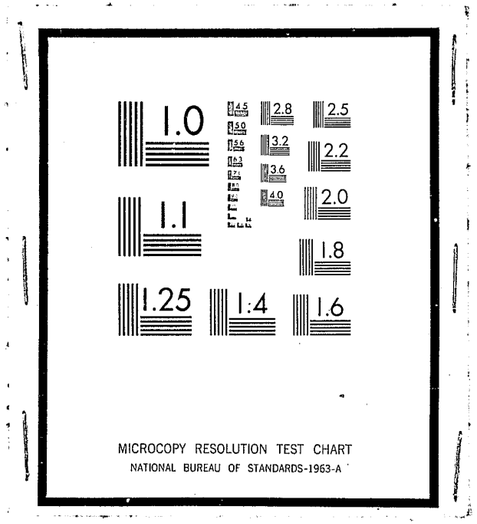

"Investigation of a Method for Identification of the High-Risk Police Applicant"

An Analysis and Interpretation of the Study, its Conclusions and its Application Based on Available Data

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EDUCATION/RESEARCH, INC.
2831 Seventh Street
Berkeley, California 94710

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Research Consultants:
William K. Hunter, M.S.
Shanti Vora, Ph.D.

Project Director:
James M. Newman

Project Coordinator:
William E. Rogin

Overview

The attached study answers in some detail three fundamental questions about Dr. Ruth Levy's study on police selection. The questions concern what the researcher did or claimed to do in her report, whether the findings should be applied, and finally their relation to the overall objective of improving the quality of personnel on the police force.

The first two sections of this report summarize and analyze Dr. Levy's report. Basically the approach is to attempt to identify, before hire, those individuals who are going to leave the force voluntarily or for improper conduct. These predictions are based on an evaluation of the background factors relating to an individual's personal and family life. Some of these background factors were found to be significant in explaining behavior after hire; for others she could not find significance but felt they should be included, based on her understanding of their psychological implications. Thus, the primary predictive device is a combination of statistically determined weights and factors and subjectively determined ones.

In order to demonstrate the validity of the predictive device, data was collected on the factors for new hires in 14 law enforcement departments between November 1, 1968 and October 31, 1969. With from two to fourteen months of elapsed time she considers the device's predictive ability to date and concludes that it can successfully predict terminations in general and dismissals in particular.

The analysis section of this report contains a comparison of the predictive devices (the equations) used for several of the departments. For Oakland in particular an analysis is made to show which of the factors have the most influence on the predictions and the accuracy of the results to date. Finally, the overall meaning of the practicality of the researcher's classified rule is considered.

Based on the data available, our conclusion is that the results should not be implemented.

There are several reasons for this conclusion, which are detailed in the report. First, the approach used to estimate the likelihood of an individual's predicted classification being correct is only a rough one at best. It could be invalid when used on a new group of individuals. Secondly, the classification rule, which uses these likelihood estimations on the new hires, emphasizes the importance of identifying people who will terminate. This is done at the expense of eliminating people who will stay with the force. In other words, there is no consideration given to the problem of how many good people you can afford to turn away in your attempt to avoid hiring a bad one. Also it is not clear what the improvement would be if the force were made up primarily of those people who are predicted to stay with the force for seven years or more. Finally, the overall predictive ability of the device has not been validated. It appears promising when terminations alone are considered for several departments, but for Oakland the predictions on terminations are no better than what would be expected by simply saying every other person you hire will terminate. That is, one could predict with

50% probability those who would terminate. Since these predictions are based on staying with the department seven years or more, the overall predictive value of the model will have to wait a few more years. Even then the other objections raised may preclude its applicability.

Summary of the Study

Motivation and Objectives

The objective of Dr. Levy's study is the improvement of the calibre of men on the police force. The researcher proposes to accomplish this objective by developing an improved police selection technique. Motivated by the difficulties in describing the desired qualities and behavior of the ideal police officer, a screening device was constructed that purports to eliminate candidates with undesirable characteristics. The screening is accomplished by defining three distinct groups of police officers and predicting, before hire, into which of the groups a candidate will fall. The three groups are defined as:

Currents:	Officers who will remain with the force a minimum of seven years
Failures:	Unsuccessful police officers who will be separated for cause within seven years and be ineligible for rehire
Non-failures:	Police officers who, within seven years, will resign voluntarily and be eligible for rehire

