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Colloquium on the Correlates of Crime and the Determinants of Criminal Behavior

INVITED PAPERS

Edited by
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DELINQUENT BEHAVIOR LINKED TO EDUCATIONAL ATTAINMENT
AND POST-HIGH SCHOOL EXPERIENCES¹

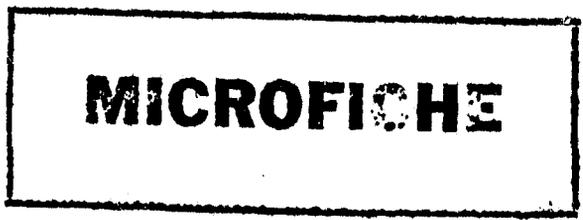
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This paper presents data from a longitudinal study which started out to explore the causes and consequences of dropping out of high school, and ended up exploring a good deal more than that. Dropping out was found to be only one end of a continuum of educational attainment which in turn was related to a number of other environments and experiences during the years immediately following high school. Our measures of delinquent behaviors, and our closely related measures of drug use, show some important relationships with several of these dimensions of experience. Thus, instead of being simply a paper about dropouts and delinquency, this report touches on a number of different factors which are related to delinquent behavior and drug use.

Delinquency and drug use have several things in common with educational and also occupational behaviors. All are considered by our educators, legislators, and the general public to be among the most important issues facing the nation's youth. Moreover, it is widely believed that these dimensions are interrelated, that is, that educational and occupational success may offer an alternative or partial solution to delinquency and drug use.

A second common factor is that delinquency, drug use, and educational and occupational attainment all are actual events; thus they can be reported relatively objectively. They do require some degree of accuracy in memory, and they also require considerable trust and candor. Nevertheless, they are reports of behaviors rather than attitudes or self-concepts; thus they may be a bit less susceptible to subtle "shading" of self-ratings in which factors such as academic ability may interact with the use of response scales.

One critical distinction is that most educational and occupational attainments can be measured meaningfully only some years following high school, after the attainments actually occur, whereas delinquency and drug use can be measured repeatedly; they can be studied in a meaningful way throughout high school (and earlier) as well as the years that follow high school. Thus measures of delinquency and drug use provide a particularly good opportunity to examine differences and changes in actual behaviors which may be linked to particular environments and experiences during and following the high school years.



This report details a portion of the findings from five waves of the Youth in Transition project. The study began in 1966 with a nationwide cross section of young men in tenth grade, who were then resurveyed in 1968, 1969, and 1970. The fifth data collection occurred in 1974, a point five years after most had graduated from high school. Among the primary objectives of the project were:

1. To explore the effects of dropping out of high school, particularly by comparing the occupational attainments of dropouts with graduates.
2. To learn more about the degree to which tenth-grade measures can predict educational and occupational attainments.
3. To assess the role of educational attainment in occupational attainments, particularly as compared with the role of family background and intellectual ability.
4. To discover the impacts of various post-high school environments and experiences (educational, occupational, marital, and parental) on values, attitudes, and behaviors. Included are such dimensions as: self-esteem; occupational attitudes; job satisfaction; views on race relations, government activities, family planning, population issues, use of illegal drugs; self-reported drug use; and delinquent/criminal behavior.

Research Design

The research design centers around a panel of 2,213 adolescent males chosen in 1966 to be representative of young men entering tenth grade in public high schools in the United States. The panel agreed to be surveyed at intervals of one year or more for an indefinite period. For those who did not drop out of high school, the first three data collections occurred while panel members were still in school. The first took place in the fall of 1966 when the subjects had just entered tenth grade. Additional data collections occurred in the spring of 1968 (the end of eleventh grade for most) and the spring of 1969 (just before most were graduated). The last two data collections corresponded to one year and five years beyond high school: the spring of 1970 and the spring of 1974.

Table 1 presents a summary of data collections and the response rates throughout the study. As the table indicates, more than 73 percent of the young men who began the study in 1966 were still participating in 1974. (For a detailed treatment of sampling, field procedures, measurement content, etc., see Bachman, O'Malley, and Johnston, 1978.)

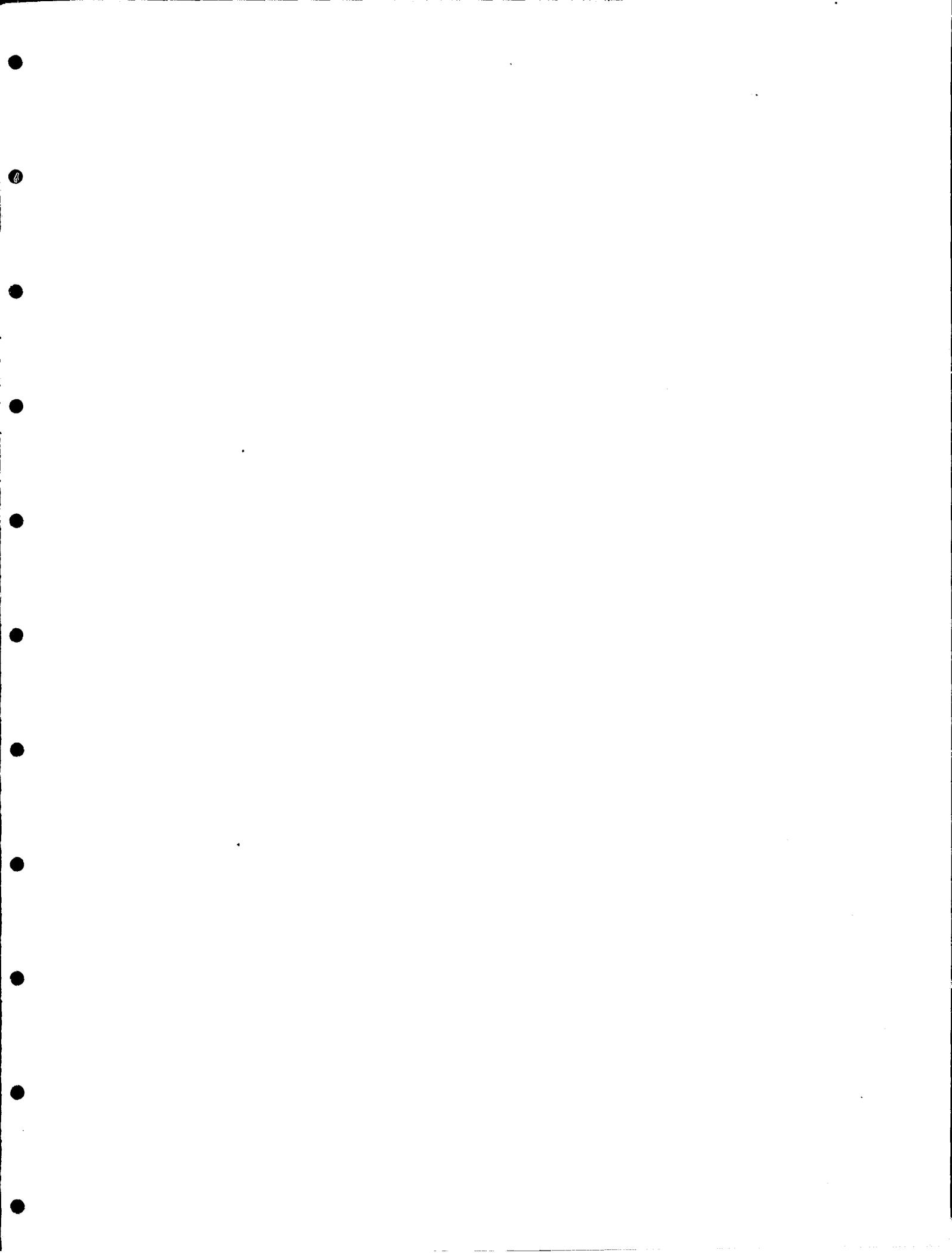


TABLE 1

DATA COLLECTIONS FROM YOUNG MEN

DATE	TIME 1 Fall, 1966 (tenth grade)	TIME 2 Spring, 1968 (eleventh grade)	TIME 3 Spring, 1969 (twelfth grade)	TIME 4 Spring, 1970 (grade 12 + 1 yr)	TIME 5 Spring, 1974 (grade 12 + 5 yrs)
Procedure	Individual interviews; group-administered tests and questionnaires	Individual interviews and questionnaires; \$2 payment	Group administered questionnaires; \$5 payment	Individual interviews and questionnaires; \$10 payment	Mail questionnaires; \$10 payment
Location	Schools	"Neutral Site"	"Neutral Site"	"Neutral Site"	Respondent's home
Number of Respondents ^a	2213	1886	1799	1620	1628
% of Original Sample (N = 2277)	97.2%	82.8%	79.0%	71.1%	71.5%
% of Time 1 Panel (N = 2213)	100%	82.2%	81.3%	73.2%	73.5%

^a Probability sample located in 87 schools

Validity of the Measures

The measures of delinquency and drug use, described a bit later, are based on respondents' self-reports. Because of this, and particularly because the behaviors not only are often illegal but in some cases are serious crimes, it is especially important to confront the question of validity. To what extent can we believe what our respondents have told us about their delinquent behaviors and their use of drugs? While we have no direct, objective validation of these measures, there exists considerable inferential evidence for their validity. Some of this evidence has been summarized by Johnston, O'Malley, and Eveland (1978, pp. 143), and it is worth repeating here.

1. Well over 50% of the sample admit to some illegal behavior.
2. Although respondents were asked to leave the confidential items blank if they felt they could not answer them honestly, the percentage of missing data was essentially identical to that in the nonconfidential sections of the questionnaire.
3. There are consistent and reasonable relationships between the drug-use and delinquency items on the one hand, and other variables dealing with attitudes and behaviors on the other.
4. Some methodological studies (for example, Petzel, Johnson, & McKillip, 1973) have included fictitious drugs in the questionnaires. Invariably, these fictitious drugs show very low levels of reported use, indicating that intentional overreporting is not a problem.
5. The longitudinal nature of the present study precluded provision of anonymity to our respondents. This appears to make little difference for validity, however, inasmuch as a number of studies have found no difference in reported incidence of drug use among groups differing in anonymity (for example, Leutgert & Armstrong, 1973; Haberman, Josephson, Zanes, & Elinson, 1972).
6. Studies like the present one have shown similar prevalence rates of drug use for the same age group (Abelson & Atkinson, 1975; O'Donnell, Voss, Clayton, Slatin & Room, 1976).
7. Gold (1970) used peer reports to establish that 77% of the boys age 13 to 16 in a study of delinquency were "truth-tellers." Another 11% were questionable, while 12% appeared to be concealing at least one offense.

8. Finally, considerable effort went into convincing the boys in the interview situations that their data were completely confidential. By 1974, the young men had been confiding in us for eight years already. It is difficult to believe that we would have observed as much stability in our data if there were large amounts of lying.

There is additional indirect evidence of validity; the measures seen in the following pages relate in meaningful ways to a number of other dimensions, including objective events. We did not state hypotheses in advance and then use the data to test them; nevertheless, the patterns of findings are in most respects clear and plausible.

In the final analysis, such inferences about validity become a matter of judgement, and the reader will have to decide whether the evidence is convincing. After considering the matter at length, our own view is that the measures are basically valid.

Delinquent Behavior

Measures of Delinquency. Our measures were adapted directly from the work of Gold (1966). Three indexes of delinquency were particularly useful and are included in the present report: an eight-item measure of interpersonal aggression, a nine-item measure of theft and vandalism, and a 10-item composite measure of seriousness of delinquency. (The seriousness index, which was patterned after Gold's application of work by Sellin and Wolfgang (1964), consisted of three interpersonal aggression items and seven theft and vandalism items.) Table 2 lists the items grouped according to index, and shows the percentages of respondents who admitted each behavior.

A number of complications in the delinquency measures had to be taken into account in our analyses and interpretations. Most important, there were several changes in the time interval for which retrospective reports of delinquent behaviors were obtained. The first data collection asked respondents, "Please tell us how many times you have done these things in the last three years--say since you started the seventh grade." At Time 2, eighteen months later, the instruction was changed to read, "Please tell us how many times you have done these things in the last 18 months--since we last talked with you." At Time 3, twelve months later, the same instruction was repeated, but, the time interval was erroneously not changed to twelve months (the interval since last we had talked with the respondents); thus we cannot be sure how many respondents were responding to the part of the instruction which said "the last 18 months" and how many were responding to the statement "since we last talked with you." At Time 4 and 5 the instructions simply asked respondents how often they had done each thing "during the past year." Needless to say, the use

TABLE 2

DELINQUENCY ITEMS, INDEXES, AND RESPONSE FREQUENCIES

INTERPERSONAL AGGRESSION INDEX	PERCENT OF RESPONDENTS WHO REPORTED DOING THIS ONE OR MORE TIMES DURING THE PERIOD PRECEDING:				
	TIME 1 ^a	TIME 2 ^a	TIME 3 ^a	TIME 4 ^a	TIME 5 ^a
Hit an instructor or supervisor	8%	6%	4%	7%	2%
^b Used a knife or gun or some other thing (like a club) to get something from a person	6	4	4	7	1
^b Get something by telling a person something bad would happen to him if you did not get what you wanted	28	16	15	16	6
^b Hurt someone badly enough need bandages or a doctor	27	19	16	20	11
Taken part in a fight where a bunch of your friends are against another bunch	33	21	21	22	10
Gotten into a serious fight in school or at work	52	32	25	28	15
Hit your father	9	7	6	6	c
Hit your mother	6	5	3	3	c
THEFT AND VANDALISM INDEX					
^b Set fire to someone else's property on purpose	7	6	4	4	1
^b Taken a car that didn't belong to someone in your family without permission of the owner	9	6	5	6	3
^b Taken an expensive part of a car without permission of the owner	6	7	7	7	5
Damaged school property on purpose	25	19	17	18	4

TABLE 2
(Continued)

	TIME 1 ^a	TIME 2 ^a	TIME 3 ^a	TIME 4 ^a	TIME 5 ^a
^b Taken an inexpensive part of a car without permission of the owner	11	10	10	12	6
^b Taken something not belonging to you worth over \$50	10	9	9	11	7
Went onto someone's land or into some house or building when you weren't supposed to be there	66	48	47	53	28
^b Taken something from a store without paying for it	50	36	34	41	24
^b Taken something not belonging to you worth under \$50	46	37	39	45	35

^aReporting intervals were as follows: 3 years prior to Time 1, 18 months prior to Time 2, 12 or 18 months prior to Time 3, 12 months prior to Times 4 and 5 (see text for explanation). All percentages in this table are based on the total number of respondents available at each time (see paragraph of Footnote 2).

^bItem included in the Seriousness of Delinquency Index.

^cItem was not included in fifth data collection (see second paragraph of Footnote 2):

of several different time intervals for retrospective self-reports on delinquent behavior is an unfortunate flaw in our measurement of this important area. (We cannot simply divide reported frequencies by the number of months involved, in part because we strongly suspect that the memories are sharpest during the first year.) Based on the greater wisdom of hindsight, we should have picked a one-year interval for all of the delinquency questions. Fortunately, our primary focus is on relational analyses rather than overall shifts in delinquency rates; therefore, the problems outlined above do not seriously limit our ability to draw conclusions from the data.

Further complications in the delinquency measures include: (1) a few item changes in the interpersonal aggression index; (2) some limitations in reliabilities because each index deals with a limited number of relatively rare events; and (3) slight differences in delinquency rates depending on whether the sample is restricted to those for whom delinquency data are available at all five time points. None of these complications, in our view, has seriously affected the basic findings and conclusions presented here.²

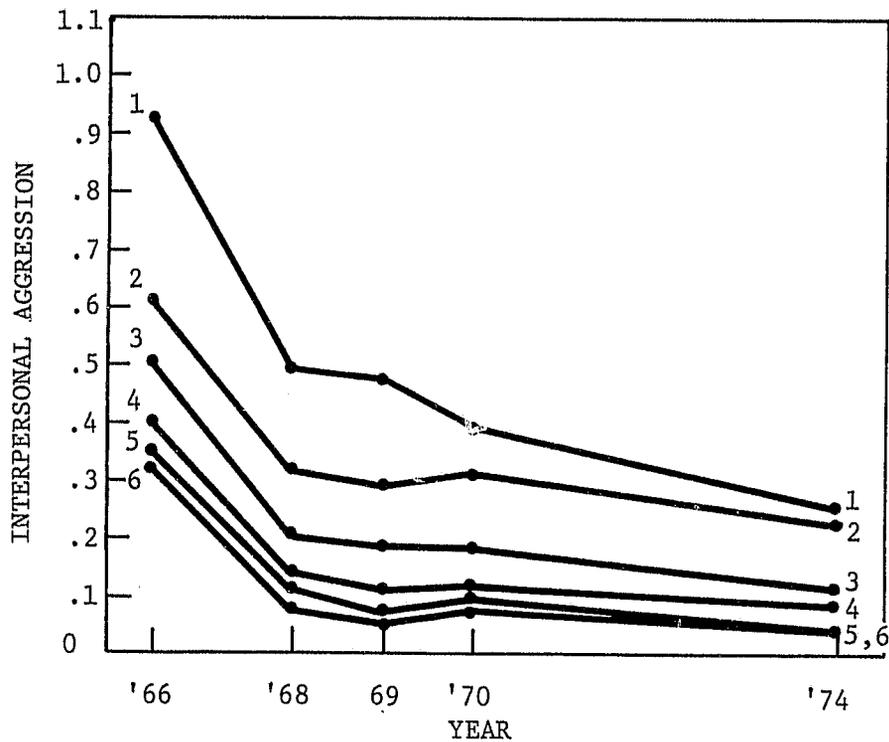
Change and Stability in Delinquency. As an examination of the items in Table 2 would suggest, the scores on all three delinquency indexes dropped appreciably from Time 1 to Time 2. Interpersonal aggression dropped more than half a standard deviation; theft and vandalism shifted more than a quarter of a standard deviation; the seriousness index dropped about a fifth of a standard deviation. Recall that the Time 1 measure was actually a retrospective account of delinquent behavior during the three prior years, i.e., seventh, eighth, and ninth grades; the Time 2 measure was an account of the preceding 18 months, or most of tenth and eleventh grade. The difference in time intervals may have had much to do with the shift in reported levels of delinquency, but there probably was also a real change reflected in the scores. In particular, the overall amount of interpersonal aggression reported for tenth and eleventh grades was well under half that reported for seventh through ninth grades. No doubt this reflects the changing norms and constraints which come into play as boys gain size and strength and become young men.

From Time 2 through Time 4, a reporting period spanning tenth grade through one year following high school, the average levels of reported delinquency remained roughly unchanged. But the annual rate of delinquency reported between four and five years after high school (the year preceding Time 5) was one-third or more lower on all three indexes. Not surprisingly, it appears that young men in their early twenties indulged in somewhat fewer delinquent behaviors than they did when they were in their late teens.

It seems clear that overall rates of delinquency changed during the span of more than 10 years covered by our reports. But to what extent did relative rankings along the delinquency scales remain the same? To what extent were the most delinquent young men during junior high school also the most delinquent in their early twenties? The actual correlations between Time 1 and Time 5 delinquency measures are not very high (a range from .26 to .28 for the three indexes). The pattern of the intercorrelations across time suggests that this is caused by rather low reliabilities of the measures (reliability estimates ranging from .50 to .55), whereas their stability may compare favorably with many other measures in the study. For example, the stability estimates for the delinquency measures are comparable to those for self-esteem--annual stability estimates are close to .9 and estimated stabilities from Time 1 to Time 5 are about .4.³

Delinquency and Educational Attainment. All three dimensions of delinquency correlated negatively with educational attainment--the higher the level of education, the lower the level of delinquency. But this relationship, similar to a number of others that we have examined in the Youth in Transition study, does not point to education as the cause of the relationships. The differences in delinquency were evident from the start of the study. During junior high school those who later became high school dropouts were involved in serious delinquency more than twice as often as those who later became college graduates. The differences were even stronger along the scale of interpersonal aggression, as shown in Figure 1. Those who became dropouts had scores which averaged 0.82 at Time 1 compared with scores of 0.36 for those who obtained a bachelor degree and 0.33 for those who continued their education beyond a bachelor degree. (The lowest possible index score is 0.00, indicating zero delinquent behavior in each of the categories. Thus, a score of 0.82 represents more than double the delinquency of a score of 0.36.)⁴

Figure 1 shows quite clearly the overall decline in interpersonal aggression scores that we discussed earlier. The more interesting aspect of the figure is the consistent ordering of educational attainment categories; the differences among educational attainment groups were fully as clear at the start of the study as they were at the end. As a matter of fact, the absolute differences in amount of delinquency were a good deal larger for the Time 1 reports (representing the period from seventh through ninth grades) than for the Time 4 reports (representing the one-year period after most had graduated from high school), and the differences were smaller still for the Time 5 reports (representing a one-year period roughly between age 22 and 23). But the differences in absolute amount of delinquency can be misleading, especially when we recall that different time intervals were involved. The variance in delinquency, like the absolute level, declined over time. Thus, the correlations between educational attainment and



eta = .25	.25	.28	.24		.22
r = .25	-.25	-.28	-.25		-.22

- | | |
|-----------------------------------|--------------------|
| 1 Dropout | 4 Associate Degree |
| 2 High School Grad., No College | 5 Bachelor Degree |
| 3 High School Grad., Some College | 6 Graduate Work |

*The measures of interpersonal aggression were retrospective. The 1966 measure asked about the past 3 years; the 1968 and 1969 measures asked about the past 18 months; the 1970 and 1974 measures asked about the past year.

FIGURE 1
INTERPERSONAL AGGRESSION* RELATED TO EDUCATIONAL ATTAINMENT

delinquency was measured. For example, educational attainment (measured at the end of the study) shows product-moment correlations of $-.25$ with interpersonal aggression reported at Time 1, and $-.22$ with interpersonal aggression reported at Time 5. The corresponding figures are $-.12$ and $.10$ for the theft and vandalism index, and 0.16 and $-.12$ for the composite seriousness of delinquency index. The correlations for delinquency measures at Times 2 and 4 are similar or slightly higher.

The relationships between delinquency and educational attainment reported here in many respects elaborate the findings reported in Volume III of the Youth in Transition monograph series (Bachman, Green, and Wirtanen, 1971). The data herein have extended our earlier findings in two ways. First, by adding another data collection we have added four years to the range of time sampled, and we find that although the overall levels of delinquency have dropped, the pattern of differences is nearly as strong as it was earlier. Second, we can now make finer distinctions in educational attainment by separating different categories of college attenders and graduates. This more refined measure of educational attainment than was possible at Time 4 (one year beyond high school) provides a neat ordering in terms of delinquent behaviors. Each increment in educational attainment corresponds to a lower average level of delinquency.

As before, we found that the high school dropout group stood sharply apart from the other groups--at least during the high school years. After high school (Times 4 and 5) this group was not so very different from those whose education ended with high school graduation. The point which must be stressed is that higher delinquency did not follow on the heels of dropping out of high school. On the contrary, it was clearly present during the junior high school years (the period covered by the delinquency reports at Time 1).

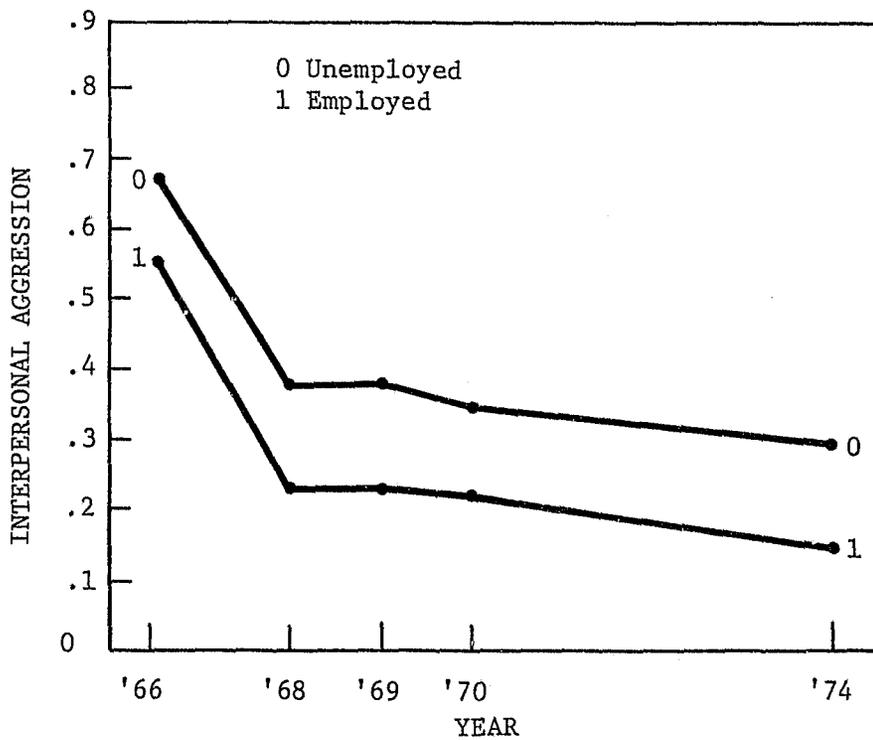
Another dimension which showed substantial differences between high school dropouts and all others was a list of delinquent behaviors in school (see Bachman *et al.*, 1971, for details). The average dropout reported about seven such delinquent behaviors during junior high school, whereas those who completed high school averaged between two and three. Our comments in the early report bear repeating here:

The typical dropout probably skipped more than one day of school, and got into one or two fights with other students. There is a good chance that he had to bring a parent to school once because of something he had done, and he probably damaged school property once or twice. He may have been suspended or expelled and he might have hit a teacher (although most dropouts did not).

It is obvious that some of these things go together. The boy who hits a teacher stands a better than average chance of getting himself suspended or expelled. And those individuals who get expelled are likely to become dropouts. But it is important to bear in mind that all of these self-reported events occurred prior to the tenth-grade data collection that marked the start of the study. When the data were collected, all the respondents who had been suspended or expelled in the past had come back and were once again attending classes. (Bachman et al., 1971, p. 96)

All of these findings linking educational attainment and delinquency fail to support the contention that high delinquency rates are a consequence of quitting high school. Given the temporal sequence, it seems more likely that delinquency contributes to dropping out of school. But another causal interpretation is also possible, and would lead us to focus on earlier educational experiences: it may be that failure experiences throughout the elementary as well as secondary school years lead to (a) delinquent behavior throughout junior and senior high school, and (b) dropping out of school--usually after age sixteen. In other words, the pattern of delinquency precedes dropping out, but both may be caused (at least in part) by earlier educational failures.⁵

Employment, Unemployment, and Delinquency. Does being out of a job lead to increased levels of delinquency? Analyses reported elsewhere (Bachman et al., 1978) suggest that unemployment, especially in the case of high school dropouts, had a negative impact on self-esteem. In order to explore the possible impact of employment versus unemployment on delinquency, we undertook a set of analyses dealing only with those in the civilian work force, excluding those who at Time 5 were primarily students or in the armed forces. At Time 5 the unemployed respondents reported levels of interpersonal aggression twice as high as the levels for the employed, theft and vandalism were about 60 percent more frequent for the unemployed, and on the composite measure of seriousness of delinquency the unemployed were about 65 percent higher than the employed (all differences statistically significant beyond the .01 level). Along each of these dimensions there were also differences in the Time 1 through Time 4 scores for those who later were employed and unemployed; in each case the delinquency scores average somewhat higher among those who were unemployed at Time 5. The relationship for the interpersonal aggression index is displayed in Figure 2. As the figure indicates, the differences in interpersonal aggression grew larger from Time 1 through Time 5. But the figure also indicates that distinct differences existed by the end of high school (Time 3); thus it cannot be



eta =	.05	.09	.10	.09	.12
r =	-.05	-.08	-.09	-.08	-.10

*The measures of interpersonal aggression were retrospective. The 1966 measure asked about the past 3 years; the 1968 and 1969 measures asked about the past 18 months; the 1970 and 1974 measures asked about the past year.

FIGURE 2
INTERPERSONAL AGGRESSION* RELATED TO 1974 EMPLOYMENT STATUS

said that differences which appear at the end of the study were solely the result of unemployment.

In our efforts to understand the linkages between unemployment and delinquency, it may be useful to recall that high school dropouts were more heavily unemployed and were also relatively high in delinquency. Perhaps the impact of unemployment on delinquency is particularly severe among dropouts. To explore this possibility, we repeated the analyses of employment and delinquency separately for dropouts, high school graduates, and those with varying amounts of college. The results for interpersonal aggression, although based on very small numbers of cases, are provocative. Among high school graduates, the aggression levels at Time 5 were almost twice as high for the unemployed as for the employed. The differences were much smaller for those with some college or with bachelor degrees. But it was among the high school dropouts that the differences were most striking: the unemployed dropouts reported interpersonal aggression levels at Time 5 fully three times as large as those reported by employed dropouts. Had these results appeared only for the Time 5 interpersonal aggression data, it would be more convincing evidence of an impact of unemployment. By Time 4, however, there was already a two-to-one difference in interpersonal aggression. (It may be, of course, that these same dropouts were having difficulty obtaining employment at earlier points in time, and that this was contributing to their high levels of aggression at Time 4.)

It is important that we keep these findings in perspective. Most of the high school dropouts in our sample were employed at Time 5. Moreover, most sample members who were unemployed at Time 5 had graduated from high school (and many had at least some college). Thus the relationship between unemployment and interpersonal aggression is not solely, or even primarily, a result of the relatively small group of unemployed dropouts. But the effect seems particularly strong within this group. A similar effect was not in evidence when we examined the theft and vandalism scale or the composite measure of seriousness of delinquency. Dropouts who were unemployed at Time 5 scored very slightly higher than those who were employed, but these differences were present more or less consistently from the junior high school years (measured at Time 1) through high school and the years that followed.

We will return to the relationship between unemployment and delinquency in the section on multivariate analyses. To summarize our findings thus far, it appears that unemployment and delinquency are indeed correlated and the relationship is not altogether simple or straightforward. Those who were in the ranks of the unemployed at Time 5 began the study with slightly higher levels of delinquency, but those differences in delinquency increased and were fairly

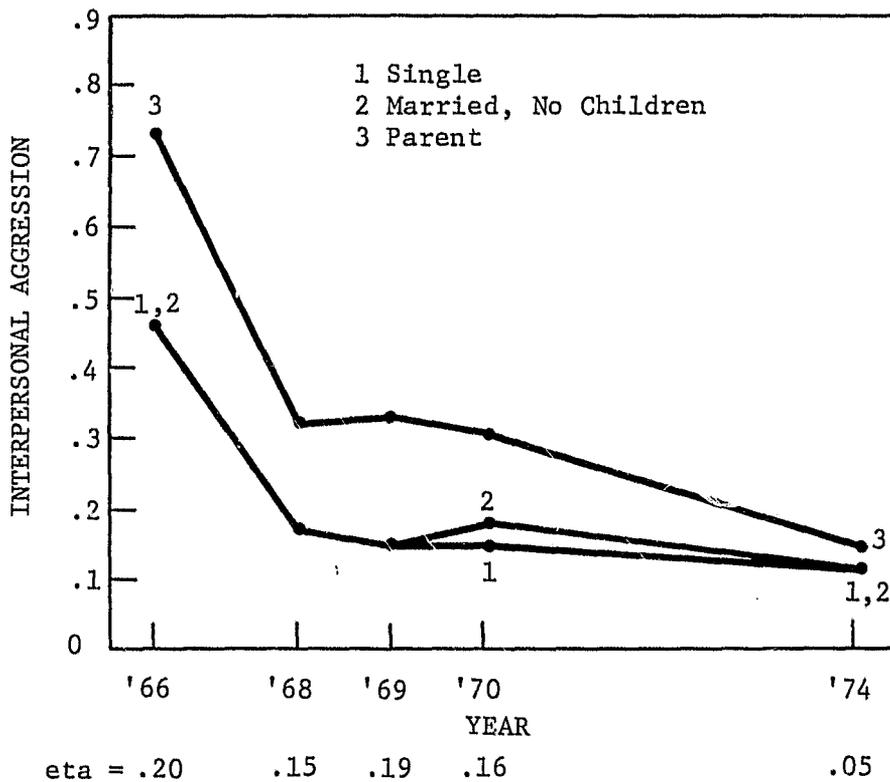
substantial at the end of the study. The relationship was strongest for the measure of interpersonal aggression, and it was particularly pronounced among high school dropouts.

Job Status and Delinquency. The relationship between job status (Duncan scale) and the delinquency measures can be summarized fairly easily. Those with a history of greater delinquency tended to have lower status jobs at the end of the study. The relationship is not strong, but it is consistent for all three delinquency scales across all five time intervals: the product-moment correlations for delinquency measured at Time 1 range from $-.10$ to $-.13$; those for delinquency measured at Time 5 range from $-.09$ to $-.11$; and those for Times 2, 3, and 4 range from $-.11$ to $-.14$, plus one value of $-.17$.

This rather small relationship, which shows delinquency differences just as strong at the start of the study as at the end, does not suggest that high status jobs lead to lower delinquency. Nor does it indicate that delinquency is a direct cause of job status, since educational attainment (also correlated with delinquency) is a far more powerful determinant of job status. On the contrary, the pattern of correlational findings, as well as the multivariate analyses summarized below, can best be interpreted as follows: job status and delinquency are modestly correlated because they are both linked to other prior factors, including those factors which lead to different levels of educational attainment.

Marriage, Parenthood, and Delinquency. An examination of the delinquency levels of those who were single, those who were married without children, and those who were married with children, revealed an interesting and rather unusual pattern of relationships. Here, as in most of the preceding analyses, the index of interpersonal aggression shows the strongest associations; they are displayed in Figure 3. Throughout the first four data collections, which report delinquency from seventh grade through the first year beyond high school, we see that those young men who married and become parents before age 23 had shown consistently higher interpersonal aggression--often nearly twice as high. By the end of the study, however, the difference had largely disappeared. The pattern of differences is similar, though not as strong for the index of theft and vandalism, and the composite measure of seriousness.

On the face of the findings in Figure 3, it would seem that those who marry and become fathers (not necessarily in that order) at a relatively early age tend to be those with somewhat above average levels of interpersonal aggression throughout junior and senior high school. But four to five years beyond high school they are not much more aggressive than their age-mates. Is this simply because most young men become less aggressive when they reach their early twenties



*The measures of interpersonal aggression were retrospective. The 1966 measure asked about the past 3 years; the 1968 and 1969 measures asked about the past 18 months; the 1970 and 1974 measures asked about the past year.

FIGURE 3
INTERPERSONAL AGGRESSION* RELATED TO MARITAL/PARENTAL STATUS

and thus the differences are attenuated? That interpretation does not square well with our findings linking aggressive behaviors to unemployment or to educational attainment. Although aggressive behaviors show an overall decline, the distinctions related to education and unemployment tend to remain fairly strong. An alternative explanation of the findings in Figure 3 is that marriage and parenthood contribute somewhat to the "reform" of previously aggressive individuals. We have reported elsewhere (Bachman *et al.*, 1978) that unemployment was low among those young men who were married and had children. Perhaps that level of responsibility also contributed to a reduction in overt aggression. Some very interesting differences in patterns of drug use among married versus single men, reported in a later section, are consistent with this interpretation.

Multivariate Analyses Relating to Delinquency. A series of multiple regression analyses quickly indicated that controls for family socioeconomic level, number of siblings, and academic ability would be of little value in dealing with the delinquency measures. The zero-order product-moment correlations between those dimensions and the Time 5 theft and vandalism index range from $-.02$ to $.02$, and for the Time 5 seriousness of delinquency measure the range is from $-.05$ to $.02$. The correlation with the interpersonal aggression correlates $-.09$ with family socioeconomic level, $.06$ with number of siblings, and $-.16$ with academic ability. The earlier measures of delinquency, especially those at Time 3, show somewhat stronger relationships with the background and ability measures; the most prominent instance is a correlation of $-.29$ between academic ability and interpersonal aggression reported at Time 3. It remains true, however, that once the Time 1, 2, and 3 versions of any of the delinquency measures enter into a regression equation predicting delinquency at Time 5, there is no gain whatever in predictive power as a result of including the background and ability dimensions. (In most instances, the adjusted multiple correlation is actually a tiny bit lower, indicating that the background and ability measures add more "noise" than information.)

Therefore, we can use a simpler form of regression analysis in which we control only for the earlier (Time 1, 2, and 3) delinquency measures in order to examine the effect of a particular experience or environment. We conducted such analyses for our three most important predictors, educational attainment, job status, and employment. For each of the delinquency measures, we found standardized multiple regression coefficients (betas) for educational attainment and job status much lower than the corresponding zero-order correlations. In other words, controlling earlier levels of delinquency greatly reduced the predictive power of educational attainment and job status. When these

two predictors were included simultaneously in equations, along with earlier levels of the delinquency measure in question, the contribution of job status was further reduced to statistical (as well as substantive) nonsignificance. We did not, however, find that controlling earlier levels of delinquency substantially reduced the predictive power of the employment/unemployment dimension. The beta values are somewhat lower than the zero-order correlations, to be sure; but the shrinkage is far less pronounced than that found for the other two predictors.⁶

Our conclusions from this series of multivariate analyses are consistent with our earlier observations based on bivariate analyses of the delinquency measures at multiple points in time. It appears that the different levels of delinquent behaviors, especially interpersonal aggression, shown by those with different levels of educational attainment reflect deeply ingrained patterns of behavior that were present as early as junior high school. As Figure 1 clearly indicates, the differences in aggression levels were just as large during the junior and senior high school years as during the later period after the respondents finished sorting themselves into different levels of educational attainment. Delinquency correlates less strongly with job status than with educational attainment. Although the correlations show the same pattern of consistency over time, we thus conclude that these correlations between job status and delinquency appear simply because job status is a weak proxy for educational attainment. Unemployment remains an environmental or experimental factor which may have some direct impact on aggression. But even here, as Figure 2 indicates, the differences in aggression were present to some degree during the high school years. On the whole, then, we conclude that the delinquency differences linked to educational and occupational circumstances at Time 5 are largely a reflection of long-standing patterns which preceded the specific post-high school experiences we have been examining.

