865 applicants who were interviewed, 1703 indicated no deception, gave no information requiring evaluation by higher authority, and were hired. The remaining 2162 indicated deception or made major or minor admissions requiring evaluation by higher authority. Of this latter group, 1352 were determined not qualified for employment with the agency, the employment of 41 was held up pending receipt of complete background investigations, and 769 were hired. Therefore 2472 applicants were hired, or approximately 63% of the total applying for employment.

6. A study of the breakdowns of test results listed in Tables III and IV reveals that the Polygraph interview developed pertinent information to a far greater extent than the background investigation in each of the areas covered. This is particularly true in areas which are not a matter of record, such as subversive sympathy or activities, communist friends and relatives, undetected crimes, and drug addiction. It is also true of such factual things as a criminal record or the falsification of the Statement of Personal History, although in lesser degree.

7. The total extent of the information developed through the Polygraph interview is not completely revealed in the Tables which follow. For simplicity of tabulation, only one admission in any area was recorded for any one individual. It is generally true, however, that each person, who admitted involvement in the pertinent areas under study, admitted complicity in more than one act. One indication of the information developed may be derived from the fact that 90 employees covered by this study were terminated solely on the basis of information developed by the Polygraph, while 6 were

terminated solely on the basis of information developed by the background investigation.

8. The total of all the admissions in areas may not be validly related to the number of persons covered by this study, since many individuals indicated deception or gave admissions in more than one area of the Polygraph test. The overall average was approximately $2\frac{1}{4}$ admissions per person. In addition, most of the individuals tested made one or more changes in their Statements of Personal History in order to correct deliberate or unintentional errors before taking the test. It should be noted also that the corrected Statements of Personal History and investigative leads developed by the Polygraph were furnished to the investigators.

9. The National Agency Check, which checks files maintained by various national agencies, developed derogatory information in such a small number of cases that it would have no measurable effect on the results of this study.

10. Table III indicates the actual results of Polygraph interviews on all employees covered by this study. The figures recorded under "Uncovered by background investigation" are predicted from the overall results of those background investigations which have so far been received on the entire group (field recruitments and local applicants) under study. "Major Admissions" as used in Tables III, IV, and V, may be defined as derogatory information which provides a basis for termination or denial of employment; "Minor Admissions" as insufficient for such administrative action.

11. Table IV shows the actual results of granting interim clearance to 554 applicants on the basis of a National Agency Check and a Polygraph interview. The background investigations on this group have been completed and correlated closely with the results of the Polygraph interview. Each

discrepancy, whether important or unimportant, has been tabulated, in an effort to establish the strengths and the weaknesses of the two investigative methods, as well as to provide a basis for improvement of the Polygraph operation through the detection of error. This group does not represent a true cross-section of applicants covered by the entire study, since none of the information tabulated under "Admissions, major and minor," or "Reactions w/o admissions" was determined to be of gravity sufficient to deny employment to the individual concerned. On the other hand, 561 other applicants during this same period were denied employment solely on the basis of information developed during the Polygraph interview and by the National Agency Check. The background investigations of the 554 ap- plicants who were granted interim clearance provided information which resulted in termination of employment for 5 of this group, two of whom had been reported as unfit for testing by the Polygraph method because of an extremely low I.Q. According to the latest personnel roster, one ad- ditional person has been terminated as a result of derogatory information developed by the background investigation. This indicates an error of 6 (total terminated as result of investigation) out of 2472 (total applicants hired) or of 1 out of 412. None of the other information developed by the background investigations was considered sufficient grounds to warrant termination of the individuals concerned.

12. Table V indicates the actual results of the Polygraph interviews on all the applicants covered by this study, whether or not they were hired by the agency. The figures recorded under "Uncovered by background investi- gation" are predicted from the overall results of those background investi- gations which have so far been received on the entire group of applicants

under study (field recruitments and local applicants).

13. The following gives an approximation of the monetary savings made possible by use of the Polygraph program.

a. This study reveals that 1352 applicants were turned down for hire as a result of Polygraph interview. Had it not been for the use of the Polygraph, they would otherwise have been acceptable employees, would have been hired, and would have remained unproductive, pending completion of background investigation, for an average period of nine months.

b. A prior study has shown that the cost to the government of each individual who remains in an unproductive status is at least \$2000 in terms of salary alone. This approximation is based on an average salary at the GS-4 level for the nine months' clearance period. This sum is low, since the average GS grade of persons previously so retained in unproductive status has been above GS-4.

c. A further expense is the cost of a background investigation which varies from approximately \$300 to \$3000 per individual. For purposes of this paper, the conservative figure of \$1000 for each investigation is taken.

d. Therefore, by turning away 1352 applicants who would in all probability have been eventually terminated anyway as a result of background investigation, a salary saving of \$2,704,000 and an investigation saving of \$1,352,000 was achieved.

e. The total saving to the government for this group of individuals, exclusive of training school and other overhead costs, is therefore \$4,056,000.