Establishment of the Independent Variables

In order to find those particular undesirable characteristics, an assumption was made that a person's background factors as revealed in pre-employment information will significantly discriminate between individuals in the different groups. From a previous study in which 5000 personnel files were collected from 14 law enforcement jurisdictions, a total of 140 of these factors were selected based on pre-employment information. Using a standard statistical technique (regression analysis) she determined how useful each of these factors was in explaining why an individual belonged to one of the three groups.[1]

The findings on those factors where the researcher reports 99% confidence of their helping to explain an individual's membership in a group are listed in the following table. The table provides a general indication of the findings on how individuals in one group differ from those in another. In addition to the factors listed in the table, membership in a group was found to be significantly related to which of the 14 departments an individual belonged. Evidently some departments had a larger proportion of individuals in one particular group than did others.

[1] That is, regression analysis was used to calculate the correlation coefficients between the variables or factors and the three groups and to establish the level of statistical significance of a factor or variable's ability to explain the variance between groups. Although the specific model used to accomplish this is not explained, it would be possible to construct the appropriate ones.

Factors	GROUP		
	Currents	Failures	Non-failures
Age at employment	oldest		youngest
Education	least		most
Had police science course	most likely	least likely	
Tenure on previous jobs	longest		shortest
Dismissed from previous jobs	least likely	most likely	
Vehicle code violations	fewest	most	
Born in city of application	most likely		least likely
Years in city of residence	longest		shortest
Number of residences	fewest		most
Number of marriages		most	

In order to develop a consistent method for quantitatively predicting into which group a candidate would fall, linear discrimination analysis was used. The purpose of discriminant analysis is to classify objects (or individuals) into two or more exclusive categories (like the three groups) by a set of independent variables (the background factors). This is accomplished by developing, mathematically, weightings for each of the variables. When the weightings are multiplied by the presence, absence, or the level of the corresponding variables and are added together, a total score is produced for the individual. If this score is greater than a value assigned

by some predetermined rule, it is classified into one group as opposed to another.

Based on the previous statistical study discussed above and on inferences from her research on psychological considerations, a list of variables or factors was developed. A complete listing of these variables is attached.[2]

[2] See list on page 25, entitled "Description of Input Variables for Discriminant Equations". Three pieces of information are given on each variable to allow tie-in with her Fortran evaluation programs. These are:

1. The column on the input card for an individual where the value for the variable appears.
2. The name of the variable as it appears in the Fortran programs.
3. A description of the variable.

Establishment of the Equations

In developing the predictive equations two approaches are used. In one approach discriminant analysis is used to determine which variables are significant and to calculate their weighting. These are known as "Empirical" or "Computer" equations. In the other approach, the results from the first are adjusted subjectively by her knowledge of social psychology. These adjusted equations are known as "Levy" or "Logical" equations.

Using 954 individuals[3] from the previous study as a basis, the researcher developed her empirical (discriminant) equations. She began by considering the following sets of two groups each:

a. Currents vs. Failures and Non-failures lumped together
b. Failures vs. Currents and Non-Failures lumped together
c. Non-failures vs. Currents and Failures lumped together

Based on which department an individual was in she segmented her base of 954 individuals. For each of the 14 departments she determined which variables were significant in explaining membership in each of the groups (Current, Failure, Non-failure) at the 80% confidence level. This was accomplished by applying stepwise discriminant analysis BMD07M to each of the three sets (a), (b), (c).

Next, the researcher combined departments having similar sets of significant variables. This led to four combinations. On each of these combinations she again found out which variables were significant in explaining membership in the groups, but this time at the 95% level.

[3] This number consisted of 495 Currents, 209 Failures, and 250 Non-failures.

At this point the researcher apparently felt she had a set of variables that could explain membership in a group for each particular combination (i.e., for each given subcollection of the 14 departments). To determine the discriminant equations themselves (and hence the weightings for the variables), the researcher applied another discriminant analysis program, BMD04M.[4] This left a predictive equation for each group (Current, Failure, Non-failure) for each of the four combinations.

