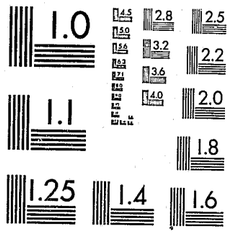

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A Factor Analytic Study of Patterns in Delinquent Behavior

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Abstract

Three existing theories about patterns in delinquent behavior, namely specialized, generalized and random delinquency, are discussed. Studies supporting each of the three theories are reviewed. Although no one theory is consistently supported, the currently available evidence points toward some kind of systematic patterning in delinquency, whether specialized or generalized. Lack of consensus about the nature of these patterns is attributed largely to instrument differences. A factor analysis of official arrest records for nearly 29,000 male members of a Danish birth cohort is presented. The analysis included 56 common and/or criminologically interesting offenses. Four factors were found: (I) general crime; (II) traffic-related offenses; (III) white-collar crime; and (IV) sex offenses. Although the analysis resulted in a large unique variance component, the four factors cross-validated quite well. The issue of difficulty factors as a competing explanation is addressed, and it is concluded that the present results are not the product of a difficulty artifact. The results of this study support the generalized delinquency hypothesis. However, many crimes appear to be independent of any pattern.

A Factor Analytic Study of Patterns in Delinquent Behavior

The social sciences have been seeking some understanding of delinquent behavior for a number of years, but have met with limited success. One fundamental question that has been addressed many times and remains unanswered concerns the existence of delinquency specialization. The issue is whether there are certain types or patterns of delinquent behavior. Some theorists have advanced the idea that delinquents tend to engage in a limited range of related delinquent activities (Cloward and Ohlin, 1960) that can be labelled specialization patterns. Others have suggested that while discernable patterns of delinquency do exist, they are weak or interrelated and ought to be considered part of a generalized tendency toward delinquent behavior (Hindelang, 1971a, 1971b). Klein (1980) has taken the position that young people select delinquent acts "cafeteria style"; that is, they more or less randomly choose from among the array of available delinquent activities.

Twenty years of research using a variety of statistical techniques, including Guttman scaling (e.g., Smith and Cartwright, 1965), progression analysis (e.g., Wolfgang, Figlio, and Sellin, 1972) and factor analysis (e.g., Gibson, 1971; Hindelang, 1971a,1971b; Kulik, Stein, and Sarbin, 1968; Quay and Blumen, 1963; Short and Strodtbeck, 1965; Short, Tennyson, and Howard, 1963; Walberg, Yeh, and Patton, 1974) have failed to provide consensus about the existence or non-existence of specialization patterns. Furthermore, when specialization patterns have been found they have only infrequently been replicated, as Table 1 shows. Such lack of agreement seems puzzling on the surface, but a closer look at the research generating these results reveals that the literature on delinquency specialization cannot be considered a series of attempts to replicate the same specialization patterns. Differences in the content of dependent measures

often make it logically impossible for two studies to obtain even roughly similar results. In addition, inadequacies in methodology and reporting abound in this literature, making it difficult to draw valid conclusions.

Devoting its attention to the factor analytic approach to delinquency specialization research, this paper will first discuss the predictions made by the delinquency specialization, generalized delinquency, and random delinquency hypotheses. Then the evidence in the literature supporting each perspective will be reviewed. Next, replication among the factors that have emerged in some studies will be examined, along with possible reasons for the overall lack of replicated factors in this literature. Differences between the two most commonly used methods of gathering delinquency data, self-report questionnaires and official records, will be discussed in light of data reliability and validity. Then a factor analysis of arrest records data will be presented.

Predictions Made by the Three Theories

The foremost question the delinquency specialization literature must address is whether delinquent behavior is specialized, generalized, or random. In order to answer this question the predictions made by the three theories must be examined.

The delinquency specialization hypothesis predicts that a factor analysis of delinquency data should yield clear-cut factors representing patterns of delinquent behavior. If correlations among factors are allowed (i.e., oblique rotation is used) the correlations should be small. On the other hand, the generalized delinquency hypothesis predicts that the first factor extracted should be by far the largest, and that this factor should be a general delinquency factor. If correlations between factors are high in an oblique rotation, this may be evidence for a higher-order delinquency factor. Correlated factors are not necessarily evidence for delinquency specialization, though, because higher-order factors often reflect response style when the data come from questionnaire responses.

Both the specialized and generalized delinquency theories predict that systematic patterns of behavior can be found in delinquency data. In contrast, the random delinquency hypothesis predicts that factor analysis should find mostly unique variance. Such a hypothesis is difficult to demonstrate, since unreliability in the data can also cause a large unique variance. For this reason studies using official records data, which are prone to unreliability problems, should expect a larger proportion of unique variance than studies using self-report data.

Methodological Inadequacies

Before drawing conclusions from this body of literature the validity of the findings should be examined. A major obstacle to such examination is the ubiquitous problem of incomplete reporting. Every study cited here has omitted crucial information from the write-up. For example, four of the articles cited in this paper (Walberg et al., 1974; Hindelang, 1971a,1971b; IJR, 1972) do not report communalities, and of these four only Walberg et al. report factor loadings. This omission is especially noteworthy in Hindelang's research, where the factors may have been defined a priori and therefore should be examined for fit. Another vital piece of information missing from most articles is the proportion of offenders in the sample. Although a representative sample of adolescents, including both delinquents and non-delinquents, is desirable, the reader should be assured that a study's conclusions about delinquent behavior are based on a reasonable number of delinquents.