14. The figures presented in this study do not show adequately the

almost month by month improvement in techniques and overall effectiveness of the Polygraph operation. For example, the number of persons who were declared emotionally or physically unfit for testing has declined from a high of 43.5%, prior to 1 November 1951, to 7.78% during this period. Less than 1% of the individuals covered refused to take a Polygraph test during this period, as opposed to the 11% who refused prior to 1 November 1951. The number of cases requiring a retest before evaluation could be made has dropped to a negligible quantity. For the most part, the 100 such cases encountered during this period involved some temporary emotional or physical condition which interfered with the evaluation of the test results.

15. This study reveals the following facts concerning the use of the Polygraph interview in connection with security clearance procedures:

a. The use of the polygraph interview may be expected to produce a type of information which is--

- (1) Commensurate within limits with that produced by a background investigation.
- (2) Far more detailed in some respects than can ever be obtained from a background investigation.
- (3) More reliable as to source (except those sources which are documented) than that obtained from a background investigation.
- (4) Invaluable in providing a source of information in developing leads for inquiry in areas pertinent to security, which otherwise would not normally be accomplished.

The reason for this situation is the basic difference between the two investigative methods. The information obtained from a background investigation

is derived mainly from the hearsay testimony of primary and secondary references. The information obtained as a result of a Polygraph interview is obtained directly from the subject himself.

The background investigation is at its best in areas which are matters of record, such as, employment, education, naturalization, criminal history, etc. On the other hand, in matters held by most subjects strictly within themselves, such as personal beliefs and mental attitudes, temperament (which invariably reveals emotional instability), concealed personal unethical activities, and even evidence of sexual deviation, the Polygraph interview is a more reliable producer of information. Again, in the Polygraph interview this information comes directly from the subject himself. It does not, as in the background investigation, come from informants whose motivation and reliability are often unknown, and who in many cases where derogatory information is concerned, are obviously vindictive.

b. Neither the Polygraph interview nor the background investigation can be considered complete in itself. Each supplements the other; each improves the validity of the security determination in each case.

c. By granting an interim clearance based on an NAC and a satisfactorily evaluated Polygraph interview for the period under study in the particular agency concerned, a demonstrable error of approximately 35/100 of 1% resulted.

d. The results of a previous survey by the agency concerned covering the period 1 May 1951 through 30 November 1951, involving 2003 individuals, when compared to this study, indicate a marked improvement in operator technique. It is imperative that all who contemplate the use of the Polygraph as an aid to security understand that the Polygraph

machine in itself is valueless in the hands of unskilled operators. It is, therefore, essential that in any program of this nature, the operators be selected carefully, their operations standardized, and by aggressive supervision by qualified personnel, their techniques be constantly improved.

TABLE I
Employees

1. Total employees covered by this study _____	1149
2. Total refusing a Polygraph interview _____	2
3. Number examined with the Polygraph _____	1147
4. Number indicating no deception and making no derogatory admissions__	506
5. Number retested because of emotional or physical unfitness_____	84
6. Number requiring evaluation by higher authority because of indicated deception or derogatory admissions of a major or minor nature _____	641
7. Number of this group whose minor reactions or admissions were evaluated as satisfactory _____	460
8. Number terminated or permitted to resign in lieu of termination _____	111
9. Number held for background investigation on whom no disposition has been made _____	70
a. On general grounds _____	49
b. Polygraph indicates sex deviation _____	21
10. Breakdown of Terminations.	
a. On basis of Polygraph only:	
(1) On general grounds _____	30
(2) Sex deviation _____	60
b. On basis of Polygraph and background investigation:	
(1) General _____	8
(2) Sex deviation _____	7
c. On basis of background investigation only:	
(1) General _____	6
(2) Sex deviation _____	0

TABLE II
Applicants

1. Total applicants covered by this study _____	3907
2. Total refusing a Polygraph interview _____	42
3. Total examined with the Polygraph _____	3865
4. Total indicating no deception and making no derogatory admissions _____	1703
5. Total requiring evaluation by higher authority because of indicated deception or derogatory admissions of a major or minor nature _____	2162
6. Total held for background investigation _____	41
7. Total approved for hire following evaluation _____	769
8. Total not hired _____	1352
9. Total applicants hired _____	2472
10. Total retested because of emotional or physical unfitness _____	16
11. Total terminated on receipt of a derogatory background investigation who were clear of major reactions or admissions on the Polygraph _____	6