In order to either validate or disprove the predictive ability of her equations, a study is currently being conducted on 1765 new officers hired by the 14 departments between November 1, 1968 and October 31, 1969. In addition to testing the empirical equations discussed above the researcher has constructed the logically derived or Levy equations. These were developed for two reasons. First, Dr. Levy apparently feels the extent to which people differ with respect to some of the independent variables has changed between the base group and the new hires in the present study. Hence, she modified some of the weightings for these variables. For example, in Oakland, a larger portion of the new hires had taken police science courses than in the base group. Therefore, the weighting on this variable was reduced to zero. Secondly, some of the variables were not found to be statistically significant in explaining membership in a group even though her research on their psychological implications indicated their usefulness for prediction. After arriving at weightings for these

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[4] This may have been done because it was felt BMD04M was easier to interpret.

variables by department, Dr. Levy adds them into the modified empirical equations to form the logical or Levy equations.

To devise a rule for predicting the classification of individuals in her current study, the researcher drew from the results of the development of the empirical equations. For each group (Current, Failure, Non-failure) associated with each department combination, a ranking of each individual by score was obtained. To arrive at the probability of correct classification (her a posteriori percents) the members of the opposite groups that fell within a given level in the ranking were simply tallied. For example, suppose the equation for predicting failures in the department combination that includes Oakland had been based on 200 (out of the initial 954) individuals. Some of these 200 are Currents or Non-failures. If we look at those individuals having the top 10% of the Failure scores and find 18 were actually Failures while 2 are either Currents or Non-failures, we might say that any individual who scores in the top 10% has an 18/20 or a 90% chance of actually being a Failure.

In this manner the researcher constructs a relationship to derive an individual's percent from his relative ranking for each group within each department combination. After evaluating their scores from the appropriate discriminant equation (both empirical and Levy) and ranking them, this relationship was then applied to the individuals in the current study. Thus determined, an individual's percent for each group is used to predict his classification in the following manner:

1. If his Failure percentage is greater than 44% and is also greater than his Non-failure percentage then prediction is Failure.

2. If his Non-failure percentage is greater than 45% then prediction is Non-failure.

3. If his Current percentage is greater than 39% and Failure percentage is less than 39% then prediction is Current.

4. Everything else remains unclassified.

Results and Conclusions

The validity of the predictions as of January 1970, on 1056[5] of the original 1765 new hires between November 1, 1968 and October 31, 1969 is summarized in the classification table below for her Levy or Logical equations:

		Predicted Classification				
		Current	Fail.	Non-fail.	Not Class.	Actual
Actual classification as of Jan. 1970	Currents	371	418[6]		167	956
	Failures	16	43	10	11	80
	Non-fail.	5	11[6]		4	20
	Predicted	392	258	224	182	1056

As an illustration of how to read the table, consider the 80 people that were actually Failures. Of the 80, Dr. Levy predicted 16 would be Currents, 43 were correctly predicted as Failures, 10 as Non-failures, and no predictions were made on 11 of the individuals that failed. Assuming that all of the eleven Non-failures whose predictive category cannot be distinguished were predicted correctly, the researcher would have had 371 Currents, 43 Failures, and 11 Non-Failures correctly classified or

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[5] 166 individuals lacked some necessary date and the 543 cases from the sheriff's office were not included.

[6] The report does not contain sufficient information to break down actual Currents and Non-failures into predicted Fail. and Non-fail.

about 40% correctly classified. This can be compared with 36%[7] which would be the percent that would have been correctly classified on a strictly random basis.

Finally the researcher determines what is referred to as "p values". After testing the distribution of predicted terminations[8] against actual terminations she finds p = .14 for the empirical equations and p = .001 for the Logical ones. She offers no explanation of how these p values were calculated and little as to how they should be interpreted. Our guess is that they are the result of a chi square test which can be applied in the following manner:

1. The Failure and Non-Failure groups are lumped together as Terminations and the classification table is reduced to:

		Predicted Classifications			
		Current	Termin.	Not Class.	Actual
Actual classification as of Jan. 1970	Currents	371	418	167	956
	Terminations	31	64	15	100
	Predicted	402	482	182	1056

2. The hypothesis that the entries in the table are on a proportionate basis (i.e., are as can be expected on a strictly random basis) is then tested

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[7] Found by multiplying the proportion actual by the proportion predicted for each group and summing.

[8] Here the Failure and Non-failure groups have been lumped together.

by the chi square test.