Use of Cigarettes, Alcohol, Marijuana, and other Drugs

The Youth in Transition project did not set out to treat drug use as an outcome or criterion measure. But by the late sixties it became clear that this was an area of great importance to youth and of great concern to society in general. Therefore, we included in our fourth and fifth data collections a number of questions about the use of illegal drugs, as well as about the use of alcohol and cigarettes. An extensive analysis of drug information from the fourth data collection has been completed by L. Johnston (1973), and an analysis of the drug material from the fifth data collection is being carried out presently by Johnston and his colleagues. In particular, an analysis of the interrelationships between delinquent behavior and drug use has already been completed by Johnston, O'Malley,

and Eveland (1978), and the conclusions based on that analysis read as follows:

We cannot conclude that drug use does not lead to crime, because one very important type of user--the addict--is not sufficiently represented in this sample. Although our data would tend to suggest that the kind of person who progresses through drug use to heroin is likely to display substantially more criminal behavior than average, even before drug use, it seems quite likely to us that many addicts increase their levels of crime to support their habits. Neither would we suggest that alcohol, which was not investigated, but which is certainly a drug, does not lead to criminal or violent behavior. Other investigators have developed evidence that suggests that alcohol may indeed be a contributing factor in assaultive crime...

What we do conclude from these explorations is that nonaddictive use of illicit drugs does not seem to play much of a role in leading users to become the more delinquent persons we know them to be on the average. The reverse kind of causation seems considerably more plausible, that is, that delinquency leads to drug use. For example, we think it quite possible that delinquents who, because of their delinquency, became part of a deviant peer group are more likely to become drug users because drug use is likely to be an approved behavior in such a peer group. We also suspect that the correlation between delinquency and drug use stems not only from such environmental factors but also from individual differences in personality. Both delinquency and drug use are deviant behaviors, and therefore both are more likely to be adopted by individuals who are deviance prone. The fact that other forms of delinquency tended to precede drug use (at least in this cohort) may simply reflect the fact that proneness toward deviance is expressed through different behaviors at different ages. Further, for this cohort, the notion of using illicit drugs at all was just rising to consciousness among these young people as they passed through high school. Studies of a more recent class cohort would undoubtedly show less precedence of drug use by other forms of delinquency because the average age of first drug use has declined markedly (Johnston et al., 1978, pp. 155-156).

Extensive analyses of the drug use data from the Youth in Transition study will be presented elsewhere. Our purpose here is limited to a few drug use dimensions and the ways in which they

relate to, and perhaps reflect the impact of, different post-high school environments and experiences. Our analyses and interpretations are made keeping in mind the above-mentioned cautions about causal interpretations of drug use data.

Measures of Drug Use. The fourth data collection (Spring 1970), approximately one year after most respondents had graduated from high school, included a set of drug use questions immediately following the delinquency items, and the special instructions that stressed confidentiality thus applied both to delinquency and drug use items. The drug questions first asked respondents to report how often they had used each of a number of substances "...during part or all of the last year for other than medical reasons." The response scale ranged from "Nearly every day" to "Never." The questions covered use of cigarettes, alcohol, marijuana, amphetamines, barbiturates, hallucinogens (e.g., LSD), and heroin. (The phrase "for other than medical reasons" was included so that any reported use of amphetamines or barbiturates would be illicit use.)

The first group of questions asked about the time interval which, for most, corresponded to the year after high school--approximately Summer 1969 through Spring 1970. The questions were followed by a second set, identical to the first, except they asked about the period "previous to this past year (that is, before last summer)..." These questions are more retrospective than the others, which would ordinarily make them suspect; however, we are dealing here with events that have clear social and psychological significance for most respondents, and also with a time interval that for most is easily demarcated--the period preceding high school graduation. We agree with Johnston et al., (1978, p. 140) that this set of questions:

...probably provides a reasonable estimate of drug use during the senior year, although it does not ask about that specific period. Insofar as some subjects may have stopped using certain drugs before reaching their senior year, it may actually over-state the annual prevalence figures. Earlier analyses (Johnston, 1973, pp. 42-44) suggested, however, that very few users stopped using drugs in the year after graduating from high school, and it seems just as reasonable to conclude, at least for the high school class of 1969, that very few decreased their illicit drug use prior to graduation.

Nevertheless, it may be useful to remember that the figures for drug usage labeled 1968-69 actually represent upper limits.

The Time 5 data collection (Spring and Summer 1974) included a repeat of the first set of drug items used in the Time 4 survey, i.e., the questions asked about use "...during part or all of the last year...

Given the Time 4 and Time 5 measures outlined above, we will be dealing with three one-year intervals that can be defined approximately as follows: 1968-69, for most respondents the senior year of high school; 1969-70, the first year following high school; 1973-74, the fifth year following high school (and, for some, the first year following college).

We will look separately at use of cigarettes (on a daily basis), alcohol, marijuana, and other (illicit) drugs. We will see some similarities, but also some differences among these four categories of substance use as they relate to post-high school experiences; thus it seemed useful to analyze each separately. On the other hand, it was not useful for our purposes to distinguish among the illicit drugs other than marijuana. Instead, we use an index which simply takes a mean of responses to the questions about amphetamines (A), barbiturates (B), and hallucinogens (LSD). For convenience we will sometimes use the abbreviation A/B/LSD to refer to this composite measure. We did not include heroin use in this composite because it is so rare in our sample, and also because a few heroin users are also relatively heavy users of the other drugs and are thus already given a high score on the A/B/LSD measure.

Change and Stability in Drug Use. Not surprisingly, we find that the usage levels for all the substances we examined increased from 1968-69 to 1969-70, and then showed a further increase by 1973-74. The usage rates for these three periods, summarized in Table 3, show that daily cigarette use increased somewhat, while weekly alcohol use nearly doubled. The proportion reporting any use (during the year) of amphetamines, barbiturates, or hallucinogens doubled; the proportion reporting any use of marijuana more than doubled, rising from one-fifth of the sample during the senior year of high school to just over half of the sample five years later.⁷

The estimates of stability and reliability for these measures, detailed in Bachman et al. (1978), indicate that drug usage has been measured fairly reliably. The stability estimates, on the other hand, are relatively low, except for cigarette use. These low estimates are quite understandable from the data in Table 3. There is only a 9 percent increase in cigarette users; but if we consider that relatively few smokers quit, we can conclude that the vast majority of respondents were doing the same thing (either smoking daily or not) in 1973-74 as in 1968-69. That means the stability of this measure is quite high. For each of the other three dimensions,

TABLE 3

CHANGES IN USAGE RATES FOR CIGARETTES, ALCOHOL, MARIJUANA, AND
OTHER DRUGS

	PERCENTAGE OF RESPONDENTS ^a REPORTING USAGE DURING THE PERIOD:		
	1968-69	1969-70	1973-74
Daily use of cigarettes	35%	40%	44%
Weekly use of alcohol	31	44	58
Any use of marijuana	21	35	52
Any use of amphetamines, barbiturates, hallucinogens	12	18	24

^aThis table is based on only those respondents who participated in both the fourth and the fifth data collections. The number of cases on which each percentage is based varies (due to missing data) from 1357 to 1405. Footnote 9 presents the rationale for this restriction of the sample.

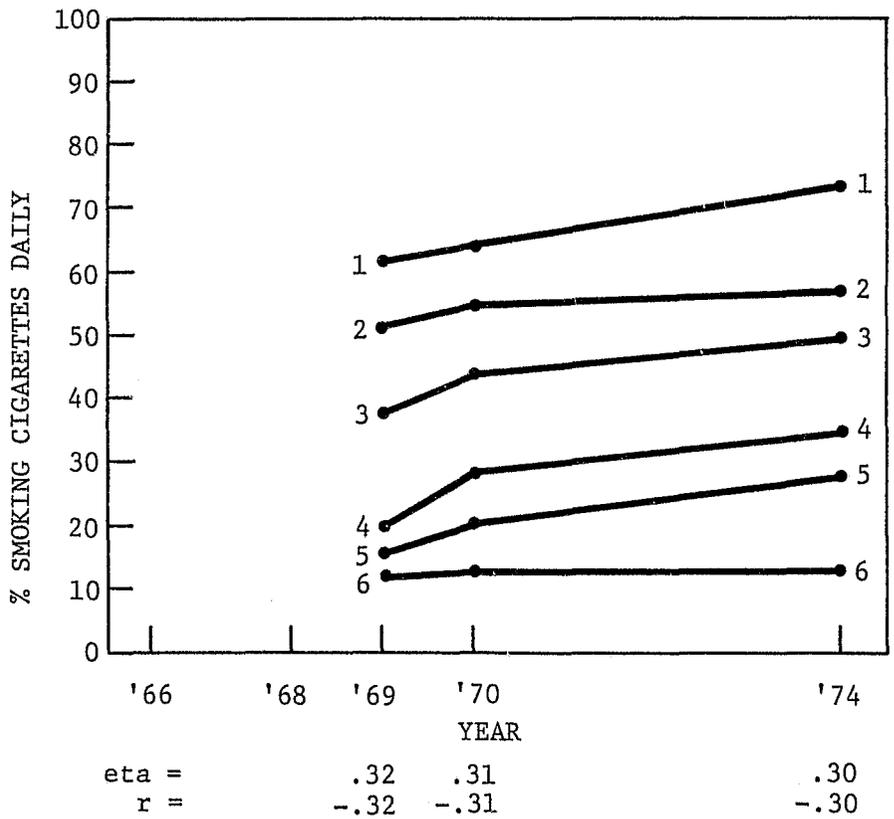
however, there is a dramatic shift in overall levels of usage. Many individuals increased their use of alcohol, and many who had not used marijuana or other drugs in 1968-69 used them at least experimentally in 1973-74, and that indicates low stability.

Since usage rates for alcohol, marijuana, and other drugs seem to have changed substantially during the span we measured, these behaviors may represent an especially promising area in which to look for differential changes linked to post-high school environments and experiences. Cigarette use, by way of contrast, is likely to show less in the way of differential patterns of change.

Educational Attainment and Drug Use. The largest difference between those who go or do not go to college does not lie in the use of alcohol, marijuana, or other illicit drugs. On the contrary, the really big difference linked to educational attainment is in the daily use of cigarettes. As Figure 4 indicates, by Time 5 about three out of four dropouts reported daily cigarette smoking, whereas one in seven of those who went on to graduate work after college were smokers. Each of the other educational attainment subgroups is neatly ordered in between--the higher the level of education attained, the lower the proportion of smokers.

Could this lowered frequency of smoking among the better educated be primarily a result of their additional schooling? Figure 4 suggests it is not, since the differences were clearly in evidence by the senior year of high school. Although smoking rates showed an overall rise during the five years following high school, the correlation between daily smoking and educational attainment remained virtually unchanged. The correlation is $-.32$ between smoking in 1968-69 and educational attainment, and the correlations for the subsequent smoking periods are $-.31$ and $-.30$. This does not mean that further schooling has no effect on smoking rates; it would be more accurate to say that additional education seems to have the effect of maintaining the differences which were present by the time most were seniors in high school.⁸

One more positive indication of possible educational impact is the negative correlation ($r = -.17$) between college quality and cigarette use--the higher the status of the college or university a young man attended, the less likely he was to be a daily smoker in 1973-74. Here again we find that the relationship was anticipated by smoking rates during high school--those headed toward the higher status colleges were less likely to be smokers during their senior year--but the correlation is not as strong ($r = -.11$).



- 1 Dropout
- 2 High School Grad, No College
- 3 High School Grad, Some College
- 4 Associate Degree
- 5 Bachelor Degree
- 6 Graduate Work

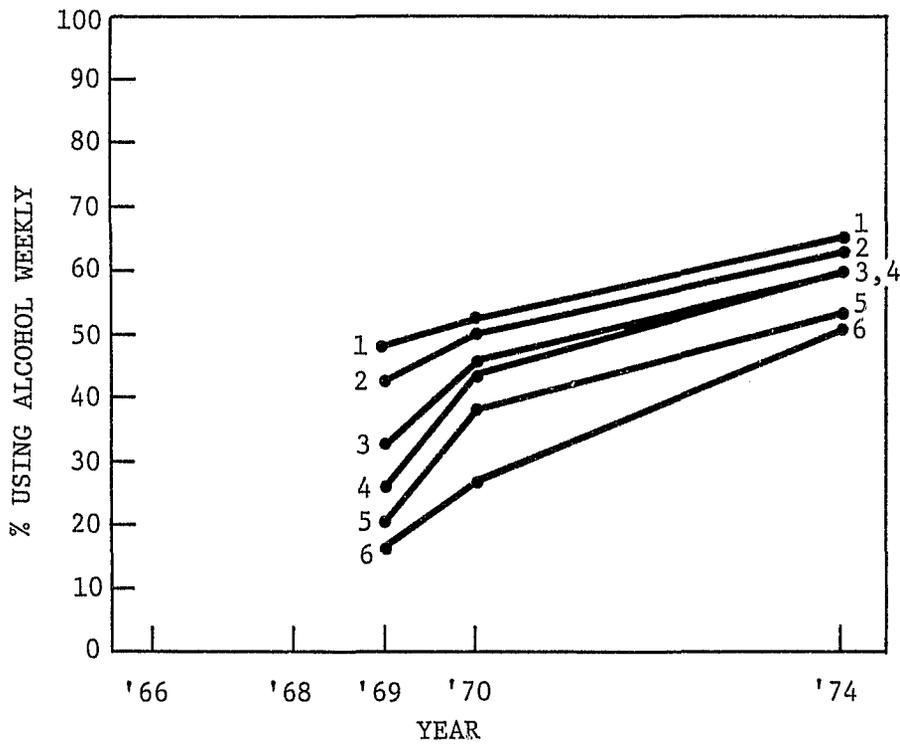
**FIGURE 4
CIGARETTE SMOKING RELATED TO EDUCATIONAL ATTAINMENT**

We conclude that post-high school educational experiences may have some marginal impact on cigarette smoking, but it appears that if we are to account for most of the relationship between smoking and educational attainment we must seek earlier causes.

Possibly the family background and ability dimensions which relate to educational attainment are important determinants of smoking behavior. However, an examination of product-moment correlations revealed that neither ability nor socioeconomic level nor number of siblings correlated more strongly than $-.12$ with smoking, and using all three variables in a multiple regression equation produced an (adjusted) R of only $.14$. A more promising possibility is that earlier educational success, which is strongly linked to later educational attainment, is also correlated with smoking behavior by the senior year of high school. One such measure of early educational success, classroom grades, does indeed correlate with senior year smoking; the correlation is $-.25$ when predicting from ninth grade grades (reported at Time 1), and for later measures of grades the correlations are $-.26$. (The other indicators of earlier educational success or failure, such as being held back a grade, show much weaker correlations with smoking.)

The fact that smoking is much less frequent among young men who got good grades in junior and senior high school, and then went on to college, does not provide us with a clear explanation as to why their smoking rates were lower; but it does suggest one strong possibility. During the last decade there has been increasing evidence, widely reported in the media, pointing to the health hazards involved in smoking. It seems likely that those young men who are more successful in school are probably also the ones most likely to read and take seriously such reports on the dangers of cigarette smoking. It is worth noting in this connection that a more recent study, dealing with the high school class of 1975, has shown a positive correlation ($r = .19$) between classroom grades and ratings of the amount of harm likely to be caused by smoking one or more packs of cigarettes per day.⁹

Turning next to alcohol use, we find that again the educational attainment groups were different by the time they reached the senior year of high school. But in this case, the differences diminished during the next five years. The findings are displayed in Figure 5. Those who completed college (including the group which went on to graduate study) had the lowest rates of alcohol use at all times studied; in the senior year of high school just under 20 percent drank as often as once a week, but five years later the figure was about 50 percent. High school dropouts, by way of contrast, showed nearly 50 percent drinking at least weekly as early as 1968-69, and by 1973-74 the rates was over 60 percent.



eta =	.20	.13		.08
r =	-.21	-.12		-.10

- | | |
|-----------------------------------|--------------------|
| 1 Dropout | 4 Associate Degree |
| 2 High School Grad., No College | 5 Bachelor Degree |
| 3 High School Grad., Some College | 6 Graduate Work |

FIGURE 5
ALCOHOL USE RELATED TO EDUCATIONAL ATTAINMENT

The differences in alcohol usage clearly are not attributable to educational attainment since they were stronger during high school than afterward. Nor is there any appreciable correlation between alcohol use and family background or ability. As in the case of daily cigarette use, alcohol use during the senior year of high school shows negative relationships with grades ($r = -.18$ for grades in both ninth grade and twelfth grade) and with the status of the college eventually attended ($r = -.12$). Alcohol use during the senior year also shows some correlation with the measures of delinquent behavior; thus, it may represent part of the syndrome of delinquent behavior that we have found to be consistently related to later educational attainment. Since for many of the respondents the use of alcohol in 1968-69 was illegal, something that was not the case by 1973-74 when they were in their early twenties, it is not surprising that the differentiation according to educational attainment was stronger in 1968 through 1970 than in 1973-74. Consistent with this explanation, the measure of alcohol use in 1973-74 generally correlates less strongly with the delinquency measures.

When we turn to those substances which are strictly illegal, we find only weak relationships with educational attainment. Marijuana use for the three time intervals measured correlates $-.09$, $.00$, and $-.05$ with educational attainment. The comparable correlations between educational attainment and the composite measure of amphetamine, barbiturate, and/or hallucinogen use are only slightly stronger: $-.12$, $-.09$, and $-.09$.

Occupational Experiences and Drug Use. The two dimensions of occupational experience of interest to us here are job status and employment (versus unemployment). The correlations between these dimensions and our several measures of drug use are presented in Table 4. The correlations are all negative, but most are rather small. Alcohol use, in particular, shows little association with job status and virtually none with employment.

Cigarette use in 1973-74 shows a correlation of $-.16$ with job status, but this is simply a reflection of the stronger correlation between educational attainment and cigarette use. (When both educational attainment and job status are entered into a multiple regression analysis predicting 1973-74 cigarette use, the beta coefficient for job status is only $-.03$ whereas that for educational attainment is $-.26$.) There is a modest set of correlations indicating that those unemployed at Time 5 were more likely to be daily cigarette smokers during high school and beyond. Sixty-one percent of those who were unemployed in 1974 were daily smokers, compared with 45 percent of those employed in the civilian work force. But these two groups had been about as different in their rates of smoking back in 1968-69--

TABLE 4

JOB STATUS AND EMPLOYMENT/UNEMPLOYMENT CORRELATED WITH
USE OF CIGARETTES, ALCOHOL, AND ILLICIT DRUGS

	PRODUCT-MOMENT CORRELATION WITH:	
	JOB STATUS	EMPLOYMENT (vs. UNEMPLOYMENT)
Daily Cigarette Use		
1968-69	-.14	-.10
1969-70	-.14	-.05
1973-74	-.16	-.09
Alcohol Use		
1968-69	-.08	-.04
1969-70	-.06	-.01
1973-74	-.07	-.04
Marijuana Use		
1968-69	-.02	-.05
1969-70	-.04	-.10
1973-74	-.10	-.18
Use of Amphetamines, Barbiturates, and/or Hallucinogens		
1968-69	-.03	-.08
1969-70	-.08	-.06
1973-74	-.12	-.16

NOTE: These correlations are based on all Time 5 participants. Therefore, the numbers of cases are larger than when analyses have been restricted to those who participated in both Time 5 and Time 4 data collections (a practice which has been employed in most of the special analyses conducted for this chapter).

the figures then were 53 percent compared with 35 percent. Thus it hardly seems that unemployment increases the likelihood of becoming a daily smoker.

As Table 4 indicates, it is when we turn to the illegal drugs that we see somewhat stronger relationships with job status and particularly with employment/unemployment. In the case of job status, the correlations with both marijuana use and use of amphetamines/barbiturates/hallucinogens show a gradual rise over time: there is virtually no relationship between drug use in the senior year of high school (1968-69) and later job attainment, but at the end of the study (1973-74) we find somewhat higher usage rates among those with lower status jobs. The employment/unemployment dimension shows the same pattern of increasing correlations from 1968-69 through 1973-74, but more strongly. As Figure 6 indicates, there is a much sharper rise in the proportion of unemployed respondents reporting any marijuana use, compared with those who were employed. The A/B/LSD dimension shows a very similar pattern: 46 percent of the unemployed group had used at least one of the drugs in 1973-74, compared with 22 percent of the employed, back in 1968-69 the rates were, respectively, 19 percent and 11 percent. While these findings do not prove that unemployment leads to increased drug use, since both may be caused by other factors, the data certainly are consistent with the argument that failure to find a job contributes to drug use.

Marriage and Drug Use. We noted earlier in this chapter that the young men who were married and parents before the 1974 data collection had been higher in interpersonal aggression during their high school years, but had shown a greater than average drop in aggression following high school (see Figure 3). We examined the drug use data for the same three groups--those who were single in 1974, those who were married without children, and those who had children. Our findings again suggest that marriage may have an effect of "toning down" the excesses of young men in their early twenties, in this case because the single men show greater increases in drug use than the married ones. The findings for marijuana use show the effect quite clearly, and are displayed in Figure 7. Note that the three analysis groups were quite similar during the last year of high school (1968-69) and in the first year following high school (1969-70); however, in 1973-74 about 60 percent of the single men used marijuana at least once, compared with about 40 percent of the married men. It is worth noting that one of the items included in the questionnaire in 1974 asked all respondents who were not currently using marijuana to check the reasons why; one of the frequently checked responses was "My wife or girlfriend would disapprove."

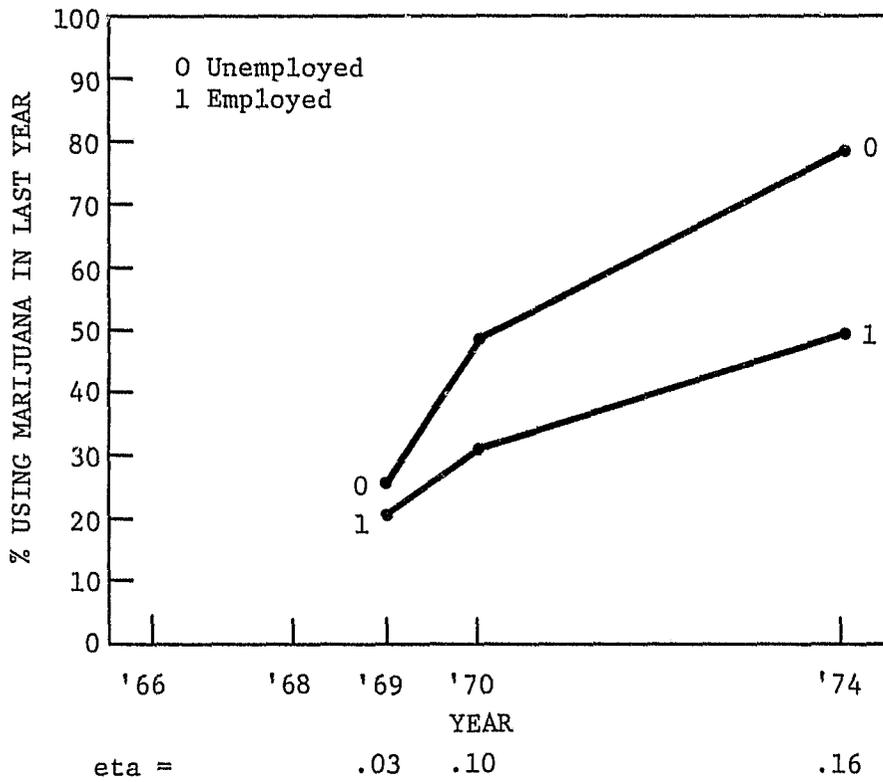


FIGURE 6
MARIJUANA USE RELATED TO EMPLOYMENT STATUS

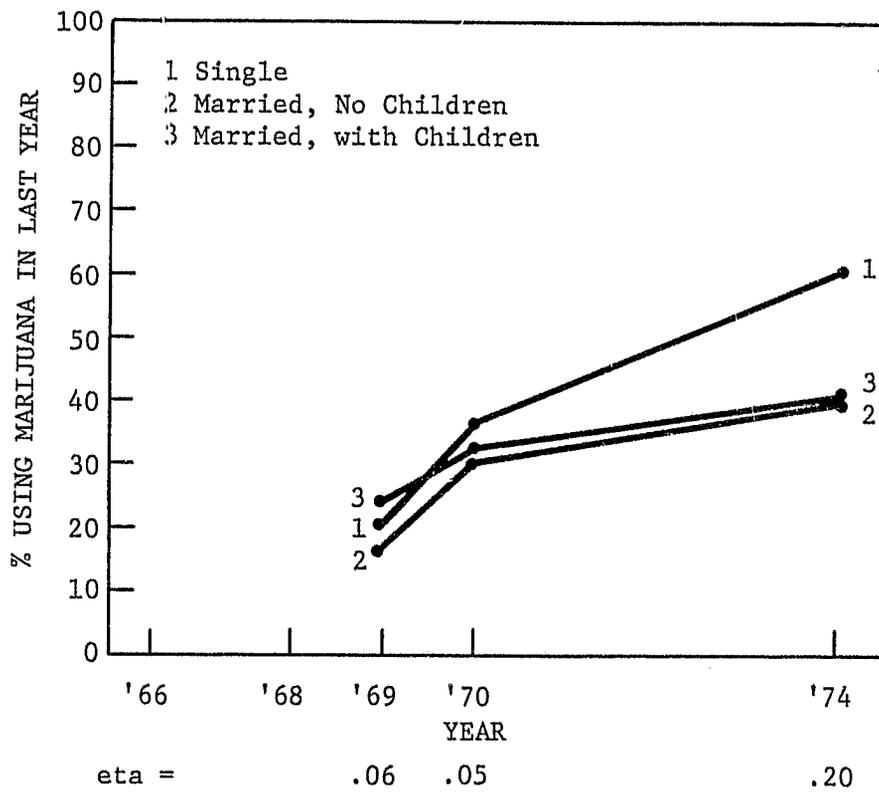


FIGURE 7
MARIJUANA USE RELATED TO MARITAL/PARENTAL STATUS

The difference between married and unmarried men appears also for the use of amphetamines, barbiturates, and/or hallucinogens. During the last year of high school the groups were very similar, and in the next year (1969-70) about 16 to 18 percent of each group reported at least some A/B/LSD use. But in 1973-74 the rate of use by married men (both parents and nonparents) remained at about 17 percent, whereas the rate for single men rose to 29 percent.

The findings for weekly alcohol use, displayed in Figure 8, show a similar pattern of greater increases for the single men, although the three groups started from different base levels during the senior year of high school. The young men who were soon to become parents showed the highest percentage of weekly alcohol users during the last year of high school (1968-69) and the first year thereafter (1969-70). Those who were to remain single during the next five years showed the lowest percentage during the 1968-70 period. But during the interval from 1970 through 1974 the proportion of the single men who used alcohol at least once a week increased from less than 40 percent to more than 60 percent; during the same interval the proportions for the married men increased by only about 6 or 7 percent.

The findings for cigarette use show little differential change among groups. Those who were married and parents by about age 23 (1974) showed consistently higher proportions of daily cigarette users from high school onward: from 48 percent during the senior year to 55 percent five years later. The other two groups had about 30 percent daily smokers in the senior year and just under 40 percent five years later.

The Impacts of Environments and Experiences: An Appraisal

We stated at the outset that our measures of delinquency and drug use provide a very good opportunity to examine the ways that particular environments and experiences may be linked to actual behaviors, and especially to changes in behavior patterns. The findings presented have shown a number of instances in which educational and other experiences are correlated with behaviors.

Educational attainment is correlated with delinquency, cigarette use, and alcohol consumption, but in each case the findings suggest that the differences in behavior preceded the sorting out by level of education. In other words, a more accurate description of the findings is that young men with high rates of delinquency, cigarette use, and alcohol use are less likely to reach high levels of educational attainment.

It is also accurate to say that those with above-average levels of delinquency and drug use are less likely to attain high status jobs. The relationships here are weaker than those involving educational

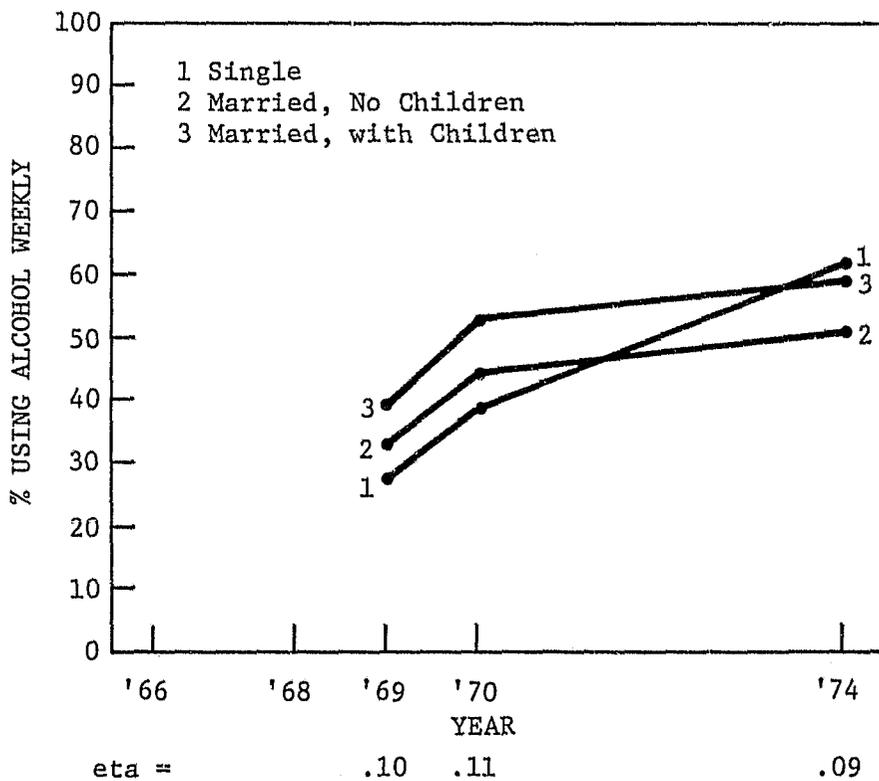


FIGURE 8
ALCOHOL USE RELATED TO MARITAL/PARENTAL STATUS

attainment, and multivariate analyses indicate that they are primarily a reflection of the impact of educational attainment on job status.

We must emphasize that it is only because we have longitudinal data that we can feel at all confident about such conclusions. If we were limited to the data collected at the end of the study, we would certainly have to entertain the possibility that different amounts of education have a direct causal impact on delinquency. But given our findings across time, we can conclude that any educational impacts on these kinds of behaviors must involve educational experiences prior to high school--perhaps prior to junior high school.

When we turn to the experience--or environment--of being unemployed, the pattern of findings is distinctly different. Interpersonal aggression, marijuana consumption, and use of other illicit drugs were all far above average for the unemployed. The correlation coefficients reflecting these relationships are misleadingly low because the proportion of unemployed was quite small. The more compelling statistic is that young men unemployed in 1974 reported fully twice as much interpersonal aggression and illicit use of such drugs as amphetamines, barbiturates, and hallucinogens as did those who were employed. Measures of drug use and aggression during 1969-70 showed much smaller differences between those who would, and would not, be unemployed by 1974. Thus it seems likely that unemployment makes some fairly direct contribution to behaviors which are generally defined as undesirable.

While unemployment seems to have an undesirable effect on behaviors, it appears that the experience--or environment--of marriage has a positive effect. Those who married and became fathers by age 23 had been well above average in interpersonal aggression during junior and senior high school, but five years later they were very similar to the rest of the sample in mean level of aggression. In the areas of drug use, there were few differences during high school between those who soon married and those who did not. But by the fifth year after high school, the proportion of single men using marijuana and/or other illicit drugs were half again as large as the proportion of married men.

Does unemployment heighten aggression and drug use? Does marriage tend to "reform" some overly aggressive individuals, and does it decrease the likelihood of drug use? Our findings in this area are suggestive, but not definitive. In each case an alternative path of causation is also plausible. Increases in aggression and drug use in the years following high school may contribute to unemployment and it may also decrease the likelihood of marriage. But the fact that we are dealing with different patterns of change in behaviors, rather than stable differences in behaviors, leads us to favor an

explanation in terms of environmental/experiential impact. Future research designed to disentangle these two causal interpretations should involve more frequent (at least annual) data collections.

Ending the Anti-Dropout Campaign

As noted earlier, a special focus of the Youth in Transition project has been to distinguish between the causes and consequences of dropping out of high school. Volume III in the Youth in Transition monograph series was devoted largely to the basic question, Does dropping out really change anything? That volume, based on data extending to one year after most graduated from high school, concluded that "...dropping out does not change things a great deal--at least not in ways that are apparent by the time a young man reaches the age of nineteen or twenty." (Bachman *et al.*, 1971, p. 175). Now, based on the longitudinal research extending four years further, the impression of rather little change as a result of dropping out can be extended at least to age 23 or 24.

The self-esteem of dropouts was slightly lower than that of high school graduates in 1974, but it had been lower in 1966 as well. This finding belies expectations that dropouts must surely suffer increasing losses in self-esteem as a result of their public failure to complete high school. Instead, their self-esteem increased considerably from 1966 to 1974, at just about the same rate as shown by the graduates. The occupational aspirations of dropouts were also a bit lower than graduates in 1974, but the differences had been greater in 1966. Delinquency also showed a pattern of relatively stable differences between groups; dropouts were higher in 1974, but the differences were actually less than in 1966. Along all of the dimensions mentioned above, dropping out appeared to have had rather little effect. Another set of dimensions, occupational attitudes, did show some small changes in relationship, however. For example, the dropouts became relatively more concerned about having a good paying job. But this is by no means a negative effect of dropping out; it probably realistically reflects the dropout's more precarious position in the labor market. We conclude that for the broad array of outcomes we examine, there are few negative effects of dropping out other than the high rate of unemployment that dropouts experience. To the extent that dropouts have more problems than average, dropping out appears primarily to be a symptom, not the cause of those problems. (See Bachman *et al.*, 1978, for an extended presentation of the data presented in this paragraph.)

Whether similar results could be expected among any of the more than 80% of students who now stay in school, should they drop out, is not clear. Obviously our dropouts are a self-selected group composed disproportionately of young men who were only marginally involved in school. Many of them had psychologically dropped out already and

extremely few of them would have opted to go on to college even had they completed high school. It would seem reasonable to expect that our findings of few ill effects from dropping out would be most generalizable to the stay-ins who are most similar to the current drop-outs, i.e., those only marginally involved in school and with extremely low probability of college attendance.

What implications derive from our results? Certainly one implication is that exhorting potential dropouts to finish high school in order to get a better job is likely to be misleading. Five years after graduation, those who ended their education with a high school diploma did not have noticeably better jobs than dropouts in terms of status, pay, and job satisfaction. They did have better chances of avoiding unemployment. Another implication is that the majority of high school dropouts are probably no better or worse as employees than are those whose education stopped with a high school diploma. If they were, presumably differences in status and wages would be discernible within five years after high school. But if most dropouts are just as good employees as high school graduates, then why do dropouts have the much higher unemployment rate? There are two possible alternatives.

1. Some dropouts simply lack the abilities and/or motivation to work. The same qualities which led them not to finish high school lead them to fail to find or keep jobs.

2. Jobs are harder to find for dropouts. Since the credential of a high school diploma is a requirement for many jobs which dropouts could perfectly well perform, this alternative is a very likely possibility.

Both alternatives are probably true to some extent. Surely some dropouts are misfits; they were unable to fit well into educational institutions and they do not fit well into occupational institutions either. But many others need not be considered misfits. Whatever the reasons that the educational environment did not provide a congenial fit, it does not follow that dropouts in general could not fit into an occupational environment. Indeed, our data indicate that many dropouts do find the occupational environment to their liking.

We believe that dropouts are often victims of discrimination in the job market. Some employers who require a diploma for jobs are discriminating on the basis of a credential which may not be truly indicative of the applicant's potential as an employee. Of course, some proportion of dropouts who are really misfits may be screened out effectively by the requirement of a diploma, but we would argue that the costs are too great.

We question whether it makes sense to insist on 12 years of schooling for the sorts of young men who currently tend to drop out.* By keeping in school individuals who basically do not fit in well with educational institutions, we needlessly make life much more difficult for everyone else in the school. Both teachers and serious, willing students suffer from the enforced presence of individuals who have little or no positive incentive to be in school; and the experience of staying in school is unpleasant for the potential dropouts who react to an environment they dislike by doing little but wasting time and causing problems for others. Further, there is a real cost associated with their schooling; perhaps the same resources could be allocated more productively to on-the-job or other vocational training programs. The views expressed in Volume III seem equally applicable now, based on our follow-up data five years after high school graduation:

...The campaign against dropping out seems based on the assumption that everyone needs at least twelve years of formal education. But the research reported here has led us to question that assumption. We have found that some young men can manage reasonably well on the basis of ten or eleven years of education. Perhaps others would do so if they were not branded as "dropouts."

Certainly there are alternatives to a twelve-year diploma; perhaps one based on ten years would be sufficient. Young people wishing to enter college might spend the years equivalent to grades eleven and twelve in publicly-supported college preparatory academies. Others might enter one-year or two-year vocational training or work/study programs. Still other young people might choose to go directly into the world of work after their tenth-grade graduation--some to return to part-time or full-time education after a year or two or three.

In a world of rapidly changing technology with its emphasis on continuing education and periodic retraining, there is less and less reason to maintain the traditionally sharp boundary between the role of student and the later role of worker. Shortening the prescribed minimum

*It should be noted that only boys are studied in the current work, so the results may or may not be generalizable to girls. For example, many girls leave school due to pregnancy--not necessarily because of marginal involvement in their school work. Obviously we would not expect our results to generalize as well to these kinds of dropouts.

period for full-time uninterrupted schooling might be a positive step toward new patterns of lifetime education in which individuals can choose for themselves among a wide range of "educational life-styles." If such changes would reduce the credential value attached to high school diplomas, all the better. One of the unfortunate side effects of the anti-dropout campaign has been the tendency to confuse education with credentials; any step in the opposite direction could have a salutary effect on our whole educational establishment (Bachman et al., 1971, pp. 181-82).

Departures from the existing educational system of the type suggested here are fairly substantial, so as with most sizeable interventions we would suggest that they be tried on an experimental basis first. If, after careful evaluation and public and professional scrutiny, they continue to seem worthwhile, then such revisions could be instituted more widely.

NOTES

¹This paper is adapted from a monograph by Bachman, O'Malley, and J. Johnston (1978). The data on delinquent behavior and drug use treated here have also been analyzed extensively by L. Johnston, O'Malley, and Eveland (1978). In particular, their analysis concentrated on the relationship between drug use and delinquency. We do not treat those relationships here, but cite their conclusions. We also borrow extensively from their paper in describing the measures and the issue of validity.