Many studies also omit valuable information about the nature of the data. Short et al. (1963) reported that their observational data were collected in the form of a checklist, but the specifics of the response scale were not given. At least some of the items were dichotomous, prompting Short et al. to collapse their original 69 items into 37 because they "wished not to have a large number of dichotomous variables" (p. 417). These collapsed items were made up of anywhere from 1 to 8 items and produced values varying in range from 0-1 to 0-11. Although Short et al. reported which items were combined to form the new items, the reader is never told exactly how the aggregation was done. Without knowing the scale properties of the original items or the process by which they were combined, it is impossible to judge whether the final product was suitable for factor analysis. Hindelang (1971a) had subjects report the number of times they had engaged in each activity mentioned on his questionnaire. For purposes of analysis all responses taking on a value greater than 9 were treated as 9's. Hindelang explains that "this procedure was followed so that extreme scores would not distort the mean values" (p. 524). The more common and more easily interpretable solution would have been the use of a logarithmic transformation. Hindelang does not report his reasons for following his chosen course of action, nor does he inform the reader whether there was actually a high proportion of responses above 9 in the data.

In short, lack of information about procedure should make the reader cautious about drawing conclusions from this literature. Bearing in mind that critical review is impossible in many cases, let us examine the research supporting each of the three theories of delinquent behavior.

Research Supporting Specialized Delinquency

Although they do not report the proportion of offenders in their sample, Walberg, Yeh, and Patton (1974) do report that they bolstered the proportion of delinquent subjects in their "random sample" of Chicago high school students by the addition of a number of students nominated by their teachers as bona fide delinquents, and by the drawing of part of the sample from a special school for girls with behavior disorders. Thus, the sample probably contains a sizeable minority of offenders. The authors used a questionnaire containing 3 automobile-related items, 4 items having to do with aggressive behavior, 3 items having to do with theft, one item concerning alcohol and one concerning drug abuse, and one item about running away from home. In addition, there were two items concerning contact with the police. The five principal components reported by Walberg et al. (see Table 1) accounted for 66 and 64 percent of the variance in male and female samples respectively, leaving a relatively small proportion of unique variance. Although the first component is quite a bit larger than the next, all five are substantial. Hence, this study seems to provide evidence in favor of delinquency specialization.

Short and Strodtbeck (1965) gathered self-report data from 469 boys, about half of whom were offenders. Short and Strodtbeck's 23-item instrument included only 8 items having to do with delinquent behavor. These 8 items included one item about truancy, 2 items about making money illegally, 3 items having to do with aggressive gang behaviors, one item about alcohol and one item about drug abuse. The rest of the items were about behaviors in which any adolescent might engage, such as dancing or sexual activity. They performed a principal components analysis with Varimax rotation, arriving at six factors (see Table 1). While the authors give no details about the relative sizes of the factors, they indicate in the text that each factor makes a sizeable contribution.

Another study supporting delinquency specialization was conducted by the Institute for Juvenile Research (IJR, 1972). IJR gathered self-report data on a sample of 3100 young people, including both offenders and non-offenders. Their report lists five factors, but the researcher is not informed of the factor analysis procedure, method of rotation, communalities, or factor loadings. This paper is a rather extreme example of unduly brief reporting, and its results should be viewed with caution.

Quay and Blumen's (1963) research was unique in its use of official records. The authors gained access to the juvenile court case records of 191 males who had experienced repeated arrests and who had undergone at least one sentence to a correctional institution. It is not clear from the report whether these were arrest or conviction records. A 50-item checklist of delinquent acts was prepared, and Quay and Blumen then determined whether each subject had a record of having committed a given offense. Only the 13 most frequently committed acts were retained for analysis. These included three automobile-related offenses, four offenses having to do with theft or property damange, one alcohol-use offense, truancy, running away, assault, and disorderly conduct. A centroid factor analysis with quartimax rotation was performed on a matrix of phi coefficients. Five factors were extracted (see Table 1). The variable communalities were low, ranging from .10 to .55 with a median communality of .23; however, this is to be expected when official records are used.

Research Supporting Generalized Delinquency

Although Klein (1980) cites Hindelang's (1971a) results as support for his notion of random delinquency, both of Hindelang's studies found systematic components to delinquent behavior. The author used a 24-item questionnaire in his first study (Hindelang, 1971a) containing four items having to do with theft or property destruction, six items about alcohol and drug abuse, six items having to

do with aggressive behavior, three items about automobile-related misbehavor, two items about school-related misbehavior, one item about gambling, one item concerning false identificaton, and one item about promiscuity. Hindelang's 1971b article used the same instrument with the addition of two items concerning sexual behavior. Hindelang found six intercorrelated clusters in each of his studies (see Table 1). Correlations between factors were high in Hindelang (1971a), ranging from r = .14 to r = .65 with a median correlation of r = .50. Correlations between factors were not reported in the second study (Hindelang, 1971b). The author suggests that this high degree of relationship among factors is "indicative of a generalized rather than a specialized delinquent involvement". It should be noted that Hindelang's investigations used data gathered from male Catholic high school students, making it possible that there were few offenders in his sample.

For their factor analysis Kulik, Stein, and Sarbin (1968) drew a sample of 200 delinquents, comprised of 100 delinquents and 100 non-delinquents, from their larger sample of 505 non-delinquent high school boys and 391 institutionaliz delinquent boys. Details of the 52-item questionnaire are not given, but the authors report that they constructed the questonnaire with the hope of covering a wide range of severity. Four factors were reported (see Table 1). The authors reported that these results replicated well on the 100 delinquents alone as well as on the 505 non-delinquent subjects. However, no information beyond this assertion is provided. They suggested that the substantial intercorrelation among their factors is evidence for the emergence of delinquent behavior "from a background of general misbehavior".

