THEORY CONSTRUCTION AND PREDICTION IN JUVENILE DELINQUENCY*

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The Problem

The maturity of an empirical discipline is often evaluated in terms of its predictive capacity. If predictions are consistent with the results of repeated observation and experiment, this is powerful evidence in support of the generalizations or theories employed. In its early stages of development, a discipline makes predictions from generalizations concerning varied and discrete items of information. Integration of such generalizations under comprehensive theories occurs later.

Viewed from this perspective criminology is a young science. It has made considerable progress in establishing methods for selecting and combining predictive variables, comparing statistical and clinical predictions, revising predictive instruments on the basis of experience in their use, and assessing the impact of alternative treatments applied to a given population of offenders. But prediction and theory construction are still regarded as separate operations. Prediction consequently has little influence on criminological theory, and theory is infrequently employed in the development of predictive devices.

The problems of theory construction and prediction are nevertheless similar. We begin in both cases with a set of variables that are presumably related to delinquency. The task is then to determine the interrelations among the variables and their joint effect on delinquency. In prediction, an equation asserts the estimated probability of delinquency by combining variables or assigning weights based on previously observed relationships. Theory construction involves the formulation of a minimum set of postulates (law-like assumptions concerning relations among a few key variables) from which the remaining interrelations can be logically

derived. While prediction can often be achieved in the absence of theory, a valid theory will provide the information needed for prediction. Thus, the requirements for prediction and theory are comparable but more rigorous in the case of theory.

A closer rapprochement between theoretical and predictive inquiries would be beneficial to both. Prediction affords the supreme test of a theory's pragmatic effectiveness. Theory, on the other hand, systematizes the generalizations employed in prediction and elucidates the deductive implications of the system. The two procedures should therefore complement each other.

How to attain a more effective alliance between theory and prediction is the topic of this paper. It compares delinquent and nondelinquent boys, develops an elementary theory of delinquency, and illustrates the use of the theory in delinquency prediction. Although the illustrations are simple and quite restricted, the same analytical techniques are applicable to more complex and comprehensive theories and predictive devices.

The Data

Data were obtained on 195 boys attending two high schools located in the area of highest delinquency within a large Western city. The area, like most of those having excessive amounts of delinquency, is characterized by unemployment, unskilled workers, broken homes, ethnic minorities, school retardation, rental residences, buildings in need of repair, multifamily dwellings, etc. However, the two schools have a heterogeneous student body, including representatives of every social class and ethnic minority found in the city. The group studied is comprised of all delinquent boys and a random sample of the nondelinquent boys attending the two schools (117 delinquents, 78 non-delinquents, and a total population of 1700 boys.) School and court files were available. In addition, the subjects completed questionnaires. Variables investigated include age, race, social class, mobility, conduct, educational and occupational aspirations, normative attachments, perception of social opportunities, delinquent contacts, motivation for achievement, punitiveness, and self-conceptions. These are some of the variables identified in the literature as being importantly associated with delinquency.

This paper reports a few of the findings that can be integrated within a theoretical system having predictive utility. The theory was constructed independently of the data and was suggested by studies of youth culture. These studies reveal similar results concerning the endorsement of middle class goals among delinquents and non-delinquents, their perception of opportunities for achieving these goals, their motivation for achievement, and the frequency of their contacts with delinquents and adult offenders. The results of the present study indicate that these variables are interrelated in a logically consistent manner and that most of their interrelations can be derived from a single set of postulates.

Matrix of Interrelations: A Theoretical Model

An empirical theory has three distinguishing features. First is a vocabulary listing the relevant variables or concepts and indicating the theory's scope and focus. Second is a dictionary connecting the variables or concepts with the data of observation and experience. Connections between theoretical terms and observed data are established by means of operational definitions and rules of correspondence. Third is a grammar comprised of rules governing the formation of sentences or assertions within the theory. The grammar specifies how the terms of the theory may legitimately be used and communicates the logical processes by which theorems may be derived from the postulates. If a theory is to be used for pragmatic purposes, it is necessary that these three components be clearly enunciated.

Vocabulary: The vocabulary of the present theory includes the concepts delinquency, delinquent contact, endorsement of middle class goals, perceived opportunity, and achievement motivation. The theory applies to male urban youth of high school age and excludes deviant behavior that results from accident or mental illness.

Dictionary: Each of the concepts of the theory is treated as a dichotomous variable. Operational definitions are applied as follows:

1). A subject is delinquent if he has a juvenile court record. If there is no record, he is nondelinquent.