3. The test shows the hypothesis can be rejected with a probability equal to p in that a true hypothesis is being rejected. In other words the probability that the entries have occurred the way they have, solely by chance, is one in a thousand for the logical equations.

Assuming a similar interpretation on p values from testing the distribution of the predicted classification vs. the distribution of the actual failures, p = .05 for the empirical equations and is less than .001 for the logical ones.

Based on these p values and on performance to date, Dr. Levy concludes:

1. A model (the Logical equations) based on pre-employment factors can successfully predict which recruits will terminate after 2 - 14 months.

2. This model will also successfully predict which recruits will be failures after 2 - 14 months.

Analysis of the Results

The Discriminant Equations

Attached are two tables illustrating the actual equations developed from the study. The weighting factors associated with each variable were obtained from the researcher's Fortran programs. These programs are used to evaluate the scores of the Logical and Empirical equations for each of the three groups, to sort and rank each individual by score, and to assign the appropriate percent depending on his ranking. The weights in the programs were checked against any lists of weights provided if available and were found to correspond.

The first of the two tables, Comparison of Empirical Equations, shows the variables and their corresponding weights for the police departments of Oakland, San Jose, and Los Angeles.[9] These are for the empirically derived equations. A blank corresponding to a particular variable or factor indicates that variable is not used in determining individual's group score for that city's equation. As an example of how to use the information to compute a person's score, assume we want to evaluate a person's Failure Score for Oakland. Suppose he has a tatoo, has had a police science course, has been discharged from two previous jobs, has never been a sworn policemen, and has had three previous jobs. His score would be 45 (17x1 - 12x1 / 6x1 / 14x0 - 2x3 / 40 = 45). There is not much similarity between the three cities with

[9] Data not available for Long Beach police department for the Empirical equations.

respect to which variables can be used for prediction or which ones are relatively more significant.

The second table, Comparison of Logical Equations, follows the same format as the first. These Logical equations exhibit a great deal more similarity than do the Empirical ones. The variables have been grouped to highlight their similarity. Notice the Long Beach equations are almost identical to the Oakland ones and the Non-fail equations are nearly the same for all cities.

Analysis for Oakland

Two questions that must be asked of any discriminant analysis study are:

1. Which variables or factors have the most influence in determining an individual's score for each of the groups?

2. How accurate are these variables in predicting an individual's actual classification?

To answer the first question we need to consider the size of the weights (regardless of sign) for each of the factors and then to rank the factors according to their weights. This approach would be successful except the values over which the variables can range is much greater for some variables than for others. Hence, given the same weight a variable which varies over a greater range of values has much more influence than one with a smaller range. Fortunately this problem can be corrected by multiplying the weights by the amount of variability (the standard deviation) of the corresponding factor.

The result of applying this type of analysis to the factors (or variables) in the Logical[10] equation for Oakland is presented in the attached table, Standardized Weights for the Logical Oakland Factors. Since the Failure group is the main group of interest in the study, the table has been constructed to highlight the relative importance of the factors used for predicting which individuals will fall in this group.

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10 Since the main emphasis is on the Logical or Levy equations this analysis has not been done for the empirical or computer equations.

Based on the classification rule for assigning individuals to groups for Oakland, additional analysis shows the five statistically most important factors overall are:

1. Years of education
2. Never having been married
3. Number of years in California after 16 years of age
4. An incorrect application blank
5. Having a tatoo

Again, these are the factors important to her classification scheme and not necessarily to an individual's actual classification. To determine the latter it would be necessary to examine her base data.

To measure the accuracy of the variable's ability to predict an individual's classification we need to compare her predicted classification against an individual's actual classification. The findings as of January 1970 for 13 of the 14 departments were discussed in the summary of her study. The results for Oakland as of February 1, 1971 are presented in the attached table, Oakland Classification Tables. This table shows her performance to date for both the Empirical and Logical equations. An analysis of the results from this table shows the following:

1. Empirical Predictions: Using her classification rule, 33 Currents, 2 Failures and 1 Non-failure are correctly assigned. This is 36 out of 83 or 43% overall. The 43% can be compared with 45% which is what would be expected if individuals were assigned to their predicted classifications in the same proportion but on a strictly random basis. Hence, overall she is not doing as well as pure chance. In looking at only those individuals that left

the force, 4 out of the 10 that left were predicted to leave. This 40% can be compared to 53% which one would expect to get right on a random basis. (She has 27 classified as Failures and 17 classified as Non-failures and 44/83 = 53%).