One study supporting the generalized delinquency perspective but frought with procedural inadequacies is Gibson (1971). Gibson's data were gathered form

a cohort of boys, 15 percent of whom had been convicted of delinquent offenses according to official records. The 32-item behavioral checklist used in this study contained 16 items about theft, four items concerning vandalism, two items about encounters with the police, five minor offenses such as riding a bicycle without lights, one item about gambling and one about truancy. Since the data concerning delinquent acts committed were self-reports and not official records, an unknown proportion of the boys were offenders who had never been convicted of an offense. Gibson reports that his factor analysis accounted for 60.3 percent of the total variance, leaving only 39.7 percent unique variance. However, Gibson retained 12 factors for rotation. Factor loadings are reported for only the first three factors, so it is impossible to judge whether retaining this many factors was appropriate. Gibson extracted three substantially intercorrelated higher-order factors.

Since the first first-order factor accounts for 20 per cent of the total variance this research seems to lend support to the generalized delinquency hypothesis. However, Gibson's interpretation of the factors is questionable. First, he interpreted the first four unrotated factors. His interpretations would probably be revised considerably if rotated factors were examined. Second, the author called the first higher-order factor a "social handicap" factor and the second a "criminal conviction" factor on the grounds that these items possess the highest positive loadings on their respective namesakes. However, in constructing his interpretation the author overlooked the fact that eight variables have loadings on the first higher-order factor greater in absolute value than the social handicap variable. The author did not comment on why so many delinquency items, including shplifting, petty theft, and vandalism, among others, should be bipolar with "social handicap" when "it is true to say that the more (socially) handicapped boys admit to more delinquency in general". It was also not mentioned that the social handicap variable itself had a higher loading on Factor II than it did on Factor I. Thus the interpretation of these results is questionable on procedural grounds.

Research Supporting Random Delinquency

An extensive search of the literature uncovered only two studies that support the hypothesis of random delinquency, namely Gold (1970) and Klein (1980). Of course, there may have been other analyses supporting the random delinquency hypothesis that have never reached publication. As Rosenthal (1978) has pointed out, null results are much more likely than positive results to be relegated to the researcher's file drawer, never to reach publication.

It is unfortunate that Gold (1970) and Klein(1980) offer neither details about their instruments nor specific information about what factor analysis procedures were attempted. Gold performed factor analyses on his entire sample of 522 high school students, on a subset consisting of the youngsters who had committed at least two offenses, on "the most delinquent" 30 per cent, and on "the most delinquent" 15 percent. He stated simply that "no typology of offenses emerged". Klein reported a factor analysis performed on official records of 800 juvenile gang members. When "five factors emerged which made absolutely no conceptual sense whatsoever", Klein concluded that the data were a "random display".

We have already stated that the published reports of factor analyses performed on delinquency data are so sketchy that much of this literature cannot be read critically. However, even if the reader takes the authors' conclusions as given, it appears that no one of the three hypotheses has been supported much more often than any other. There is some evidence for a systematic component to delinquent behavior, though, whether it be sharply defined specialization patterns or more diffuse patterns indicating generalized delinquency. Only two of

the studies cited here provide evidence in favor of random delinquency, and this evidence consists of a very minimal amount of information. If random delinquency is to be considered a viable theory of delinquent behavior, researchers who have filed away unsuccessful attempts at factoring delinquency data must share the details of these attempts with the scientific community.

Replication of Factors

If the existence of systematic, measurable patterns of delinquent behavior has been suggested by much of the delinquency specialization literature, what are those patterns? Table 1 contains the factors found by Walberg et al. (1974), Short and Strodtbeck (1965), Short et al. (1963), Quay and Blumen (1963), Kulik et al. (1968) and Hindelang (1971a,1971b). Factor loadings are included if the authors provided them in the research report. Examination of Table 1 reveals three factors that are replicated a number of times. One of these is an "automobile-related misbehavior" factor, appearing in Walberg et al. as Factor IV for males and Factor V for females; in Short et al. in the "authority protest" factor; in Quay and Blumen's "impulsive and thrill-seeking delinquency" factor; in IJR's "auto violations" factor; and in Hindelang's "driving offenses" factor. Another pattern that appears fairly frequently is an "aggression" factor. This is represented by Walberg et al.'s Factors II and V for boys and Factors IV and V for girls; by Quay and Blumen's "interpersonal aggression" factor; by IJR's "violence" factor; by Kulik et al. in their "assaultiveness" factor; by Hindelang (1971a) in his "conflict" factor, and again by Hindelang (1971b) in his "aggressiveness" factor. A third replicated factor is "drug use", appearing in Kulik et al., IJR, both of Hindelang's articles, and Short et al..

Although some agreement exists, every study cited here without exception contains unreplicated factors. One major cause of this failure to replicate has

been instrument differences among studies. All of the studies cited here except Quay and Blumen (1963) used questionnaire data as dependent measures. Decisions about what items should be included in a delinquency questionnaire are in part subjective ones, infuenced by the researcher's taste and priorities and any situational constraints, such as local school board censorship. There have been nearly as many self-report delinquency measures as there have been researchers on self-reported delinquency. Some instruments have even contained items pertaining to mildly deviant and normal behaviors as well as delinquent behavors. For example, Short and Strodtbeck (1965) and Kulik et al. (1968) included items of this type in their questionnaires. These studies reported some factors comprised of normal or only slightly deviant behaviors that can by no means be labelled delinquent.