²Several of the complications in the delinquency items occurred because we did not adequately anticipate the need for revisions in the delinquency measures as our respondents moved through high school and then into the post-high school years. (One reason for this is the fact that the Youth in Transition project was originally designed to have only three data collections, with the third one occurring shortly after the end of high school.) The original list of delinquent behaviors adapted from Gold's (1966) work included 26 delinquent behaviors. The list was shortened to 21 items at the fourth data collection in order to omit a number of school-specific items (none of which was included in the three indexes used in this report). Three more items were removed in the final data collection, two of which had been included in the interpersonal aggression index, as noted below.

A number of modifications were made in the interpersonal aggression index because some items become less appropriate in their original form. For the first three data collections the item "Hit an instructor or supervisor" had been worded "Hit a teacher," and the item "Gotten into a serious fight in school or at work" had not included the reference to work. Also, the items about hitting father or mother were not included in the last data collection (when the young men were at an average age of 23). An examination of the frequency distributions of the two changed items suggests that the changes in wording making them less school-specific did not produce any important shift in responses. Omitting the two items about hitting a parent led to very little loss in information; by the fourth data collection (when the respondents were about 19) only 6 percent reported having hit their father during the last year, only 3 percent hit their mother, and there is good reason to think that four years later the percentages would have been still lower. (Not having these very low frequency items included in the index computation at Time 5 had the effect of making the interpersonal aggression scores higher than they would have been if the two items had been retained. In other words, omitting these two items has the effect of slightly underestimating the drop in interpersonal aggression from Time 4 to Time 5.)

The reliabilities of the delinquency indexes are estimated to be rather low--a range from .50 to .55. One reason for these low levels of reliability has to do with the fact that the delinquency items deal with events which are fairly infrequent during the junior high school years and which become still less frequent during the years that follow (see Table 2). Because of this, a difference of one scale point on any one item (e.g., getting into a fight one time rather than not at all) would be sufficient to move an individual out of the majority category for interpersonal aggression at Time 5 (the majority reported no instances of any of the six behaviors measured). This means that our indexes, even though they are based on six to 10 items each, make relatively crude distinctions among individuals, and this in turn means that reliability levels are decreased. If we wanted our measures of delinquency to have the same level of reliability as we attain with our 10-item index of self-esteem (in which respondents make extensive use of at least three of the five scale points for each item) we would probably require 50 or more delinquency items. Fortunately, the comparison of different subgroups is not so seriously affected by the limited reliability of the delinquency measures, and such analyses are the primary focus of this chapter. The place where low reliability causes more serious problems is in multivariate analyses that attempt to assess change and causal impact by "controlling" earlier levels of delinquency. If delinquency is not very reliably measured, the "controls" provided by multiple regression analyses are not complete.

We noted in our discussion of the retention rates for our longitudinal panel that the Time 5 questionnaire successfully reached some respondents who did not participate in earlier data collections, particularly the interview/questionnaire session at Time 4 (one year after high school). For most purposes, our strategy of limiting analyses to those who participated at Time 5 has not given us problems even though the "middle" data collections and particularly the one at Time 4 have had higher proportions of missing data. In the present topic areas, however, the problems are a bit more noticeable. The delinquency levels of those who missed Time 4 but returned to the study at Time 5 were (at both the start of the study and the end) a bit higher than the levels for those who participated at both Time 4 and Time 5. The distortions are not really severe; nevertheless, we found it preferable for some analyses in this chapter to further restrict the sample to those who participated at both Time 4 and Time 5. (Incidentally, the same strategy was employed for some of the drug use analyses. In this case data were collected only at Time 4 and 5, so it was particularly appropriate in some analyses to limit ourselves to those respondents who participated on both occasions.)

Perhaps one other complication is worth noting. The percentages reported in Table 2 are based on the total sample participating at each data collection, rather than only Time 5 (or Times 4 and 5) participants. This was unavoidable, because the data on individual items were not retained for individual respondents (thus making it impossible to compute frequency distributions on each item for any particular subset of respondents). The individual item responses were destroyed, after initial frequency distributions were run and index scores were computed, in order to insure that no individual's report of any particular delinquent (and sometimes criminal) activity could be recovered from our data files. This lack of precise matching of respondents across time means that the frequencies presented in Table 2 must be viewed as only approximations. Nevertheless, the differences across time are quite substantial, whereas the biases introduced by sample shifts are very limited. Thus, the broad conclusions drawn from the table remain valid.

³See the third paragraph in Footnote 2 for a further discussion of the reliability of these delinquency measures.

⁴Respondents were asked to report how often they had done each behavior using this five-point scale: Never (during the time interval in question); Once; Twice; Three or Four times; Five or more times. In this chapter we have in effect assigned values of 0 through 4 to these five scale points so that the resulting index is very close to a true ratio scale. Since very few (less than 5 percent) of the

respondents gave higher values than "Twice" in answering most questions, we are comfortable with treating the delinquency measures as ratio scales.

⁵This interpretation was suggested in a personal communication from our colleague Martin Gold.

⁶As we noted in Footnote 2, the reliability of the delinquency measures is unusually low and this presents special problems for multiple regression analyses. The lower reliabilities mean that the observed correlations between the early delinquency scores and the Time 5 scores are substantially lower than the "true" correlations. Thus, when we introduce these correlations into the multiple regression formula, we are only partly controlling earlier levels of delinquency. This results in an overstatement of the contribution of the other predictors such as educational attainment, job status, and unemployment. One way of attempting to solve this type of problem is to introduce adjustments for reliability. We have not chosen to carry these analyses to that level of complexity for several reasons, the most compelling of which is that even with the present inadequate controls the basic direction of the findings seems sufficiently clear.

⁷In computing the drug use percentages, and in most other analyses in this section, we have followed the practice employed in our analyses of delinquent behavior, i.e., we have limited the sample to those who participated in both the Time 4 and Time 5 data collections (rather than simply limiting to those who participated at Time 5). The roughly 200 individuals who missed the fourth data collection but participated in the fifth reported slightly higher usage rates than the rest of the Time 5 sample. By excluding them from the present analyses, we avoid an overestimate of the increases in drug use from Time 4 to Time 5, but we also very slightly underestimate the actual usage levels for the whole sample at Time 5. Since our emphasis is primarily on relational analyses and changes, this restriction in the sample seems appropriate. (It should be added that the correlational data used in our multivariate analyses were not restricted to those who participated at both Times 4 and 5.)

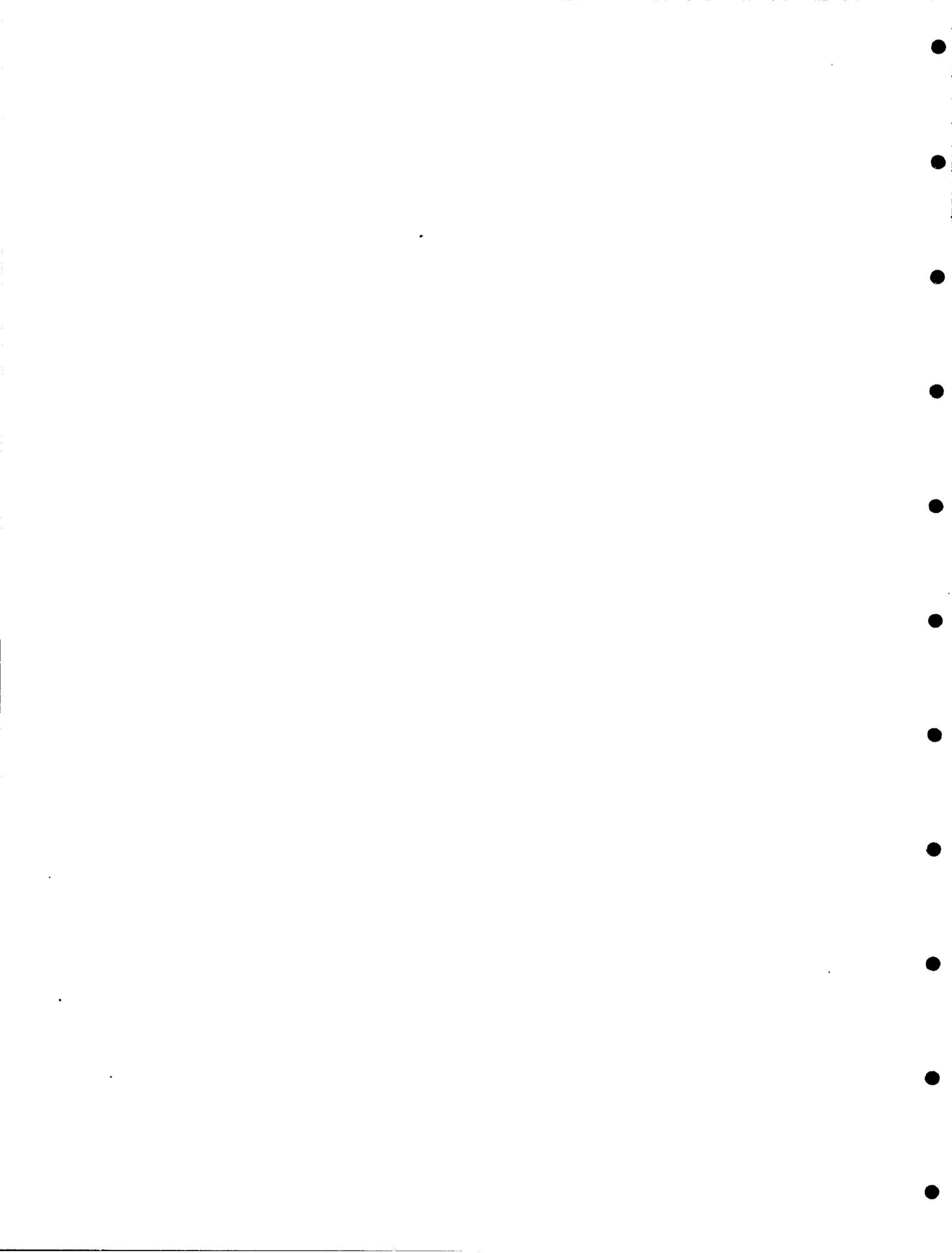
⁸In a multiple regression analysis predicting daily smoking in 1973-74, and using daily smoking in 1968-1969 plus educational attainment as predictors, the beta values for the two predictors are, respectively, .59 and -.12. The beta value of -.12 for educational attainment after controlling for smoking level during high school is no doubt an overestimate of its true impact; the control for early smoking is limited by the fact that we used a dichotomous version of the cigarette smoking question at both time points, whereas if we had used the continuous

version and/or if we had incorporated adjustments for unreliability the contribution of educational attainment in the multiple regression analysis would have been reduced.

⁹This finding is based on the Monitoring the Future project currently being conducted at the Institute for Social Research.

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TOWARD A DEVELOPMENTAL APPROACH
IN CRIMINOLOGY;
CLUES FROM DRUG STUDIES

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INTRODUCTION

The non-medical use of psychoactive drugs can be of interest to criminology in four ways. One is because of the correlation found both generally and specifically by subgroups between such drug use and other criminality. Secondly, understanding the etiology of crime may be enhanced by attention to the development of extreme drug use. That occurs not only because the drug-crime correlation requires that influences leading to drug use be examined as possible influences to other criminality as well, and because drugs may precipitate criminal acts, but because there can be a transfer of concepts, methods or findings initially germane to drug studies to crime research. A third point of interest arises from the fact that much drug use is itself illicit and necessarily drug production and distribution involve criminality. Fourth, practical problems and approaches in law, prevention, corrections, treatment overlap--and are sometimes identical for the two areas.

In this paper I shall document the drug-crime correlation and shall attend to individual developmental aspects of extreme drug use with its usually correlative delinquency--doing that by drawing on aspects of the work of our group at Stanford. I shall conclude with suggestions for future work.

The Drug-Crime Correlation

A national survey (O'Donnell et al., 1976) of young men 20 to 30 years old shows that users of any illicit drug are more criminal than non-users. Marijuana users are less criminal than users of more extreme drugs, (e.g., amphetamines, heroin; "extreme" is defined as being less prevalent). Twenty-four percent of users in the more extreme group admit to breaking and entering compared to 7% among non-illicit drug users; shoplifting at 62% compared to 35%, armed robbery 3% to 1%. By comparison, among the heaviest alcohol users, breaking and entering is reported by 18%, shoplifting by 56%, armed robbery 2%. Arrest experience is high for all young men; 31% have been arrested for other than traffic matters and 12% convicted, according to survey self reports. (Living in big cities and having low educational achievement correlate with increased criminality). The sample is equally divided into those



who used any illicit drug before arrest--that mostly cannabis--and those arrested before drug use. Among those arrested, about half stated that drugs had caused them legal difficulties; for those who had served time, two thirds so stated. Nine percent with no arrest records said they had nevertheless had legal problems because of drugs. Note that heavy alcohol users are very close to illicit drug users in their reported criminal histories. In this connection, bear in mind that use of illicit drugs has a near perfect correlation with alcohol experience, although the converse does not hold true, that is, many drinkers will not be users of illicit substances.

Among a representative sample in New York State, five percent of all adults said they had experienced troubles with the police from using alcohol; 2% reported police troubles from using other drugs (Chambers, 1977). In Manhattan, narcotics users known to the police were responsible for 28% of the crimes known to the police (Savojic and Karpas, 1976). In a sample of Lexington USPHS Hospital addicts, 96% had engaged in non-drug crime; 28% crimes against the person, 68% property crimes (Vaillant, 1966). Of admissions to Lexington and Fort Worth, about 87% had arrests prior to admission (Ball and Chambers, 1970), and in a London sample, 76% of heroin addicts were convicted before the onset of addiction (Cited in Nurco and DuPont, 1977). For New York State, Inciardi and Chambers (1972) estimate that less than 1% of addict non-drug crime results in arrest. They further estimate that only 4% of the property crimes by addicts and 5% of their crimes against persons are reported to the police to become national statistics.

Among high school students followed over eight years, Johnston et al. (1976) report a strong relationship between an index of theft and vandalism and increasing drug use. Interpersonal aggression was also drug-rate linked. And Elliott and Ageton (1976), using urban samples ages 11-17, found both property and personal crime higher for drug users than non-users. Further, in a BNDD six city study, arrest rates for all charges were higher for drug users than for non-drug users, (BNDD, 1971, Six City Study). Among persons jailed on non-drug offenses, the range of heroin users is from 20% to 59%, depending on the city. In Philadelphia, (Savitz, 1977) 17% of all arrestees are identifiable as current drug addicts. Current addicts have an average of 7.2 prior arrests; non-addict arrestees average prior arrest rates of 3.5 offenses. In Washington, D. C. (Kozel and DuPont, 1977), the number of heroin users jailed is more than twice as high as any other group defined by their illicit drug preferences.

In a national prison study (Barton, 1974) one of four inmates claims he/she was under the influence of drugs at the time of the commission of the offense leading to imprisonment; 14% claiming heroin influence. All other drugs combined, those claiming to have been under

the influence of alcohol outnumber other acute drug states by 2 to 1. Indeed, one third of those claiming an acute heroin state also claim simultaneous alcohol influence.

Data from such studies suffers the unreliability that attends either self reports or police records; Shellow (1976) and Ansel et al. (1976) report, for example, that in an assessment of reliability and validity of heroin use and criminality in 1500 patients, 55% provided unreliable data. Lest one trust more in objective biochemical measures, consider that Savitz (1977) noted that mass screening via urinalysis in one sample identified only 10% of those otherwise known to be drug addicts.

Nevertheless, the thrust of these studies is consistent enough, supplemented by other reports not cited here, to allow us four conclusions. The first is that users of illicit drugs are more likely than non-users to be engaged in non-drug crime. The second is that known offenders are more likely to have histories of extreme drug use, either illicit or sanctioned alcohol, than are their non-offender peers. Third is that heavy alcohol users are more likely to have offense records than are moderate drinkers and, fourth, drug use itself--alcohol foremost--is perceived as a precipitating factor for crime and police contacts by users.

The latter observation is sustained by objective studies of criminal events, as for example, vehicle manslaughter, assault, homicide or rape. The homicide studies of Wolfgang (1958) are an example. Similarly, a California study, (Molof, 1967) found that drinking delinquents commit more assaults than non-drinkers. Assault is the most frequent violent crime in the U. S. Williams (1967) study of college students found that the collegian problem drinkers were more aggressive and less sociable than others.

While there seems little question that alcohol is a precipitating factor in violence, it is also possible that more aggressive youth seek out alcohol. McClelland's work on the fantasies of powerfulness as the prepotent fantasy genie emerging from the bottle is compatible with either event, that is, impulsive, aggressive and self-aggrandizing actions as a consequence of alcohol disinhibition, or the affinity to alcohol among those who enjoy the stimulus--or excuse--it provides to be overtly aggressive. Lest one think only in terms of alcohol as disinhibitor, be reminded of Tinklenberg's findings (1974) of acute barbiturate states precipitating teen-age group violence.

There is, of course, a large literature embracing the assumption that heroin also "causes" crime, that via a longer action sequence. The addiction is presumed to compel gratification attempts, that in turn

compelling crime in order to "support the habit". McGothlen (1978) for instance, reports that former addicts recall committing more crimes while on heroin "runs" than when abstaining from heroin. Whether the simple formulation which provides convenient justifications for the offender, and such a neat etiology for the observer is, in fact, a sufficient account for addict crime is uncertain. McGothlen's (1978) review concludes it is, yet most addicts are delinquents before trying heroin, most who try heroin do not become addicts, most who characterize themselves as addicts--a criminal life style--are not using heroin on any given day, and any who wish to obtain a legal opiate to "satisfy their craving" can do so at their local methadone clinic. And some former addicts become more competent criminals after treatment. (For a review see Blum, R., 1978).

Descriptive data of the foregoing sort has been characteristic of most work on drugs and crime. Little of it addresses the question raised by simple curiosity about the obvious. Why is it that there is so often found a strong correlation between extreme psychoactive drug use and recidivistic criminality?

Exploring the Relationship

The simplest accounting is a sociological tautology, being "deviant." The elaborated tautology holds that either people do such things because they are deviantly predisposed, or because they fall in with deviant companions and learn further nonconformity, or because someone else labels them as odd birds and they adopt the plumage. As statistically descriptive disapproval, the terminology and its explanatory sequelae are not helpful etiologically or correlatively.

If, however, one examines the phenomenon, looking for identifiable subgroups in which background factors and current correlates are specified, the "deviance" concept becomes more useful. Berg and Bass, for instance, found that those scoring in an unusual way on one psychological test tended to do so on others, but that clusters or patterns could also be identified. That is, of course, the essence of subgroup or syndrome identification or diagnosis. Freedman and Doob (1968) report that upon producing artificial deviancy in an experimental setting, those thinking of themselves as now different, having been given false personality trait scores, tended to stick together and be unresponsive to authority. Non-deviant subjects began to mistreat the deviants. Extrapolating, it appears that an outgroup once created generates further divisiveness.

Cahalan (1966) found nonconformity plus impulsiveness predicted problem drinking among young men when, attitudinally, alcohol was believed to be rewarding at more levels, i.e., serves more functions personally. When the drinking climate, represented by parents or peers,

is more permissive there will be more drinking. Thus, when alcohol quantity, personal functions and personal traits, plus unconventionality all present and enhanced by age--more often under age 30 than over--the risk of problem drinking is greatest. The problems will include unlawful acts. Robins' (1966) study offers another example. Recall that a followup 30 years after child-guidance clinic experience found that a majority of the sociopathic adults--who had been seen as cases when children and diagnosed as antisocial then--had records of criminal offenses and alcohol problems. Only 7% of the controls had alcohol problems and 17% adult arrests. Welfare dependency, divorce, mental hospitalization, accidents, child neglect, unemployment and so forth, were also part of the adult lives of the former antisocial children. Both crime and drinking problems are part of the larger package of troubled lives, early identifiable and linked, as Robbins' data show, to parental conduct. For example, more than half of the antisocial children with drunkard fathers were sociopaths as adults; when both mother and father were sociopathic and/or alcoholics, the risk of the child being an adult sociopath was at its greatest.

Knowing the "before" (antisocial child), the "before that" (drug and crime involved parents) and the "after" (a deviant adult) stimulates researchers to look for genetic and developmental specifics just as it entices clinicians to draft plans for psyches predisposed to drugs, crime and assorted social incompetencies. Traits such as poor judgment, impulsiveness, impoverished relations, rebelliousness, lack of foresight, self destructiveness, poor self esteem, amorality are common in the clinical portraits. Such traits in one or another psychodynamic formulation are usually linked etiologically to personality structure familial and situational features. We have elsewhere reviewed that literature with reference to extreme drug use. (Blum and Associates, 1972a, 1972b, 1976, 1978; Blum, Blum, and Garfield, 1976). It supports the conclusion that both idiosyncratic personal and adverse interpersonal circumstances are contributory, that subgroups can be identified, and that those currently described as heavily drug involved are likely to show personal psychopathology.

Whilst most of us probably accept such characterizations, two cautions are required. One is that attempts to formulate personality theory on the basis of drug conduct have misfired; my wife's review (Blum and Blum, 1967) of psychoanalytic theory with regard to the "addictive personality" yields a disappointing conclusion as to consensus, consistency, and empirical support. Observations on similarities between recidivist offenders and drug dependents (for example Yochelson and Samenow, 1977) must pay careful attention to those hazards. This is not to demean their potential importance. The other caution is that studies which rely on descriptions of those already drug involved are in jeopardy of reporting derived or overly phenomena. Extreme drug use--or for that matter, criminality--provides

a narrow enough funnel for experience that whatever personal diversity may have been earlier present, the present picture of persons is of a sameness. This is the masking effect found in alcoholism, in the addict role, and can be inferred in sociological concerns with manufactured roles as a result of labelling and processing. Therefore, one is grateful for research which is prospective, longitudinal, or which when retrospective relies on reports independent of distortion by subjects, or is predictive over the short run as is the case with experimental designs, or when descriptive of a cross-section at one point in time, relies on reports from sources supplementing the subject. The variety of findings from studies obeying these cautions is great enough to encourage the view that people with similar early characteristics can take different life courses with respect to drugs and crime, that the extreme drug or recidivistic criminal outcome can be a final common pathway for diverse prior experience, and that even when subgroups are identified which share common developmental characteristics and outcomes, error in prediction is great enough to recommend eclecticism in regard to theory, as well as an interdisciplinary perspective.

In examining work which focuses on extreme drug use, it is also well to bear in mind that such use is both specific and general. Extreme users show a general interest in psychoactive compounds, a predilection or readiness to employ them all, and a capacity to substitute one drug for another. There are also episodes of alternating or complementary use as, for example, uppers and then downers or simultaneous use as, for example, coffee and cognac or heroin and bourbon. Episodes of high and low levels of use also are typical. Specificity, on the other hand, is observed with respect to individual preferences for individual drugs or for those within a class as, for example, depressants versus stimulants. Preferences vary by age and for subgroups biosocially defined. This complex patterning colors any effort at subgroup identification and, in addition, forces one to examine the interaction among person, set, setting and specific pharmacological effects. There are parallels with delinquency for that also tends to be both varied and specific, episodic, and shaped as to expression by learning and opportunity even as chronic general predispositions are inferred. Yochelson and Samenow's clinical data illustrate the latter dramatically. Attention to general propensities, that is, readiness or set, invokes concepts derived from learning and motivational theory such as general arousal or excitatory levels the specific expression of which is a function of opportunity and leads to learned, elaborated repeated behavior which tends then to be described in terms of goals or motives. From our work with drug dealers, for example, one would be hard pressed to say their drug use and other criminality began as purposeful; to the contrary, it seems a drifting course powered by excitement, shaped by opportunity, and channeled by immediate gratifications. There certainly appear to have been multiple predisposing features so that when the "right" experience presented itself youngsters didn't hesitate to respond. The initial

response leads quickly--for most a span of no more than three years from illicit drug initiation to becoming a regular dealer--into more structured, differentiated careers. This differentiation, individually as a developmental process and statistically or epidemiologically as a matter of description and subgroup classification, appears to offer particular opportunity for research. Sociologists have recognized that through the concept of a "career."

Clues from our Work

Our group at Stanford has only recently considered the developmental process as such, including differentiation, as a focus for future work. In the past, we have ranged over a variety of phenomena bearing on psychoactive drug use, historical, cultural, epidemiological, situational, psychological and psychopharmacological, as well as the examination of intervention and policy. We have always been interested in etiology and correlates, but it was not until family studies followed by our recent longitudinal work with school children that we concluded that more intensive attention to developmental events keyed to transitional phases should be fruitful. The reason for that conclusion, apart from a natural interest in children's development, arises from an accretion of findings beginning with those from isolated initial hypotheses for which there has been recurring confirming evidence.

Let me now list, study by study, observations which, taken together, may suggest to you predilections and pathways for development into extreme drug use groups, some of which are also delinquent. You will see that our own work has not consistently avoided possible error arising from unvalidated subjective retrospection. Significant differences between groups only prove disparate perceptions, not actually disparate features. On the other hand, when contrasting subjective views with objective evaluation in the area of family influences, one learns of high correspondence between the perception of the several parties involved.

We have observed:

Study A: In a normal adult population, divided into drug use groups on the basis of the extent of substances used and functions ascribed to these, that: Persons with the more extreme drug experience will report more willingness to have been "ill" as children, describing advantages in taking the sick or patient role as a child. They will report more experience with medical care, will believe in the efficacy of medicines more, and will give medicines and self-medicate more.

Persons with the greater drug experience will report more psychological conflicts centered about orality measured by reported eating

problems as children and, currently, as adults. Admission of food cravings as such, linked to childhood eating problems, is in turn associated with fears of dependency with respect to drug use. Dependency fears are also associated with cravings as such, defined in terms of never getting enough of some things (love and emotion most often mentioned) or not being gratified. Extreme and unreasonable (self characterized) likes and dislikes are part of the configuration distinguishing extensive from limited drug users. There is also, as most other studies also report, greater recollected dislike of parents, and more dissatisfaction with self, with relations with others, and with work.

Social facilitation does and reportedly did play a greater role in ingestion; high users as opposed to others saying that they take more of drugs and of food when in company; as children they report more taking of things "on a dare"; currently they report more enhancement of drug effects when in company. It is this same group which seems more anxious about social relations, measured by sensitivity to criticism about drug use, fear of falling under the control of others and drug proselytizing.

Study B: In a cross-cultural study which relied on the Human Relations Area Files for data on 247 non-literate societies (Blum and Associates, 1969b) an association obtains between levels of drug use and child rearing methods. Specifically, when there is strong pressure toward developing obedient behavior in the child, alcohol use is greater, tobacco and stimulant use is more moderate, hallucinogen use is limited to adults.

When early oral satisfaction is high, then alcohol use is by both sexes rather than males, tobacco and stimulant use is high or excessive.

When positive pressure toward developing responsible behavior in the child is high, then alcohol is plentiful and tobacco use is moderate rather than high.

When pressure toward developing self-reliant behavior in the child is high, then alcohol use is predominantly male and stimulant use is both sexes and all ages.

When indulgence of the child is high, alcohol use is by adults rather than all ages.

When child's inferred anxiety over nonperformance of responsible behavior is high, then tobacco use is moderate rather than high or excessive.

Study C: In an anthropological study of alcohol use in rural Greece (Blum and Blum, 1964) where alcoholism is rare: No personal psychodynamic conflicts appeared to be projected to alcohol use symbolism, further food ingestion was likewise free of conflict, for example, neither foods nor wine take on desirability because of being associated with badness. Foods are not used as punishment for children via their deprivation but are used as rewards and are, in addition, given as tokens of love, hospitality, sharing. It is proposed that, other things equal, when childhood food ingestion is not made into an internalized conflict arena, later alcohol ingestion will not be excessive.

Study D: In a study of adolescent drug use in association with family values and child rearing practices (Blum and Associates, 1972a) for white middle class families, it was found that:

Mothers of high drug using youngsters more often reported depriving their children of food as a punishment. Concerns about childhood overweight, that as a function of over-ingestion, has been greater among mothers of high risk children. On the other hand, feeding problems described in the infant were more common among adolescents currently in the low drug use group.

Serious illness, age 2 to 12, were more often reported by mothers for the high use adolescents, as were allergies. Doctors' visits were most frequent during the prior 12 months in the high use families.

Premature babies, abortions and stillbirths were more common among high risk mothers; post delivery complications were highest in this group as well.

Masturbation and childhood sex play was denied by high use mothers than others. Toilet training difficulties are greater with high use groups.

Low use children were least often reported by parents to have been truant, rowdy, or as having discipline and study problems in school. Adolescents now in the high use group also had higher parent reported rates of running away and traffic violations although police records did not discriminate high from low groups.

Low use youngsters had experienced less separation from home, were reportedly more interested in vocations as policemen and were more often described as punctual, self-accepting and practical. High use youngsters were characterized by mothers as less cautious and less likely to be bored.

Mothers of high use youngsters indicated that early childhood-- 2 to 12--had been difficult periods for parenting, and these mothers, when asked to discuss the pleasures of child rearing, were most often negative in their appraisals.

Many expected differences did not emerge as, for example, eating problems as such were more often reported by mothers for their low use children, no difference in rates of nervousness occurred, and so forth.

With respect to family styles, the families with high drug use youngsters may be summarized as being more permissive, being less cohesive and having less positive emotional interaction. These families are less religious, less concerned with self-control, and the parents are more likely to use medications and to have alcohol problem histories. In these upper middle class families the emphasis is on the child's adjustment, individuality, freedom, exploration and change. Low drug using youngsters' parents give priority to discipline, family togetherness, love of God and country, and support for authority and the status quo.

Concentrating on individual rather than family descriptions, one finds the same general trends; for example, moderate drug users were also moderate eaters as infants; high risk individuals were, as infants, characterized as picky about food and later were more subject to food deprivation as punishment. High use youngsters were more seriously ill as infants and until twelve defined by time in hospital. They were also more likely to be bed wetters and, in adolescence, to be more sexually active, this a matter of conflict with parents even though parents were the more permissive. Earlier maternal worry about the child was more common for the high use group. Mothers rated the low drug use children as more self-confident, less insecure, more matter of fact; mothers of high risk children when reflecting on their parenting thought they had been too strict.

Considering this and other data, one infers three themes present in the high drug use youngsters contrasted with low drug use ones-- when their families are matched socioeconomically and when all were intact. One factor seems to be a "trouble" variable beginning in infancy and including early health problems and parental uncertainty. It includes craving as measured by over-eating, mild conduct disorder beginning early in school, and an apparent early lack of self-confidence. A second theme reflects a philosophy of life which is self-centered and self-indulgent but which by no means implies impairment in ability to work or achieve. A third theme reflects learning from parents--both direct conduct and ideas, as for example, drug use and self-centered values. As children learn from parents, so have the

grandparents been influential on the child's parents. The positive nature of parent-grandparent ties and the sense of affectionate, respectful family continuity appears to differentiate families with low drug use youngsters from others.

The same study applied to a smaller sample of black working class families yielded sometimes similar results. The high drug use black adolescents were described when younger as having had allergies, food aversions, eating problems and nervousness to a greater extent than moderate or low drug use youngsters. The high drug use parents were more punitive, hostile, indifferent, seductive, naive and mocking in relations with their children; they appeared incompetent as parents and unable to cope with their children.

A study comparing a small sample of poor Mexican-American families, the method this time more anthropological, indicated that the high drug use youngsters' mothers' were upset, poorly acculturated to Anglo ways, more ritualistic. The high use families were discordant, unhappy, externally oriented. The high use youngsters had long histories of distress, school problems, police problems and reciprocal maternal and family disorder.

Clinical observations--two independent clinicians rating films of experimental family situations--elaborated the foregoing findings. When families were rated as high in problems and pathology, the risk of extreme drug use for youngsters was greatest. Ratings on low problem families differed from high problem families on the variables of love, forgiveness, feelings of worth, confidence, parental reliability, parental leadership, acceptance and expression of emotions, protectiveness, parents' love of their own parent, joy, humor, mutual support, tolerance, teasing, communication clarity, respect and trust. The statistical and clinical findings corroborate one another.

Study E: In a longitudinal study of California school children (Blum, Blum and Garfield, 1976) cohorts from the 2nd, 4th, 6th, 8th and 10th grades and classified by their evolving drug use were described in terms of pre-drug school records as well as current family characteristics:

Among 4th graders, where tobacco, alcohol and cannabis use began, movement into new drugs was associated with poorer school and peer adjustment; 6th and 10th graders showing exaggerated drug use changes had more personal, school and family problems. By the 10th grade, those with the greater cannabis use had a report card record of downward grades for prior years. Among the most extreme drug use group there was more by way of personal and social difficulties. At all grade levels, two variables consistently discriminated those with the increasing drug use; excessive absences (an unreliable measure

because of poor school records) and prior teacher ratings of poor character and being a trouble maker. For the most part lower average grades and the selection in high school of soft subjects also characterized high drug use youngsters.

Comparing families of low versus high drug using school children, the findings of the earlier study were confirmed. Parents of abstainers more than high drug using childrens' parents were religious, enjoyed marital stability and agreement, used fewer drugs, placed greater emphasis on child rearing, on work, duty, discipline and love of parents, supervised their children closely, were more conventional and opposed unsanctioned drug use. High drug use children were characterized by their parents as curious and adventuresome, and these parents placed more value on freedom, flexibility, independence in the child.

When children are compared for their rate of drug change, that is rapid expanders compared with limited users with stable patterns, one sees that the latter's families used less alcohol and tranquilizers and have less parental disagreement over child rearing practices with reference to leisure time, drug use and peers, and there is less evidence of a "trouble" variable beginning in infancy.

Age is of great importance for the prediction of drug use change and the effectiveness of intervention efforts. There are certain transitional periods in which the most marked shifts occur; the shifts occur for clusters of drugs defined for the most part by their popular use prevalence. In our California school sample, liquor use rises from 19% to 73% from ages 9 to 11, tobacco from 17% to 50%, inhalents from zero at age 8 to a peak at age 11. At about age 11, the 6th grade marijuana use increases rapidly and amphetamine, barbiturate, heroin, cocaine use begins. A third transitional period, a leap from experimental to regular use of these latter unsanctioned drugs, occurs with the movement into high school, that at about age 14. It is in the 6th grade cohort that a two-year drug education effort proved most effective, that defined by dampening expected rapid uptake of unsanctioned drug use, but also by producing a more than expected (normal, compared to controls) rise in rate of use of the popular drugs, alcohol, tobacco and marijuana.

Study F: In a large study of drug dealers (Blum and Associates, 1972b) a subsample of 480 unincarcerated Bay Area dealers were interviewed at length. There were no means for independently verifying replies. The sample ranged from 12 to 70 in age, the median age bracket was 19 to 23. In our street dealer subsample, three-fifths reported arrests; over half had arrests for non-drug offenses; the average number of non-drug arrests was four per dealer; three-fourths of those arrested had conviction records; an average of 1.4 convictions per dealer. Charged crimes were, in order, burglary, drunkenness and

assault, larceny and auto theft, robbery, forgery. One-fourth of our sample carried guns. All of our dealers were also drug users and had been drug users before becoming dealers. Using, dealing, and for the majority being otherwise delinquent were, by the time we saw them, all part of the fabric of life. The high criminality of dealers is consistent with Elliott and Ageton's findings (1976) to the effect that youthful sellers of any illicit compound had higher crime rates than "hard drug" users as such. Recall that (older) heroin users, in turn, have higher rates than average non-drug using arrestees. It appears that drug dealers are a model population for a high drug-crime interrelationship. There are, of course, high and low crime subgroups among dealers based on life styles, drugs of choice, nature of clientele and so forth.

The interview records show the following about street dealers' families and personal development:

About one quarter of the sample described one or both parents as alcoholics. About one quarter of the parents also had felony arrests. (The rate of alcoholism is at least four times greater than normal if the descriptions are correct.) Three percent of the parents are described as addicts. Dealer's siblings had fewer arrests than the dealers. Limiting oneself to same sex siblings older than our subjects one finds the arrest rate only one-third as great for the siblings and those arrests are primarily narcotics; these ten times higher than the next offense category. One sees that non-drug crime is much more prevalent in our dealing subjects than in their siblings. Dealing drugs is reported for only by one-fifth of the older sibs. Sibs are seen as having lower alcohol problem rates than the parents. Sibling rates of use of illicit drugs approximates the average California urban rate for their age group.

Comparing dealers whose parents are described as having alcoholic, addiction and/or felony histories with others, one finds that although the two dealer groups differed, the magnitude of differences was not as great as other comparisons conducted in our study, as for example between arrested and unarrested or active and inactive dealers. These "troubled" parents were also much more likely to be divorced, less well educated, earlier married, and to be heavier drug users. In a few cases, these parents also initiated their child into illicit drug use.

Dealers with troubled parents met other dealers at an earlier age and themselves began supplying earlier than the comparison group. As dealers they are more engaged in predatory business relations (robbing, cheating.) They are, as dealers, more heavily involved, have higher rates of drug and non-drug arrest, and more often say they commit crime for the fun of it, although committing crime "for the fun of it" occurs

throughout our street dealer population. Troubled family dealers more often carry weapons, describe poor relations with their parents, report school truancy and dropping out, being in poor health, and themselves as either being or in danger of becoming alcoholics. There is a trend for the dealers from troubled parents to describe their older siblings as having histories of drug use and alcohol problems. Even so, the arrest rate for sibs is no more than one-half of that for our subjects. In the stable family group, sib arrest rates are slightly below that.

We expected that the emotional components anticipatory to and during initial illicit drug use and also delinquent acts are felt as positive. That is in addition to the presumption that persons beginning use expect a good pharmacological result as well as the social approval which is part of drug initiation. Our dealers recollected their first drug use as being a "party", that certainly implying a pleasurable aura. The first drug purchase was characterized as being an occasion of excitement, nervousness, pleasure, feeling important, that followed after the transaction with a sense of satisfaction; few said they felt any guilt. At the next stage when they first supplied drugs to someone else, the recollected emotions were pleasurable; less than one-fifth claimed indifference, only 1% recalled feeling any guilt. Peer approval was an important feature. One dare not assume that such delinquent initiations are always conflict free or that later careers are without distress. Indeed most regular dealers do find life becoming more unpleasant. Apprehension of further arrest and jail are, they say, the most unpleasant aspect. Even though over half feared that they themselves had become drug dependent, most preferred the dealing life and few seriously considered any alternatives to it, even if they were in current "retirement." Certainly, we sensed no internal restraints or conflicting personal values associated with what a budget and activities analysis showed to be lives busy with illicit conduct. Pressures to change tended to be external; arrest, family pleadings, increasing awareness of risk as they observed peers and, finally for an important group, "maturation". Perhaps maturation is an awareness that one has, as a drug dealing criminal, become what our street sample seems to have become, more self-centered, money oriented, unfriendly, paranoid, apprehensive, drug dependent and enjoying the dream much less. The bloom wears off the rose.