2. Logical Predictions: Using the researcher's classification rule, 37 Currents, 5 Failures and 0 Non-failures are correctly assigned. This is 42 out of 83 or 50% correctly assigned overall. The 50% can be compared with 47% which is the amount that would be correctly classified by chance. Again, looking at just those individuals that left the force, Dr. Levy had 5 out of 10 or 50% correctly classified. There is also a 50% chance of classifying someone to leave the force on a strictly random basis given the researcher's proportion classified as Failures and Non-failures.

These results do not indicate success in predicting an individual's classification to date. A list of the individuals for Oakland, their scores, and their predicted classification has been provided. With this information it will be possible to determine the validity of her predictions after a period of time that corresponds more closely to the seven years used in defining the three groups.

The Classification Rule

In order to use discriminant analysis, a classification rule must be developed for assigning individuals to groups. Normally this rule is used by comparing the scores from the discriminant equations against a pre-determined value. This value is based on what chance one is willing to take on being wrong in his classification. The scores themselves define the chance of being correct provided they were calculated by a valid discriminant analysis study.

As explained in the summary, the method the researcher used to calculate this chance is that of associating the ranking with the percent correctly classified. The percentage assignment as it appears in the Fortran Program for Oakland is shown in the attached table, Rank to Percentage Conversion. This assignment relationship appears to come from the base of the original 954 individuals. If this is true, there is no reason to assume that the present sample of new hires will have the same rank to percent correctly classified percentage.

Two rather obvious problems arise due to this ranking process. First, since it is the ranking of scores rather than the score itself[11] that assigns the probability, there is no way to assign one individual at a time. Further, let us suppose a set of individuals all have about the same scores and they are all low. If the equation is the one that predicts Failures, then the

[11] Although in the packet of information Dr. Levy associates actual scores with percent probabilities, it is apparently only after ranking the scores with the computer program.

individuals with the highest of these low scores will be assigned a high chance of actually being a failure, when in fact none of them should be classified in the Failure group.

Next, let us consider the decision rule itself. Without a classification rule that will accomplish a well defined and relevant objective, the study has no immediate practical value. In this study a relevant objective might have been to minimize the total cost (including social cost) of hiring mistakes. Notice, one cannot say "maximize the effectiveness or maximize the efficiency (effectiveness/cost) of the force" because this particular study does not deal with the question of individual job proficiency.

To accomplish a relevant objective it would first be necessary to know what action was to be taken on an individual, given his classification in one of the three groups. Secondly, it would be necessary to know what the penalties are for taking the prescribed action on an individual. In other words, what are the costs for being wrong. Then, after looking at an individual's scores to find the correct probability that he belongs to each group, it would be possible to choose the classification and take the corresponding action that minimized the expected or average cost of hiring the individual.

The rule itself is outlined in the first section of the report. It is doubtful that the researcher used the foregoing approach in arriving at this classification rule. The effect of the rule is to emphasize the importance of identifying the Failures and Non-failures at the expense of misclassifying some of the Currents.

Conclusions

Should the Study be Used?

To use the study as it stands, simply obtain the values of the pre-employment factors and multiply them by the appropriate weights given in the table, Comparison of Logical Equations. After summing to obtain a score, use the data in Dr. Levy's information packet to convert the scores to percents for each of the equations. Next apply the classification rule to the percents to arrive at each individual's classification. The final step would be to take action on the information just obtained.

Our recommendation is that the study, i.e., the information obtainable from the equations, should not be acted upon. The reasons for this recommendation are as follows:

1. First, the study has not been validated. As of January 1970, with two to fourteen months' experience on the new hires for 13 departments, she has 40% correct classifications. This 40% can be compared to 36% which is what would be expected if individuals were assigned to their predicted classifications in the same proportion but on a strictly random basis. Hence, overall the researcher's scheme is not much better than pure chance. Looking at the Failures and Non-failures as a group, Dr. Levy does better--with 64% correct vs. 46% correct on a random basis (for Oakland alone, only 50% correct predictions vs. 50% on a random basis). As mentioned earlier, this is a result of the decision rule's emphasis on catching the Failures and

the Non-failures. It will probably be three or four more years before any valid conclusions can be drawn.