Naturally, to the extent that questionnaires differ in content the factors extracted from them must be different. Thus, one potential explanation for the failure of factor analyses of delinquency data to replicate factors is that there has been no attempt to replicate. Certain factors may have appeared in only one or two studies because other investigations used questionnaires that contained few or no items pertaining to those factors. For example, almost all of the research in delinquent behavior has requested information about automobile-related misbehavior. It would be erroneous to conclude that the "automobile-related misbehavior" factor is the most reliable since it has been replicated most often. "Aggression", "drug use", or some other factor may replicate frequently in future research if an attempt is made to standardize at least part of delinquency questionnaire content.

Reliability and Validity of Data: Self-Report vs. Official Records

There are two commonly used ways of obtaining data on delinquent behavior. One way is the administration of a self-report questionnaire; the other is the obtaining of official records. Each type of data has advantages and disadvantages, and each has a unique contribution to make.

Self-report questionnaires are typically administered under the close supervision of the researcher. Consequently they tend to be much more reliable than official records, which are subject to unreliability introduced by variability in recording methods, changes in policy, and the like. However, the variance contributed from these sources is unlikely to be systematic, while social desirability concerns can introduce bias into retrospective accounts of behavior.

We have already mentioned that there have been many different self-report delinquency questionnaires, each containing items selected by the researcher who constructed it. In most cases there was no attempt to exhaustively cover all possible offenses, and the decision about what items to include was the researcher's alone. On the other hand, official police files record society's censure of societally defined delinquency. Thus, the content of these records is not dependent on the judgment of the researcher. Instead the "items", actually crimes, are societally agreed-upon measures of delinquent behavior. There is also a difference in focus between self-report and official offense records. It has been well established that self-report measures of delinquency and official police records tap somewhat different behavioral domains (Hindelang, Hirchi, and Weis, 1979; Gould, 1969), with self-report measures emphasizing less seriously delinquent activities, such as promiscuity and truancy.

Thus, the choice of a valid measure of delinquent behavior depends largely on two considerations: (1) whether the researcher wants to investigate certain specific behaviors to the exclusion of others or wants to investigate a very wide

variety of delinquent behaviors; and (2) whether the researcher is interested in minor offenses unlikely to be recorded by the police or in more serious delinquent offenses.

The Present Study

The interest of the present study is delinquency specialization patterns in a wide range of serious offenses. Therefore, a factor analysis was performed on official arrest records. The subjects comprise a complete birth cohort of nearly 29,000 males in metropolitan Copenhagen, Denmark. 10,922 boys from this cohort are recorded as having had at least one police contact, and altogether 122 different offenses were catalogued. The scope of the study and the quality of the data on which it is based (Wolfgang, 1977) puts the present analysis in a unique position to provide information on delinquency specialization.

Method

Data Source

This cohort consists of all male children born in Copenhagen between January, 1944 and December, 1947.[1] Since the Danish society is a very stable one, the severe attrition difficulties which frequently hamper retrospective studies are minimized. Altogether, 31,436 boys were identified by examining the parish records for birth information. Of this number, 2557 individuals could not be located at the time the study began. Of this number, 1791 were deceased, 703 had emigrated, and the remainder (63) could not be located in the national archives (folkregister) which contains current residence information. Thus fully 88 per cent of the cohort, or 28,879 people, were available for study.

The offense information was obtained from a second national register which records all police contacts for every resident in Denmark. Wolfgang (1977) has written regarding these data, "The reliability and validity of the Danish record-

keeping system are almost beyond criticism. The criminal registry office in Denmark is probably the most thorough, comprehensive and accurate in the Western world" (p. v). The information was collected in 1975, when the older cohort members were 31 years of age. Thus, the data contain records throughout the entire adolescence and early adulthood of each subject.

For each arrest record, information is given about the age at arrest, the court sanction that was later applied, and the penal code violations that resulted in the police contact. Ten thousand nine hundred twenty-three cohort members recorded at least one arrest. Of these offenders, the most active offender produced 42 distinct police contacts.

The data file contains information on a total of 130 offenses, but the extremely low frequencies for many offenses prompted the reduction of the set to 56 offenses. The elimination of offenses was decided upon by constructing a frequency distribution. Any offense with an incidence of less than one tenth of one percent in the cohort was a candidate for elimination. Exceptions were made for very serious offenses that have received attention in the criminology literature, such as arson and murder. Also violations of obscure technical codes or very trivial offenses, such as improper bicycle maintainance, were eliminated regardless of frequency. Table 2 contains a list of the final set of 56 offenses and their percentage frequencies. Note that the frequencies are low in all cases, the largest being an incidence of 12.06 percent for theft/housebreaking. A list of the offenses that were excluded from the analysis is given in the Appendix.

Procedure

A subject was given a score of zero for a crime if he had no record of having been arrested for that crime, and a score of 1 if he had a record of having been arrested for that crime once or more than once. In other words, the crimes

were coded dichotomously, with no record made of repeated arrests for a single crime. The topic of interest here is patterns of delinquent behavior, not recidivism, and our procedures are designed for application to binary data.

Cross-validation, the practice of performing separate analyses on subsamples for comparison purposes, allows the researcher to assess the stability of parameter estimates--in this case factor loadings--across sampling fluctuations. Because a large sample size was available it was feasible to split the cohort into two subsamples in order to allow cross-validation. Each subsample contained half of the subjects. Random assignment to subsamples was done in such a way as to assure nearly equal splits of 28 low-frequency (under N=50) offenses.