We did not, in this sample, inquire after health histories. In another dealer sampling, taken from newly registering students in an urban college, we found that recent and current reported rates of psychiatric care were double those of using non-dealers and over three times those of non-users of illicit compounds. Medical problems occur

at a rate twice as high as non-users, surgical ones at a thrice greater rate. One is reminded that illness and mortality rates among English registered heroin addicts are much higher (Mitcheson and Hartnoll, 1972-76; Hartnoll and Mitcheson, 1977; Hawks, 1971) than their peers.

In a sample of drug dealers found among students in an upper income residential university, no differences obtained between them and a random sample of undergraduates with respect to non-drug arrests, although drug arrests occurred much more frequently. These college dealers also differ from non-dealers in the greater vagueness of career plans--this tendency to drift along reminding one of the street dealers, but no collegians had criminal careers in mind, not even long-term dealing. On psychological tests, this group did not differ from matched drug users. Dealers are, as expected, more heavily involved in drug use and in drug using groups.

In a study of dealers in a wealthy junior high school, lower vocational aspirations were present, compared to others even though dealers' parents were better educated. Dealers appear to derogate parents more, do not do as well in school, and are less involved with other students in organized or group activities, except of course for their role with drug using peers.

Summary of Our Developmental Observations

There is recurring evidence for characteristics and situations emerging during various phases of development which distinguish extreme drug users from others, and also discriminate between those heavily drug involved and otherwise delinquent in contrast with others. It is not difficult as one controls for major socioeconomic variables to identify familial and personal features which have predictive power. Within the family, there are also striking differences between those both drug-involved and delinquent and their siblings. One infers that the greater the presence of antisocial and drug-centered activities coupled with unconventional vocational and social interests, the more noticeable are other discriminating features in background and personality. Thus, the subgroups defined by the absence of other delinquency, given high illicit drug use per se, consistently differ in the direction of greater conventionality on social and family and personal measures.

Some variables are visible over long developmental periods, others seem limited to developmental epochs. Discriminating variables at one or another stage include extreme parental drug use, criminality and marital instability (as Robins, 1966 earlier has shown), infancy problems which include maternal child bearing difficulties, and

infant illness, childhood food cravings, conflict-laden aspects of eating and drinking (e.g. food deprivation as punishment) maternal worry about the child, perceived inadequacy in parenting and greater parental conflict over rearing methods, illness and patient role-taking through childhood and at present, problematic peer relations defined by over-responsiveness, isolation and avoidance of structured activities--encouraging ideology, conflict with parents represented in identifications, derogation, lack of affection over several generations, early and continuing school problems both academically and in misbehavior, early emerging truancy and delinquency, more sexual activity, general excitement and satisfaction at the time of critical steps into illicit activities, including crime for the fun of it, the absence both early and later of competing ideals as to life styles or vocations, and the absence of inner restraints either emotional or ideological.

We do not find or propose that all of these characterize any group or person; no one mold stamps all extreme drug users or delinquents using drugs. It is likely that multiple patterns including the foregoing components, and no doubt others, appear during development. Some components are signs of maladaptation, personal styles or predilection, apparent, we think, in infancy. Some are reactions, some immediate influences, some internal facilitators or settings favoring a more unconventional step into the next phase. Some components may be phenotypical phenomena which only seem to disappear as they undergo developmental transformation yet retain a thrust toward extreme drug use and delinquency as culturally available, obviously satisfying life styles.

The prevalence of these features varies, as does their power. When variables such as parental drug use and crime operate intimately over an entire childhood, its dominance can be understood. But maternal child-bearing difficulty or childhood food cravings are of a less direct order such that intervening constructs need be invoked and less predictive power for final outcomes expected. To chart the differential place and power of variables identified at differing stages of development, path analysis offers itself as a conceptual model. Yet for research, the longitudinal method is usually impractical, especially since developing knowledge may antiquate concepts even while the work is midway. For that reason, one more often opts either for retrospective work, experiments as such, or shorter cross sections of follow up study at transitional ages of special importance. These certainly embrace the spans of drug initiation as, for example, ages 9 to 11, the mid-teens, the periods of acute school performance decline, and for early childhood offenders, a la Yochelson and Samenow (1977) or the Gluecks, (1960) pre-school years.

The conceptual task for research is to identify the discriminating components of these various sorts, and to recognize clusters and patterns. One needs to separate genotypical from phenotypical phenomena and to construct themes and concepts useful in thinking and theory constructions. One will want to pay close attention to sequences, transition points, and developmental transformations critical for differentiation into one or another drug or drug-and-delinquent preference, career and subgroup.

We must wait to have any further satisfaction of our curiosity about the drug crime correlation, one so well demonstrated in the intense simultaneous involvement of some dealer subgroups, particularly in the older lower class habitual offenders. One enjoys knowing that prediction begins at least in the grandparent's generation, relies on parental traits prior to one's subjects' conception is bolstered by knowledge of pregnancy and delivery difficulties, by knowing about infant illness, behavior and early maternal worry, and becomes strong by examining childhood health, eating, school grades, school conduct, peer relations. Family interactions are part of the predictive matrix, so is the child's other conduct; from bedwetting through sexuality. By adolescence the predictors are part of the picture, now being called symptoms or expressions or correlates of the criteria. As classes of events one can say that the drug-crime correlation seems to arise out of bad influences from important people, through conflict and distress, via social events and settings, from chemical effects and related experiences, and because of traits, some of which suggest quite individualistic predispositions over a life span; the autonomy either to be special trouble compared to sibs or, in the straight kids, the autonomy to resist being trouble in spite of all. None of that tells us why our subjects prefer drugs and crime, or for that matter, early sexuality, truancy, being sick or special food. As the plague, one seeks to avoid being Steinesque, retreating to the old tautology that deviance is what deviants do which is drugs and delinquency plus. One does allow oneself the indulgence of motivational affirmation; what they do is easy and exciting and rewarding both socially and--we can be sure about it as to drugs and one thinks about it as to crime--neurophysiologically via altered or differentiated emotional states.

As soon as one looks at the rewards of immediate gratification and amorality--the classic picture of either infant or psychopath--one is forced to ask, as always, what restrains others from doing the same? How does one civilize and what mortal materials lend themselves best to that remarkable achievement? We have by no means escaped philosophical debate about the nature of man or the purpose of society.

Specific Research

The choice of specific areas for vigorous study depends as much on the sagacious hunch as well as on initial empirical revelation and on theory. With reference to drug-related delinquencies, there is certainly great attractiveness to the further exploration of psychophysiological anomalies predisposing both to the psychopath diagnosis and to one of its most common expressions, heroin addiction with "addiction" defined as a criminal style. Hare's work (1970) as well as that of Lykken (1957), Schachter and Latane (1964) and others is critical. Moral development a la Piaget (1954) and Kohlberg (1969) is also an appealing arena, preferably in association with hypotheses derived from drug-related dependent learning. Since the conduct of the convinced drug delinquent is general and patently amoral, should there not be a link both to a retarded stage of moral development and the function of drugs in maintaining that? Indeed, may not drug-centered delinquency provide a rationale for suppressing moral development?

Mednick's work and that of his colleagues provide yet another stimulant; grant heritability and learning from parental models as well; what then are the immunizing features? In Mednick and Christiansen (1977), class is seen to be one, but what else keeps correlations low? Stanton (1977) and other family investigators remind us of delinquent differentiation as a function of family roles and pathology, that certainly is worth pursuing further. Mother-infant interaction and its biological effect on social development dare not be overlooked (e.g., Butler et al., 1978).

Autonomy deserves further developmental examination. Temperment may be part of that. Autonomy is of two orders and is here defined as the capacity to reject if not to insist upon resisting parental and peer influences, be these wholesome or criminal. Given the suggestion of infant neurophysiological (brain) deficit, one conceives of malevolent autonomy as that disallowing higher level functions required in what, by one day, is called achievement, self-discipline or conformity to civilizing norms. If its derivation is environmental, i.e., inadequate mothering or insufficient activity or stimulus, these may also continue to operate as negative environmental influences. A benevolent autonomy allows, as does Piaget's concept of higher moral and cognitive development, examination of choices within an ethical framework. One should not be surprised if malevolent autonomy, if itself biochemically based, induces what is later seen as liability to extreme and chronic psychoactive drug use, for in its typical expression that too is a self-centered deficient and possibly compensatory performance. At the psychological level, it is compatible with the observation that drug user's score higher on internal locus of control, (Berzens and Ross, 1971, Goss

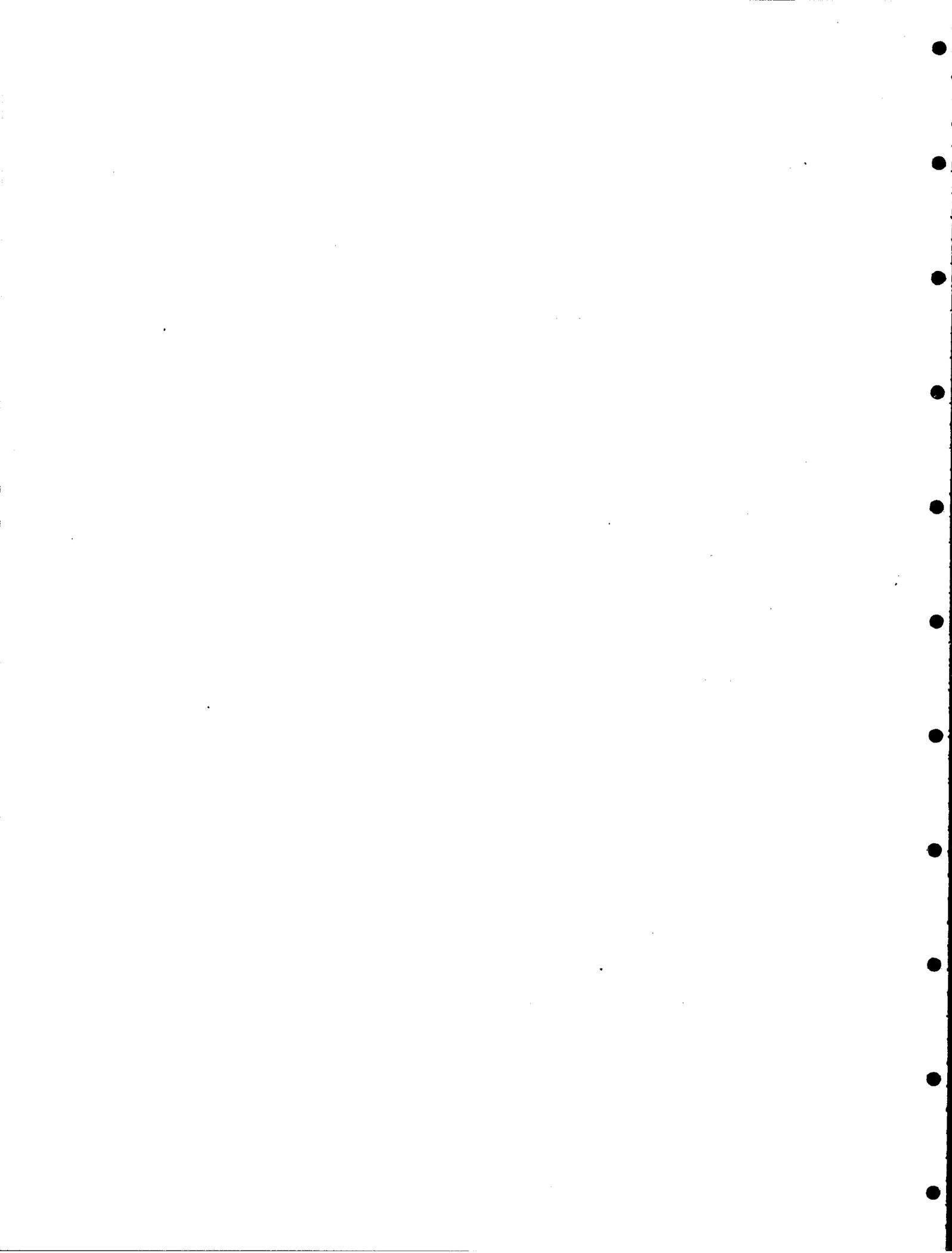
and Moroski, 1970). Dienstbier (1975) has in turn shown that emotionally aroused subjects with the opportunity to attribute their arousal to drugs rather than moral sources (guilt, other people) engage in more morally prohibited acts than those not able--in an experimental setting--to attribute arousal to the (drug) source. Such work as this must be pursued.

Autonomy and moral development both lead to an interest in preferences, i.e., choice. We may rely on a deterministic doctrine in etiological studies, but when examining the moment of action, as for example, lending oneself to a drug or delinquent opportunity, the focus must be on choice itself and its repetition as a function of learning preferences. The range of perceived options, interest in them, their attractiveness and the capacity to act may well be a function of prior events, but the immediate quality of aware experience, what occurs volitionally, must be examined in charting developmental sequences. In drug research, preference remains one of the mystery areas; I think it is that for delinquent choices as well.

A Personal Preference

Criminology dare not concentrate on searches invoking only those broad social variables--for example, class, poverty, opportunity, population density, ethnicity--which are so consonant with our egalitarian, environmental, progressive values as citizens (See Clark, R., 1970). The time has come for a redistribution of scientific interest, inviting neurophysiology, psychopharmacology, genetics, child development, psychology, psychiatry to share prominence with the more social of sciences in the work of criminology. By way of shifting emphasis, one also prays for--since I harbor little hope it can be achieved any other way--a decrease in the chrome bright technological contracts be these for stun guns, brogans for gum shoes, or midget cars for mighty cops most of which has been such a waste. I also wonder how long one will go on spending to redesign the overnourished, foundering dinosaur of criminal justice bureaucracies via management and administrative studies. If we are to work to no practical avail, which may well be the case in endeavors attending to crime, let it at least be work satisfying in and of itself. Let it, at least, teach us something about humans.

To that end I propose basic scientific work, cross disciplinary conversation, acknowledged philosophizing and artistic innovation. Each should play a larger role in criminological endeavors. Thus, any new emphasis on work which is cross disciplinary, basic, complex, initially ambiguous, quite conscientiously irrelevant, intrinsically fun, and at risk of intelligent failure will be particularly welcome.



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PSYCHOPHYSIOLOGICAL RESPONSES
TO
CROWDING IN PRISONS

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The purpose of this paper is to give the reader an overview of the literature on behavioral and psychophysiological effects of crowding in mammals and in man. The literature in this area is quite extensive so that a special emphasis is placed on data that are relevant to the prison environment. Several sources of data are presented including those from animal studies, observations in man and some new data collected by the author.

Health Effects of Crowding Mammals

The term "crowding" in animal studies usually implies only population density, a much more simplistic notion than is warranted. Nevertheless, crowding in several mammalian species has been shown to cause increased aggression and emotionality and subsequent prostration, convulsions, and death (Bullough, 1952) (Christian, 1960) (Ader, Kreutner and Jacobs, 1963) (Barnett, Eaton, and McCollum, 1960) (Turner, 1961). These observations have been made in 7 mammalian species (Christian, 1960) (Green, Larsen, and Bell, 1939) (Calhoun, 1956, 1962) (Barnett, 1960, 1963) (Rosen, 1961) (Denenberg, 1962) (Keely, 1962) and (Seitz, 1954, 1958). One of the more relevant findings was that of Henry, Meehan, and Stephens (1967) who observed that crowding induced prolonged and severe high blood pressure in mice and in rats in three separate sets of observations. Alexander (1974) obtained similar results by aggregating a group of Wistar rats.

Crowding and Behavior in Man

In reviewing this literature I have been guided by the principle that I am not testing a theory about the social environment and adaptation. I am specifically interested in the prison environment and its effects. I am not prepared to claim that our results can be extrapolated to nursing homes, psychiatric hospitals, college dormitories or other environments that have been studied. In much of this literature the term "crowding" is not defined, and when it is, the definitions commonly differ from one investigator to the next. In some work, population density is used, in others, number of persons per room, and in yet others, number of opportunities for interaction per unit of space and time and options of avoiding them (the interactions, not time and space).



The few studies that have emphasized experimental analysis of psychological and social effects of crowding have reported results that are by no means straightforward and unequivocal. Hutt and Vaizey (1966) studied autistic, brain-damaged and normal children in small group situations with regard to aggressive behavior, social interactions and time spent on the outer boundaries of the room as a function of "social densities." They observed that large groups and increase in group density was associated with increased aggression and decreased interaction as well as a greater amount of time spent on the periphery of the rooms. However, in a later study, Hutt and McGrew (1966) found that social interaction and aggressive behavior among nursery school students increased as density increased.

Freedman, Klevansky and Ehrlick (1971) studied the effect of density on human performance in a variety of intellectual tasks with no significant results. In a more recent study by Freedman, Levy, Buchanan and Price (1972) males and females tended when crowded, to be more competitive and more inclined to give more punitive sentences in a mock jury situation. They also reported that crowded situations were more unpleasant. Griffitt and Veitch (1971) studied the effects of variation in temperature and group size on attraction responses. They observed that those persons in a more crowded and warmer room rated a stranger less attractive than those in a cooler and more spacious room and that there were some confounding effects of temperature on crowding.

Smith and Haythorn's (1972) study suggests that crowding yielded more stress and anxiety reactions in three-vs. two-man groups. Baxter and Deanovich (1970) employing dolls in a simulation study found some effects of subject crowding indicated by more anxiety attributed to the doll figures. The results of Desor's study (1972), also using doll-like figures in a simulation, can be interpreted to indicate that spatial configuration, which relates to social stimulation, may be a more important determinant of crowding than solely physical, number of people per unit of space.

These experimental studies indicate that the concepts of crowding are by no means simple and that any simple model could not possibly approximate the real phenomenon. Correlational studies, that is, those studies that investigate the relationship of certain measures of population density and various indexes of social disorganization have been the major source of empirically based conclusions regarding the effects of crowding.

Schmid (1937, 1960) found high population densities and high crime rates in ghettos and central city areas and a progressive decrease in both in the suburbs. Other studies that have confirmed this relationship in major cities are those by Bordua (1958); Lander (1954); Lottier

(1938); Shaw and McKay (1942); Sorokin and Zimmerman (1929); Watts (1931); and White (1931).

Schmitt (1957) found a high correlation between population density, juvenile delinquency and adult crime. He (1966) made the further distinction between two measures of population density: population per acre (outside residences) and people per dwelling unit (inside residences). He found that population per acre correlated with social breakdown as measured by mental illness, TB, VD, crime and illegitimate births while density per dwelling unit did not. There is a voluminous earlier literature, usually limited in methodology, which makes the same points. (Faris and Dunham, 1939) (Lantz, 1953) (C'hombord de Lawve, 1959) (Hollingshead and Redlich, 1958) (Queen, 1948) (Schroeder, 1942) (Pollack and Furbush, 1921) (Malzberg, 1921) (Landis and Page, 1938) (Schmid, 1933, 1955) and (Sainsbury, 1956).

In a study of the effects of density on social interaction, Smith, Form and Stone (1954) found that there was a gradual decrease in intimacy, number and frequency of personal contacts as one went from the periphery of the city to the more densely populated city centers. Barker and Gump (1964) found that students in larger schools tended to be less involved in school activities than those in smaller schools.

Galle, Gove and McPherson (1972) focused on the impact of four types of density on social pathology as measured by mortality and fertility rates, public assistance, juvenile delinquency and admission to mental hospitals while controlling for social class and ethnicity. They examined the effects of 1) number of persons per room in dwellings; 2) the number of rooms per dwelling unit; 3) number of housing units per building; 4) the number of housing structures per acre. Their results indicated that the main correlate of social pathology was number of people per room in dwelling units. They argue that high density and crowding are micro-interpersonal processes, which involve face-to-face issues, not merely numerical masses of people per unit of space. Mitchell (1971) in his study of 4,000 people in Hong Kong adds weight to this viewpoint. He found that stress reactions were maximal among those who shared their households with other families, and that sheer number of people was not the primary cause of complaint.

Most of these findings on density must be interpreted with great caution because of the severe limitations of the ecological (area analysis) approach. The two major limitations of working with aggregate data and using areas of city as unit of analysis are: 1) ecological correlations between variables exaggerate enormously the association between variables if it were computed on individuals instead of aggregated over areas; in fact, ecological correlations and correlations on individuals could even be of opposite signs. The term "ecological fallacy" refers to this logical difficulty of making inferences about

individuals from ecological data; 2) various components of (low) social class are so highly correlated (at the ecological level) with density (people per room) that some aspect of poverty, rather than crowding per se, could be equally well the causal factor.

The individual's perceived or real ability to control interactions is also speculated to be an important factor in analyzing the dynamics of the crowded situation. Stokols (1972a, 1972b) has emphasized the subjective, personal locus of crowding phenomena. Density is conceived of as a physical construct, whereas crowding is described as a subjective, motivational state, an experimental condition which occurs when there is a discrepancy between the space demanded by a person and the actual amount of space available. Stokols also suggests that the experience of crowding involves a loss of freedom which the individual attempts to restore through a variety of responses, including augmentation of space.

Recent research reported by Paulus and his colleagues has indicated that laboratory-induced crowding in man can have deleterious effects. One study found that decreased room size, increased group size and increased proximity all led to decrements in task performance (Paulus, et al., 1976). A second study suggested that these results are limited to situations in which others are seen as potentially negative or aversive stimuli (Seta, et al., 1976).

A number of studies in man indicate that crowding has negative psychological effects. It has been shown that crowding produces negative affect and social withdrawal in dorms and housing projects (Aiello, et al.; Baron, et al., 1976; McCarthy and Saegert; Valins and Baum, 1973), increased illness complaints on naval ships (Dean, et al., 1975), and disruption of cognitive functioning in stores and train stations (Langer and Saegert, 1976, Saegert, et al., 1975).

The area immediately surrounding an individual which he regards as belonging to himself has been labelled "personal space" (Sommer, 1959) or "proximetric space" (Hall, 1963). Based upon the conceptualization that a number of factors contribute to determine spatial usage, this territory has also been labelled the "body buffer zone" (Horowitz, 1964). Horowitz (1968) theorizes that enlarged body-buffer zones represent a behavioral manifestation of the (intrapsychic) defense of withdrawal. The notion of defense withdrawal as a mechanism for dealing with unconscious impulses and conflicts may be expressed through a variety of channels, one of which is spatial usage. Dosey and Meisels (1969) similarly hypothesized that greater interindividual distances would be found under conditions of threat, whether the threat stemmed from environmental or intrapsychic sources. Studies of the effect of stress, defined in the sense of reproof by others (Little, 1966), have also found greater distances under more stressful conditions.

Taken together, these studies support the notion that external sources of threat lead to the utilization of increased spatial distances.

Two recent studies conducted within a prison setting are particularly relevant to this paper. The first by McCain, Cox and Paulus (1976) investigated the relationship between illness complaints and degrees of crowding. They found a two-fold higher rate of illness complaints among inmates housed in dormitories as compared to inmates housed either in single cells or two-man cells. In a second study, Paulus (personal communication) utilized palmar sweat as an indicator of state of arousal in inmates subjected to different social densities. They found a significant positive correlation between palmar sweating and social density. Both of these studies' findings are consistent with our work (D'Atri, 1975; D'Atri and Ostfeld, 1975) and demonstrate in man significant stress-related behavior and physiological effects induced by crowding.

Because acute psychosocial stresses have been shown repeatedly to elevate blood pressure, search for environmental, social and psychological factors contributing to essential hypertension has been widespread (Lang, 1950) (Alexander, 1939). There are two major hypotheses in the field. One is that there are two types of conflict more characteristic of persons with high blood pressure than of others. These are a) conflict between passive dependent longings and aggressive competitive impulses and b) a conflict between chronic anger close to conscious awareness and a need to repress these feelings for fear of loss of love and esteem (Saul, 1939). The other theory has focused on the kind of life events causing acute rises in blood pressure. Looking at these life events from the point of view of the person involved, the life events can be characterized as possessing several attributes: 1) The outcome of the event is uncertain, 2) the possibility of bodily or psychological harm exists, 3) although running or physical resistance may be considered, they are not always appropriate behavior and 4) the person involved commonly feels compelled to maintain a vigilant attitude until the situation is clarified or ended (Ostfeld and Shekell, 1967). The relevance of both these hypotheses to life in prisons is immediately apparent.

Anger-Aggression and blood pressure in prisons and central cities

The work of Meyer (1968) dealing with the repression of aggression among inmates of a state prison warrants a more detailed description. Meyer's observations were made on inmates of the State Prison of Southern Michigan who had served at least two years previous to the initiation of this study. Reliable records on relevant variables were available.

A sample of 111 Ss aged 23 to 35 was selected from this population via a table of random numbers. These Ss were assessed for the amount of aggression expressed during the 18 months immediately prior to this study. Thirty-nine Ss, approximately the top one-third of the sample who were lowest on the expression of aggression, were designated the low aggression (Low A) group. These Ss were the only 39 not involved in any aggressive incidents. The middle group was composed of 33 Ss who had only one definite report of acting-out aggression. The high aggression (High A) group was composed of 39 inmates who definitely acted-out aggressively two or more times.

All Ss in the high and low aggression groups were called in for testing. They were matched on age, weight, race, and prior medical history. Sixty-eight subjects (thirty-four in each group) were examined. Ten minutes after a preliminary blood pressure was taken, two blood pressure measures were taken fifteen seconds apart, and the Mosher Incomplete Sentences Test (Mosher, 1961) was then administered to assess the amount of guilt over the expression of aggression. The Cattell 16 PF was also administered to obtain both anxiety and intelligence scores.

The primary hypothesis, that subjects who for the 18 months prior to the study expressed little aggression would have significantly higher diastolic pressures than subjects who continued to aggress substantially, was statistically significant. A second hypothesis, that those who manifested high guilt over the expression of aggression would have significantly higher diastolic pressures than those who showed low guilt, was also significant. A similar though not significant trend was found when systolic measures were employed.

The two groups were not found to be significantly differentiated by any Cattell scale, including anxiety or intelligence scores. Meyer concluded the following: 1) A continued state of the non-expression of aggression, in those men who have at one time expressed direct physical aggression, results in higher levels of diastolic blood pressure than in those men who continue to aggress against the environment. 2) Within that group of men who continue to aggress against the environment, those who have guilt over such expression develop higher blood pressure than those who do not have such guilt. 3) Self-reported anxiety, or other Cattell personality dimensions, are not related to the raising or lowering of diastolic blood pressure levels, or to the expression of aggression.

The work of Harburg, et al., (1973) supports the importance of the construct of guilt in its relationship with suppression of hostility and their subsequent association to an increased level of blood pressure. Harburg, et al., selected four areas in Detroit by factor analysis of all census tracts as varying widely in socioecological stressor conditions.

High stress areas were marked by rates of low socioeconomic status, high crime, high density, high residential mobility, and high marital breakup; low stress areas showed the converse conditions. Blood pressure levels were highest among Black High Stress males and showed no difference among Black Low Stress and White areas. Suppressed hostility was related to high blood pressure levels and percent hypertensive for Black High Stress and White Low Stress males; Black Low Stress men with high pressure were associated with anger but denying guilt. White High Stress readings were most associated with guilt after anger.

Our Work in the Field; Cross-Sectional Data

Our work began as an attempt to replicate in man the findings of a positive association between crowding (rather simplistically conceived at that point) and blood pressure in mammals. We want to test this hypothesis:

Under conditions of enforced crowding there will be a positive correlation between degree of crowding and blood pressure.

In the protocol, other questions about basic demographic characteristics and about perceptions of the prison environment were also asked. Their content will be described in the results.

Selection of Sample

The characteristics of an environment we hypothesized to produce elevated blood pressure were: 1) a crowded environment; 2) an enforced stay in that environment; and 3) a continuous subjection to that environment. Initially, we determined that military barracks, submarines and urban apartments did not fill all these criteria. The prison approximated most closely the human setting in which these characteristics can be found. Therefore, it was believed essential to carry out this study in prisons.

Data were collected from three correctional institutions. Each of these institutions had several modes of housing for their inmates. These institutions were also selected on the basis of the comparability of the average length of sentence of their inmates. The average age of inmates was 26. The mean length of sentence was 7 months and 71% of the inmates were white, 27% black and 2% other.

Once the populations had been identified, collection of data was attempted from the entire enumerated population of each institution. Only those inmates in the institutions on the day in which data collection commenced were considered to constitute the study population. Cooperation rates and completion rates exceeded 90 percent in all institutions. Those who did not participate differed in no essential characteristic from those who did participate.

Data were collected by trained interview persons using standardized questionnaires in each institution. The forms differed slightly from institution to institution in that inappropriate items were deleted and some additional data were collected in the latter stages of the study.

The items that were collected in all three institutions included demographic and subcultural data, personal characteristics, education, previous occupation, confinement history, mode of housing, and blood pressure determinations. In institutions B and C data were also collected on the amount of time the inmate was out of his cell or dorm, whether or not he had a job detail, (the items were inappropriate for Institution A) smoking history, attitude of guards, subjective attitude of the size and crowdedness of the institution, and pulse rate. Blood pressure and pulse rate determinations in all institutions were made by another investigator "blind" to all other data collected on each participant.

RESULTS

The Effect of Housing on Blood Pressure

In Institution A, mean systolic and diastolic blood pressures in both black and white inmates were significantly higher for those housed in the dormitory as compared to those housed in a single- or double-occupancy cell. The magnitude of this blood pressure difference was 20 mm/Hg systolic and 12mm/Hg diastolic. It should be noted, however, that the number housed in dormitories is very small. Such factors as age (which has a very narrow range in this study), height, and weight (which might, if substantially different, have accounted for blood pressure differences) had no such effect here.

In Institution B, mean systolic and diastolic blood pressures were significantly higher for those inmates housed in dormitories as compared to those housed in single-occupancy cells.

In Institution C, the mean systolic and diastolic pressures were higher in white inmates housed in dormitories than in white inmates housed in single-occupancy cells. The magnitude of this difference ranged from 10 to 20 mm/Hg systolic and 8 to 14 mm/Hg diastolic. This relationship also holds true for systolic pressures in black inmates housed in dormitories as compared to those housed in single-occupancy cells but is not true for mean diastolic pressure. The mean pulse rates for both black and white inmates were higher in those housed in the dormitory than those housed in single-occupancy cells.

For Institution C, there were significantly higher mean systolic and diastolic blood pressures and pulse rates in the dormitory group

than in the single-occupancy cell group for the total population. The blood pressure differences between groups ranged from 12 to 16 mm/Hg systolic and 8 mm/Hg diastolic.

A stepwise multiple regression technique was used to assess the significance of housing mode, height, weight, age, duration of confinement, and skin color in their association to systolic and diastolic blood pressure within each of the three institutions.

In Institution A, B and C, the results of the stepwise multiple regressions for systolic and diastolic blood pressure in the single-occupancy cells versus dormitory groups show quite clearly that the only variable that is significant in its association to systolic and diastolic blood pressure is housing mode. The association of housing mode to systolic and diastolic blood pressure was significant at the 0.001 level in all institutions with a simple correlation ranging from .463 to .511.

The Effect of Duration of Confinement on Blood Pressure

For the purpose of examining the effect of length of confinement on blood pressure, five institutional confinement groups were created: Group 1 includes those inmates who have been confined for a period between 1 and 14 days; Group 2, 15 and 30 days; Group 3, 31 and 60 days; Group 4, 61 and 180 days; and Group 5, over 180 days. Keeping in mind that these are cross-sectional and not longitudinal data, the trends in systolic and diastolic blood pressure indicate that they are higher initially, fall in the 15-30 days category, and rise progressively after that with duration of confinement.

The Effects of Personal Attitudes and Perceptions on Blood Pressure

White inmates who viewed the guards as "very harsh" and as "very easygoing" had higher blood pressures by 8-10 mm/Hg than inmates who viewed the guards in an intermediate way. The data for the black inmates do not show this same relationship perhaps, in part, because of small numbers. Black inmates tended to view the guards as considerably harsher than did white inmates.

When the relationship of institutional confinement to perception of guards' attitudes was examined, it showed that the longer the inmate is confined, the less apt he is to view the guards in a positive manner. When the data on perception of available space and perception of guards' attitude were examined, a significant association was found.

The mean blood pressures for recidivists and first-time offenders indicated that black recidivists tended to have somewhat but not significantly lower blood pressures than first-time offenders; this was not true for white inmates.

An examination of mean blood pressure levels by size of community lived in most of the inmate's life, showed a significant negative correlation between the size of community lived in and systolic blood pressure.

Our Work in the Field, Longitudinal Data

Based upon these cross-sectional results, we undertook a longitudinal study of men confined to a correctional facility. This work is still underway, but some preliminary data are available.

Methods of Procedure

During the intake period, each person admitted to the correctional institution was given a brief physical examination (including EKG, blood pressure and pulse rate determinations) as part of his usual intake procedure. After this examination, he was informed about the study by our staff. After learning the purpose and methods of the study, the new admissions were informed that they might either elect to participate in the study or choose not to of their own free will. If he elected to participate, he was asked to sign a consent form.

After the consent form was signed, the interviewer administered a questionnaire. The questionnaire includes those items such as date of birth, skin color, place of birth, parents' place of birth, type of area lived in most of his life, ancestry, usual occupation, length of sentence, previous institutionalization, attitude about sentence, marital status, smoking history, aliases, names of friends, outside places frequented, nicknames and housing mode in confinement. Additional data collected included blood pressure and pulse determinations, and psychological assessments of constructs believed to be related to the development of high blood pressure, including repressed anger-aggression, hostility, vigilance and arousal. The questionnaire was designed by the investigators with the aid of suggestions from the inmates of the institution before the study commenced.

After the initial data were collected, a schedule was set up so that the participant could be interviewed at regular intervals. The first interview following intake took place at the end of the second week in the institution. Based upon our previous work, we believe that it is at this time that the new inmate gets over his initial stressful reaction to new environment. The next interview took place at the end of the 30-day period, the next at the end of the second 30-day period, and others at the end of each subsequent 30-day period of confinement. An additional interview takes place within the last few days before release. There are an average of 9 data collection periods on each participant during the period of time he is confined to the House of Correction. This is based on an average length of confinement of 6-7 months.

The interview following the initial intake interview entails blood pressure and pulse determinations, body weight, and psychological measurements used to assess the process of his adaptation to the environment together with additional questions about vigilance and arousal. Also included in these interviews were questions dealing with the participant's perception of the guards' attitudes and his assessment of the degree of crowding in the institution. In the latter interviews, the participant was also informed about the method to be used to contact him after his release. He is given a schedule of dates at which time an interviewer will be in touch with him. He was informed about how he will be able to contact the interviewer if an alteration in schedule is necessary.

I. Preliminary Examination of First Interview

To begin the analysis, initial blood pressure was crosstabulated with two broad categories or items, personality and perception of the environment, which were also assessed as of the first interview (T1). The study population consisted of all 571 inmates.

Personality Variables

Men who described themselves as "anxious", "bothered by nervousness", "fidgety", "terrified" or "tense nearly all the time" or were "bothered by their heart beating hard nearly all the time" had higher blood pressures than their counterparts who did not describe themselves in this manner. The magnitude of the difference in the blood pressure levels between these positive and negative responses was 4 to 11 mm/Hg for systolic blood pressure and 2 to 6 mm/Hg for diastolic blood pressure depending upon the item.

The data also suggest that those men who suppress hostility have higher blood pressures than those who do not. Those men who reported that they never felt irritable or that the last time they were really angry was a year or more ago had systolic and diastolic blood pressures averaging 4 mm/Hg higher than men who reported feeling irritable nearly all the time or men who reported feeling angry today or yesterday. This was also true for men who stated they were very hard to annoy, never felt like being rude, never felt like picking a fight versus those who felt like that nearly all the time. Again, the difference in systolic blood pressure was in the order of 4-5 mm/Hg and 2mm/Hg for diastolic blood pressure.

Preception of Environment

Higher mean systolic and diastolic blood pressures were found in men who viewed the institution as very dangerous as opposed to those who viewed it as safe. This was also true for men who reported that

they felt very tense, wide awake, always looking out, nervous or worried.

Another interesting trend emerged; inmates who viewed the prison environment itself favorably had higher blood pressures than those who were more critical. For example, men who described their cell as very comfortable, pleasant, the guards as good natured, cooperative or understanding had higher blood pressures than those men who viewed the environment and guards in an opposite manner. This set of responses, like the suppression of hostility items noted, fits well into the general construct of repression of aggression and blood pressure. This data is also consistent with our earlier cross-sectional findings.

The initial impact of the prison environment on psychological well-being is clearly documented by comparing the distributions of inmate responses to each of eleven anxiety items with age- and sex-specific data gathered by the National Health Interview Survey (NHIS)*. For instance, 66% of the inmates had trouble getting to or staying asleep, while only 18% of the NHIS subjects felt that way. Fifty-two percent of the inmates couldn't take care of things because they couldn't get going, contrasted with only 17% of the national sample. Thirteen percent of the national sample were also bothered by headaches, but 48% of the inmate population reported that complaint. Over one-third (35%) of the inmates were bothered by their heart beating hard, while only 3% of the comparison group were similarly afflicted. One-quarter of the inmates felt like they were going to have a nervous breakdown, contrasted with 7% of the national sample. The differences between the inmates and the NHIS group range from 3% for some items to 48% for others, with a median discrepancy of about 20%.

Some of these differences may be attributed to artifactual sources. For example, the NHIS questions were simply scored "Yes" or "No", while the present study provides 5 responses ("nearly all the time", "pretty often" and "sometimes"--which were combined to approximate the NHIS category "Yes"--together with "Rarely" and "Never"). The NHIS report also states that higher symptom rates were found among the poor and less educated groups that are heavily represented in our study population. The magnitude of the differences between the inmates and the NHIS subjects however, suggests that the prison environment per se plays a contributory role in the high prevalence of anxiety and symptoms among inmates.