2). He has high delinquent contact if he admits personal acquaintance with ten or more delinquents. If acquainted with less than ten delinquents, he has low delinquent contact.

3). He has high goal endorsement if he reports that going to college is important for one's success in life. Otherwise he has low goal endorsement.

4). He has high perceived oppor-

tunity if he states that he is likely to go to college. Otherwise he has low perceived opportunity.

5). His rating on achievement motivation is high or low depending on his response to Aronson's graphic test of need for achievement. In the test, figures are flashed on a screen in view of the subject who is later asked to reproduce them. Scoring is based on the manner in which the figures are reproduced, the amount of detail, etc.

Several other procedures for observing the concepts were also employed. More elaborate definitions therefore could be utilized in the theory. They might produce a more comprehensive and powerful theory. In the present analysis, however, the above definitions are retained because their simplicity makes it easy to compare the logical and the empirical structure of the theory. What is the best definition, in any case, depends upon the kind of analysis to be made of the data.

Grammar: The theory's grammar is communicated by its postulates. Four postulates are needed to connect the five concepts. They were drawn from previous studies and in most cases assert relationships that have been frequently observed:

I. Goal endorsement has a positive relationship with perceived opportunity.

II. Perceived opportunity has an inverse relationship with delinquent contact.

III. Delinquent contact has a positive relationship with achievement motivation.

IV. Achievement motivation has a positive relationship with delinquent behavior.

Each of the postulates is a two-valued statement claiming that a certain kind of empirical relation holds true for the two concepts involved. Since the theory contains five concepts, there are ten combinations of these concepts taken two at a time. To express these relations ten two-valued statements are required. Thus, six theorems must be deducable from the postulates if the theory is logically valid.

Before the theorems can be derived, the meaning of the relationships asserted by the postulates must be stipulated in greater detail. Various kinds of relations are permissible. In the absence of previous tests of the theory, decisions regarding the nature of the relations are perhaps a matter of intuitive judgment. Since the postulates were drawn largely from studies using correlation techniques, however, the decision was to consider the relations as being symmetrical and transitive. A symmetrical relation is one in which the statement that A is related with B implies that B is also related with A. Transi-

tive relations are those in which the statements that A is related with B and that B is related with C implies that A is also related with C.

These assumptions enable us to state the following theorems:

V. Goal endorsement has an inverse relationship with delinquent contact (Derived from posulates I and II).

VI. Perceived opportunity has an inverse relationship with achievement motivation (Postulates II and III).

VII. Delinquent contact has a positive relationship with delinquent behavior (Postulates III and IV).

VIII. Goal endorsement has an inverse relationship with achievement motivation (Postulate I and Theorem VI).

IX. Perceived opportunity has an inverse relationship with delinquent behavior (Postulate II and Theorem VII).

X. Goal endorsement has an inverse relationship with delinquent behavior (Postulate I and Theorem IX).

Regardless of the order or method in which the theorems are derived, their claims are consistent. Together with the postulates, they cover all possible combinations of the concepts. This demonstrates the logical validity of the theory. There remains, of course, the question of its empirical adequacy.

Matrix of Interrelations: The Empirical Evidence

The distribution of proportions for all combinations of variables, estimated for the total population by extrapolation of the observed data, is shown in Table 1. Arrows indicate the relationship claimed by the postulates and theorems. Note that in every instance the theoretical claim holds true empirically, although in some cases the measure of association is relatively low.

The table shows also that delinquency is not equally associated with each of the other variables. For the total population, the delinquency rate is .07. By contrast, the rate is .29 for subjects having high delinquent contact and .04 for those having low contact. Again, subjects with high perceived opportunity have a rate of .03, whereas those with low opportunity have a rate of .13. High and low achievement motivation and high and low goal endorsement reveal rates of .09, .05, .06, and .10, respectively. These findings suggest that in delinquency prediction the major contribution will be made by contact and opportunity.

Furthermore, the findings indicate that certain combinations of variables are infrequently observed. Low goal

Table 1

MATRIX OF INTERRELATIONS: EMPIRICAL DATA *
Each entry lists estimated proportions of total population.