Results

As a preliminary step, principal components factor analyses were performed on each subpopulation using the principal axis without iteration (PA1) procedure in the SPSS factor analysis program (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975). This analysis yielded twenty-four eigenvalues greater than unity in each subpopulation. Since no factor beyond the first five had more than one loading greater in absolute value than 0.2 a five-factor common factors solution was computed using the principal axis factoring with iteration (PA2) procedure in SPSS. Table 3 contains the eigenvalues yielded by this analysis.

In order to verify that factor loading patterns represented non-chance phenomena the factor pattern matrices for the two subpopulations were orthogonally rotated to a mutual least-squares fit using Cliff's (1966) factor matching program. The rotation resulted in substantial correlations between the two subpopulations on the first three factors ($r_{I,I} = .99$; $r_{II,II} = .95$; $r_{III,III} = .87$), a weaker but still respectable correlation for the fourth factor ($r_{IV,IV} = .76$), and virtually no relation between the samples on the fifth ($r_{V,V} = -.02$).

Accordingly, the first four factors from each subpopulation were further rotated to a Varimax solution. These four factors together accounted for 8.89 and 8.71 percent of the variance, respectively, in each sample -- rather low proportions. Rotation was done on each subpopulation separately as well as on the two subpopulations in tandem. These results are presented in Table 4. The similarity in loading patterns across the two subpopulations is striking, although the reader will note that Factors I, II, and III replicated somewhat more reliably than Factor IV, as reflected in the correlations reported above.

Factor I, containing by far the largest number of indicators, seems to be a GENERAL CRIME factor. This factor is composed of offenses varying widely in seriousness, and even including three traffic-related offenses. Factor II is clearly a TRAFFIC OFFENSES factor, containing only traffic offenses, and those generally of a less serious nature than the traffic offenses loading on Factor I. Factor III is a small WHITE-COLLAR CRIME factor, and Factor IV, also a small factor, seems to reflect SEX OFFENSES.

Every bit as interesting as finding which offenses cluster together is finding which ones stand alone. The bottom of Table 4 contains a list of the crimes in the reduced set of 56 that did not load on any factor. A number of crimes that have been of great interest to criminologists appear on this list, including serious violent crimes such as murder, rape, arson, and armed robbery.

Discussion

Although much of the research in delinquency specialization has found an "aggressiveness" factor (Walberg et al., 1974; Quay and Blumen, 1963; IJR, 1972; Dembo, 1973; Kulik et al., 1968; Hindelang, 1971a, 1971b) such a factor is conspicuously absent in the present study. Several items loading on the first factor, GENERAL CRIME, involve violent behavior, but it would be difficult to justify calling Factor I an "aggressiveness" factor since these items are in the minority. Furthermore, most of the violent crimes do not load on any factor, remaining in the large unique variance component. It may be that such offenses are for the most part isolated, random acts that simply do not fit in with any systematic criminal patterns. The results of the present study do not rule out the possibility of highly specialized criminal behavior characterized by repeat arrests for one specific crime. According to conventional wisdom arson, rape, and pimping are frequently crimes of this sort. All three of these items failed to load highly on any of the factors.

The present study is in agreement with much of the literature on delinquency specialization in its finding of an "automobile-related misbehavior" factor, namely Factor II, TRAFFIC OFFENSES. However, three traffic offenses load on Factor I, only one of which loads on Factor II as well. Factor III, WHITE COLLAR CRIME, is unique in the literature reviewed here, while Factor IV, SEX OFFENSES, is somewhat similar to Short et al.'s "retreatist" factor. Note that a substantial number of traffic, white-collar, and sex-related offenses do not load on any factor.

Two crucial differences between the present study and much of the past literature in this area should be reiterated. First, this cohort is Danish, whereas every study cited here has used either American or British subjects. Besides the effect that differences between the two countries are likely to have on generalizability, possible differences between them with respect to recording methods, handling of juveniles, and the law itself are no small considerations. Second, recall that these data are official police records, not subjects' self-reports of delinquent behavior. In this study the TRAFFIC OFFENSES factor has emerged as a pattern consisting of relatively minor offenses, and so is perhaps most like the sort of data yielded by self-report measures. Factors III and IV, WHITE-COLLAR

CRIME and SEX OFFENSES would have been difficult if not impossible to extract from the self-report data gathered in the studies cited here.

Although four delinquency patterns emerged as a result of factor analysis here, the variables' communalities are quite low. In fact, a large number of variables have no loadings above Ø.2 on any factor. Since the sample size available to these researchers is quite large and the factors cross-validated well, we feel confident in our findings. As has already been stated, a large component of unique variance is to be expected when official records are used as data. Also, the overall level of frequency in this set of variables is quite low, making opportunities for covariation among the items relatively rare.