TABLE III
Employees

Breakdown of Test Results

Area 1. Falsification of the Statement of Personal History	
Actual Admissions, major and minor _____	144
Reactions w/o admissions _____	43
Uncovered by background investigation _____	124
Area 2. Deliberate disclosure of classified information to unauthorized persons	
Actual Admissions, major and minor _____	60
Reactions w/o admissions _____	31
Uncovered by background investigation _____	5
Area 3. Sympathy toward Communism	
Actual Admissions, major and minor _____	34
Reactions w/o admissions _____	45
Uncovered by background investigation _____	0
Area 4. Past or present participation in any type of Communist activity	
Actual Admissions, major and minor _____	41
Reactions w/o admissions _____	30
Uncovered by background investigation _____	0
Area 5. Close friends or relatives having Communist sympathy	
Actual Admissions, major and minor _____	128
Reactions w/o admissions _____	47
Uncovered by background investigation _____	10
Area 6. Having worked in the interests of a foreign government	
Actual Admissions, major and minor _____	13
Reactions w/o admissions _____	4
Uncovered by background investigation _____	1

TABLE III (Cont'd) - Employees

Area 7. Close friends or relatives working for a foreign government	
Actual Admissions, major and minor _____	47
Reactions w/o admissions _____	7
Uncovered by background investigation _____	0
Area 8. Close friends or relatives residing in a foreign country	
Actual Admissions, major and minor _____	172
Reactions w/o admissions _____	14
Uncovered by background investigation _____	1
Area 9. Incidents or conditions which might open them to blackmail	
Actual Admissions, major and minor _____	33
Reactions w/o admissions _____	60
Uncovered by background investigation _____	5
 NOTE: The following seven areas were checked only when reactions or admissions on Area 9 made this necessary.	
Area 9a. A criminal record	
Actual Admissions, major and minor _____	109
Reactions w/o admissions _____	3
Uncovered by background investigation _____	42
Area 9b. Participation in serious undetected crimes	
Actual Admissions, major and minor _____	26
Reactions w/o admission _____	16
Uncovered by background investigation _____	3
Area 9c. Mental or nervous disorders	
Actual Admissions, major and minor _____	43
Reactions w/o admissions _____	14
Uncovered by background investigation _____	5

TABLE III (Cont'd) - Employees

Area 9d. Homosexual activity	
Actual Admissions, major and minor _____	111
Reactions w/o admissions _____	53
Uncovered by background investigation _____	5
Area 9e. Unethical practices, such as threats, bribery, extortion, etc.	
Actual Admissions, major and minor _____	7
Reactions w/o admissions _____	2
Uncovered by background investigation _____	0
Area 9f. Drug addiction	
Actual Admissions, major and minor _____	8
Reactions w/o admissions _____	4
Uncovered by background investigation _____	0
Area 9g. Any other item of an equally serious nature	
Actual Admissions, major and minor _____	43
Reactions w/o admissions _____	5
Uncovered by background investigation _____	16
TOTALS	
Total actual admissions, major and minor _____	1032
Total reactions w/o admissions _____	378
Total of either major or minor uncovered by background investigation _____	217

TABLE IV

Applicants Granted Interim Clearance on Basis of Satisfactory MAC and Polygraph Interview Upon Whom Complete Background Investigations Have Since Been Received and to Whom Final Clearances Have Been Granted or Denied

Area 1. Falsification of the Statement of Personal History	
Actual Admissions, major and minor _____	68
Reactions w/o admissions _____	8
Uncovered by background investigation _____	48
Area 2. Deliberate disclosure of classified information to unauthorized persons	
Actual Admissions, major and minor _____	3
Reactions w/o admissions _____	4
Uncovered by background investigation _____	2
Area 3. Sympathy toward Communism	
Actual Admissions, major and minor _____	3
Reactions w/o admissions _____	0
Uncovered by background investigation _____	0
Area 4. Past or present participation in any type of Communist activity	
Actual Admissions, major and minor _____	3
Reactions w/o admissions _____	1
Uncovered by background investigation _____	1
Area 5. Close friends or relatives having Communist sympathy	
Actual Admissions, major and minor _____	17
Reactions w/o admissions _____	0
Uncovered by background investigation _____	1
Area 6. Having worked in the interests of a foreign government	
Actual Admissions, major and minor _____	8
Reactions w/o admissions _____	1
Uncovered by background investigation _____	1

TABLE IV (Cont'd) - Applicants Granted Interim Clearance on Basis of Satisfactory NAC and Polygraph Interview Upon Whom Complete Background Investigations Have Since Been Received and to Whom Final Clearances Have Been Granted or Denied