		Perceived Opportunity		Delinquent Contact		Achievement Motivation		Delinquent Behavior	
		High	Low	High	Low	High	Low	Del.	Non-Del.
Goal Endorsement	High	.55	.26	.07	.74	.35	.46	.05	.76
	Low	.05	.14	.06	.12	.08	.11	.02	.17
Perceived Opportunity	High			.05	.54	.25	.35	.02	.59
	Low			.08	.32	.10	.22	.05	.35
Delinquent Contact	High					.08	.05	.04	.10
	Low					.35	.52	.03	.84
Achievement Motivation	High							.04	.39
	Low							.03	.54

* Arrows indicate relationships implied by the theory. Single arrows specify theorems; double arrows specify postulates.

endorsement, for example, occurs rarely in combination with high perceived opportunity. Likewise, high delinquent contact is rarely combined with high perceived opportunity, and it occurs infrequently in combination with low achievement motivation. Apparently social processes in the community or in the subjects themselves operate so as to inhibit these particular combinations. What the processes are and how they operate is a subject for further investigation.

The general finding is that the population studied is distributed among the combined variables in accordance with the claims of the theory. To use the theory for prediction, however, requires that we know the relative distribution of delinquents and non-delinquents among the different combinations. If the ratio is the same in the various combinations, the theory has little utility in predicting delinquency. The implication is that the ratio will fluctuate when different variable are combined and that the fluctuation will be consistent with the claims of the theory. Table 2 provides the distribution of delinquents.

	Contact	
	High	**Low**
High	High contact-High opportunity (Group A)	Low contact-High opportunity (Group B)
Opportunity		
Low	High contact Low opportunity (Group C)	Low contact-Low opportunity (Group D)

According to the theory, the ratio of delinquents to nondelinquents should be highest in group C and lowest in group B. The observed ratios are 1 to 1.6 in group C, 1 to 6.8 in group A, 1 to 13 in group D, and 1 to 57.1 in group B. The difference between groups B and C is in accord with the theory. Although the theory makes no explicit claim regarding groups A and D, the difference in ratios is consistent with the finding that delinquent contact has a higher association with delinquency than does perceived opportunity.

Among the variables one interacts

Table 2

MATRIX OF INTERRELATIONS: EMPIRICAL DATA FOR DELINQUENT POPULATION
Each entry lists observed proportion of delinquent population.

		Perceived Opportunity		Delinquent Contact		Achievement Motivation	
		High	Low	High	Low	High	Low
Goal Endorsement	High	.24	.48	.32	.39	.42	.30
	Low	.00	.28	.21	.08	.14	.15
Perceived Opportunity	High			.10	.14	.16	.08
	Low			.43	.33	.39	.37
Delinquent Contact	High					.30	.23
	Low					.26	.21

When two variable are combined, the effect is to modify the ratio of delinquents to nondelinquents. To illustrate, let us examine the combination of delinquent contact and perceived opportunity. Four groupings are produced as follows:

with others in certain cases so as to contradict the theory. This variable is goal endorsement. It has an inverse relationship with delinquency. But it shows a positive relationship with delinquency when combined with high delinquent contact (when combined with low

delinquent contact, it operates according to the theory). This means that a special rule will have to be adopted when goal endorsement is used for predictive purposes.

Test of Predictions Based on the Theory

When the four dichotomous variables theoretically related to delinquency are combined simultaneously (four at a time) there are sixteen possible combinations. Prediction involves, first, estimating the relative delinquency rates in the different combinations and, second, arranging the combinations in a sequential order that is consistent with their ascending or descending delinquency rates. Since the postulates and theorems deal with only two variables at a time, we need another rule to establish priorities among the combinations of four variables. Various kinds of rules have been suggested for this purpose. One suggestion is to use a multiple regression technique in estimating the differential contributions of the variables. Another is simply to assume that delinquency rates are negatively correlated with the proportions of the total population that are found in the different combinations. The rule employed in the present analysis, however, is based on the marginal frequencies of the original matrix indicating the relationship between delinquency and each of the other variables. The rule asserts that in any combination the greatest contribution to delinquency is made by contact, the next greatest by opportunity, the next by achievement motivation, and the least by goal endorsement. This rule establishes a system of priorities among the variables so that their combinations can be arranged in a predetermined sequence.

The procedure for employing the rule is illustrated below. First the combination theoretically having the highest delinquency rate is recorded (High Contact, Low Opportunity, High Achievement, High Goals). There are four combinations that deviate from this pattern on only one variable. These are listed next. Then the six combinations deviating on two variables are listed, followed by the four that deviate on three variables, and finally the one combination that deviates on all four variables. The result is a complete listing of combinations ordered roughly in terms of their descending delinquency rates.