2. Secondly, the approach used to develop the probability of correct classification provides only a rough estimate of their true value and cannot confidently be applied to a set of individuals different from the base group. It should be noted that Dr. Levy cannot properly estimate probabilities with the Logical or Levy equation since she has abandoned the statistical derivation of the equation in favor of judgment.

3. Aside from the problem that the decision rule tests percentages which may not be accurately estimated, there appears to be little consideration given to both sides of the hiring problem. In other words, how many good men can you afford to turn away in your attempt to avoid the hiring of a bad one?

4. Finally, it should be determined if a police force primarily made up of individuals from the group classified as Currents by the equations would be desirable.

Extension of the Findings to Future Studies

Assuming that Dr. Levy's study turns out to be valid, one result of its application would be to reduce turnover. In the sense of retaining good officers, reducing training and hiring costs, not employing people that will turn out bad, and having a more experienced force, this is a good objective. It is a questionable objective in the sense of selecting only those people who have the greatest likelihood of remaining for more than seven years. To resolve this question it is necessary to determine if there is a correlation between performance and score by group (particularly the Current group).

Any future study should be designed to overcome the objections raised in this report. Additionally, a sampling of individuals should be set aside from the base sample in order to immediately validate the results. Finally, some of the background factors that are significant in explaining behavior after hire will undoubtedly prove to be useful and should properly be included in any future study.

DESCRIPTION OF INPUT VARIABLES FOR DISCRIMINANT EQUATIONS *

Col	Code	Format	Description
1-6	ID	I6	ID Number
7	DEL	I1	N=No military service, *case deleted for conflicting or insufficient information
8	Q(1)	I1	Reason for becoming police officer (1=work with people, 2=influenced, 3=interest, 4=service mankind)
9	Q(2)	I1	Number of marriages (if Q(2)>1, Divor.=1)
10-11	Q(3)	I2	Age at first marriage (=0 if not married, =17 if 18, =23 if > 22)
12-13	Q(4)	I2	Age at birth of first child (same as above)
14-15	JSIBS(1)	I2	Total number of children in family
16-17	JSIBS(2)	I2	Applicant's birth order
18	JSIBS(3)	I1	Applicant is last born
19	JSIBS(4)	I1	Applicant is first born
20	M(1)	"	is a Jr.
21	M(2)	"	has a tatoo
22	M(3)	"	police science course
23	M(4)	"	police major
24	M(5)	"	does not drink alcohol
25	M(6)	"	negro
26	M(7)	"	divorced, separated or had marriage annulled
27	M(8)	"	-
28	M(9)	"	discharged from previous jobs
29	M(10)	"	received dishonors in military or in school
30	M(11)	"	lied or blundered on application blank
31	M(12)	"	-
32	M(13)	"	-
33	M(14)	"	unstable parents, divorced, separated, etc.
34	M(15)	"	divorced or separated parents
35	M(16)	"	dead parent
36	M(17)	"	-
37	M(18)	"	member of family was (is) police officer
38	M(19)	"	father was (is) police officer

* See footnote (2) on page 7.

Col	Code	Format	Description
39	M(20)	I1	brother is (was) police officer
40	M(21)	"	other relative is (was) cop
41	M(22)	"	-
42	M(23)	"	negative references (regardless of source)
43	M(24)	"	" " employer
44	M(25)	"	" " second employer
45	M(26)	"	" " character reference
46	M(27)	"	" " school
47	M(28)	"	" " neighbor or landlord or wife
48	M(29)	"	negative recommendation by background investigator
49	M(30)	"	" " " " interviewer
50	M(31)	"	" " " " psychiatrist, psychologist, or examining physician
51-52	M(32)	I2	height
53-54	M(33)	I2	age
55	GED	I1	GED or other highschool equivalency (no highschool dipoloma)
56-57	ED	I2	years education
58	PO	I1	was sworn police officer
[illegible]	GUARD	I1	corrections officer, guard, etc. (not sworn police officer)
[illegible]	COP	I1	PO and/or GUARD and/or military police
61-[illegible]	JOBS	I2	number of jobs
[illegible]	MIL	I1	served in military
[illegible]	MP	I1	was MP
[illegible]	MILRES	I1	was in reserve unit (only)
[illegible]	MILACT	I1	was on active duty
67-[illegible]	YRSMIL	I2	years in military
[illegible]	RANK	I1	highest rank achieved in last active military service
[illegible]	NAVY	I1	active Navy
71-72	RESID	I2	number of residences
73-74	YRSCAL	I2	years in California after age 16
75	BNZØA	I1	born in city he resides at time of application
76	P	I1	adult arrests for penal code violations
77	PJ	I1	juvenile arrests for penal code violations
78	DX	I1	law enforcement entrance tests taken previously
79	DXF	I1	law enforcement entrance tests failed previously
80	LC	I1	coder (1-cook, 2-Levy)