Area 7. Close friends or relatives working for a foreign government	
Actual Admissions, major and minor _____	18
Reactions w/o admissions _____	1
Uncovered by background investigation _____	0
Area 8. Close friends or relatives residing in a foreign country	
Actual Admissions, major and minor _____	46
Reactions w/o admissions _____	0
Uncovered by background investigation _____	1
Area 9. Incidents or conditions which might open them to blackmail	
Actual Admissions, major and minor _____	2
Reactions w/o admissions _____	10
Uncovered by background investigation _____	1
NOTE: The following seven areas were checked only when reactions or admissions on Area 9 made this necessary.	
Area 9a. A criminal record	
Actual Admissions, major and minor _____	20
Reactions w/o admissions _____	0
Uncovered by background investigation _____	21
Area 9b. Participation in serious undetected crimes	
Actual Admissions, major and minor _____	1
Reactions w/o admissions _____	1
Uncovered by background investigation _____	2
Area 9c. Mental or nervous disorders	
Actual Admissions, major and minor _____	10
Reactions w/o admissions _____	0
Uncovered by background investigation _____	0

TABLE IV (Cont'd) - Applicants Granted Interim Clearance on Basis of Satisfactory NAC and Polygraph Interview Upon Whom Complete Background Investigations Have Since Been Received and to Whom Final Clearances Have Been Granted or Denied

Area 9d. Homosexual activity

Actual Admissions, major and minor _____	6
Reactions w/o admissions _____	1
Uncovered by background investigation _____	2

Area 9e. Unethical practices, such as threats, bribery, extortion, etc.

Actual Admissions, major and minor _____	8
Reactions w/o admissions _____	0
Uncovered by background investigation _____	0

Area 9f. Drug addiction

Actual Admissions, major and minor _____	2
Reactions w/o admissions _____	1
Uncovered by background investigation _____	0

Area 9g. Any other item of an equally serious nature

Actual Admissions, major and minor _____	34
Reactions w/o admissions _____	1
Uncovered by background investigation _____	11

TABLE V
Applicants

Breakdown of Test Results

Area 1. Falsification of the Statement of Personal History	
Actual Admissions, major and minor _____	508
Reactions w/o admissions _____	202
Uncovered by background investigation _____	273
Area 2. Deliberate disclosure of classified information to unauthorized persons	
Actual Admissions, major and minor _____	66
Reactions w/o admissions _____	47
Uncovered by background investigation _____	17
Area 3. Sympathy toward Communism	
Actual Admissions, major and minor _____	59
Reactions w/o admissions _____	93
Uncovered by background investigation _____	0
Area 4. Past or present participation in any type of Communist activity	
Actual Admissions, major and minor _____	72
Reactions w/o admissions _____	93
Uncovered by background investigation _____	12
Area 5. Close friends or relatives having communist sympathy	
Actual Admissions, major and minor _____	260
Reactions w/o admissions _____	79
Uncovered by background investigation _____	6
Area 6. Having worked in the interests of a foreign government	
Actual Admissions, major and minor _____	49
Reactions w/o admissions _____	16
Uncovered by background investigation _____	6

TABLE V (Cont'd) - Applicants

Area 7. Close friends or relatives working for a foreign government	
Actual Admissions, major and minor _____	110
Reactions w/o admissions _____	14
Uncovered by background investigation _____	0
Area 8. Close friends or relatives residing in a foreign country	
Actual Admissions, major and minor _____	396
Reactions w/o admissions _____	23
Uncovered by background investigation _____	6
Area 9. Incidents or conditions which might open them to blackmail	
Actual Admissions, major and minor _____	29
Reactions w/o admissions _____	190
Uncovered by background investigation _____	6
NOTE: The following seven areas were checked only when reactions or admissions on Area 9 made this necessary.	
Area 9a. A criminal record	
Actual Admissions, major and minor _____	220
Reactions w/o admissions _____	23
Uncovered by background investigation _____	145
Area 9b. Participation in serious undetected crimes	
Actual Admissions, major and minor _____	73
Reactions w/o admissions _____	66
Uncovered by background investigation _____	22
Area 9c. Mental or nervous disorders	
Actual Admissions, major and minor _____	108
Reactions w/o admissions _____	22
Uncovered by background investigation _____	6

TABLE V (Cont'd) - Applicants

Area 9d. Homosexual activity

Actual Admissions, major and minor _____	147
Reactions w/o admissions _____	106
Uncovered by background investigation _____	22

Area 9e. Unethical practices, such as threats, bribery, extortion, etc.

Actual Admissions, major and minor _____	56
Reactions w/o admissions _____	14
Uncovered by background investigation _____	0

Area 9f. Drug addiction

Actual Admissions, major and minor _____	22
Reactions w/o admissions _____	14
Uncovered by background investigation _____	0

Area 9g. Any other item of an equally serious nature

Actual Admissions, major and minor _____	195
Reactions w/o admissions _____	21
Uncovered by background investigation _____	58

TOTALS

Total actual admissions, major and minor _____	2370
Total reactions w/o admissions _____	1023
Total of either major or minor uncovered by background investigation _____	579