* An interview survey conducted by DHEW based on a probability sample of the U.S. population.

C. Blood Pressure by Personality Among Age Groups

The relationship between personality factors and blood pressure was also examined within age groups. This analysis suggests an interesting Age X Personality interaction--differences in mean systolic and diastolic pressures regarding anxiety and suppression of hostility expressed at the first interview are greatest among men 30 years of age or older.

In regard to anxiety, for instance, older men who reported that they often felt like they were going to have a nervous breakdown had a mean systolic pressure of 139 mm/Hg and a mean diastolic of 91 mm/Hg, while the men who never felt that way had means of only 127 mm/Hg and 81 mm/Hg. Correspondingly, inmates age 30 or more who said that they were nearly always fidgety, nervous, or tense had mean systolic and diastolic pressures of 139 mm/Hg and 86 mm/Hg, respectively, compared with 122 mm/Hg and 80 mm/Hg for the "never" group. The results for the younger men were in a similar direction but usually lesser in magnitude.

II. Changes in Blood Pressure over Time in Regard to Mode of Housing at the Third Interview

An initial investigation of the first four interviews provided a longitudinal study of one of the project's major hypotheses: degree of crowding within the prison is positively correlated with blood pressure levels. This thesis could not be treated cross-sectionally with either the intake (T1) or two-week (T2) interviews because all inmates were housed in cells at those times. Assignments to dormitories or work-release began at the one-month (T3) interview and continued throughout the course of the study. These results are of course preliminary; a more complete picture will unfold as the subsequent interviews are processed and analyzed.

These data are based on a group of 352 men who were in confinement four or less days at the time of the first interview and who subsequently completed the second and third interviews. The first condition was imposed to insure that all responses and measurements represented initial reactions to the environment. The second requirement provided the cohort necessary for a study of change over time. Additional data were also gathered from a subgroup of 232 men who, in addition to the above criteria, were also required to have completed the two-month (T4) interview and to have lived in the same type housing (cell, dorm, or work-release) from T3 to T4. Thus a core group was established to investigate the continued effects of the prison environment in general and residence mode in particular.

A. Blood Pressure by Housing Mode at T3

For the 352-man cohort, mean systolic pressure dropped from 117 mm/Hg at T1 to 116 mm/Hg at T2, and then rose to 118 mm/Hg at T3. The mean blood pressures were also analyzed, however, in regard to place of residence at T3. Men who were in cells dropped in systolic blood pressure from 117 mm/Hg to 115 mm/Hg from T1 to T2, followed by a return to 117 mm/Hg at T3. The dorm residents remained at a constant 118 mm/Hg from T1 to T2 and then rose to 121 mm/Hg at T3, the time at which they were placed in the dorms. The work-release men, however, showed a steady increase from 117 mm/Hg at T1 to 123 mm/Hg at T3. In contrast, the diastolic pressures of each group remained relatively constant.

When the 232 men who lived in the same residence from T3 to T4 were examined, a somewhat different pattern emerged. The overall T1 mean pressures were 116 mm/Hg systolic and 73 mm/Hg diastolic, T2 readings were 116 mm/Hg and 72 mm/Hg, T3--118 mm/Hg, and 72 mm/Hg, and at T4--117 mm/Hg, and 73 mm/Hg. Considering housing mode specifically, cell inmates showed a slight decline in mean systolic pressure from 116 mm/Hg to 115 mm/Hg, then rose to 117 mm/Hg and then declined again to 116 mm/Hg from T3 to T4. Dorm residents displayed a sharp drop from T1 to T2 (124 mm/Hg to 120 mm/Hg) and then experienced an increase of 6 points as they were placed in the dorms. Men who were in work-release at T3 and T4 steadily increased from 118 mm/Hg at intake to 130 mm/Hg two months later.

Another set of comparisons were also performed. Men who moved from cells to dorms from T3 to T4 increased in systolic blood pressure from 117 mm/Hg to 119 mm/Hg and inmates who were placed on work-release during that period similarly increased from 123 mm/Hg to 126 mm/Hg.

In general, the data suggest that blood pressure decreased slightly from the time of intake to the 2-week interview and then rose again as time progressed. This trend appeared to be strongest among dormitory residents, inmates for whom the increase in blood pressure from T2 to T3 was accompanied by relocation from cell to dorm. Men who were placed on work-release at T3 showed a clear and consistent increase in blood pressure over the month period.

B. Anxiety by Housing Mode at T3

Additional analyses were conducted to link differences in blood pressure over time with changes in anxiety. As noted earlier, levels of anxiety were high at intake, but they decreased steadily as time progressed. For example, 41% of those inmates frequently had trouble sleeping at T1, but only 24% reported that problem one month later. Twenty-four percent were also initially nervous, fidgety, or tense

versus 11% at T3. Little or no increase in anxiety was noted among dorm or work-release inmates from T2 to T3, the period in which they were transferred from cells to their respective residences. Increases in the blood pressures of cell and dorm inmates do not appear to be correlated with increases in reported anxiety alone.

C. Perception of Environment by Housing Mode at T3

Efforts were also made to determine whether these differences in blood pressure over time were associated with changes in the perception of the environment. Perceptions of the institution and place of residence were more stable than anxiety levels, but, in general, these perceptions also became less negative as time progressed. For instance at T1, 31% of the inmates considered the institution to be dark, contrasted with only 16% at T3. Similarly, 46% of the men initially felt that the institution was dirty, compared with 31% at 1 month. This trend was evident for all inmates regardless of place of residence, but the greatest decreases were shown by men who were put into work-release at T3.

An important exception to this pattern, however, is the item "privacy". When 43 men were placed in dorms at T3, 81% of them reported that they felt a lack of privacy, contrasted with only 34% at T2, before the move took place. A similar proportion (79%) of those still in the dorms at T4 also felt there was no privacy at T4.

A different picture emerged when the inmates' perceptions of the guards were analyzed. In this regard, perceptions grew more negative over time. For instance, only 5% of the inmates initially felt that the guards were bad-natured, compared with 11% one month later and 15% two months later. Of special interest was the finding that the dorm residents reported the greatest increase in the proportion perceiving the guards negatively. For example, 27% of the dorm residents felt that the guards were harsh at T3, compared with only 11% at T1. The corresponding change for cell inmates was 17% from 8%. Inmates in work-release at T3 showed the smallest increase.

Thus, increases in blood pressure from T2 to T3 among inmates who were concurrently being assigned to dormitories were correlated with increases in feeling a lack of privacy and in negative perceptions of the prison guards. The striking increase in blood pressure for work-release men, however, was not associated with subjective reports of anxiety or negative perceptions of the environment. Future analyses will focus upon elucidating the factors associated with this latter finding.

Summary

In summary, the effect of crowding on behavioral, psychological and pressure responses has been shown in the animal literature. The

literature in man, although, in large part, weak and full of speculation, nevertheless supports the notion that man reacts in a similar fashion. Our own data, both cross-sectional and longitudinal, substantiate the hypothesis that crowding in a prison setting as defined by housing mode is associated with elevation of systolic and diastolic blood pressure.

The trends in blood pressure noted in our earlier work indicate that pressures are higher initially, fall in the 15-30 day category, and rise progressively with duration of confinement after that. These results suggest an initial period (1-14 days) of apprehension, anxiety or novelty associated with higher blood pressures, a short-term adjustment period (15-30 days) during which pressures and anxiety decrease, and a progressive rise in pressures during a long-term adaptation, or rather, maladaptation. The gradual blood pressure increase with confinement appears to be quite independent of initial higher levels, suggesting one hemodynamic mechanism for the initial higher levels and another one for the long-term adjustment period. It is the second mechanism that is hypothesized to be the one associated with the effects of crowding. This trend in blood pressure was again found in our longitudinal data.

The significant association between duration of confinement and perception of guard's attitude, and available space and privacy was shown in both studies. This association indicates that the longer an inmate is confined, the less likely he is to view his environment as spacious or private or the guard's attitudes as satisfactory.

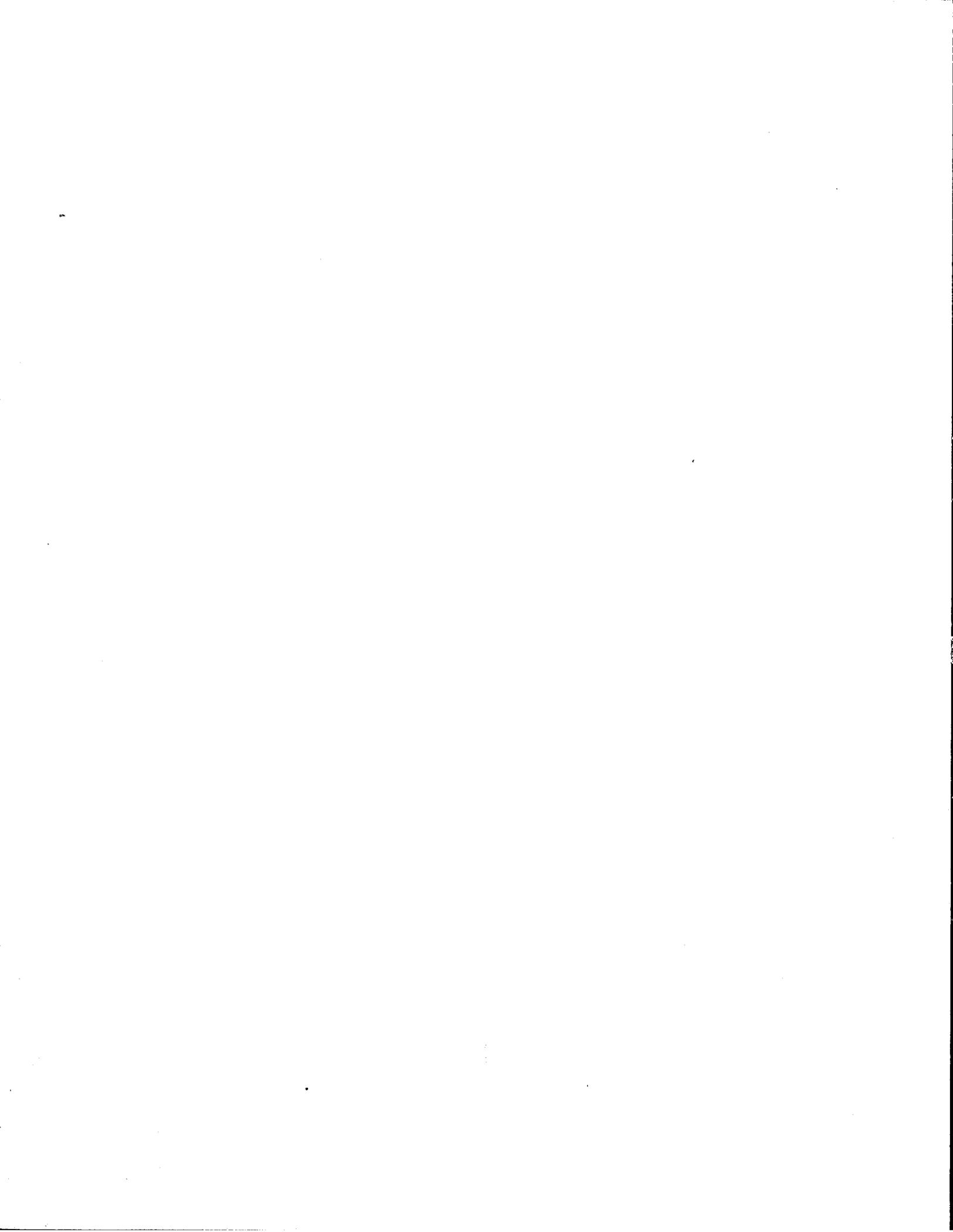
In earlier parts of this paper (especially in the review of previous work done), the term crowding was accepted as it was used by the authors of the various studies which were reviewed. Frequently, in these studies crowding had a narrow and simplistic meaning which tended to neglect many other possible explanations of the findings. In our own study, the term crowding has no pre-eminent status; we do not intend to develop an elaborate theory or model of crowding which we would then test, incidentally, in the prison setting. Rather, our focus is on the prison environment and the study's objectives are to understand the effects of this environment. Crowding becomes a convenient term which we can use to describe certain aspects of the prison environment (e.g., dormitory vs. single cell) that in our work to date, explains some of the variance in blood pressure levels, a marker variable indicative of the men's reactivity to this environment. But as our research design indicates, the multiple measurements of the physical dimensions of the prison environment, of the perceived dimensions, and of the reactions to this environment, show our determination to explicate fully the meaning of "crowding" in this setting. And we are quite prepared to discover that the term "crowding" is, ultimately, useless in this context if the findings should reveal that certain social dimensions (e.g., relations

among prisoners and between prisoners and guards; social hierarchies and networks; social-interactions) fully account for differences in our dependent variables, initially linked to the physical dimensions of prison living.



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PSYCHOPATHY AND CRIME

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INTRODUCTION

There are four main parts to this paper. The first part contains a brief outline of a concept of psychopathy that is widely used by clinicians and behavioral scientists in North America and some parts of Europe, especially Scandinavia. This is followed by a discussion of some of the problems associated with the diagnosis of psychopathy (or sociopathy) and in the selection of subjects for research purposes. Some data are presented to illustrate that the use of different diagnostic procedures can lead to greatly divergent estimates of the proportion of criminals that is psychopathic, in the traditional sense of the term. In particular, comparisons are made between global assessment procedures and those which make use of the sorts of diagnostic criteria proposed for the new diagnostic and statistical manual (DSM-III) of the American Psychiatric Association. In the third part of this paper some new data on the criminal history of psychopaths are presented. The final section contains an outline of some of the recent research on the biological correlates of psychopathy.

CONCEPT OF PSYCHOPATHY

Detailed discussion of current views and research on psychopathy have recently been provided by Hare and Schalling (1978) and by Reid (1978). In their review of clinical definitions of psychopathy, from which much of the following discussion is taken, Hare and Cox (1978a) suggest that although there may be considerable argument about the etiology and dynamics of psychopathy, there is good agreement on the clinical and behavioral features of the disorder. Although different terms may be used--psychopathy, sociopathy, antisocial personality, antisocial personality disorder, etc.--they all refer to a common core of attributes. Cleckley (1976) describes the psychopath as an individual whose antisocial behavior appears to be inadequately motivated and not simply the result of psychosis, neurosis, or mental deficiency. The most salient characteristics include unreliability,



insincerity, pathological lying, and egocentricity; impulsivity and poor judgment; a lack of remorse, guilt, and shame; an inability to experience empathy or concern for others, or to maintain warm, affectional attachments; an impersonal, trivial and poorly integrated sex life; and a failure to learn from past mistakes and to follow a reasonable life plan.

Until a few years ago the American Psychiatric Association's (APA) classification most closely related to the syndrome of psychopathy was Sociopathic personality disturbance; Antisocial reaction; in practice, the term sociopath was frequently used. In the 1968 revision of the APA's Diagnostic and Statistical Manual of Mental Disorders (DSM-II), a revised category was introduced, 301.7, Antisocial Personality, similar to that used by the World Health Organization (1968). Individuals in this category were described as unsocialized, incapable of loyalty, selfish, callous, irresponsible, impulsive, intolerant of frustration, and incapable of feeling guilt and learning from experience.

In the draft versions of the APA's proposed DSM-III, the category has been changed to 301.70 Antisocial Personality Disorder, and the description greatly expanded and elaborated (Notes 1 and 2). Essential and associated features include a history of continuous and chronic antisocial behavior, beginning before age 15 and persisting into adulthood; poor occupational history; early signs of stealing, fighting, truancy, resisting authority, aggressive sexual behavior, excessive drinking, and use of illicit drugs; and markedly impaired capacity to sustain lasting, close, warm, and responsible relationships with family, friends, or sexual partners.

DIAGNOSIS

Several different methods are used for the diagnosis of psychopathy and for the selection of subjects for research purposes. These include psychiatric and global assessments, behavior checklists, and self-report inventories. Each of these methods has been described in detail elsewhere (Hare and Cox, 1978a), and the emphasis here will be upon the use of global assessments and the diagnostic criteria likely to be used in the proposed DSM-III.

Global Assessments

Several investigators, including the author and his colleagues, have successfully used global assessments of psychopathy, based largely upon Cleckley's (1976) conception of psychopathy, in research with prison inmates. These assessments generally are based upon interviews and careful analyses of extensive case history data, with a rating of psychopathy being made on a 7-point scale. In spite of their apparent subjectivity, ratings of this sort can be very reliable,

providing that the concept of psychopathy being used is well understood and a common framework for the ratings adopted. Inter-judge reliabilities of at least .8 are frequently obtained under these conditions.

Global assessments of this sort are based to a very large extent upon evidence of a consistent pattern of behavior, past and present. Although interview data are also used, they are treated with caution, since it is our experience and that of others that there is often a marked difference between what an inmate (especially a psychopathic one) says in an interview and what is actually present in his files. Indeed, we have some data showing that psychopathic inmates will often describe themselves and events in a way that is in direct conflict with the objective evidence, though they know that the interviewer is aware of this evidence.

Although we have found global assessments to be very reliable and useful in research with prison inmates, we recognize the advantage of having selection procedures that are more objective and more easily communicated to others. However, the development of such procedures is proving to be very difficult, and there is a danger that objectivity will be gained at the expense of distorting or failing to capture the full clinical picture of psychopathy. This is not to say that the attempt shouldn't be made, only that diagnostic and selection procedures should be consistent with the conception of psychopathy underlying their use. For example, although the Minnesota Multiphasic Personality Inventory of MMPI (Dahlstrom and Welsh, 1960) is a popular instrument for the diagnosis of psychopathy, the relationship between MMPI and clinical assessments of psychopathy is frequently a very weak one (see Hare and Cox, 1978a). This may be partly the result of poor clinical assessments and/or a tendency for inmates to give dishonest or distorted responses to the items contained in self-report inventories. These possibilities notwithstanding, it is worth mentioning that our own attempts to develop a self-report inventory have met with some success--moderately high correlations (around .6) have been obtained between global assessments of psychopathy and scores on a preliminary version of the inventory.

Research Diagnostic Criteria and DSM-III

Research Diagnostic Criteria

The antisocial personality disorder described in the draft-version of DSM-III is based upon the Research Diagnostic Criteria (RDC) for antisocial personality outlined by Spitzer, Endicott, and Robins (1975). The criteria are quite explicit and generally more objective than those used in making global assessments. For example,

the RDC diagnosis of antisocial personality is based upon the presence of each of the following conditions: (a) behavior problems in childhood; (b) poor occupational performance; (c) repeated antisocial acts; and (d) evidence of an impaired capacity to sustain lasting, close, warm and responsible relationships with family, friends, or sexual partners. Specific examples of (a) through (c) are given, but (d) involves the same sort of clinical judgment used in making global assessments of psychopathy.

Since the RDC (and the proposed DSM-III) are likely to be used by many investigators, and since some published estimates of the relationship between psychopathy and criminality have been based upon similar diagnostic procedures, it may be useful to compare diagnoses using this procedure with those made using global assessment procedures. As part of a larger study two researchers rated 76 prison inmates on a 7-point scale of psychopathy; the correlation between the two sets of ratings was .80. The two ratings for each subject were then added together; thus, the rating scores could range from 2 (low psychopathy) to 14 (high psychopathy). At the same time, we determined, for each inmate, the extent to which he met the RDC conditions for the diagnosis of antisocial personality. Since there were four such conditions (a through d; see above), scores ranging from 0 (none of the conditions met) to 4 (all of the conditions met) were obtained for each inmate. For convenience, we can assume that inmates who met 0-2, 3 or all 4 RDC conditions would receive the diagnoses of, respectively, not, probably, and definitely antisocial personality. Similarly, inmates with global ratings of 2-6 and 12-14 would be considered by us to be least and most psychopathic respectively, with the other inmates falling somewhere in between. The number and percentage (in brackets) of inmates who fell into each RDC and global assessment category are shown in Table 1. The degree of association between the assessment procedures was highly significant ($\chi^2 = 23.6$, $df = 4$, $p < .001$), but it is clear that there were many cases of disagreement. For example, although the two procedures agreed very well on the incidence of psychopathy within the sample (27.6% with global ratings and 28.9% with the RDC), there was disagreement on which inmates were psychopaths (or antisocial personality). Thus, of the 21 inmates considered to be psychopaths by the rating procedure, the RDC procedure classified 9 definitely, 10 probably, and 2 not antisocial personality. Similarly, of the 22 inmates classified as definitely antisocial personality, the rating procedure considered 9 to be psychopathic, 12 in between, and 1 not psychopathic.

Part of the agreement between the two procedures may have been due to the fact that condition (d) of the RDC also enters into our global rating procedure. Since condition (d) involves a clinical judgment, an additional analysis was carried out, using only the

TABLE 1

NUMBER AND PERCENTAGE (IN BRACKETS) OF INMATES THAT MET EACH COMBINATION OF GLOBAL RATINGS OF PSYCHOPATHY AND RESEARCH DIAGNOSTIC CRITERIA (0-4 CONDITIONS) FOR ANTISOCIAL PERSONALITY.

Global Rating	Number of RDC Conditions Met			Total
	0-2	3	4	
2 - 6	17 (22.4%)	5 (6.6%)	1 (1.3%)	23 (30.3%)
7 - 11	8 (10.5%)	12 (15.8%)	12 (15.8%)	32 (42.1%)
12 - 14	2 (2.6%)	10 (13.2%)	9 (11.8%)	21 (27.6%)
Total	27 (35.5%)	27 35.5%)	22 (28.9%)	76 (100%)

behavioral data from the RDC, i.e., data from conditions (a) through (c). In this analysis, inmates who met 0-1, 2, or all 3 RDC criteria were considered to be, respectively, not, probably, and definitely antisocial personality. The results are shown in Table 2. The degree of association between the two procedures was significant ($\chi^2 = 17.0$, $df = 4$, $p < .01$), although it was not as strong as when RDC condition (d) had been used.

In compiling these data, it became clear that RDC classifications are age-related; young inmates may not have had enough time to do many of the things (especially in conditions b and c) considered to be indicative of antisocial personality. In this respect, the RDC may be a conservative instrument, but on the other hand, many inmates who are clearly not psychopaths are classified as antisocial personality by the RDC.

DSM-III

Although the proposed DSM-III is based largely upon the RDC, the latest draft version (Note 2) uses only behavioral criteria for the diagnosis of antisocial personality disorder. The diagnostic criteria can be summarized as follows:

- A. Current age at least 18 and a history of continuous and chronic antisocial behavior in which the rights of others are violated.
- B. Onset before age 15 as indicated by a history of two or more of the following: (1) truancy, (2) expulsion from school, (3) delinquency, (4) running away, (5) persistent lying, (6) unusually early or aggressive sexual behavior, (7) unusually early drinking to excess or substance abuse, (8) thefts, (9) vandalism, (10) poor school performance, and (11) chronic violations of home and school rules.
- C. Antisocial behavior since age 15, as indicated by three or more of the following: (1) poor occupational stability, (2) three or more non-traffic arrests or a felony conviction, (3) two or more divorces and/or separations, (4) repeated physical fights or assaults, (5) repeated thefts, (6) illegal occupation, (7) repeated defaulting on debts or other major financial obligations, and (8) travelling around without a prearranged job or clear goal.
- D. No period of five years or more without antisocial behavior between age 15 and onset of adult antisocial behavior, when the individual was not ill or confined in an institution.

TABLE 2

NUMBER AND PERCENTAGE (IN BRACKETS) OF INMATES THAT MET EACH COMBINATION OF GLOBAL RATINGS OF PSYCHOPATHY AND RESEARCH DIAGNOSTIC CRITERIA (0-3 CONDITIONS) FOR ANTISOCIAL PERSONALITY.

Global Rating	Number of RDC Conditions Met			Total
	0-1	2	3	
2 - 6	11 (14.5%)	9 (11.8%)	3 (3.9%)	25 (30.3%)
7 - 11	4 (5.3%)	13 (17.1%)	15 (19.7%)	32 (42.1%)
12 - 14	1 (1.3%)	11 (14.5%)	9 (11.8%)	21 (27.6%)
Total	16 (21.1%)	33 (43.4%)	27 (35.5%)	76 (100%)

- E. The antisocial behavior is not symptomatic of severe mental retardation, Schizophrenia, Schizoaffective or Paranoid Disorders.

While individuals who meet each of these criteria are certainly antisocial, are they also psychopaths in the strict sense of the term? To help answer this question we used the DSM-III diagnostic criteria with 75 of the 76 inmates (one was only 17 years old, and therefore did not meet Criteria A) for whom global assessments of psychopathy had been obtained as part of the analyses presented in the previous section. The number and percentage of inmates that met 1, 2, 3, 4, and 5, of the DSM-III criteria and that received psychopathy ratings of 2-6, 7-11, and 12-14, are shown in Table 3. The most dramatic finding was that 59 (almost 79%) of the inmates met all five criteria and would receive a DSM-III diagnosis of antisocial personality disorder. However, we considered only 20 of these 59 inmates to be psychopaths. It is evident that the latest (December, 1977) version of the proposed DMS-III is extremely liberal with the diagnosis of antisocial personality disorder, making the diagnosis almost synonymous with criminality. Actually, the DSM-III diagnosis of antisocial personality disorder may be even more liberal than the preceding analysis would indicate. Some of the information required to determine whether or not an inmate met each of the five criteria was missing from several files and could not be obtained reliably from the inmates themselves. Had the information been available, I suspect that at least 85% of the inmate sample would have received the diagnosis of antisocial personality.

The irony of all this is that the description of antisocial personality disorder given in DSM-III is consistent with the "Classic" conception of psychopathy outlined by Cleckley (1976) and used by many investigators, including the author. While psychopathy consists of a particular set of behavioral characteristics--antisocial acts, poor job performance, frequent but short-lived attachments, etc.--it also consists of key personality traits--impulsivity, egocentricity, lack of empathy and remorse, etc. These traits are more difficult to assess than are the more purely behavioral features, but they are nevertheless very important to the overall picture of the individual that emerges. While these traits are often reflected in behavior, similar behaviors can occur for other reasons. The DSM-III appears to acknowledge this, but the diagnostic criteria rely only upon behavioral indications, and in a fairly loose fashion. Moreover, while the behaviors themselves are objective enough, subjective assessments are frequently required in order to evaluate whether or not a given behavior actually meets the DSM-III criteria. The net result is that in its present version there is a great deal of slippage between the DMS-III conception of antisocial personality disorder and the diagnosis of individuals who fit this conception.

TABLE 3

NUMBER AND PERCENTAGE (IN BRACKETS) OF INMATES THAT MET EACH COMBINATION OF GLOBAL RATINGS OF PSYCHOPATHY AND THE PROPOSED DSM-III CRITERIA (1-5) FOR ANTISOCIAL PERSONALITY DISORDER.

Global Rating	Number of Criteria Met					Total
	1	2	3	4	5	
2 - 6	1 (1.3%)	3 (4.0%)	4 (5.3%)	3 (4.0%)	11 (14.7%)	22 (29.3%)
7 - 11	0 (0%)	1 (1.3%)	0 (0%)	3 (4.0%)	28 (37.3%)	32 (42.6%)
12 - 14	0 (0%)	0 (0%)	0 (0%)	1 (1.3%)	20 (26.7%)	21 (28.0%)
Total	1 (1.3%)	4 (5.3%)	4 (5.3%)	7 (9.3%)	59 (78.7%)	75 (100%)

The problem is made even worse by the fact that some of the criteria in DSM-III, like those in the RDC, are age-dependent. For example, a 35 year old is more likely to meet the criteria for Condition C (having to do with evidence of antisocial behavior since age 15) than is a 19 or 20 year old. The younger individual simply may not have had enough time to engage in the sorts of behavior that would satisfy Condition C; even if he has engaged in this behavior, it may not yet be apparent (to the authorities, psychiatrist, etc.) that he has done so. A related problem is that it may be difficult to evaluate the extent to which an older criminal or inmate satisfied Condition B (evidence of antisocial behavior before age 15). The reason for this is that the older an inmate is the less likely his prison file will contain the sorts of detailed information required to assess his childhood behavior. As his criminal career develops, more and more emphasis in the files is given to adult and current behavior. The result is that the individual may in fact have engaged in a great deal of antisocial behavior before age 15 but this information may not be explicitly spelled out in his files. As a result, he may fail to meet Condition B by default, and would not be diagnosed as Antisocial Personality Disorder.

In spite of the fact that each of these age-dependent problems should make the DSM-III diagnosis of Antisocial Personality Disorder more conservative, we still ended up with almost 80% of our prison sample receiving this diagnosis. Perhaps one way around the problem would be to let the stringency of the criteria be determined by the age of the individual being assessed. For example, we found that while 79% of our inmate sample would be diagnosed as Antisocial Personality Disorder using the proposed DSM-III criteria, only 38% would receive this diagnosis if the number of behaviors needed to satisfy Conditions B and C was set at 5 and 4 respectively, for inmates younger than 25, and at 2 and 5 for inmates 25 or older. With this procedure, the correlation between the number of conditions satisfied and the global assessment of psychopathy was .60. Even if the DSM-III criteria are not evaluated according to the age of the inmate being assessed, it would be possible to make the diagnosis of Antisocial Personality Disorder more stringent. Thus, when the number of behaviors needed to satisfy Condition B and C was set at 3 and 4 respectively, 41% of the inmates received the diagnosis of Antisocial Personality Disorder, and the correlation between the number of conditions met and the global assessment of psychopathy was .51. When the criteria were made even more stringent (four behaviors for Condition B and five for Condition C), only 16% of the inmates qualified for the diagnosis of Antisocial Personality Disorder and the correlation between the number of conditions met and the global assessment of psychopathy was .60.

It is apparent that the DSM-III diagnosis of Antisocial Personality Disorder can be made stringent or liberal simply by manipulating the number of behaviors required to satisfy each condition. Just how stringent the criteria need be is difficult to say, but certainly

criteria that permit almost 80% of a group of inmates to receive the diagnosis are not very stringent. While behavioral scientists could adopt relatively stringent criteria for research purposes, the general use of the proposed DSM-III criteria would make the diagnosis of Antisocial Personality Disorder almost meaningless where criminals are concerned.

PSYCHOPATHY AND CRIME

Incidence of psychopathy

Much of the data presented in previous sections is relevant to the question of the incidence of psychopathy in criminal and prison populations. The question is of more than academic importance, since research strategies, decisions about "treatment" programs, parole, probation, etc., are all influenced by assessments of the individual inmates involved. For example, it is generally believed that it is very difficult to modify the behavior of psychopaths (see review by Suedfeld and Landon, 1978), and if the large majority of the prison population is considered psychopathic, it may not be worthwhile to expect the prison to serve much more than a custodial function. On the other hand, if most inmates are not psychopaths, they can be provided with treatment and training programs that might be more "successful" with them than with psychopaths.

The data presented in Table 3 clearly indicate that the use of the proposed DSM-III criteria results in around 80% of a group of prison inmates who volunteered for an experiment being diagnosed as antisocial personality disorder. We don't know whether the same proportion of the general prison population, including those who did not volunteer, would receive this diagnosis. However, there is some evidence that the high proportion of inmates diagnosed as antisocial personality disorder is not specific to the group of volunteers we studied. Guze (1976) has presented a great deal of data on the relationship between sociopathy or antisocial personality and crime. His definition of sociopathy is consistent with the conception of psychopathy used in this paper, and is given in detail in Woodruff, Goodwin, and Guze (1974). Guze studied 223 consecutive male felons who were being considered for parole or who were near the end of their sentence. The diagnosis of sociopathy was made if an inmate had a history of police trouble and if two of the following were present: a history of excessive fighting, school delinquency, a poor job record, and a period of wanderlust. It is apparent that these criteria are similar to those contained in the draft version of DSM-III. Using these criteria, 78% of the felons received the diagnosis of sociopathy, a reflection of the tendency (also found with DMS-III) to "...lump rather than split" diagnostic categories (Woodruff et al., 1974).

My own estimate of the percentage of white prison inmates in Canada who are psychopaths in the strict sense is around 25 to 30%. This estimate is based upon almost 15 years of research in a variety of penal institutions, ranging from minimum to maximum security. In some cases the estimate is derived from groups of volunteers (who may or may not have represented the rest of the prison population), while in others it is based upon a random selection of inmates. In general, it would appear that in maximum security institutions most of the psychopaths are highly aggressive, while medium and minimum security institutions contain a greater proportion of psychopaths who are more manipulative and adept at using the system to their own advantage.

Psychopathy and Criminal History

Guze (1976) has summarized the results of several studies on the relationship between sociopathy and criminal activities subsequent to release from prison; however, as we've seen, the criteria for sociopathy were very broad. In this section I'll present some unpublished data on the criminal history of psychopathic and nonpsychopathic inmates prior to and after taking part in one of our research projects. In effect, the material to be presented is both retrospective and prospective, although emphasis will be placed upon the latter, since we are still collecting data on family and early history.

The data are from several hundred white, male psychopathic (P) and nonpsychopathic (NP) inmates who took part in at least one of our psychophysiological studies during the years 1964 to 1974. Background and life-history data were collected for each inmate at the time of testing, and in some cases various personality inventories were administered. Each inmate's criminal history was divided into two periods. The first was the Pre-assessment Period, which extended from the date of his first conviction in adult court to the time when he was first assessed as to degree of psychopathy in one of our research projects. The second period was the Post-assessment Period, which extended from the time of first assessment to December 31, 1975. For inmates first studied in 1964, the follow-up period was 11 years, while it was only 15 months for those first studied in 1972. However, the inmates studied in 1974 were in a Provincial prison in which the maximum term is less than two years; as a result, most of the inmates had been released between 8 and 12 months before the end of the follow-up period.

For various reasons, complete data were not available for all inmates, and, as a result, the number of inmates varied from one analysis to another. In most cases and unless otherwise indicated, there were around 100 inmates in each group.

Characteristics of the Inmates

At the time of diagnosis mean age, years of formal education, and Revised Beta I.Q. were, respectively, 28.7, 9.2 and 106.7 for the inmates in Group P, and 29.2, 9.2, and 105.5 for the inmates in Group NP. None of the differences between groups was significant. Most of the inmates were from the lower socioeconomic levels. About half of each group were addicted to drugs (primarily heroin), while 13% of Group P and 22% of Group NP used drugs occasionally. There were more alcoholics in Group NP than in Group P (29% vs. 15%), but more problem drinkers in Group P than in Group NP (44% vs. 23%).

Criminal History in Pre-Assessment Period

In British Columbia the minimum age at which a minor can appear in adult court is 17, unless he has an extensive history of delinquent behavior and has committed a serious crime. The mean age of first appearance in adult court was 18.1 years for the psychopathic inmate (i.e., Group P; $N = 104$) and 20.0 for the other inmates (i.e., Group NP; $N = 107$), a statistically significant difference ($p < .01$). Almost 40% of the psychopaths made their first appearance before they reached the age of 17, whereas only about 19% of the other inmates did so.

Following their first arrest most inmates continued to engage in criminal activity, although those in Group P were considerably worse in this respect than those in Group NP. In the period between their first arrest and the beginning of their latest sentence (an average of 9.5 years for Group P and 8.3 for Group NP), the inmates in Group P spent significantly ($p < .001$) more time in prison (an average of 44% of the period) than did those in Group NP (an average of 30% of the period). The left-hand columns of Table 4 show the mean number of times each inmate was convicted for various crimes during each of the years he was not in prison in the pre-assessment period (the post-assessment data in the right-hand columns will be considered later). It is evident that most inmates were pretty active when they were free; note that this does not include crimes that they may have committed but for which they were not charged and found guilty. The psychopaths were convicted of significantly more thefts, robberies, and assaults, but fewer narcotics offences, than were the other inmates. The mean number of convictions for each inmate during each year free was 5.46 for Group P and 3.65 for Group NP ($p < .01$). On the average, each inmate in Group P was convicted 5.46 times for each year of freedom, while each inmate in Group NP was convicted 3.65 times ($p < .05$). When arrested, twice as many of the psychopaths used an alias than did those in Group NP ($p < .05$), a rather pointless evasion (though in keeping with the nature of psychopathy; see Cleckley, 1976), since identification for felony convictions is always checked with fingerprint analysis.

TABLE 4

MEAN NUMBER OF TIMES EACH INMATE WAS CONVICTED OF VARIOUS TYPES OF OFFENSE DURING EACH YEAR HE WAS FREE BEFORE ASSESSMENT AND AFTER ASSESSMENT (FOLLOW-UP).

Type of Offense	Before Assessment			After Assessment		
	Group P (N=100)	Group NP (N=102)	p	Group P (N=102)	Group NP (N=106)	p
Theft	3.08	1.59	<.005	.72	.30	<.01
Robbery	.18	.05	<.05	.23	.01	.01
Fraud, forgery, etc.	1.01	.60	--	.37	.39	--
Murder	.02	.01	--	.02	0	--
Assault	.32	.14	<.05	.08	.02	--
Weapons	.15	.08	--	.19	.01	<.01
Minor Driving	.04	.05	--	.01	.01	--
Major Driving	.10	.13	--	.10	.09	--
Possession Narcotics	.10	.28	<.005	.08	.18	--
Trafficking in Narcotics	.09	.20	<.05	.03	.11	--
Misc. Minor	.36	.47	--	.15	.14	--

The psychopaths also broke out of prison significantly ($p < .05$) more often than did the other inmates (a total of 20 escapes per year for Group P vs. 10 per year for Group NP). Prior to assessment 37% of the inmates in Group P and 28% in Group NP had received at least one parole; the total number of paroles granted to each group was 54 and 45 for Groups P and NP respectively. Parole violations occurred in over 70% of the cases in each group, and, on average, after less than 40% of the parole had been completed.

The preceding analyses were based upon univariate statistical procedures. However, significant differences between groups were also obtained with multivariate analyses. For example, a Hotelling's T^2 test (Morrison, 1976) revealed that the difference between groups P and NP (on the 11 variables described below) was highly significant ($F = 3.49$, $df = 11/181$, $p < .001$). A discriminant analysis (Nie, Hull, Jenkins, Steinbrenner, & Brent, 1975) indicated that significant discrimination between groups could be obtained with these variables (Wilk's lambda = .82, $\chi^2 = 35.7$, $df = 11$, $p < .001$). The standardized discriminant function coefficients (the larger the coefficient the greater the contribution made to discrimination between groups) for these variables were as follows: thefts (.58), charges dropped (-.44), possession of narcotics (-.43), weapons offences (.40), aliases (.38), trafficking in narcotics (-.28), frauds (.22), robberies (.20), paroles granted (.19), escapes (.17), and assaults (.03). Although significant discrimination between groups was obtained, only 66% (chance = 50%) of the inmates were correctly classified, using the obtained discriminant function.