COMPARISON OF EMPIRICAL EQUATIONS

OAKLAND - SAN JOSE - LOS ANGELES

VARIABLES	Current			Failure			Non-Failure		
	OAK	SJ	LA	OAK	SJ	LA	OAK	SJ	LA
M(2)-has tatoo				+17	+ 5	+ 5			
M(3)-has police science course	+14			-12					
M(9)-discharged from previous jobs		-24		+ 6	+23	+10			
M(23)-age			- 5				- 2		+ 3
ED-years of education	- 2	- 2	- 1	+14	+ 3		+ 9	+ 3	
PO-was sworn policeman	-10								
GUARD-was corrections officer guard				- 2	+ 4				
JOBS-number of jobs	+ 2	- 1			-11			- 6	+1/2
MIL-served in military					- 8			+ 1	
MP-was MP		+12						+ 6	
NAVY-active Navy	+ 7	+ 2	+ 3				-10	- 2	- 3
RESID- number of residences			- 1						
YRSCAL-yrs in Calif. after 16 yrs(2)			+1/2	-1/3	-1/2	-1/2	- 2	- 4	-1/3
P-no. of adult arrests					-			-	- 3
DIVOR(1)-has been divorced	-17	- 8	- 5		+ 2			+ 5	+ 2
Constant	+100	+100	+50	+40	+50	+10	+20	+ 0	0

(1) DIVOR=1,if the number of marriages is greater than 1 or whether divorced, separated, or had annullment is indicated

(2) a maximum number of 10 years

COMPARISON OF LOGICAL EQUATIONS

OAKLAND - LONG BEACH - SAN JOSE - LOS ANGELES

VARIABLES	Current				Fail				Non-Fail			
	OAK	LB	SJ	LA	OAK	LB	SJ	LA	OAK	LB	SJ	LA
Is a Jr.									+6	+6	+6	+6
father policeman									+3	+3	+3	+3
no. Juv. arrests(1)									+2	+2	+2	+2
last born					+3	+3	+3	+2				
incorrect applic.				-3	+10	+10	+10	+10	-3	-3	-3	-3
unstable parents	-2	-2		-3	+10	+10	+10	+10				
neg rec bkgrd invest(2)	-2	-2	-2		+3	+3	+3	+3	-1	-1	-1	
previous fail PD exam	-5	-5	-5	-3	+5	+5	+5	+5				
no jobs but prev. mil.	-8	-8	-8									
has tatoo					+17	+17	+5	+5				
fired from past jobs	-10	-10	-24	-5	+6	+6	+23	+10				
dishonors school or mil					+6	+6	+3	+4				
dead parent					+9	+9	+3	+4				
any neg reference(2)					+3	+3	+2	+2	-1	-1	-1	-1
age									-2	-2		
highschool equivalency	-2	-2			+3	+3						
ex guard or corr off							+4				-4	
was MP			+6				-3					
no. of residences	-1	-1	-1	-1					+1	+1	+1/2	+1
age 21(7)	-2	-2			+2	+2		+1				
has been divorced	-17	-17	-8	-5	+6	+6		+2				
first born					+3				+3	+3	+3	+3
divorced parents	-1		-1		+2	+2	+1					
neg rec interviewer(2)	-2	-2	-2			+3	+3		-1	-1	-1	
years education	-2	-5	-2	-1					+6	+6	+3	+3
served in military	-4	-5	+3		+2	+2	-3		+4	+4	-1	
adult arrests(1)					+14	+3	+3	+3	-3	-3	-4	-3
born in city of applic	+9	+9	+9	+3	-2	-5						
no yrs in Calif(3)		+1		+1/2			-1/3	-1/2	-2	-2		-1/3
active Navy	+4	+6	+2	+3					-6	-6	-2	-3
no. of jobs	+1		-1		1				+1	+1	+1	+1/2
rank correction(4)	-*	-1/2*	-*	-1/2*	+*	+*	+*	+*				
never married	-6				+9							
no jobs & no military									-2			
reason joining force	-4	-8(5)	-4(5)	-3	+5	+9(5)	+5(5)	+5				
police science course		+4										
was sworn policeman		-2				+2	+3					
age at brth 1st chld(6)							+1	+1				
constant term	+100	+92	+100	+50	+40	+49	+50	+10	+20	+20	+0	+0