There is an alternative explanation for the results set forth above. When the frequency of "correct" responses, in this case frequency of arrests, varies widely from item to item in an array of dichotomous data, "difficulty" factors may masquerade as substantively meaningful factors (Carroll, 1961). The difficulty artifact causes items that may in reality comprise a unidimensional scale to break down into two or more factors clustering according to frequency. Unfortunately, in spite of the widely voiced concern on the matter relatively little is known about the form difficulty factors take, and clear guidelines for recognizing them do not exist. Preliminary research done in this laboratory (Cudeck and Cliff, in preparation) indicates that a perfect Guttman scale made up of items ranging in frequency from very low to moderate, similar to our data but less extreme, yields at least two factors. The first factor is strongly and positively related to frequency, and the second bears a quadratic relationship to frequency. The arrest records data of the present study are a far cry from a perfect Guttman scale, but these data are similar to the array analyzed above in that the frequencies are confined to the low end of the possible range. The

first factor in the arrest records data bears a strong positive linear relationship to frequency (r = .82). Although this could be evidence for a difficulty factor, it could mean simply that committing a variety of commonplace offenses is a valid characteristic of the "general crime" pattern. Loadings on the second factor are significantly correlated with frequency (r = .29, p<.Ø5) but not with squared frequency (r = .12, p>.1Ø). However, regression of Factor II's loadings on both frequency and squared frequency reveals an R^2 of .21, with the increase in R^2 due to squared frequency equal to .13, significant at p<.Ø1. It seems that at best only 13 percent of the variance in Factor II's loadings is attributable to a curvilinear relationship with frequency -- a statistically but not conceptually significant amount. This offers support for a substantive rather than an artifactual interpretation of these two factors. There is no apparant relation between frequency and loadings on Factors III and IV.

Additional support comes from further research done in this laboratory (Cudeck and Cliff, in preparation), where an array containing two approximate Guttman scales with approximately equal ranges of frequency and a third set of variables completely dependent on the other two sets was factored. These results were encouraging. Two factors were found, one containing the items comprising the first Guttman scale and the other containing the items from the second, with no evidence of artifactual item clustering. In order to investigate the possibility of difficulty factors emerging in subsequent factors, all seven factors with eigenvalues greater than one were retained for Varimax rotation. There was no evidence for a difficulty artifact in any of the factors.

These results suggest that the effects of frequency on factor structure are most pronounced when the array being factored is in fact unidimensional and highly consistent. When there is more than one underlying dimension in an array

and consistency is imperfect it seems that factor analysis yields factors reflecting these dimensions rather than difficulty artifacts. Since there is no reason to believe that a diverse assortment of items such as the one used in the present study comprises a unidimensional scale, it seems reasonable to conclude that the patterns of delinquency reported here are not troubled by a difficulty artifact.

Conclusions

The present study has found four factors in delinquent behavior. These factors are (I) general crime; (II) traffic-related offenses; (III) white-collar crime; and (IV) sex offenses. Since the first factor is by far the largest and the three remaining factors are weak, it is concluded that this research supports the generalized delinquency hypothesis. The patterns cross-validate well and do not seem to be an artifact of item frequency. However, they account for a very small proportion of the variance in the arrest items, showing many crimes to be independent of any pattern.

Footnote

The raw data were graciously made available by Sarnoff Mednick, director of the Center for Longitudinal Research, Denney Research Center, University of Southern California.

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Appendix

Crimes Excluded from the Analysis

Crime against the state

Crime against officials

Counterfeiting

Cruelty to animals

Gambling

Incest

Offense against the family

Unspecified minor violation

Violation of rationing laws (obsolete)

Violation of price controls

Violation against the Ministry of Justice

Violation of railroad laws

Miscellaneous health code violation

Improper brake and steering gear maintenance

Improper lights on auto

Improper tractor equipment

Improper motor-implement

Improper bicycle equipment

Improper horse-drawn vehicle equipment

Other vehicle violations

Improper number plates

Improper tractor equipment

Giving chase

Improper foreign vehicles

Driver failing to take responsibilty for the condition of the vehicle

Auxiliary rules for tractors, motorized cycles, etc.

Improper practice driving

Owner of car allowing unlicensed or improper driver to drive car

Improper foreign drivers

Poor traffic decision

Violation of fundamental traffic rules: attention and courtesy

Failure to signal

Failure to clear passage for emergency vehicle

Failure to observe railway crossing

Violation of rules about traffic over railway crossings

Hanging on vehicles and playing on the street

Obstruction of traffic

Improper use of traffic path

Vehicle improperly placed on roadway

Improper turns

Improper parking

Improper lights

Overloaded vehicle (weight)

Overloaded vehicle (size)

Improper weight for motorcycles

Improper attached trailer

Improper attached trailer-machines

Improper truck driving

Needless noise

Violations of special rules for motorcycles

violations of special rules

violations of traffic rules for motorcycles

Pedestrian violation

Violation of streetcar traffic rules

Impeding a streetcar

Violation of traffic rule involving rail vehicles

Violation of laws involving autos and streetcars

Improper signs

Misleading signs

Improper signs at a plant

Improper road markings

Improper signs at a tank-plant

Planting a sign such that it is inconvenient for traffic

Four laws having to do with compensation and third party liability insurance

Violation of law about the penalty clause

Violation of law about schools' responsibilty to protect children from traffic

Failure to report a missing person

Violation of laws about taxis

Violation of laws about self-drive rented vehicles

Table 1

Summary of Factor Analyses on Delinquency Data

Study	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Comments
Walberg, et al. (1974)	78 Taken things of little value 77 Taken things of medium value 74 Used or sold narcotics	72 Had fist fight with one person 71 Drank alcohol outside home 61 Gang fighting	84 Arrest 78 Station adjustment	77 Speeding or reckless driving	76 "Beat up" on kids		Untitled factors Boys only
	78 Station adjustment 72 Arrest	77 Car theft 74 Speeding or reckless driving	78 Taken things of medium value 78 Taken things of large value	79 Used force to get money 74 "Beat up" on kids	71 Had fist fight with one other person		Girls only