Criminal History Following Assessment

The length of the follow-up or post-assessment period ranged from 15 months to 11 years. During this period most subjects continued to engage in criminal activity, with 89% of the subjects in Group P and 91% of those in Group NP being charged with criminal offences. The psychopathic (Group P) subjects spent significantly ($p < .005$) more time in prison (an average of 44% of the period) than did the other (Group NP) inmates (an average of 32% of the period). However, while they were free, the psychopaths committed and were convicted of more crimes (an average of 1.98 per year) than did the other subjects (an average of 1.26 per year), a significant difference ($p < .05$). The breakdown of the mean number of convictions per year free is presented in the right-hand columns of Table 4. The psychopaths continued to be convicted of more thefts, robberies, and weapons offences than the other subjects. For both groups, the mean number of convictions per year decreased from the pre- to the post-assessment periods, perhaps a reflection of a general tendency for criminal activity to decrease with age (see Guze, 1976; Robins, 1966). It is also possible that many of the inmates become more adept at avoiding arrest and conviction.

Whatever the reason for the overall decrease in conviction rate, the fact that the psychopaths showed any decrease at all is of interest here, given the general impressions about the consistency of psychopathy over time. However, Robins (1966; see also the review by Suedfeld and Landon, 1978) has shown that after age 30 there is often a reduction in the severity of the antisocial behavior of sociopaths. We therefore divided Groups P and NP into three subgroups each, based on the age of each inmate at the time we first assessed him, i.e., at the beginning of the follow-up period. These age-groups were 18-25, 26-30, and over 30, at the time of assessment. The mean number of criminal convictions during each year a subject was free following assessment was then calculated. The results for each age-group are plotted in Figure 1. It is obvious that psychopaths (Group P) who were over 30 at the time of assessment subsequently were convicted of far fewer crimes than were those who were younger when assessed, while the subsequent conviction rate for the subjects in Group NP was unrelated to their age at assessment. Although this may support the hypothesis that some psychopaths tend to "burn out" with age, it should be noted that this may only mean that their behavior becomes less grossly antisocial than it had been before (cf. Robins, 1966). To a certain extent this point is illustrated in Table 5, which contains the percentage of inmates who were convicted of various types of crime during the post-assessment (or follow-up) period as a function of age when assessed; also included are the number of subjects in each age range and the length of the follow-up period. Note that during the follow-up period psychopaths who were 26-30 when assessed were more likely to be convicted of several types of crimes than were those either younger or older when assessed. As Figure 1 indicates, these same subjects were also convicted of the greatest number of crimes per year. While it would appear that the greatest period of criminal activity of the psychopaths occurred when they were between 26 and 30, the decrease in criminal activity after age 30 was more dramatic when compared with this 26-30 year old period than when compared with the 18-25 year old period. In some cases, most notably fraud, forgery, use of weapons, and major driving offences there was little or no decrease in conviction rate with an increase in the age of the psychopaths. In addition, the older psychopaths were more likely to be convicted of narcotics offences than were those who were younger when assessed; the opposite trend occurred with the nonpsychopathic inmates.

In spite of the fact that the psychopaths generally had worse criminal histories, both before and after assessment, than did the other subjects, they continued to be more successful at obtaining parole. In the follow-up period, 39% of the subjects in Group P obtained at least one parole (a total of 57 paroles), while only 23% of the inmates in Group NP obtained parole at least once (a total of 32 paroles). Parole violations occurred in about 75% of the cases



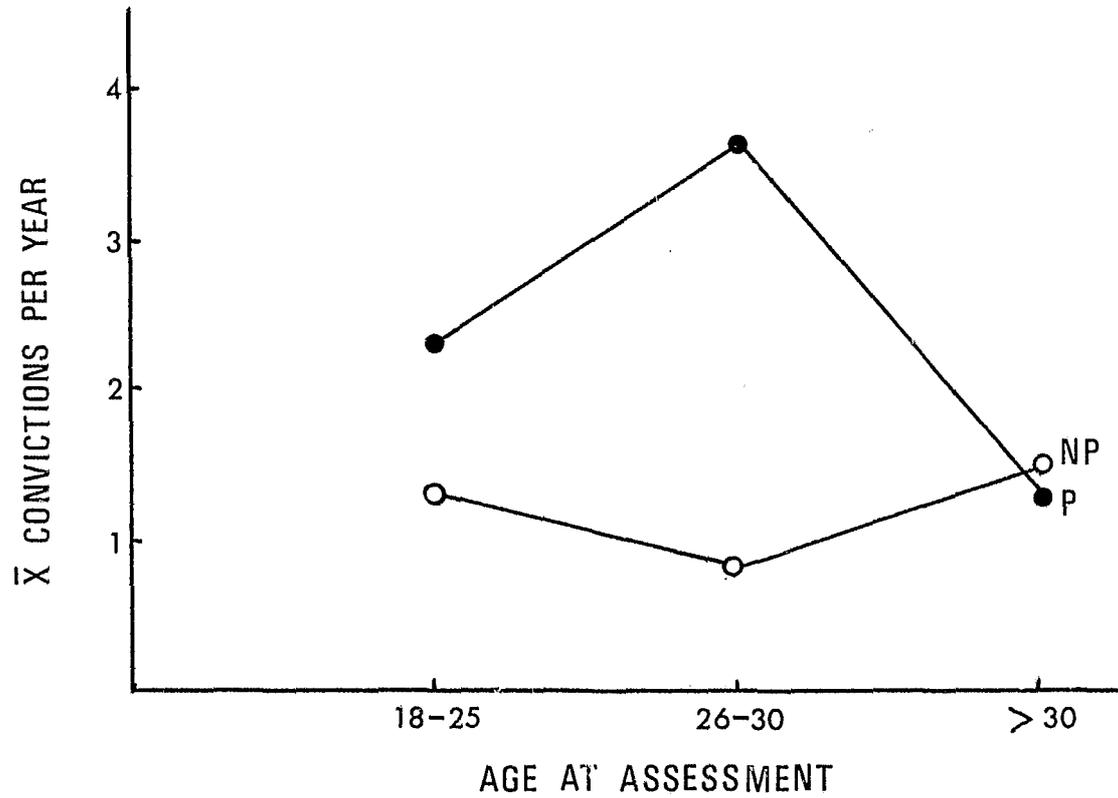


FIGURE 1
MEAN NUMBER OF SUBSEQUENT CONVICTIONS PER YEAR FOR
PSYCHOPATHIC (P) AND NONPSYCHOPATHIC (NP) INMATES AS A
FUNCTION OF AGE AT ASSESSMENT

TABLE 5

PERCENTAGE OF SUBJECTS THAT WAS CONVICTED OF VARIOUS TYPES OF CRIME DURING THE FOLLOW-UP PERIOD AS A FUNCTION OF AGE WHEN ASSESSED.

Type of Offense	Group P			Group NP		
	18-25	<u>Age</u> 26-30	>30	18-25	<u>Age</u> 26-30	>30
Theft, possession stolen property, B & E.	40.0	61.9	26.4	17.8	18.2	27.0
Robbery	8.9	28.6	8.8	2.2	0	0
Fraud, forgery, etc.	15.6	9.5	11.8	6.7	9.1	13.5
Murder, attempted murder	0	4.8	0	0	0	0
Assault	11.1	19.0	2.9	2.2	13.6	2.7
Possession Weapons	17.8	9.5	14.7	4.4	4.5	2.7
Minor Driving	2.2	0	2.9	0	0	5.4
Major Driving	13.3	14.3	14.7	6.7	4.5	13.5
Possession Narcotics	8.9	14.0	33.3	22.2	31.8	8.1
Trafficking in Narcotics	6.7	9.5	2.9	6.7	18.2	5.4
Misc. Minor	17.8	19.0	8.8	13.3	9.1	21.6
Number of Subjects	45	21	34	45	22	27
Length of Follow-Up (months)	50	89	78	45	59	59

in each group, and, on the average, after less than 35% of the parole had been completed; these values are marginally worse than they had been prior to assessment. In addition to the generally poor parole record of both groups, it is apparent that psychopaths continued to get many paroles regardless of their rather horrendous criminal history.

Although the preceding analyses were based upon univariate statistical tests, significant differences between Group P and NP were obtained with multivariate analyses. A Hotelling's T^2 test indicated that the difference between groups on the 11 variables described in the last section (and presented again below) was significant ($F = 2.43$, $df = 2/181$, $p < .01$). A discriminant analysis also indicated that significant discrimination between groups could be obtained with these variables (Wilk's lambda = .87, $\chi^2 = 25.6$, $df = 11$, $p < .01$). The standardized discriminant function coefficients for these variables were as follows: robberies (.48), paroles obtained (.39), weapons offences (.38), possession of narcotics (-.36), escapes (.26), thefts (.23), aliases (.22), trafficking in narcotics (-.20), assaults (.20), frauds (-.13), and charges dropped (.09). Using the obtained discriminant function, 65% of the inmates were correctly classified.

Before finishing this section, I'd like to present some individual data on several of the 26 psychopathic subjects we first studied in 1964 and have followed-up for 11 years now. These subjects were in a Federal Penitentiary serving sentences of two years or more. Six of these inmates were serving indefinite terms (Preventive Detention) as habitual criminals, in principal, incarceration for life. In fact, however, each of these six inmates received at least one parole. Subject #87, 29 years old in 1964, was paroled in August 1967, and returned to prison in October 1968 for parole violation and theft. He received an additional sentence of 30 months, but was again paroled in September, 1971. In January, 1973, he violated parole and was returned to prison. In June, 1973 he was again paroled, but again he violated parole, being returned to prison in February, 1974; he was still in prison in December, 1975, at age 40.

Subject #20 was 39 years old in 1964 and also was serving a sentence as a habitual criminal. In June, 1967 he was released on life-parole, but was returned in October, 1969 for possession of narcotics and parole violation. He received a sentence of life + 1 year, but was again paroled in September, 1971. In December, 1972 he was returned to prison for fraud and parole violation, and sentenced to life + 2 years. In December, 1975 he was still in prison, at age 50.

Perhaps an even more dramatic example of the failure of some psychopaths to "burn out" with age, is Subject #89. In 1964 he was 54 years old, serving a life sentence as a habitual criminal. In May, 1967 he received a life-parole. In August, 1968 he was convicted of petty larceny in the United States, and three months later was returned to prison in Canada; he received a sentence of life + 18 months. In March, 1970 he was again paroled, but was returned four months later for theft and parole violation; he received a sentence of life + 2 years. In February, 1971 he received a day-pass from the prison, but failed to return. When he was caught a month later he received an additional sentence of six months. A few months later he escaped (from a penitentiary from which very few escapes have ever been made), but was caught within a month. This time he received a sentence of life + 15 months. In May, 1974 he was again given a day-pass, and again failed to return. Within a month he had been caught and convicted of theft and leaving the scene of an accident; the sentence was life + 2 years. In December, 1975 he was still in prison, at age 65.

Not all of the psychopaths studied in 1964 were this persistent in their criminal behavior, although most were. Thus, in 1975 11 of the original 26 psychopaths, but only 2 of 24 nonpsychopaths, were still in prison. During this 11 year period, the psychopaths received a total of 26 paroles, while the other inmates received only seven. Of course, an inmate can't be paroled unless he is in prison to start with; on this basis, the psychopaths had more opportunities for parole, since they were more frequently in prison during this period.

I can conclude this section by noting that the data presented do not support Guze's (1976, p. 50) conclusion that once a man has been convicted of a felony, psychiatric diagnoses play only a limited role in predicting future criminal behavior. As we saw earlier, Guze's definition of sociopathy was a very broad one, and included 78% of his sample. However, the data presented here indicate quite clearly that the subsequent criminal history of carefully defined groups of psychopathic criminals is considerably worse than is that of nonpsychopathic criminals.

Psychopathy, Age at First Conviction, and Criminal History

The age at which the first conviction in adult court occurred would seem to give some indication of the severity of antisocial behavior in childhood, and, by itself, might be expected to be a rather good predictor of subsequent criminal behavior. To check on the possibility, we computed "a total crime-index" for each of our subjects; this index was defined as the mean number of criminal convictions per year free for all crimes in the interval between the first conviction and December, 1975. The correlation between age of first conviction

and the "total crime-index" was $-.09$ for all subjects, $-.06$ for Group P, and $-.05$ for Group NP; none of these correlations was significant.

However, this "total crime-index" is quite a crude way of assessing criminality, and more detailed analyses were therefore carried out. Although the data are too extensive to be presented here, they can be summarized as follows. With all subjects combined, the younger an individual was when first convicted in adult court the more likely ($p < .05$ or better) he was to have subsequently been convicted of theft, robbery, assault, possession of narcotics, and miscellaneous minor crimes. Furthermore, the younger he was at first conviction in adult court, the more likely he was to use an alias, to avoid conviction on subsequent charges, to be granted parole, and to have his parole revoked. However, when Group P and Group NP were considered separately, somewhat different patterns emerged. For example psychopathic (Group P) subjects who had been first convicted in adult court at an early age were subsequently more likely ($p < .05$) to escape and to be convicted of violent crimes (robbery and assault) than were those who were older at first conviction in adult court; these relationships did not occur with the nonpsychopathic (Group NP) subjects. Further, among the psychopaths, there was no relationship between age at first conviction in adult court and subsequent drug offences or success at obtaining or violating parole. On the other hand, nonpsychopaths who were first convicted at an early age were subsequently far more likely to receive (and violate) parole and to be involved with drugs than were those who were older at first conviction in adult court.

BIOLOGICAL CORRELATES OF PSYCHOPATHY

This section contains a brief outline of research on psychophysiological differences between psychopathic and other criminals. Research and theory on the biochemical correlates of psychopathy are not included, primarily because very little systematic research has been conducted with well defined groups of subjects, although some interesting work in this direction has recently been carried out (by Lidberg, Levander, Schalling, and Lidberg, 1978). While several biochemical theories of psychopathy have been presented (e.g., Mawson and Mawson, 1977; Porges, 1976), they are based primarily upon inferences from highly selective and generally incomplete reviews of the behavioral and automatic (actually, electrodermal) literature, and not on biochemical research. Also missing from this section is consideration of the neurology of psychopathic behavior, since most of the relevant research has been more concerned with criminality than with psychopathy have been reviewed by Elliott (1978) and, elsewhere in this volume, by Monroe and Moyer. Yeudall (1978) has recently presented some neuropsychological data which suggest that psychopathy may be characterized by dysfunction of the left temporal and frontal regions. However, the number of subjects studied is small, and the diagnosis of psychopathy is uncertain.

Although the following discussion is concerned with the psychophysiological correlates of psychopathy, the recent theory and research on the hyperactive child syndrome (e.g., Satterfield, 1978) should also be kept in mind. The two disorders may be developmentally related, appear to have similar psychophysiological correlates, and have been interpreted in terms of similar biological models.

To a large extent, the material to be covered is based upon recent reviews by Hare (1978a) and Hare and Cox (1978b). Extensive discussions of related topics can be found in Hare and Schalling (1978).

Electrocortical Activity

EEG Studies

In most of the published research on brain-wave activity in psychopathic patients electroencephalographic (EEG) recordings were obtained as part of routine medical and psychiatric procedures; in many cases, experimental control, quantification of data, and the diagnosis of the patients were inadequate. Nevertheless, some fairly consistent findings have been reported over the years, the most frequent being the presence of "abnormal" amounts of slow-wave activity in the EEG. Several interpretations have been offered for this finding. The similarity of the adult psychopath's slow-wave activity to that of a normal child has led to the suggestion that psychopathy is related to delayed cortical maturation (Elliott, 1978; Kiloh and Osselton, 1966). Another interpretation is that the slow-wave activity reflects some underlying cortical or subcortical dysfunction. A third possibility is that slow-wave activity in psychopaths reflects low cortical arousal and/or a proneness to become bored and drowsy during routine EEG examinations (Forssmann and Frey, 1953; Hare, 1970).

However, a recent review by Syndulko (1978) has been critical of much of the research in this area, and he concludes that it has yet to be firmly established that psychopaths are in fact characterized by amounts of slow-wave activity that could be considered abnormal.

Cortical Evoked-Potentials

Very little research has been done on the relationship between psychopathy and cortical evoked potentials. The recent review by Syndulko (1978) concludes that significant differences between psychopathic and other subjects have not been consistently demonstrated.

Contingent Negative Variation

McCallum and Walter (1968) reported that the contingent negative variation (CNV) during the foreperiod of a reaction-time study was absent or only very small in psychopaths. However, there is some concern about their definition of psychopathy; moreover, more recent research (see Sydulko, 1978) has failed to obtain consistent CNV differences between psychopathic and other subjects.

Low CNS Arousal

Even if subsequent research manages to establish the existence of electrocortical differences between psychopaths and other subjects, these differences by themselves would not necessarily indicate the presence of some underlying structural anomalies. They may, for example, reflect differences in motivational, attentional, and cognitive processes. For example, if an unusual amount of slow-wave activity is observed in psychopaths, it could be associated with a lowered state of central nervous system (CNS) arousal in a situation that is not as exciting as it could be. Several investigators (e.g., Hare, 1970; Quay, 1965) have in fact argued that much of the psychopath's behavior is the result of cortical underarousal and a pathological need for stimulation. Psychophysiological evidence in support of a low cortical arousal hypothesis, as well as some of the implications for the psychopath's behavior, are reviewed in Hare (1970), while Zuckerman (1978) and Cox (1977) have discussed the psychopath as a stimulation-seeker. In many respects, Eysenck's (1967) theory relating extraversion to biological processes is relevant here.

In spite of the methodological problems associated with much of the electrocortical research on psychopathy, well controlled research with a conceptually similar disorder, the hyperactive child syndrome, has found evidence of excessive slow-wave activity in the EEG. Satterfield (1978) notes that the data can be interpreted in terms of delayed cortical maturation or low CNS arousal, although he prefers the latter. The implications of the low CNS arousal model for the behavior of both the hyperactive child and the adult psychopath are also discussed by Satterfield.

Autonomic Correlates

Most of the research on the autonomic correlates of psychopathy has involved electrodermal and cardiovascular activity, generally in response to simple stimuli or in classical conditioning paradigms. Extensive discussions of this research are available elsewhere (Hare, 1968, 1970, 1975, 1978a; Schalling, 1978; Siddle, 1977), and only a brief summary is presented here.

Electrodermal Activity

Palmar electrodermal activity has been the most frequently used index of autonomic activity in psychopaths.

Skin Conductance. Several investigators have recorded tonic electrodermal activity (palmar skin conductance and nonspecific fluctuations in skin conductance) during a variety of experimental procedures. The results have been inconsistent, partly, perhaps, because of the use of different subject-selection procedures and different tasks (see review by Hare, 1978a). A frequent finding has been that the tonic skin conductance of psychopathic inmates is lower than that of other inmates during the initial "rest" period of an experiment. While these differences are not always significant, they are usually in the same direction. In order to remove the effect of different subject-selection procedures, we recently combined the results of eight of our own experiments, two of which had obtained significant differences between groups, and six of which were in the direction of lower skin conductance for the psychopaths. The combined analysis yielded a highly significant difference between psychopathic and nonpsychopathic inmates. There is thus reasonable support for the hypothesis that the resting skin conductance of psychopathic inmates is lower than that of other inmates, at least during the sorts of laboratory procedures generally used. The difference between groups may increase during the course of experiments that are boring and tedious, with the palmar skin conductance of psychopaths decreasing more than that of the other subjects. Similarly, it appears that when the procedure is unpleasant or threatening, the palmar skin conductance of psychopaths does not increase as much as does that of nonpsychopaths.

It is difficult to interpret these findings, since tonic skin conductance is affected by so many different things. In view of the clinical nature of psychopathy, one hypothesis would be that the psychopath's low level of tonic skin conductance during experiments with aversive or unpleasant features reflects a relative lack of fear, anxiety, or apprehension. Other interpretations are possible, especially where the procedures are not particularly stressful or aversive. In this case, the low tonic skin conductance of psychopaths may be related to motivational or cognitive factors rather than to emotional ones (e.g., see Elliott, 1969; Kilpatrick, 1972).

Fluctuations in Skin Conductance. "Spontaneous" or nonspecific fluctuations in electrodermal activity have also been related to psychopathy. A recent review (Hare, 1978a) indicates that group differences during the initial "resting" period of various experiments have been small and inconsistent. The difference between groups sometimes increases throughout the experiment, with psychopathic inmates tending to show progressively fewer tonic nonspecific fluctuations in skin conductance than do other inmates.

The interpretation of these data also presents problems. It has been suggested that nonspecific fluctuations in skin conductance reflect the operation of mechanisms which have excitatory effects upon the cortex (Lacey and Lacey, 1958; Lader, 1965) or which help to maintain an optimal level of cortical arousal (Venables, 1967). Szpíler and Epstein (1976) have argued that fluctuations in skin conductance are a measure of physiological instability which reflects a state of diffuse, unchanneled arousal (or anxiety) induced by the perception of threat in the absence of a suitable coping response. Thus, the relatively small number of electrodermal fluctuations sometimes observed in psychopathic subjects as the experiment progresses could be related to drowsiness, boredom, lowered cortical arousal, or to a lowered level of anxiety or stress. These interpretations are not necessarily incompatible, and it may be that each helps to account for the data in a complementary fashion.

Skin Conductance Responses. Perhaps of more significance than tonic electrodermal activity are skin conductance responses to specific, unsignalled stimuli. For example, there is reasonably good evidence (see review by Hare, 1978a) that with weak or low-intensity stimuli (e.g., tones) presented without warning, psychopathic and nonpsychopathic inmates do not differ very much in the size of the skin conductance response elicited. However, with more intense or aversive stimuli, psychopaths give smaller skin conductance responses than do other subjects. That is, psychopaths appear to be electrodermally hypo-responsive only to strong stimuli, and this seems to apply to responses recorded from the left and right hands.

Recovery Limb. Recently, interest has developed in the recovery limb of the skin conductance response (Edelberg, 1970). The interpretation of skin conductance recovery time is currently uncertain (Edelberg and Muller, 1977), but Venables (1975) has argued that it is related to "sensory gating" or to the degree of "openness-closedness" to environmental input, fast recovery times being associated with a reduction in the inhibitory effect of the hippocampus on incoming sensory input (open gate) and slow recovery with a reduction in the excitatory influence of the amygdala (closed gate). Mednick (1975; Mednick and Hutchings, 1978) suggests that recovery rate may reflect the rate at which fear reduction occurs, and has related this to avoidance learning in schizophrenics, psychopaths, and criminals.

There is some evidence that long recovery times may be associated with criminal behavior (Hare, 1978a; Mednick, 1975; Siddie, Mednick, Nicol and Foggitt, 1976; Venables, 1975), and may even be predictive of asocial behavior long before it has actually occurred (Loeb and Mednick, 1976). It has also been suggested that slow recovery may be associated with psychopathy (Mednick, 1975; Venables, 1975), and that

the poor avoidance learning of psychopaths is related to delayed fear reduction, as reflected in slow recovery of the skin conductance response. However, the evidence for abnormally slow recovery in psychopathic criminals is not very consistent or strong yet. In a recent paper (Hare, 1975) I reported on the analysis of data from an earlier study (Hare, 1968) in which inmates were presented with a series of 15 900Hz, 80dB, fast-onset tones, followed by a 16th tone, 350Hz and 70dB. There were no group differences in recovery time of the electrodermal responses (in the left hand) to the first 15 tones; however, the psychopathic inmates showed slower recovery to the novel, 16th tone than did the other inmates. The results probably did not reflect the effects of novelty alone, since there were no differences between groups in recovery to the first tone. One possibility, I support, is that the psychopaths' relatively slow recovery of the skin conductance response to the 16th tone resulted from the introduction of a stimulus that had novel surprising qualities, and that followed a period in which the inhibitory processes associated with habituation had been building up. More recently, we found that recovery of the skin conductance response was slower in psychopathic than in nonpsychopathic inmates only when very intense stimuli with startle qualities (120dB, fast-onset tones) were used, and then only in the left hand (Hare, 1978a). However, we have also found that when an aversive stimulus (e.g., a 120dB tone) is followed by some sort of warning signal, the recovery time of the skin conductance response to the stimulus is shortened and the differences between psychopathic and nonpsychopathic inmates wiped out (Hare, 1978a). The interpretation of this finding is uncertain, but it is possible that the chance for the psychopaths to make preparatory adjustments or to "get set" for the stimulus served to reduce its impact, thereby producing recovery times that would ordinarily be expected of weaker, unwarned stimuli. Obviously, more research is needed.

With reference to our finding that abnormally slow recovery in psychopaths was more apt to occur in the left hand than in the right one, it is interesting that Venables and Mednick (Note 3) have recently found that the 11-12 year old children of parents who are criminal, psychopathic, or character-disordered, showed slower recovery than did children of normal parents, but only in the left hand. It has been suggested (e.g., Gruzelier and Venables, 1974) that cortical control of electrodermal activity may be ipsilateral, and both sets of findings may have some bearing upon the hypothesis that psychopathy is associated with dysfunction of the temporal and frontal lobes of the left hemisphere (see Yeudall, 1977). However, there is no evidence that group differences in other aspects of electrodermal activity (tonic skin conductance, amplitude of responses, etc.) are dependent upon the hand involved. About all that can be said at this point is that more substantial data are required before speculating further.

Before concluding this section I would like to comment briefly on Mednick's hypothesis that asocial behavior is the result of slow fear reduction during avoidance learning and that this rate of fear reduction is reflected in electrodermal recovery time. Most of the data presented by Mednick and his associates have been based upon recovery time and/or rate to stimuli that were not very fear arousing. Our finding that electrodermal recovery times of psychopathic inmates were unusually long only when extremely intense stimuli were used could, perhaps, be the result of slow fear reduction following fear-arousing stimuli. However, I don't really think that these data, or the recovery data presented by Mednick, are really relevant to his theory or avoidance learning, since the interpretation is based upon the assumptions that recovery rate reflects rate of fear reduction, and that recovery rate to simple stimuli is predictive of recovery rate during avoidance learning. A more direct test of the theory as it applies to psychopathy would be to compare electrodermal recovery (presumably to the warning stimuli) of psychopathic and nonpsychopathic criminals both before and after they had made a successful avoidance response.

It should be pointed out here that Mednick's theory may apply more to asocial and criminal behavior in general than to psychopathy in the strict sense. While the largest difference in recovery time should occur between psychopathic criminals and normal noncriminals, it should be easier to obtain differences between criminals and noncriminals than between subgroups of psychopathic and nonpsychopathic criminals. The latter are similar to one another in that each subgroup has engaged in repeated asocial, criminal activity, and, within the context of the theory, each would be expected to exhibit slower electrodermal recovery than that found in the general population. Some data presented elsewhere (Hare, 1978a) are consistent with this position--male university students had much shorter recovery times following presentations of moderate and intense tones than did prison inmates.

Anticipatory Responses. Perhaps the most consistent electrodermal finding with psychopaths is that they show only relatively small increases in electrodermal activity in anticipation of an aversive stimulus. This applies to the traditional classical conditioning procedure (in which a warning signal, say a weak tone, is repeatedly followed by an aversive stimulus, say an electric shock or very loud tone), and to a quasi-conditioning procedure (in which the subject is told that he will receive an aversive stimulus after a specific period of time.). In each case, psychopathic inmates give smaller increases in skin conductance and nonspecific fluctuations in skin conductance in anticipation of the aversive stimulus than do nonpsychopathic ones. That is, they appear to be poor electrodermal conditioners (see review by Hare, 1978a). To illustrate this point, some recent data are

presented in the right hand part of Figure 2; they are based upon a study by Hare et al., 1978 in which four groups of prison inmates were told that they would hear a loud "blast" (a 120dB tone) at the end of a 12-sec. "count-down" procedure. The mean increase (from the pre-count period) in left palmar skin conductance as the loud tone was awaited is shown for the two groups considered to be most (P) and least (NP) psychopathic; the data are averaged over three trials. It is clear that as the noxious tone approached in time, the skin conductance of Group P increased far less than did that of Group NP. Similar results were obtained for increases in the number of nonspecific fluctuations in skin conductance, with Group P showing the smaller increase. Responses recorded from the right hand were essentially the same.

Since the awaited stimuli in experiments of this sort are usually painful and highly aversive, the findings have been interpreted to mean that psychopaths experience little apprehension or anticipatory fear, and interpretation is in agreement with clinical reports. This apparent failure to experience anticipatory fear has in turn been used to account for the psychopath's relative inability to avoid punishment and to keep out of trouble. For a thoughtful discussion of this and related theories, reference should be made to the paper by Trasler (1978).

Electrodermal Activity in the Hyperactive Child. As a final point here, there is some evidence (see Satterfield, 1978) that the hyperactive child syndrome, like adult psychopathy, may be characterized by relatively low tonic skin conductance levels and electrodermal hyporesponsivity. There is thus some consistency of electrodermal findings across two disorders which may be developmentally related.

Cardiovascular Activity

Heart Rate and Pulse Amplitude. Psychopathy does not appear to be related in any consistent way to tonic heart rate or peripheral pulse amplitude during initial "rest" periods or throughout the rather limited experimental procedures generally used. Reports that the cardiovascular system of psychopaths is unusually sensitive to injection of adrenaline (Lindner, Goldman, Dinitz, and Allen, 1970; Schachter and Latane, 1964) were based upon inadequate research procedures and questionable data, and were not supported by more recent research (Hare, 1972, 1973). No data are available on the relationship between psychopathy and other cardiovascular variables, including blood pressure. Perhaps the recent development of pulse-wave velocity procedures for measuring blood pressure on a beat-by-beat, non-invasive basis will lead to the accumulation of relevant data.

Heart Rate Responses. The results of research on the cardiovascular responses of psychopaths to simple stimuli have been equivocal. Hare (1968) found that psychopathic inmates responded to novel 70 and 80dB tones with smaller decreases in heart rate than did other inmates. Heart rate deceleration is one component of the orienting response (Graham and Clifton, 1966; Sokolov, 1963) and is generally associated with sensory-intake (Lacey, 1967). The small cardiac orienting responses given by the psychopaths may thus have been indicative of relative insensitivity to changes in environmental stimulation. However, more recent research, using tones ranging from 80 to 120dB, failed to find any significant differences in the heart rate responses of psychopathic and other inmates (Hare, 1978a). At the higher intensities, the heart rate response usually shifts from deceleration to acceleration (a defensive response) and may be associated with sensory-rejection (Lacey, 1967). Although there are theoretical reasons for expecting this shift from an orienting to a defensive pattern to occur at a higher intensity in psychopaths than in nonpsychopaths, results so far available do not support this prediction.

Anticipatory Responses. The most dramatic cardiovascular correlate of psychopathy observed thus far occurs during anticipation of a painful or aversive stimulus. If psychopaths can be said to be poor electrodermal conditioners, they can also be said to be unusually good at cardiovascular conditioning. Thus, while awaiting delivery of an aversive stimulus, psychopathic inmates show much larger increases in heart rate than do other inmates (Hare and Craigen, 1974; Hare, et al., 1978). Consider, for example, the data on the left side of Figure 2, which are from the same subjects for which electrodermal responses are presented on the right side of the figure. Again, only the data for the most (P) and least (NP) psychopathic groups are presented. It is apparent that while the subjects in Group P gave only small increases in skin conductance, they gave large increases in heart rate in anticipation of the 120dB tone.

Interpretation of Anticipatory Responses

It could be argued that the anticipatory increases in heart rate found with psychopaths indicate that they fear an impending stressor. However, the electrodermal data would lead to the opposite conclusion.

The pattern of large increases in heart rate and small increases in electrodermal activity in psychopaths prior to an anticipated aversive stimulus can be interpreted in another way (see Hare, 1975, 1978a for details). This interpretation rests upon the argument (Lacey, 1967; Lacey and Lacey, 1974) that cardiac acceleration is associated with sensory-rejection and decreased cortical arousal, and

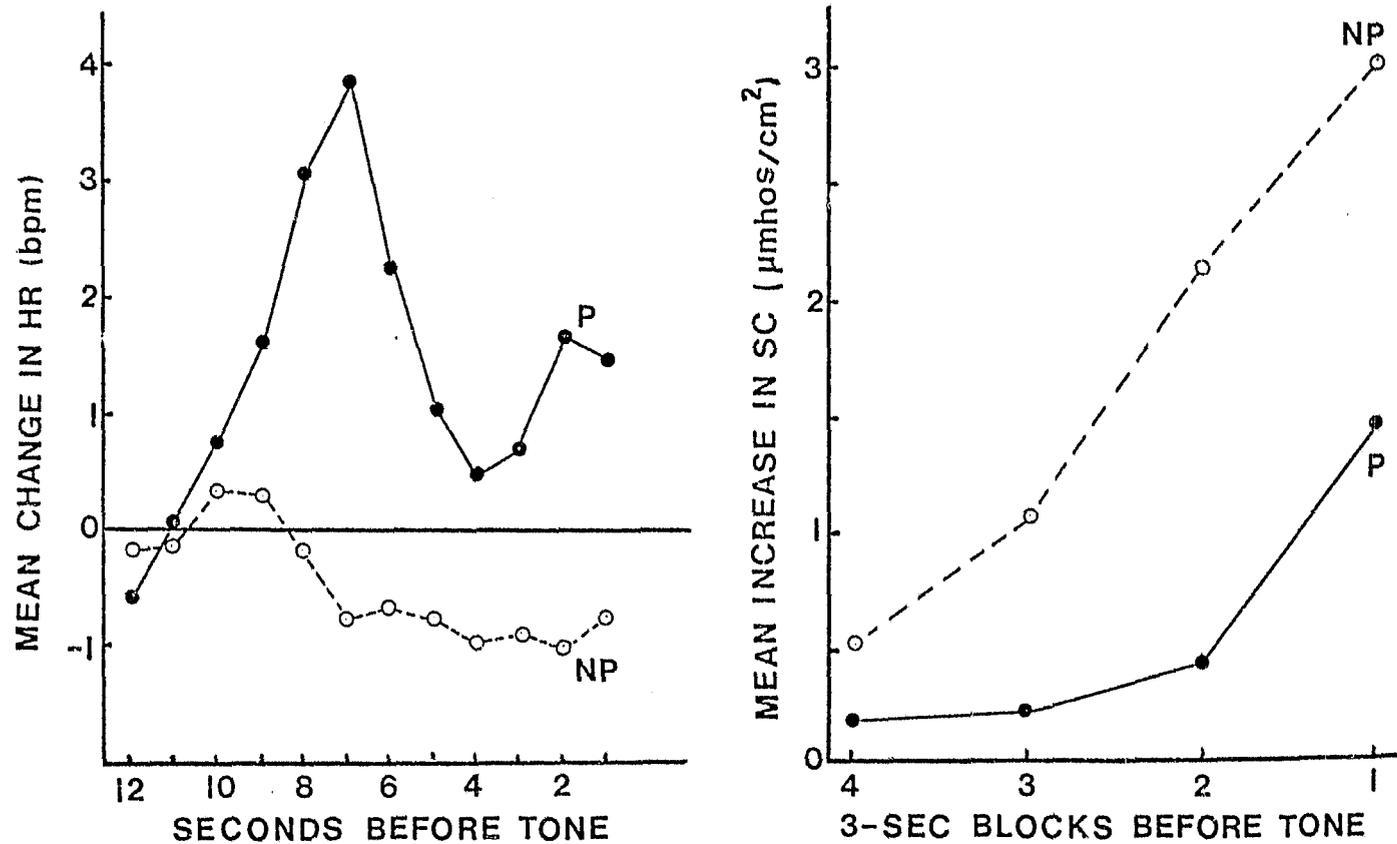
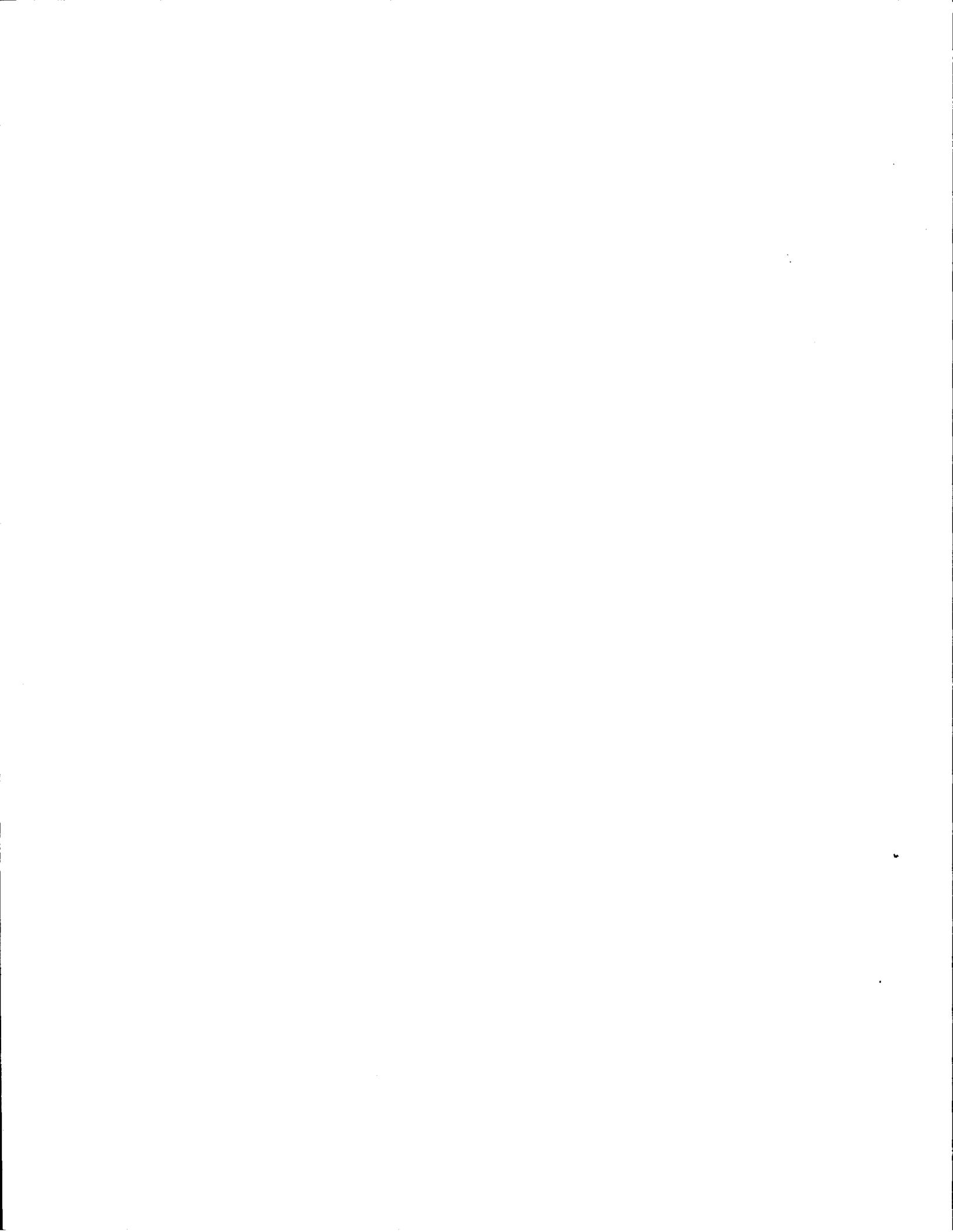


FIGURE 2
MEAN INCREASES IN LEFT PALMAR SKIN CONDUCTANCE (RIGHT
SIDE OF FIGURE) AND HEART RATE (LEFT SIDE OF FIGURE)
FOR THE MOST PSYCHOPATHIC (P) AND LEAST PSYCHOPATHIC (NP) INMATES
DURING THE 12 SECOND INTERVAL
PRECEDING PRESENTATION OF A 120dB TONE. (MODIFIED FROM HARE, ET AL., 1978)



also upon evidence that acceleration is part of a defensive response serving to reduce sensitivity to environmental stimulation (Graham and Clifton, 1966; Sokolov, 1963). Cardiac responses may influence or at least reflect the way in which aversive sensory input is modulated; Hare and Blevings (1975) have suggested that this may be particularly important when such responses are anticipatory in nature. According to this model, anticipatory heart rate acceleration is part of an adaptive response which helps the individual to cope with, "tune-out", or reduce the impact of the premonitory cues and the impending aversive stimulus. With respect to psychopaths their pattern of heart rate acceleration and small increases in electrodermal activity is hypothesized to reflect the operation of an active, efficient coping process, and the inhibition of fear arousal. As a result, situations that have great emotional impact for most people would be of little consequence to the psychopath, because he is better able to attenuate aversive inputs and to inhibit anticipatory fear. As indicated elsewhere (Hare, 1978a), however, this very efficient coping process would be adaptive only when the psychopath could not make use of the premonitory cues and anticipatory fear to facilitate avoidance behavior. To a certain extent, this may help to account for the psychopath's difficulty in avoiding punishment. That is, the cues that would help him to do so are "tuned-out" and the mediating effects of anticipatory fear are reduced.