(1) maximum number of three

(2) if recommendation is strictly against hire then the weighting is doubled.

(3) a maximum number of ten years. The number of years is after age 16.

(4) If military rank 5, then *=0: if rank is less than 4 and years military is less than 4 then *=(4-rank)^2; if rank is less than 5 and years military is greater than 3 then *=(5-rank)^2; otherwise *=0

(5) If a single reason (ie., one and only one) is given for wanting to become a police officer, the sign (±) changes and this factor also becomes a variable. That is the weight of this new added variable is the same and it has the opposite sign (±). The weight given is for reason being service to mankind.

(6) If age at birth of first child is 14 or older but less than 22. then multiply the weighting by (age at birth of first child-21)^2 otherwise multiply by 0

(7) age 21=0 if age is greater than 22. If age=22, then age 21=1. If age is less than 22, age 21=4.

STANDARDIZED WEIGHTS FOR THE LOGICAL

OAKLAND FACTORS

VARIABLES	GROUPS		
	Current	Failure	N.Failure
Unstable Parents	- .8	+4.1	
Incorrect Application		+3.9	-1.2
Never Married	-2.1	+3.8	
Has Tatoo		+3.8	
Age 21	-3.1	+3.1	
Dead Parent		+3.0	
No. of Adult Arrests		+2.1	- .5
No. of Jobs Held	+2.0	-2.0	+2.0
Dishonors in School or M.L.		+2.0	
Discharged from Previous Jobs	-3.1	+1.8	
Previous Fail P.D. Exams	-1.8	+1.8	
Reason for Joining Force	-1.5	+1.5	
Negative Reference		+1.5	- .5
Last Born in Family		+1.4	
First Born in Family		+1.1	+1.1
Served in Military	-1.9	+ .9	+1.9
Has been Divorced	-2.4	+ .8	
Divorced Parents	- .4	+ .7	
Highschool Equivalency	- .5	+ .7	
Neg. Rec. Background Invest.	- .3	+ .5	- .2
Rank Correction	- .5	+ .5	
Born in city of Application	+2.1	- .5	
Years Education	-2.5		+7.7
No. Years in California			-5.6
Age			-4.5
No. of Residences	-2.4		+2.4
Active Navy	+1.3		-2.0
Is a Jr.			+1.9
No. of Juv. Arrests			+1.5
No. Jobs but Previous Military	-1.8		
Neg. Rec. by Interviewer	+ .6		- .3
Father was Policeman			+ .4

OAKLAND CLASSIFICATION TABLES

EMPIRICAL PREDICTIONS

Actual to 2/1/71		Current	Failure	Non-failure	
	Current	33	24	16	73
	Failure	5	2	0	7
	Non-failure	1	1	1	3
		39	27	17	83

LOGICAL PREDICTIONS

Actual to 2/1/71		Current	Failure	Non-failure	
	Current	37	16	20	73
	Failure	2	5	0	7
	Non-failure	3	0	0	3
		42	21	20	83

RANK TO PERCENTAGE CONVERSION

OAKLAND

The Individual's Score Ranks Between the Top	Percent Correct Classification	
	Scores are from Current Equation	Scores are from Fail and Non-FAil Equations
0% - 5%	90%	90%
5% - 10%	70%	70%
10% - 20%	70%	60%
20% - 25%	70%	50%
25% - 30%	70%	40%
30% - 37.5%	60%	40%
37.5% - 40%	60%	30%
40% - 50%	50%	20%
50% - 62.5%	40%	10%
62.5% - 75%	30%	10%
75% - 87.5%	20%	10%
87.5% - 100%	10%	10%

END

7 tables/figures