	Corner-Boy Delinquency	Lower Class Social & Sexual	Nonretreatist Conventional	Early Adolescent Heterosexual	Mature Vocational	Organized Individual Sports
Short and Strodtbeck (1965)	-72 Gambling -71 Signifying -67 Hanging -58 Drinking -56 Riding in cars -42 Making money illegally	72 Playing cards for fun 68 Dancing 56 Sexual int. 47 House parties	72 Going to school 62 Team sports -54 Smoking marijuana	-66 Singing -53 Trying to impress girls -45 Smooching, necking, petting -34 Listening to rock & roll	65 Working, job -55 Skipping school	-78 Individual sports -56 Club meetings

Table 1 (continued)

Study	Conflict	Stable Corner Activities	Stable Sex	Retreatist	Authority Protest		Comments
Short, et al. (1963)	79 Individual fighting 76 Group fighting 67 Assault 67 Concealed weapon 51 Robbery 44 Theft 43 Public nuisance 40 Statutory rape	71 Individual sports 68 Team sports 60 Social activities 48 Gambling 45 Joy riding 43 Truancy 40 Hanging	77 Sexual intercourse 68 Statutory rape 67 Petting 53 Signifying 44 Hanging 39 Alcohol 36 Work	56 Narcotics 55 Marijuana 53 Homosexuality 50 Fathering an illegitimate child 48 Common-law marriage 36 Attempted suicide 27 Pimping	69 Auto theft 65 Driving without a license 58 Public nuisance 53 Theft 48 Alcohol 44 Running away 41 Joy riding 39 Truancy		Observational data
	Uncomplicated Truancy	Impulsivity and Thrill-Seeking	Interpersonal Agression	Impersonal Aggression	Age-Related Delinquency		
Quay & Blumen (1963)	62 Truancy -45 Property Theft	-74 Driving without a license -64 Reckless driving -38 Liquor violations -25 Larcency -20 Auto theft	42 Disorderly 40 Assault 36 Liquor violations	44 Auto theft 28 Vandalism 26 Runaway	29 Runaway -29 Possessing stolen goods 26 Bicycle theft		Phi matrix

Table 1 (continued)

Study	Delinquent Role	Drug Usage	Parental Defiance	Assaultiveness			Comments
Kulik, et al. (1968)	92 Obtained liquor via older friends 85 Truancy 83 Got drunk 81 Used alcohol excessively 80 Rode in stolen car 78 Gang fight 77 Carried weapon 76 Bought alcohol 75 Sexual intercourse 68 Late for school	91 Used narcotics 89 Smoked marijuana 75 Sniffed glue or took bennies	79 Defied parents' authority to their faces 67 Shouted at parent 63 Cursed at parent 61 Disobeyed parent 47 Struck parent	87 Taken part in robbery involving force 84 Taken part in robbery involving weapon 78 Any robbery 76 Resisted arrest 57 Hit a teacher			Correlated factors

	Criminal	Conflict	Retreatist	Malicious Destruction	Drinking	Driving Offenses	Comments
Hindelang (1971a)	Theft of less than $10 Theft of greater than $10	Individual fist fight Group fist fight Carrying a weapon Individual weapon fighting	Marijuana use Glue sniffing LSD, methedrine, mescaline use Heroin use	Property dest. less than $10 Property dest. greater than $10	Drinking Getting drunk	Drag racing Driving under the influence Involvement in hit & run accident	Correlated factors

Table 1 (Continued)

Study	Criminal	Malicious Destruction	Aggressiveness	Soft Drug Use	Hard Drug Use	School Misconduct	Comments
Hindelang (1971b)	Theft of less than $10 Theft of greater than $10	Property destruction doing less than $10 damage Property destruction doing more than $10 damage	Individual fist fight Group fist fight Individual weapon fight Carrying a weapon	Drinking alcohol Getting drunk Using marijuana Driving under the influence	Using heroin Sniffing glue Using LSD, methedrine, or mescaline	Cheating on school exams Cutting classes	Correlated factors

	General Deviance	Property Crimes	Violence	Automobile Violations	Drug Use		Comments
IJR (1972)	Cheated at school Drank without permission Truancy Got drunk Bought liquor	Petty theft Shop lifting Kept/used stolen goods Property damage Stolen at least $20 Breaking and entering	Had fist fight Carried weapon In gang fight Used weapon Strongarmed	Driven without a license or permit Driven too fast or recklessly Joy riding Stripped a car	Used marijuana Used psychedelics Used downers Used uppers Used inhalants Sold drugs Used heroin		Method of rotation unknown