Biological Variables and Criminal Behavior

Most of the discussion in the preceding sections has been concerned with the question of whether or not there are meaningful biological (especially autonomic) differences between criminals who are psychopaths and those who are not. We can also ask, however, whether or not there is any relationship between these biological variables and criminal behavior, including the type and frequency of crimes committed, performance on parole, etc. In an attempt to answer this question we are analyzing data from several psychophysiological studies conducted over the past 10 years or so. The findings are far from complete, but several preliminary trends are of interest. For example, in a group of 58 psychopathic and nonpsychopathic inmates for whom data were available, there was a correlation of .24 ($p < .10$) between the mean number of criminal convictions per year free and electrodermal recovery time in the left hand following presentation of a noxious stimulus; that is, slow recovery tended to be associated with frequent convictions. Since the index of criminality used in this analysis was rather crude, we looked for possible associations between electrodermal recovery time and convictions for various types of crime. Nine inmates with recovery times at least one S.D. above the mean (for all 58 inmates) were compared with 10 inmates with recovery times at least one S.D. below the group mean. The only significant association to

emerge so far was between recovery time and convictions for fraud: 7 of the 9 inmates with long recovery times, but only 1 of the 10 with short recovery times, had been convicted of fraud at least once ($p < .01$ by Fisher's exact test). That is, inmates with slow electrodermal recovery were more likely to have been convicted of fraud than were those with fast recovery. Six of the seven inmates with long recovery times and convictions of fraud were psychopaths, while only three of the nine inmates with fast recovery times and no convictions of fraud were psychopaths. Within the context of Mednick's theory relating recovery time to avoidance learning, I suppose it could be argued that successful fraud requires good avoidance learning ability, and that the long recovery times of the inmates (mostly psychopaths) who were caught and convicted of fraud is indicative of poor avoidance learning capacity for this type of endeavor. On the other hand, we could also argue that psychopaths with long electrodermal recovery times are "closed" to the type of social and environmental cues required to engage in successful fraud (see p. 119). However, these are highly speculative possibilities, and it is obvious that much more research is required. Meanwhile, our preliminary analyses suggest that relationships between biological variables and criminal history data may not be the same for groups of psychopathic subjects as they are for nonpsychopathic ones. For example, it appears that psychopaths who exhibited high cardiovascular arousal and low electrodermal arousal during one of our experiments were convicted of more crimes and did more poorly on parole than did psychopaths who exhibited different physiological response patterns. This particular physiology-criminal behavior relationship doesn't appear to occur among groups of non-psychopathic subjects. While it is still too early to draw any real conclusion from these analyses, it is becoming more and more apparent that predictions of criminal behavior variables are better when biological data and assessments of psychopathy are used in combination than when either is used alone.

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YOU DON'T NEED A WEATHERMAN!

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1. I recently (1976) attended an international meeting at which Hans Eysenck asserted that 85% of the etiological variance in criminal behavior is ascribable to genetic factors. His remarks were less than popular with the audience composed of sociologists, psychiatrists and psychologists.

2. A recent article by Hirschi maintains that intelligence is an excellent predictor of delinquency and, in addition, chastises socio-culturally-oriented criminologists for having ignored this variable.

3. Two volumes by Yochelson and Samenow report on their extensive unsystematic clinical experience which, for them, reveals the serious criminal as "virtually devoid of any redeeming human qualities" (Holden, 1978, p. 512); they do not hold socialization experience responsible for antisocial behavior. An informal national poll of leading practicing criminologists elicited surprisingly enthusiastic support for the Yochelson-Samenow statement (though some of the enthusiastic criminologists refused to have their names revealed!) (Holden, 1978). In Holden's extensive Science review of the Yochelson-Samenow book she suggests that the winds of public and professional attitudes are shifting away from (20th century) tabula rasa-socio-economic causation toward (19th century) bad seed-wickedness views of the criminal.

The influential opinions of social scientists must be anchored in solid empirical evidence to resist prevailing winds born in discontent with current practice and unreasoning public attitude shifts on the liberalism-conservatism axis. The mature social scientist disapproves of both exclusively biological and exclusively socio-cultural winds. They blow no good. (See Wolfgang (1978) for additional comments).

The current "biological" wind must be very critically evaluated and contained strictly within the bounds of whatever empirical



evidence generates it. In this paper* I intend to present some of the evidence relating biological factors to criminal behavior. I will restrict the presentation to genetic and autonomic nervous system research.

Are There Biological Characteristics of Individuals Which Predispose Them To Evidencing Antisocial Behavior?

I will argue that there are such biological characteristics and that they can improve our prediction and understanding of antisocial behavior if their interactions with socio-cultural factors are considered. Because of the complexities of research with humans, it is difficult to imagine a line of research which might convincingly and indisputably demonstrate a unique or prime causal role for a biological variable; even if such a variable correlates extremely well with criminality, the correlation might be mediated by early life circumstances of the criminal or other social factors. But on the other hand if we could convincingly demonstrate the existence of the genetic transmission of criminality, then the acceptance of a partial biological etiology for antisocial behavior would be forced upon us. I see this as perhaps the most critical implication of any positive genetic findings in the field of criminology. What is the evidence?

Heritability of Antisocial Behavior

Two valuable strategies for studying the influence of genetic factors on behavior are the twin and adoption methods. In the adoption method we study individuals adopted at birth who later become criminal or psychopathic. Since environment and genetics are thus relatively well separated we can evaluate the relative influence of these two factors by studying the criminality in the adoptee's biological and adoptive families. The twin method capitalizes on the fact that monozygotic (MZ) twins have essentially identical genetic structures while dizygotic (DZ) twins are no more similar genetically than are siblings. If criminality within pairs of MZ twins is markedly more similar (or concordant) than is criminality within pairs of DZ twins, this may not be seen as evidence against a possible genetic influence. Conclusions from twin research related to genetics are somewhat weakened, however, by assertions that MZ twins have more mutually similar environments than do DZ twins (Christiansen, 1977a). Thus the environment as well as the genetics may be more similar for MZ twins. On the other hand, environmental conditions during pregnancy, delivery, and post-natally may produce differences between MZ twins. Because of these factors the twin studies must be interpreted cautiously.

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Twin Studies. In the first twin-criminality study, Lange (1929), found 77% concordance for MZ twins and 12% concordance for DZ twins. Subsequently, studies of twins (until 1961 there were eight in all) tended to confirm Lange's results. About 60% concordance has been reported for MZ and about 30% concordance for DZ twins.

These eight twin studies suffer from the fact that their sampling was biased or even rather haphazard. They report too high a proportion of MZ twins. MZ pairs, concordant for criminality, are more likely to be noted. MZ twins prove easier to detect, especially if they end up in the same prison. All these factors tend to inflate MZ concordance in asystematic studies.

Christiansen (1977) in Copenhagen overcame these sampling problems by studying all twins born in a well-defined area of Denmark between 1881 and 1910. Of 3,586 such twin pairs he found 799 pairs with at least one of the twins registered for criminality or minor criminality. He reported a pairwise concordance rate of 36% for the MZ twins and 12.5% for the DZ. The MZ concordance is 2.8 times higher than the DZ concordance. Christiansen's study is now being extended to all twins born up until 1920 and will include all of Denmark.* This will bring the number of twins up to approximately 14,000 pairs. This number should be sufficient for a more detailed analysis than has been possible before. Despite the cautions mentioned, this study does not argue against the existence of some genetic effect in criminality.

Dalgaard and Kringlen (1977) have recently completed a study in Norway which involved a representative, but small, unselected population of twins born 1921-1930. Their MZ pairwise concordance rate for serious criminality was 25.8%; their DZ pairwise concordance rate was 14.9%. This is the smallest MZ-DZ difference recorded in the twin literature but the results are in the same direction as all the other work.

I urge the interested reader to study Christiansen's detailed review of these twin studies (Christiansen, 1977b). Despite the weaknesses of the twin method, we can certainly state that the reported findings do not argue for rejection of the hypothesis assigning a partial etiological role to genetic factors.

The Adoption Studies. A weakness of the twin method for drawing conclusions relating to genetics is the fact that in the overwhelming number of cases the twins are raised together. Thus genetic and

*Unfortunately, Karl O. Christiansen died before this work was completed. It is being carried on by Mednick, Gottesman and Hutchings.

environmental factors are not well separated. A design which does a better job in this regard studies individuals adopted at birth. Fortunately, a register of all non-familial adoptions in Denmark in the years 1924-1947 has been established (Kety, et al., 1968; 1974). While this adoption file was established with the support of contracts between the Psykologisk Institut and the USPHS for the purpose of studying schizophrenia, it is also useful for the study of criminality. The design of the present study follows that of the previous work. We wish to gratefully acknowledge permission to use this file. There are 14,300 adoptions recorded including information on the adoptee and his biological and adoptive parents.

I will report two investigations completed on this material studying adoptees born in Copenhagen. I will also describe a U. S. study by Crowe. From 5,483 Copenhagen adoptees, Schulsinger (1972) identified 57 psychopaths from the psychiatric registers and police files. His definition of psychopathy was reliable and specified. Schulsinger also selected 57 non-psychopathic control adoptees matched for sex, age, social class, neighborhood of rearing, and age of transfer to the adoptive family. The main findings are presented in Table 1. Despite the small sample, it is clear that the heaviest weight of psychopathy in the relatives comes in the cell concerning the biological relatives of the psychopathic adoptees. Since the postnatal contact between the adoptee and the relative was in most cases non-existent or at most minimal, environmental factors probably did not play a very important role in this relationship. The existence of some heritable factor seems the most reasonable interpretation.

Using part of the same adoptee material, Hutchings and Mednick (1974) conducted a pilot study on the registered criminality of a sample of 1,145 male adoptees born in Copenhagen between 1927 and 1941. Of these 1,145 male adoptees, 185 or 16.2% had been convicted of a violation of the Danish Penal Code. Of these 185 criminals we were able to identify 143 for each of whom we were certain of the biological father's identity and where the fathers had been born after 1890 (since better police records were kept after 1890). To each of these 143 criminal adoptees we matched a non-criminal adoptive son for age of child and social class of adoptive father. For the criminal and non-criminal groups the age of parents and age of child at adoption were examined; interestingly enough, they proved to be about the same, suggesting that these variables were not related to the child's later criminality. The amount of contact between the adoptee and the biological father was, in almost all cases none at all. Table 2A indicates that the weight of the registered criminality in the fathers is in the cell of the biological fathers of the criminal adoptees. Again, we have evidence that genetic factors play some partial role in the etiology of registered criminality.

TABLE 1
 PSYCHOPATHY IN RELATIVES OF PSYCHOPATHIC ADOPTEES
 AND CONTROL ADOPTEES

A. Psychopathy in Relatives			
	BIOLOGICAL RELATIVES		ADOPTIVE RELATIVES
Psychopathic Adoptees	$\frac{12}{305} = 3.9\%$		$\frac{1}{131} = 0.8\%$
Control Adoptees	$\frac{4}{285} = 1.4\%$		$\frac{2}{133} = 1.5\%$
B. Psychopathy in Parents			
	BIOLOGICAL PARENTS		ADOPTIVE PARENTS
Psychopathic Adoptees	$\frac{5}{111} = 4.5\%$		$\frac{1}{111} = 0.9\%$
Control Adoptees	$\frac{1}{113} = 0.9\%$		$\frac{0}{114} = 0\%$
C. Psychopathy in Fathers			
	BIOLOGICAL FATHERS		ADOPTIVE FATHERS
Psychopathic Adoptees	$\frac{5}{54} = 9.3\%$		$\frac{1}{54} = 1.9\%$
Control Adoptees	$\frac{1}{56} = 1.8\%$		$\frac{0}{57} = 0\%$

TABLE 2

REGISTERED CRIMINALITY IN BIOLOGICAL AND ADOPTIVE
RELATIVES OF CRIMINAL ADOPTEES

A.		BIOLOGICAL FATHER		ADOPTEE FATHER
	Criminal Adoptive Sons (N = 143)	70		33
B.	"Cross fostering" analysis: Table values are percent of adoptive sons who are registered criminals.			
		IS BIOLOGICAL FATHER CRIMINAL?		
		YES		NO
Is Adoptive Father Criminal?	YES	$\frac{21}{58} = 36.2\%$		$\frac{6}{52} = 11.5\%$
	NO	$\frac{46}{214} = 21.4\%$		$\frac{35}{333} = 10.5\%$

Table 2B presents this information in a different form, analogous to the cross-fostering paradigm. As can be seen in the lower right-hand cell, if neither the biological nor the adoptive father is criminal, 10.5% of their sons are criminal. If the biological father is not criminal but the adoptive father is criminal, this figure rises to only 11.5%. But, as illustrated in the lower left corner of Table 2B, if the biological father is criminal and the adoptive father is not criminal, 21.4% of the sons are criminal. This percentage misses being statistically significant (.05 level) from the 11.5% figure but it is highly significantly different from the 10.5%. Thus the comparison analogous to a cross-fostering comparison does not yield confirmation that the "genetics-only" cell is reliably superior to the "environment-only" cell.* But the genetic influence is highly significant and the direction and extent of the difference are clear. It seems to suggest that a partial genetic-etiology assumption may be not totally inaccurate. Note that in this table, the influence of the adoptive father's criminality is only statistically significant (36.2% versus 21.4%) in those sons with biological criminal fathers.

We must caution that simply knowing that the adoptive father has been a criminal does not tell us how criminogenic the adoptee's environment has been. On the other hand, just a second after conception the genetic influence of the father is already complete. Thus, as we have arranged the cross-fostering table, it is not a fair comparison between environmental and genetic influences.

A third adoptee project has been completed by Crowe (1975) in Iowa. This investigation found 41 female inmates of a reformatory who had given up their children for adoption. He selected controls from a state adoptions register and matched them to the experimental group for age, sex, race, and age of adoption. Eight of the index cases and two of the controls had arrest records. The index cases had 18 records of arrest, the controls two arrests. Seven of the index cases had been convicted, only one of the controls. Crowe further notes an apparent similarity in the types of crimes of the biological mother and the index cases. This suggests the possibility of some form of specificity of genetic effect. At present, Hutchings and Mednick are extending the adoptee-criminality study to encompass the entire 14,300 adoptees and their adoptive and biological parents. From study of these individuals and Christiansen's 14,000 twin pairs, it should be possible to test a more precise question regarding the genetic specificity of type of crime.

*Since this paper was written we have extended our sample and made a preliminary analysis of 7,000 adoptions. The results are similar to those reported in Table 2B; the "genetics-only" cell is now significantly greater than the "environment-only" cell.

Problems With Adoptee Method. These adoptee studies have a rather strong face validity. This probably is due to their apparent separation of genetic and environmental influences. If anything were to be found which acted to increase the correlation between the genetic and environmental forces, this would serve to temper the strength of impact of the findings. As a matter of fact, Hutchings (1972) has pointed out the fact that the adoptive agency in Denmark had, at this time, a policy of attempting to match the biological and adoptive families for vaguely defined social characteristics. That they partially succeeded is attested to by the significant correlation of the occupation status of the biological and adoptive fathers ($r = .22$, $p < 0.001$). If this matching were related to the criminality observed in this study then we would expect a relatively large number of adoptees with both biological and adoptive fathers criminal. By chance we would expect 55 such cases; we observed 58. In the case of this study, any matching which was attempted did not express itself significantly in a correlation for registration for criminality in the fathers.

Another factor to be considered in interpreting the strength of the genetic influence is the fact that the study took place in Denmark. The laboratory experimenter in behavior genetics reduces the variance ascribable to environmental influence when he wishes to explore the effects of genetic differences. As environmental variance increases, the genetic difference effects become more and more masked. While operating in a narrower range than is available to the laboratory researcher, the extent of variability of a natural, human research environment (in our case, Denmark) will also influence the extent to which existent genetic factors will be observed. We would suggest that, because of its socioeconomic structure (i.e., the lack of great social class differences), the amount of variability in Denmark for most crime-related environmental dimensions will be less than that of many other countries. It follows that extrapolation of our Danish findings to other national situations must be conducted with very great caution.

The evidence of these twin and adoptee studies lends some credence to a hypothesis partially involving genetically influenced factors in the etiology of antisocial behavior. As suggested above, this implies rather forcefully that biological factors are, to some extent, involved in the etiology of antisocial behavior. There is no suggestion in these findings that biological factors predestine criminality in some inevitable, fateful manner. Rather, they suggest there must be some biosocial interaction at work. In the following, I will relate a story which might help illustrate how this interaction can be expressed in a modest, miniature theory.

BIOSOCIAL BASES OF CRIMINAL BEHAVIOR: AN ILLUSTRATIVE, MINIATURE INTERACTION THEORY

Hare (1970) and Trasler (1972) have discussed the possibility that the criminal has some defect in avoidance learning which interferes with his ability to learn to inhibit antisocial responses. Their hypotheses sprang from the 1957 study by Lykken indicating the difficulties psychopaths have in learning to avoid an electric shock. Hare has suggested that the empirically observed and reobserved autonomic hyporeactivity of the psychopath and criminal may be, partially, the basis of this poor avoidance learning.

In order to clarify the possible importance of defective avoidance learning in antisocial individuals, we must consider the avoidance learning situation. In particular, let us follow Trasler (1972) and consider how the law-abiding citizen might learn self-control. (When one considers the modern urban center in terms of the temptations and, in fact, incitements it offers to a variety of forms of antisocial behavior, it is noteworthy that 80-90% of the population manages to avoid committing repetitive or heinous crimes.)

Let us consider in particular how children might learn to inhibit aggressive impulses. Frequently when child A is aggressive to child B, child A is punished by his peers or parents. After a sufficient quantity or quality of punishment, just the thought of the aggression should be enough to produce some anticipatory fear in child A. If this fear response is large enough, the aggressive response will be successfully inhibited.

Whether or not this child is rewarded after he has successfully inhibited such an antisocial response may be critical for his learning of civilized behavior. Let us consider the situation again in detail.

1. Child A contemplates aggressive action.
2. Because of previous punishment he suffers fear.
3. He inhibits the aggressive response.

What happens to his fear?

4. It will begin to dissipate, to be reduced.

We know that fear-reduction is the most powerful, naturally-occurring reinforcement which psychologists have discovered. So the reduction of fear (which immediately follows the inhibition of the aggression) can act as a reward or reinforcement for this inhibition and (if repeated) will result in the learning of the inhibition of aggression. The fear-reduction-reinforcement increases the probability that the inhibition of the aggression will occur in the future. Each time such an aggressive impulse arises and is inhibited, the inhibition

will be strengthened by reinforcement. Thus, in order to learn to inhibit aggression, a child requires:

1. Censuring agents (typically social forces, peers and family)
AND
2. An adequate fear response AND
3. The ability to learn the fear response in anticipation of an antisocial act AND
4. Fast dissipation of fear to quickly reinforce the inhibitory response.

With respect to point 4, the speed and size of reinforcement determines its effectiveness. An effective reinforcement is one which is delivered immediately after the relevant response. In this situation, the faster the reduction of fear, the faster the delivery of the reinforcement. The fear response is, to a large extent, controlled by the autonomic nervous system (ANS). We can estimate the activity of the ANS by means of peripheral indicants, such as heart rate, blood pressure, and skin conductance. The measure of most relevance will be the one which reflects the rate of speed at which the ANS recovers from periods of imbalance.

If child A has an ANS that characteristically recovers very quickly from fear, then, according to our model, he will receive a quick and large reinforcement and learn inhibition quickly. If he has an ANS that recovers very slowly, he will receive a slow, small reinforcement and learn to inhibit the aggression very slowly, if at all. This orientation would predict that (holding constant critical extra-individual variables such as social status, crime training, poverty level, etc.) those who commit antisocial acts will be characterized by slow autonomic recovery. The slower the recovery, the more serious and repetitive the antisocial behavior predicted.

TESTS OF THE INTERACTION THEORY

This miniature theory was first tested in a longitudinal study of a group of 311 individuals we have followed for 16 years. A number recently evidenced serious disagreements with the law; we checked and noted that their ANS recovery (skin conductance), measured in 1962, was considerably slower than that of their law-abiding fellow subjects (Loeb and Mednick, 1977). Since that initial study, there have been a series of replication attempts in a number of nations, using a variety of techniques and research situations; these studies have all found antisocial individuals to evidence slower ANS recovery than law-abiding individuals. Further, the more antisocial the behavior, the slower the ANS recovery. (see review by Siddie, 1977.) A compelling study by Wadsworth (1976) traced all the males registered for delinquency from a sample of the 13,687 births which

occured in England, Wales and Scotland between March 3 and 9 in 1946 (Douglas, et al., 1958). An autonomic variable (smaller-than-normal pulse rate in response to mild stress) predicted whether or not a boy would be a serious delinquent by age 21. These results have since been replicated (Wadsworth, personal communication) and are highlighted here in view of the representativeness of the population. The Wadsworth results reflect on the aspect of the theory which requires an "adequate fear response." (See also paper in this volume by Hare).

Heritability of ANS Recovery Rate. In view of the relationship between ANS variables and antisocial behavior and in view of our interest in better understanding the apparent genetic predisposition to antisocial behavior, we next turned to a study of the possible heritability of ANS behavior (Bell et al., 1977). Male 12-year old twin pairs were studied. Interestingly enough, among the physiological measures only ANS recovery proved to have significant heritability ($H = .89$). (H was estimated by $(V_{DZ} - V_{MZ})/V_{DZ}$). This finding suggested that part of the heritability of antisocial behavior might be related to the heritability of ANS recovery. Thus, ANS slow recovery might be a characteristic a criminal parent could pass to a biological son which (in combination with the proper environmental circumstances) could increase the probability of the child's failing to learn adequately to inhibit antisocial responses. Thus we would predict that criminal parents would have children with slow recovery.

Table 3 presents data on the electrodermal behavior of children with criminal and non-criminal fathers. As can be seen, results are consistent with the prediction regarding ANS recovery. It is interesting that the pattern of responsiveness of these children closely resembles that which we might anticipate seeing in their criminal fathers.

Interaction of Family Milieu and ANS Factors. The next step which attracted our attention was direct study of the interaction of the social censoring factor and an individual's ANS functioning in determining the probability of his evidencing criminal behavior (Mednick et al., 1977). For purposes of this study we make the assumption that training for law abidance was greater in a family with no record of criminality than it would be in a family in which the father (and in some cases the mother also) had been convicted and jailed for a criminal offense. We knew that in families with criminal fathers present in the home (in Denmark) the probability of criminality in the sons was increased substantially. In such families we were especially interested in knowing what personal

TABLE 3

SKIN CONDUCTANCE BEHAVIOR DURING ORIENTING RESPONSE TESTING IN CHILDREN WITH
CRIMINAL AND NON-CRIMINAL FATHERS

SKIN CONDUCTANCE FUNCTION (Right Hand)	MEAN SCORE NON-CRIMINAL FATHER	MEAN SCORE CRIMINAL FATHER	F	df	p
Basal Level Skin Conductance	2.51	2.33	.09	1,193	n.s
Amplitude (in micromhos)	.031	.016	.03	1,193	n.s
Number of Responses	2.79	1.55	8.51	1,187	< .01
Response Onset Latency (in seconds)	2.11	2.18	.07	1,97	n.s
Latency to Response Peak (in seconds)	2.05	2.38	5.32	1,95	< .05
Average Half Recovery Time (in seconds)	3.75	5.43	4.26	1,90	< .05
Minimum Half Recovery Time (in seconds)	2.26	4.33	8.80	1,90	< .01

Note: During Orienting Response Testing, the child was presented 14 times with a tone of 1000 cps.

characteristics of the son protect him from the criminogenic influences. We also knew that if the father was not a criminal, the probability of criminality in the son was considerably reduced. In such a non-criminogenic environment, what personal characteristics of the son might help lead him into crime?

Design of Study. We determined to comb a well-defined population to identify those criminal and non-criminal sons who had been reared in a criminal or non-criminal family (i.e., a 2 x 2 factorial design). We ascertained and registered a population of 1944 consecutive male deliveries at a large Copenhagen hospital from January 1st, 1936 to September 30th, 1938. Among these were 544 in which the father could not be identified sufficiently to permit reliable search in the registers. These 544 were dropped from consideration.

The flow diagram describing the process of subject selection may be seen in Figure 1. Individuals with minor offenses were dropped from the study. If the mother was registered for any crime, the family was excluded from the groups with non-criminal fathers. For practical reasons we only included sons who were currently living in the greater Copenhagen area.

Contact and Selection of Subjects. A psychiatrist visted the sons and requested their cooperation in the study. A total of seven refused to participate. Four groups resulted from the selection process:

1. Criminal father - Criminal son.
2. Criminal father - Non-criminal son.
3. Non-criminal father - Criminal son.
4. Non-criminal father - Non-criminal son.

Assessment Program. The subjects experienced the following test battery:

- Psychophysiological assessment
- Psychiatric interview
- Perceptual testing
- Psychological testing

These data have not been fully analyzed, but we can report some preliminary trends in the data relevant to the special interests we expressed above.

Criminal Father - Non-Criminal Son. The question we raised here was what protected the son from criminality despite the criminogenic milieu? This group had a mean IQ of 113, significantly higher than the other groups' IQs, which were 104.9, 104.6, and 99.8. In

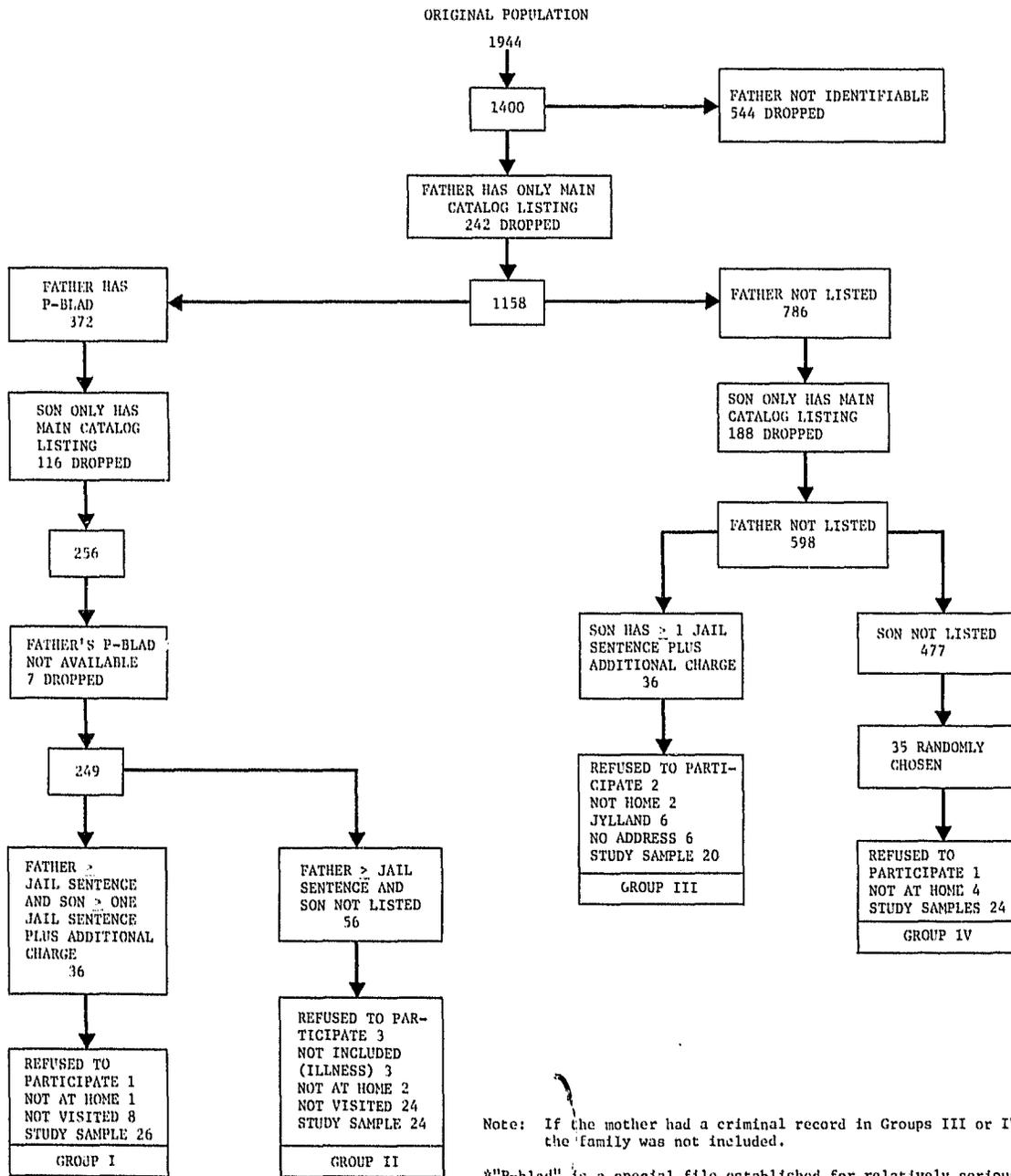


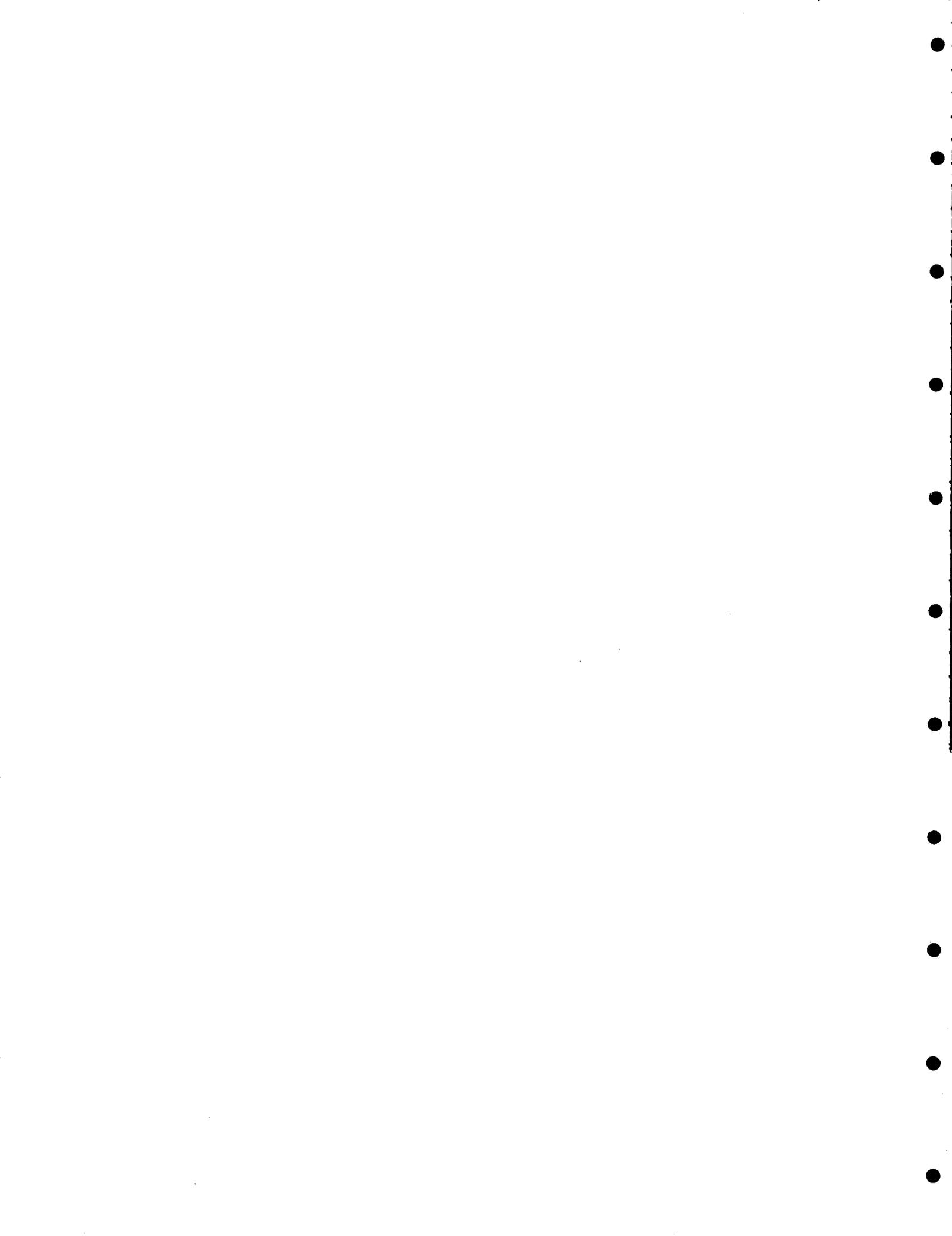
FIGURE 1
SUBJECT SELECTION ORIGINAL POPULATION

addition, they evidenced the fastest ANS recovery of the four groups. These results may be interpreted as suggesting that these sons, raised in a criminogenic milieu, resisted criminality because they are intellectually gifted, perhaps were reinforced by their school experiences, and have a good ANS aptitude for learning to inhibit antisocial responses.

Non-Criminal Father - Criminal Son. For this group we asked the question: "What personal factors push this individual to criminality despite the non-criminogenic nature of the family?" Among the limited number of variables investigated, one is outstanding. The son from the non-criminal milieu who becomes criminal evidences the slowest ANS recovery of the four groups. In terms of the theory presented above, such a finding is expected.

These findings suggest that where the environmental push toward antisocial behavior is apparently minimal, the physiological variables most clearly express themselves. Christiansen (1977b) also points to this type of balance in the results of his twin study. For example, he found that in rural areas (where the environmental push to antisocial behavior is relatively small) the rate of MZ concordance (i.e., the expressed genetic effect) was greater than in urban areas. In the lower social classes, Christiansen found the extent of expression of genetic effect to be less than in the middle classes. In the case of social class, socioeconomic factors apparently play a relatively dominant etiological role in the lower classes; perhaps in the middle classes the socioeconomic criminogenic factors are less compelling and the genetic factors assume greater relative importance.

These ideas and data were presented to this conference to inform but also to advocate more attention to study of biosocial interaction in understanding the origins of antisocial behavior.