The priority rule provides for further ordering of the combinations within each of the sets listed. Among the combinations that deviate from the delinquency pattern on only one variable, for instance, the one deviating on the weakest variable (Goals) is listed first, then the one deviating on the next weakest (Achievement), and so on. Table 3 presents the observed delinquency rates for the combinations ordered in this manner. It is clear that the rule provides for an appropriate arrangement of the empirical findings.

Some criminologists have argued that separate theories of delinquency will have to be constructed for different ethnic groups and social classes. The implication is that these groups respond differently to social situations and that different causal processes are in effect. If this is the case, then our predictions, although fairly accurate for the total population, may be inadequate for certain populations segments. For this reason separate prediction tables were constructed for the different ethnic and social groups in the study population. No appreciable differences were noted in the accuracy of prediction. The rate of

Table 3

TEST OF PREDICTIONS ON TOTAL POPULATION

Contact	Opportunity	Achievement Motivation	Goal Endorsement	Delin- quents	Non- dels.	Projected Total	Prop. Dels.
High	Low	High	High	13	0	13	1.00
High	Low	High	Low	12	1	32	.38
High	Low	Low	High	13	1	33	.39
High	Low	Low	Low	12	2	53	.23
High	High	High	High	10	3	71	.14
High	High	High	Low	0	1	20	.00
Low	Low	High	---	21	12	265	.08
High	High	Low	High	2	0	2	1.00
High	High	Low	Low	0	0	0	--
Low	Low	Low	---	18	13	282	.06
Low	High	High	---	9	16	334	.03
Low	High	Low	---	7	29	596	.01

delinquency, of course, is much higher for Negroes than for Caucasians and for lower class boys than for middle class boys. But the prediction data suggest that these variations can be explained largely in terms of the relative concentrations of these groups within the different combinations of variables listed in the theory. Table 4 gives the relevant data for ethnic minorities, excluding orientals, in the study population.

What about the remaining variables included in the study? It appears that some of them can be added to the theory, thereby increasing its comprehensiveness and possibly its predictive efficiency. Delinquents, for example, tend to rate security as being more important to them than happiness while nondelinquents attach greater importance to happiness. Again, delinquents often perceive social norms as idealistic prescriptions that nearly everyone violates, whereas nondelinquents see the norms as actually influencing people's conduct. Important differences also are found in self-conceptions, punitiveness, and several other factors. Perhaps these can be incorporated within the theoretical framework. Some other variables probably can best be used as indicators of conditions under which the theory holds true. The specification of such conditions is of crucial significance in any theory that is to be used for pragmatic purposes. Thus far, criminology has paid little attention to the conditions under which theories operate.

Conclusion

Our objective in this report is to demonstrate that it is both possible and profitable to coordinate theory construction and prediction in empirical research. The elementary theory developed here is used for illustrative purposes and is by no means a finished product. So far as predictive efficiency is concerned, however, this theory compares favorably with most of the conventional devices employed in delinquency prediction.

Unless prediction is integrated with theory construction, there is little basis for evaluating alternative definitions of concepts or alternative formulations of postulates. Theory cannot be accepted on the basis of its logical validity alone. At the same time, predictions from independent and perhaps inconsistent generalizations are not likely to be effective when applied to different populations or to different time series. There is a sound basis for the assumption that theory will help to increase the reliability and validity of predictions. For these reasons we believe that criminological research would produce more cumulative and verifiable knowledge if theoretical and predictive frameworks were developed jointly.

Table 4

TEST OF PREDICTIONS ON ETHNIC MINORITIES - EXCLUDING ORIENTALS

Contact	Opportunity	Achievement Motivation	Goal Endorsement	Delinquents	Non-Dels.	Projected Total	Prop. Dels.
High	Low	High	High	2	0	2	1.00
High	Low	High	Low	3	0	3	1.00
High	Low	Low	High	4	0	4	1.00
High	Low	Low	Low	6	1	26	.23
High	High	High	High	5	1	25	.20
High	High	High	Low	0	0	0	--
Low	Low	High	---	10	6	132	.08
High	High	Low	High	1	0	1	1.00
High	High	Low	Low	0	0	0	--
Low	Low	Low	---	7	5	109	.06
Low	High	High	---	1	2	42	.02
Low	High	Low	---	0	3	61	.00