Table 2

The Final Set of 56 Offenses and Their Frequencies

	Variable	Frequency (%) Combined	A	B
1.	Violence against authority	0.32	0.31	0.32
2.	False evidence in court	0.02	0.02	0.02
3.	False accusation I	0.03	0.03	0.04
4.	False accusation II	0.06	0.06	0.06
5.	False accusation III	0.03	0.03	0.03
6.	False accusation IV	0.04	0.04	0.03
7.	False accusation V	0.17	0.17	0.18
8.	Forgery	1.26	1.23	1.29
9.	Arson	0.13	0.12	0.15
10.	Prostitution	0.02	0.02	0.01
11.	Rape	0.09	0.09	0.08
12.	Heterosexual immorality with partner under 15	0.13	0.13	0.13
13.	Homosexual immorality with partner under 18	0.03	0.04	0.02
14.	Public decency	0.14	0.13	0.15
15.	Pimping	0.64	0.66	0.62
16.	Murder	0.03	0.02	0.03
17.	Negligent homicide	0.14	0.14	0.15
18.	Threat of violence	1.85	1.88	1.81
19.	Bodily injury	0.10	0.11	0.08
20.	Offense against personal freedom	0.08	0.05	0.10
21.	Theft/housebreak	12.06	11.98	12.15
22.	Larceny	0.50	0.51	0.49
23.	Embezzlement, fraud	1.88	2.02	1.75
24.	Blackmail	0.01	0.01	0.02
25.	Receiving stolen goods	2.45	2.51	2.40
26.	Severe theft	0.01	0.01	0.01
27.	Robbery	0.47	0.47	0.46
28.	Malicious damage	1.54	1.36	1.72
29.	Unlawful appropriation	6.87	6.84	6.90
30.	Miscellaneous	1.61	1.57	1.64
31	Failure to register auto	0.71	0.66	0.76
32.	Violations of military law	1.55	1.61	1.50
33.	Unregistered weapon	0.88	0.89	0.86
34.	Commercial radio violations	0.02	0.01	0.03
35.	Narcotics violations	1.03	1.05	1.01
36.	Sailor's laws	0.12	0.13	0.12
37.	Civilian camp violations	0.66	0.67	0.64
38.	Smuggling/customs' violations	0.39	0.41	0.37
39.	Shopkeepers' laws	0.02	0.01	0.02
40.	Failure to folk register	0.04	0.03	0.05
41.	Violations of hunting	0.06	0.07	0.06

Table 2 (Continued)

	Variable	Frequency (%) Combined	A	B
42.	Shops' hours	0.07	0.06	0.08
43.	Failure to give employees 2 weeks' vacation	0.05	0.03	0.06
44.	Violations of restaurant law	0.20	0.19	0.21
45.	Creating a civil disturbance	5.89	5.85	5.92
46.	Driving while in poor condition	0.14	0.10	0.17
47.	Driving under the influence	6.14	6.25	6.03
48.	Driver's license	5.69	5.73	5.63
49.	Evasion of responsibility at a traffic accident	4.84	4.91	4.78
50.	Speeding I			
51.	Meeting and overtaking	2.40	2.40	2.40
52.	Failure to yield	4.27	4.21	4.32
53.	Signals violations	0173	0.76	0.70
54.	Drag racing	0.03	0.03	0.03
55.	Speeding II	0.62	0.62	0.62
56.	Having one's license taken away	0.05	0.05	0.04

Table 3

Eigenvalves from Common Factors Analysis of 56 Crimes

Factor	Sample A		Sample B	
	Eigenvalve	% of Variance	Eigenvalue	% of Variance
1.	2.66	4.75	2.80	5.00
2.	0.76	1.36	0.64	1.14
3.	0.61	1.09	0.53	0.95
4.	0.54	0.96	0.50	0.89
5.	0.41	0.73	0.41	0.73
		8.89		8.71

Table 4

Factor Loadings Above .20 and Communalities

Variables	Rotated Separately								Rotated in Tandem								h^2	h^2
	General Crime		Traffic Offenses		White-Collar Crime		Sex Offenses		General Crime		Traffic Offenses		White-Collar Crime		Sex Offenses			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
2) Unlawful appropriation	64	63							64	63							42	41
1) Theft/housebreak	62	63							62	63							41	42
5) Driver's license	56	55							56	55							36	34
4) Causing a civil dist.	42	41							42	41							19	19
3) Driving under the influence	42	39							42	39							22	19
8) Receiving stolen goods	41	40							41	40							18	18
11) Threat of violence	40	36							40	36							18	13
15) Malicious damage	33	32							33	32							11	11
16) Forgery	32	26			50	53			31	27			50	52			35	35
10) Embezzelment	29	25			42	49			29	26			42	49			26	31
12) Miscellaneous	25	26					21	14	25	26					21	15	12	09
14) Military law violation	24	21							24	22							06	05
18) Having an unregistered weapon	23	20							23	20							06	05
27) Violence against authority	23	19							23	18							06	05
25) Robbery	22	22							22	22							07	06
13) Evasion of responsibility	20	21	20	28					20	21	20	28					08	13
6) Speeding I			41	37							41	37					19	16
9) Meeting and overtaking			33	30							33	30					12	09
7) Failure to yield			32	28							32	28					11	09
29) False accusation					22	19	24	04					23	18	23	45	11	05

Table 4 (Continued)

Variables	Rotated Separately								Rotated in Tandem								h^2	h^2
	General Crime		Traffic Offenses		White-Collar Crime		Sex Offenses		General Crime		Traffic Offenses		White-Collar Crime		Sex Offenses			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
52) Prostitution							43	26							43	26	19	07
32) Public decency							42	51							42	51	19	26

Variables with no major loadings: 51, 41, 45, 46, 47, 51

False evidence in court (5 items)

20) Failure to register auto
53) Commercial radio violation
21) Civilian camp violation
54) Shopkeeper's laws
39) Shop's opening hours laws
42) Employee's 2 weeks vacation
28) Restaurant laws
44) Failure to folk register
40) Hunting laws
35) Sailor's laws
30) Driving when ill, overworked
19) Traffic signalling
50) Drag racing
23) Speeding II
43) Deprived of driver's license

26) Smuggling/customs violation
17) Narcotics
56) Severe theft, i.e., armed
38) Offense against personal freedom
24) Larceny
55) Blackmail
36) Inflicting bodily injury
37) Rope
34) Heterosexual immorality with person less than 15
48) Homosexual immorality with person less than 18
22) Pimping
33) Arson
49) Murder
31) Negligent homicide

END