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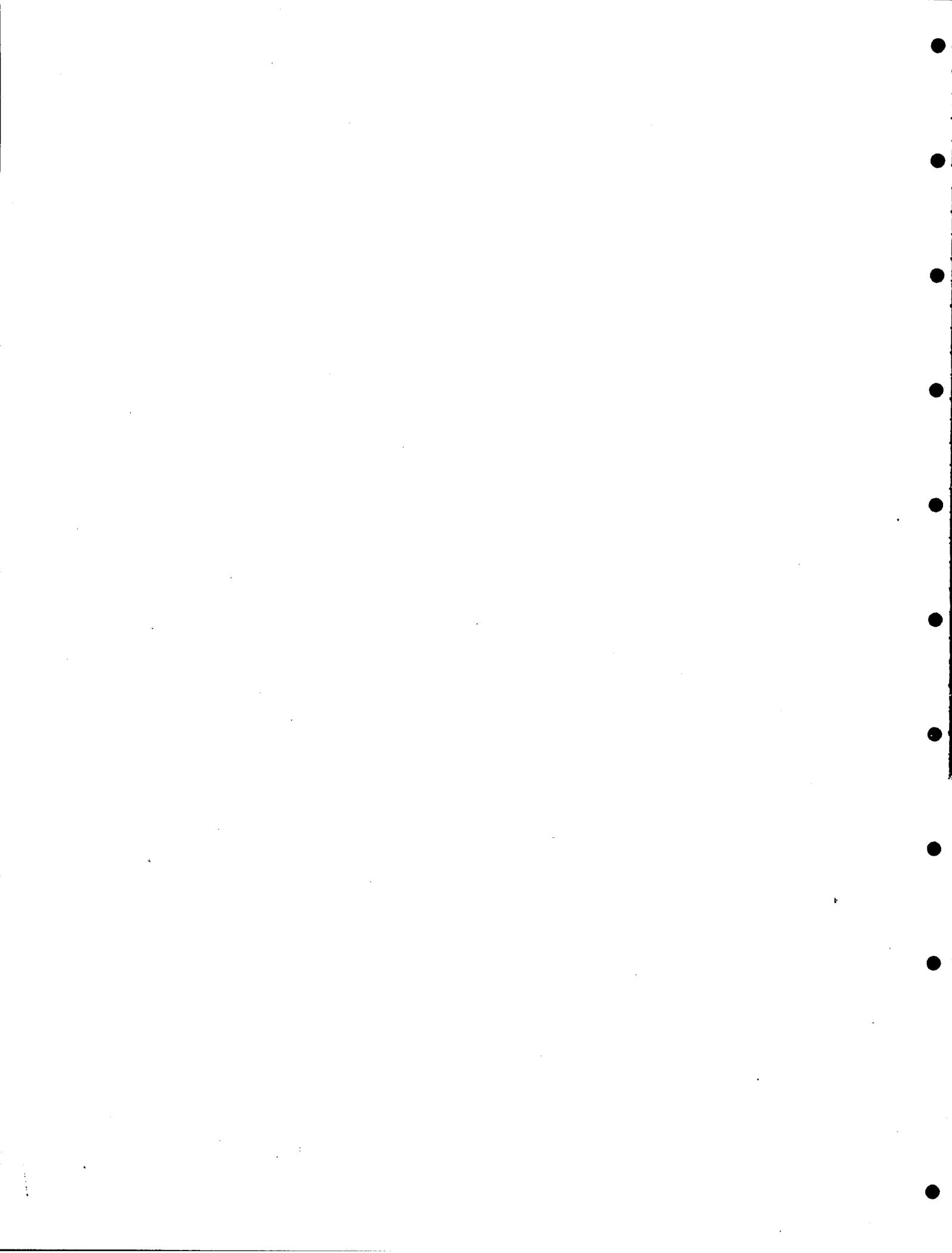
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FOOTNOTES

- ¹The work reported in this paper is supported by USPHS(NIMH) grants MH 19225, MH 24872, MH 25311 from the Center for Studies of Crime and Delinquency.
- ²Unfortunately, Karl O. Christiansen died before this work was completed. It is being carried on by Mednick, Gottesman and Hutchings.
- ³Since this paper was written we have extended our sample and made a preliminary analysis of 7,000 adoptions. The results are similar to those reported in Table 2B; the "genetics-only" cell is now significantly greater than the "environment-only" cell.



NEUROPSYCHIATRIC DIMENSIONS OF CRIMINAL BEHAVIOR*

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INTRODUCTION

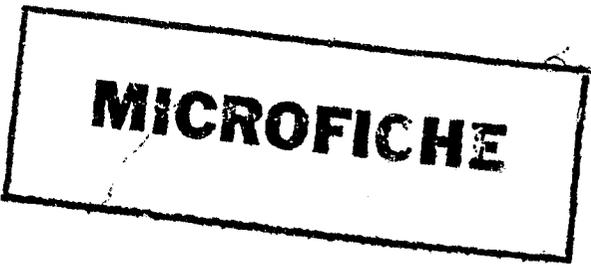
Recent analysis of criminality gives clues as to the multiple factors--that is genetic, social, psychiatric and neurologic--that contribute to criminal behavior. In view of this, an important research strategy becomes a careful phenomenological analysis of the antisocial behavior in an attempt to develop subtypes of that all too inclusive category "antisocial personality." Such a strategy seems valuable in the affective disorders and to some extent in schizophrenia, the two other equally broad diagnostic labels utilized in the Diagnostic and Statistical Manual. Identifying subtypes is important if such subtypes have specific prognostic and therapeutic implications, e.g., a group that might be significantly responsive to a pharmacologic regimen versus other groups more responsive to psychotherapeutic and/or sociologic intervention.

The current study is based on the hypothesis that limbic system dysfunction, reflecting either a focal epileptoid mechanism and/or a more generalized maturational lag of the central nervous system, contributes to a specific type of impulsive aggressiveness which leads to antisocial acts. Data reported in this chapter also suggest that neurologic insult and histories of minimal brain dysfunction and/or hyperactivity significantly contribute to the identification of this syndrome. The data presented here is a summary of a more detailed analysis of our findings on 93 recidivist aggressors hospitalized at the Patuxent Institution (4).

STUDY FINDINGS

In a previous study I proposed a new diagnostic classification--the "Episodic Behavioral Disorders," defined as any precipitously appearing maladaptive behavior that interrupts the life-style and

*Research supported by NIMH (MH 21035) and Maryland Psychiatric Research Center.



life-flow of the individual, the behavior being both out of character for the individual and out of context for the situation. Pertinent for this discussion is one of the subcategories of episodic behavioral disorders, namely "Episodic Dyscontrol," defined as an interruption in life-style that is an abrupt act or short series of acts with a common intention carried through to completion and accompanied by either a relief of tension or gratification of a specific need (see Figure 1). These dyscontrol acts are motivated by intense feelings of fear and rage with either absent or distorted foresight; hence, result in destructive behavior towards self or others. In my original monograph, I indicated that these dyscontrol acts fell on a continuum between two polar extremes; at one pole the essential mechanism is a transitory limbic system seizure, while at the other pole the dyscontrol acts are determined by psychodynamic mechanisms, that is, the act represents an explosive rebellion against a severe superego in a person who is usually over-controlled or over-inhibited.

In an earlier study (3) I noted a sex reversal in the prevalence of the episodic behavioral disorders in that among children, males were more likely to demonstrate such behavior than females, while serial admissions of adults to an acute psychiatric center indicated just the reverse, that is more females than males demonstrated such behavior (2). An evaluation of the clinical histories revealed that the behavior which precipitated admission to a psychiatric hospital for adult females with dyscontrol symptoms would probably have led to incarceration in adult males.

The study summarized here was a test of this hypothesis, namely to look at the prevalence of such a syndrome in the Patuxent Institution, a unique hospital-prison where recidivist aggressors were assigned by the courts on indeterminate sentences as "defective delinquents." A defective delinquent by statute is defined "as an individual who by the demonstration of persistent aggravated anti-social or criminal activity and is found to have either such intellectual deficiency or emotional unbalance or both as to clearly demonstrate an actual danger to society so as to require such confinement and treatment when appropriate as may make it reasonably safe for society to terminate the confinement and treatment."* It was felt that such a study might also clarify possible mechanisms behind Wolfgang's cohort of repeated offenders. He noted that in his total cohort of 9,946 boys reared in a ghetto area of Philadelphia, 35% had at least one contact with the police before age 18 (7). However, 6.3% of this group were chronic offenders, that is with 5 or more offenses, and this small percentage

*The Maryland Defective Delinquent Law was repealed July 1, 1977 but this was after the data collection on this study had been completed.



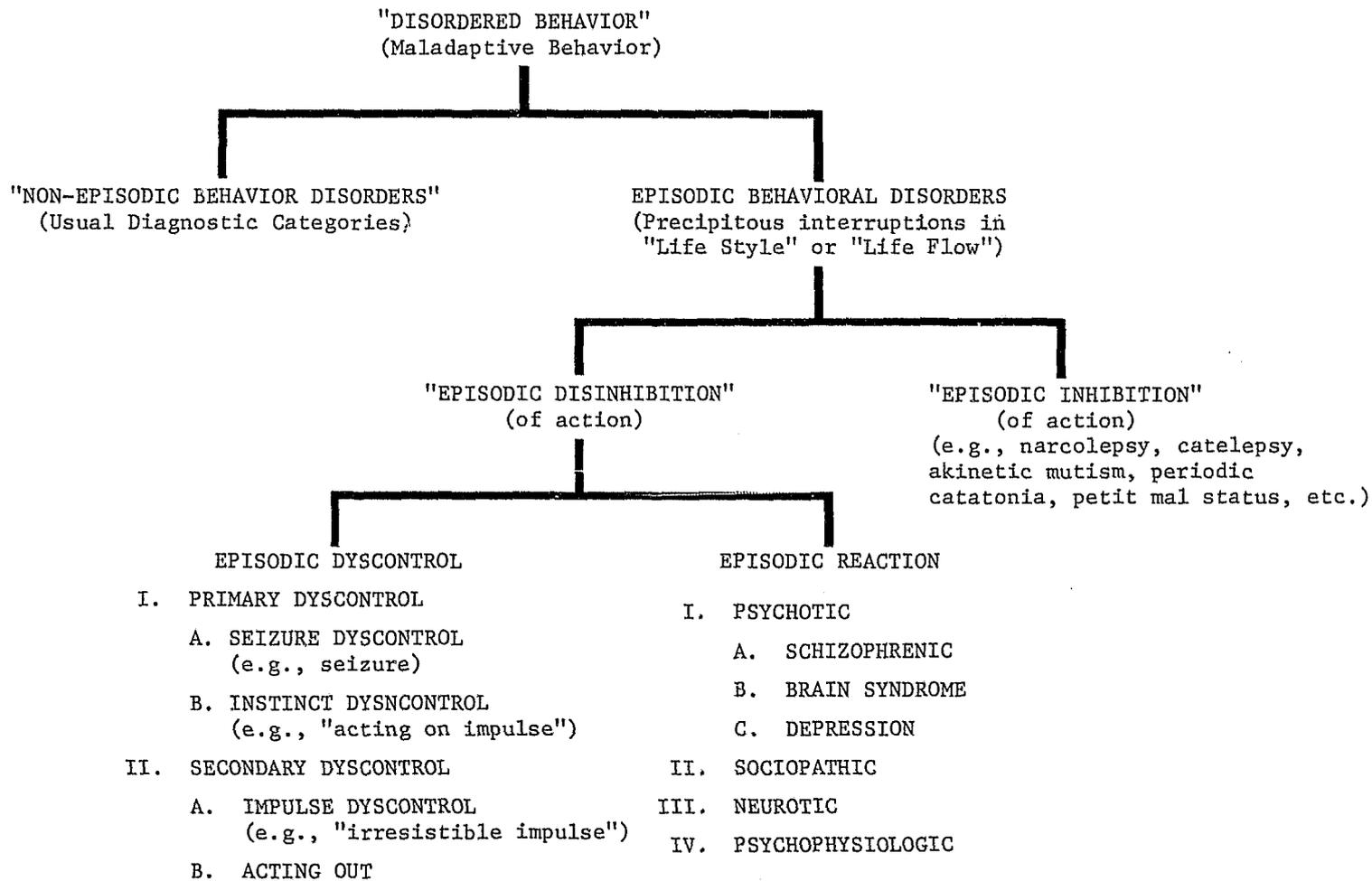


FIGURE 1
EPISODIC BEHAVIORAL DISORDERS

were responsible for 52% of the total criminal acts committed by the entire birth cohort. I suspect that a significant number of these repeated offenders are typical of those referred to Patuxent Institution as defective delinquents, and that both within Wolfgang's chronic offenders and the inmates of Patuxent Institution there would be a large number of individuals demonstrating episodic dyscontrol. Subsequent analysis of the Patuxent data confirmed this suspicion, inasmuch as 53 of the 93 individuals studied (57%) met the criteria for diagnosis of episodic dyscontrol.

Drug activated alpha chloralose electroencephalograms were used as an objective measure of the epileptoid and/or maturational instability of the central nervous system. This procedure brings out latent EEG abnormalities, such as focal or generalized spikes or typical petit mal spike slow waves as well as generalized paroxysmal delta-theta activity. Such abnormalities are elicited in 90% of epileptics as well as individuals with neurologic evidence for focal central nervous system disorder. This technique also elicits abnormal patterns in a high percentage of psychiatric patients who give a history of dyscontrol behavior. It induces abnormal EES' patterns in only 15% of individuals who have no history of epilepsy, neurologic disease, or behavioral abnormalities. Its value then is to decrease significantly the "false negative" EEGs while not increasing excessively the "false positives" (3).

A systematic scoring of dyscontrol behavior was devised by Plutchik (6) on the basis of the monograph on the episodic behavioral disorders (3). This dyscontrol scale showed mean scores higher than 20 in epileptics, violent self-referred patients, male and female prisoners. The 18 item self-rating scale was graded on the basis of never (0), rarely (1), sometimes (2), often (3), and included the following statements:

1. I have acted on a whim or impulse.
2. I have had sudden changes in my moods.
3. I have had the experience of feeling confused even in a familiar place.
4. I do not feel totally responsible for what I do.
5. I have lost control of myself even though I did not want to.
6. I have been surprised by my actions.

7. I have lost control of myself and hurt other people.
8. My speech has been slurred.
9. I have had "blackouts".
10. I have become wild and uncontrollable after one or two drinks.
11. I have become so angry that I smashed things.
12. I have frightened other people with my temper.
13. I have "come to" without knowing where I was or how I got there.
14. I have had indescribable frightening feelings.
15. I have been so tense I would like to scream.
16. I have had the impulse to kill myself.
17. I have been angry enough to kill somebody.
18. I have physically attacked and hurt another person.

Utilizing these two dimensions, that is the activated delta-theta activity on the electroencephalogram as a measure of central nervous system instability and the self-rating scales as a measure of dyscontrol behavior, we devised a 2 x 2 matrix for classifying the 93 recidivist aggressors. Figure 2 represents this matrix listing the distinguishing characteristics for epileptoid dyscontrol and hysteroid dyscontrol as presented in the original monograph on the episodic behavioral disorders (3). In an unselected sample, group 4 would represent the total range of non-episodic pathology and also include normal individuals. With regard to group 3 no prediction was made in the original monograph as to the behavioral characteristics of this group except that it could represent those group 4 subjects who showed "false-positive" electroencephalograms.

Table 1 lists the offenses for which the subjects were currently incarcerated. The mean number of incarcerations for this population was 4.2; 40% had spent more than 5 years in other correctional facilities before their current incarceration and the average current incarceration was 5.5 years. Table 2 lists other demographic characteristics of the sample and Table 3 gives the psychiatric diagnosis for this group. In this summary neither table needs comment except that it should be noted individuals with overt psychosis or serious

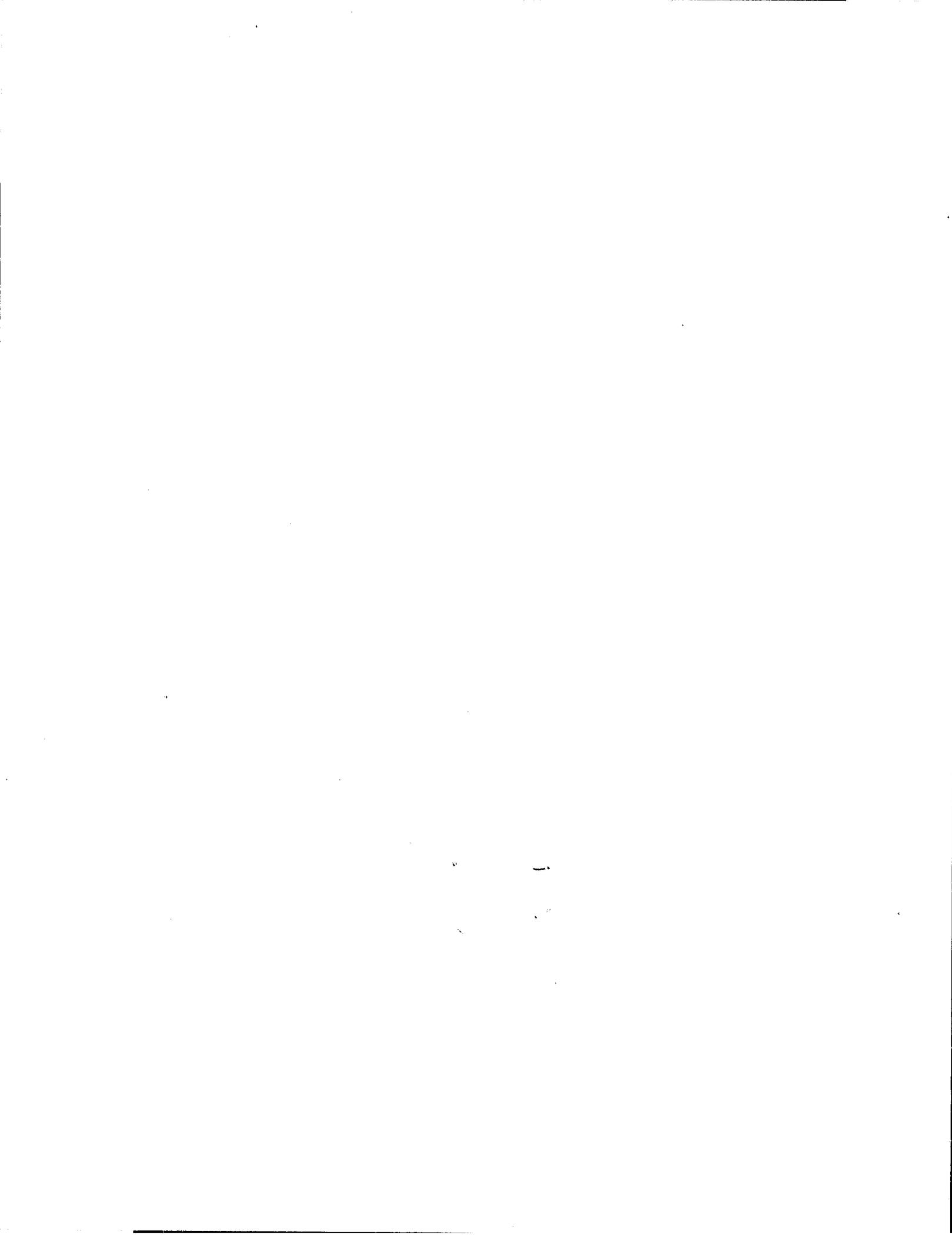


TABLE 1

CRIMINAL OFFENSES

N = 92

Murder, Assault to	6
Rape	10
Rape, Attempted	2
Rape, Assault to	1
Carnal Knowledge	1
Carnally Know, Assault to	2
Indecent Exposure	1
Perverted Practice	9
Assault on Child	1
Assault and Battery	4
Assault	3
Narcotics Law	1
Abduction	1
Robbery	5
Robbery with a deadly weapon	20
Robbery, Assault to	3
Explosives Violation	1
Arson	4
Burglary	7
Breaking and Entering	3
Housebreaking	2
Storehouse Breaking	2
Rogue and Vagabond	1
Larceny, Grand	1
Larceny, Auto (unauthorized use)	1

TABLE 2
DEMOGRAPHIC DATA

AGE:	N = 93
19-24	34.4%
25-34	45.2
35-44	16.3
45-54	4.4
SEX:	
Male	100.0%
MARITAL STATUS:	
Single	68.8%
Married	12.9
Separated	12.9
Divorced	5.4
RACE:	
White	62.4%
Black	36.6
Other	1.1
EDUCATION:	
College Grad.	1.1%
High School Grad.	3.2
10-11 yrs.	12.9
7-9 yrs.	45.2
Less than 7 yrs.	36.6
Uncoded	1.1
OCCUPATION:	
Minor Executive	2.2%
Clerk, Technician	3.3
Skilled Manual	6.5
Semi-skilled Employee	21.7
Unskilled Employee	55.4
Not Working	7.6
Uncoded	3.3
Missing	1.1

TABLE 3

DIAGNOSES OF SUBJECT POPULATION

	NO. OF SUBJECTS*
Mental Retardation	3
Epilepsy	1
Psychoses	1
Neuroses	3
Personality Disorders	
True Personality Disorders	
Paranoid Personality	1
Schizoid Personality	10
Explosive Personality	10
Antisocial Personality	44
Passive-Aggressive Personality	21
Sex Deviations	
Homosexuality	3
Pedophilia	9
Exhibitionism	1
Other Sex Deviation	4
Alcoholism	
Episodic Excessive Drinking	13
Habitual Excessive Drinking	5
Alcohol Addiction	1
Narcotic Drug Dependence	15

*-Some subjects had multiple diagnoses.

medical or neurologic disorders were not confined at the Patuxent Institution. Family, social, and economic data were collected on this population, but there was no significant difference between the subgroups with regard to these factors. The groups appeared relatively homogeneous--that is all our subjects came from extremely deprived social-economic groups with evidence for early childhood parental separation and a history of criminality, mental illness, and alcoholism in siblings and parents. Such a patient sample then would highlight psychiatric and neurologic, rather than socioeconomic variables. Figure 3 represents a scattergram of the 93 "defective delinquents" at the Patuxent Institution as they were placed in this four group matrix.

The data collected on these individuals included the following:

1. Psychiatrist--A psychiatric history and mental status examination as recorded on the current and past psychiatric scale (CAPPS) of Endicott and Spitzer (1); A CAPPS addenda which included a detailed analysis of the dyscontrol acts including prodromal symptoms, affect during the act, motor coordination, memory, and premeditation; a mood and affect scale (4).
2. Group therapist--A rating of treatment behavior by a member of the staff of Patuxent Institution (4).
3. Psychologist--A battery of psychological tests to measure CNS integration, cognitive control, and personality characteristics (4).
4. Neurologist--Neurologic history including birth data, head injury, and central nervous system insult; neurologic examination for congenital stigmata, hyperacusis, photophobia, apraxia, asymmetry of motor strength, gross coordination and proprioceptive sensation (4).

Also included in the data analysis was a global estimation by the neurologist based solely on neurologic data of a possible epileptic "suspect" and a global estimation by the psychiatrist of an epileptoid mechanism behind the dyscontrol behavior based on the phenomenological analysis of epileptoid versus hysteroid types of dyscontrol behavior as outlined in the monograph on episodic behavioral disorders (3). This phenomenological analysis is summarized in Figure 1.

Figures 4, 5, 6 and 7 show the intergroup differences on this two-dimensional analysis utilizing a one-way analysis of variance with the least significant difference criterion employed for mean group differences. Those items designated by an asterisk represent intergroup

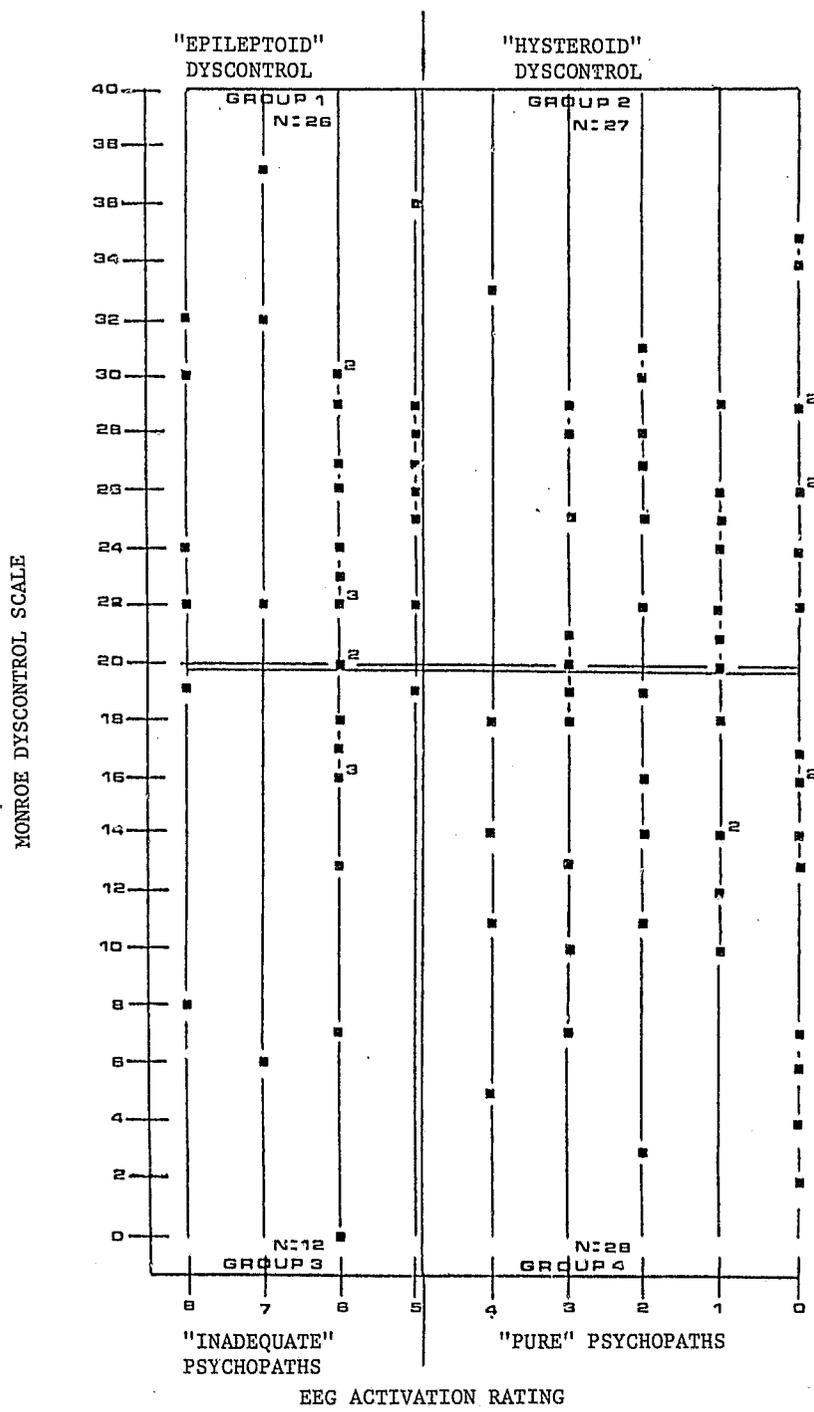


FIGURE 3
SCATTERGRAM OF THE FOUR GROUP SYSTEM

GP 1 "Epileptoid" Dyscontrol

- * High neurologic scale (gps 2,3, &4)
- * More neurologic stigmata
- * More neurologic hyperacusis (gps 2&3)
- Less passive-aggressive
- More emotional responsiveness
- More perversion
- * More guilt
- * More CNS impairment
- * Less amnesia for act
- * More prodromal motor restlessness
- * More prodromal autonomic symptoms
- * Higher infraction rating

vs. "Hysteroid"
GP2 Dyscontrol

GP 1 "Epileptoid" Dyscontrol

- High neurologic scale (gps 3,2, &4)
- More epilepsy suspect (gps 3&4)
- More repetitive dreams
- More neurologic hyperacusis (gps 3&2)
- More photophobia
- Better adaptation to stress
- More friends
- Less sensitive
- Less painful relations
- Less fluctuation of feelings
- More responsibility
- Less alcohol abuse
- Less brooding
- Less agitation
- More belligerence-negativism
- More agitation-excitement
- Younger

vs. "Inadequate"
GP3 Psychopath

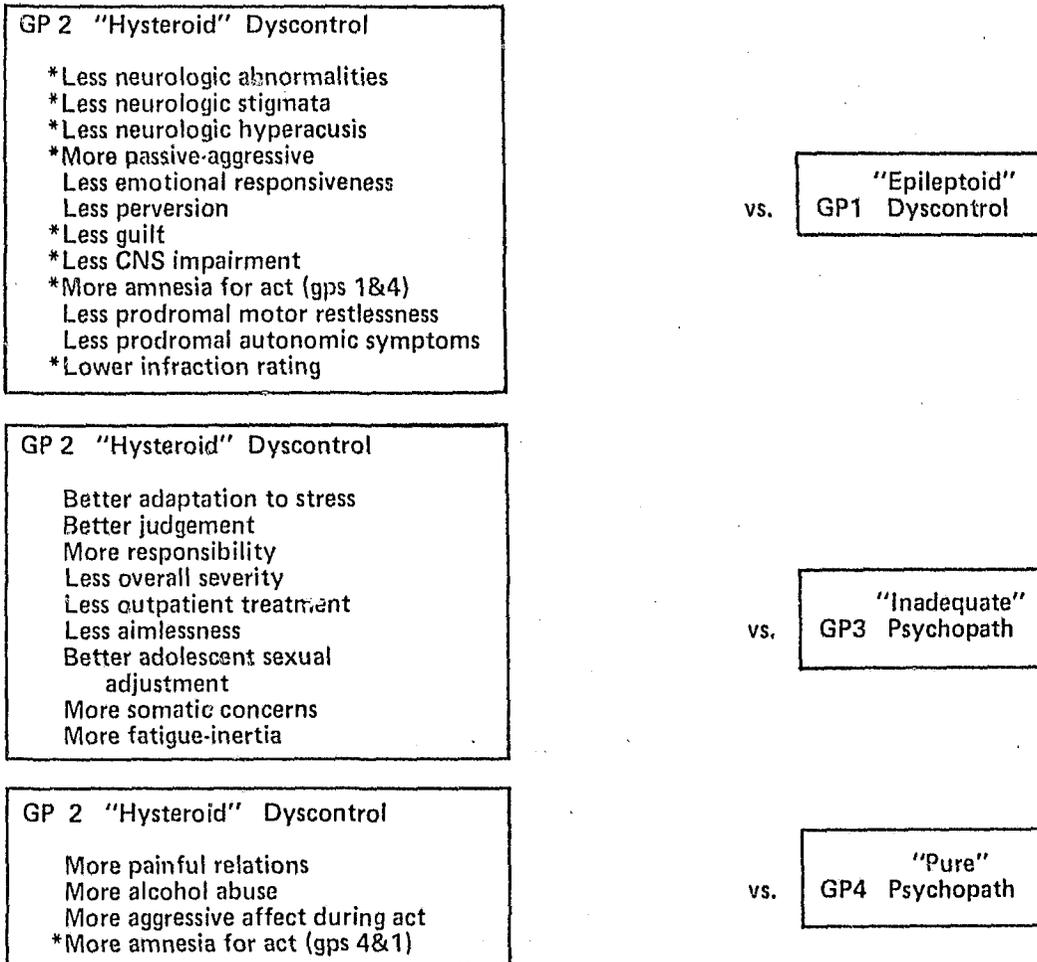
GP 1 "Epileptoid" Dyscontrol

- * Higher estimated epileptoid mechanism (psychiatrist)
- * High neurologic scale (gps 4,3, &2)
- * More epilepsy suspect (gps 4&3)
- * More photophobia
- More stubborn
- Lower completed school grade
- More insomnia
- * More aggressive affect during act
- * More fear-panic affect during act
- * More prodromal anger
- * Speech or action is more impulsive in group therapy
- * More verbal hostility to group therapist

vs. "Pure"
GP4 Psychopath

*Predicted in previous study (3). Underlined item differentiates from all other groups.

FIGURE 4
GROUP DIFFERENCES IN "EPILEPTOID" DYSCONTROL



*Predicted in previous study (3).

FIGURE 5
GROUP DIFFERENCES IN "HYSTEROID" DYSCONTROL

GP 3 "Inadequate" Psychopath

- Less epilepsy suspect
- Less repetitive dreams
- Less hyperacusis
- Less photophobia
- Less neurologic abnormalities
- Poorer adult friendship patterns
- More sensitive
- More painful relations (gps 1&4)
- More fluctuation of feelings
- More alcohol abuse (gps 1&4)
- More brooding
- More agitation
- Less belligerence-negativism
- Less agitation-excitement
- Poorer adaptation to stress (gps 1,2, &4)
- Greater lack of responsibility (gps 1,2, &4)
- Older

vs. GP1 "Epileptoid" Dyscontrol

GP3 "Inadequate" Psychopath

- Poorer judgement (gps 2&4)
- More overall severity (gps 2&4)
- More outpatient treatment (gps 2&4)
- More aimless behavior (gps 2&4)
- Poorer adolescent sexual adjustment
- Less somatic concern
- Less fatigue-inertia
- More emotional responsiveness
- Poorer adaptation to stress (gps 2,1, &4)
- Greater lack of responsibility (gps 2,1, &4)

vs. GP2 "Hysteroid" Dyscontrol

GP3 "Inadequate" Psychopath

- More stubborn
- Poorer judgement (gps 4&2)
- More emotionally distant
- More painful relations (gps 4&1)
- More grandiosity
- More overall severity (gps 4&2)
- More outpatient treatment (gps 4&2)
- More aimless (gps 4&2)
- More alcohol abuse (gps 4&1)
- More fear-panic affect during act
- More prodromal anger
- Poorer adaptation to stress (gps 4,2, &1)
- Greater lack of responsibility (gps 4, 2, & 1)

vs. GP4 "Pure" Psychopath

Underlined item differentiates from all other groups.

FIGURE 6
GROUP DIFFERENCES IN "INADEQUATE" PSYCHOPATH

GP 4 "Pure" Psychopath

- * Lower estimated epileptoid mechanism (psychiatrist)
- * Less neurologic abnormalities
- * Less epilepsy suspect
- * Less photophobia
- Less stubborn (gps 1&3)
- Higher completed school grade
- Less insomnia
- * Less aggressive affect during act (gps 1&2)
- * Less fear-panic affect during act (gps 1&3)
- * Less prodromal anger (gps 1&3)
- * Speech or action is less impulsive in group therapy
- * Less verbal hostility to group therapist

vs. GP1 "Epileptoid" Dyscontrol

GP 4 "Pure" Psychopath

- Less painful relations (gps 2&3)
- Less alcohol abuse (gps 2&3)
- * Less amnesia for act
- * Less aggressive affect during act (gps 2&1)

vs. GP2 "Hysteroid" Dyscontrol

GP 4 "Pure" Psychopath

- Less stubborn (gps 3&1)
- Better adaptation to stress
- Better judgement
- Less emotionally distant
- Less painful relations (gps 3&2)
- More responsibility
- Less grandiosity
- Less overall severity
- Less outpatient treatment
- Less aimlessness
- Less alcohol abuse (gps 3&2)
- Less fear-panic affect during act (gps 3&1)
- Less prodromal anger (gps 3&1)

vs. GP3 "Inadequate" Psychopath

*Predicted in previous study (3).

FIGURE 7
GROUP DIFFERENCES IN "PURE" PSYCHOPATH

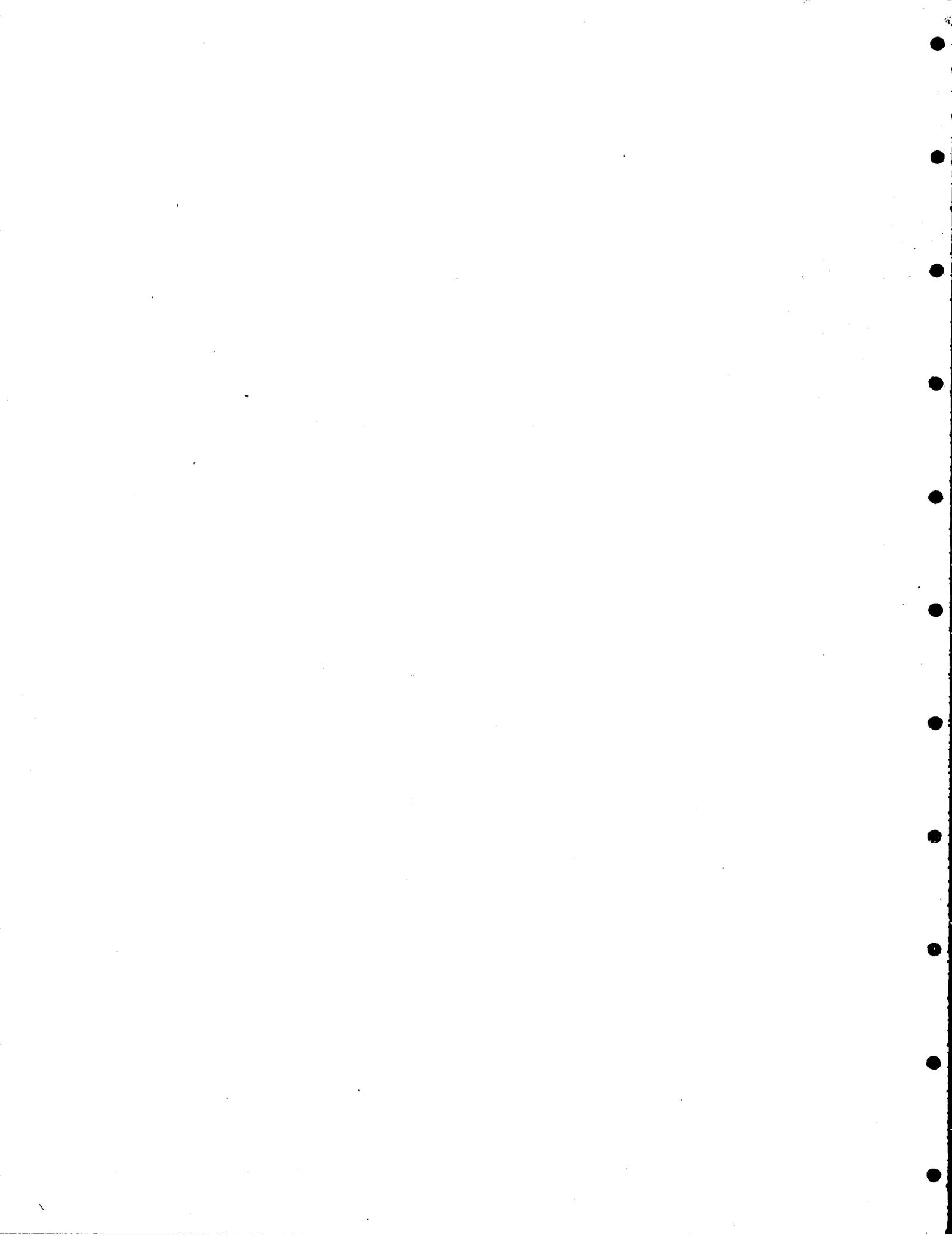


TABLE 4

SUMMARY OF 4 GROUP CHARACTERISTICS

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
Suspicion of epilepsy	+			
Neurologic dysfunction	+			
Excessive motor activity	+			
Unrealistic thinking	+			
Sexual aggression	+			
Hostility	+			
Poor academic performance	+			
Passive-aggressive		+		
Amnesia		+		
Less overt guilt		+		
Socially inept			+	
Irresponsible			+	
Poor judgement			+	
Aimless			+	
Poor interpersonal relations			+	
Alcohol abuse			+	
Better abstract thinking				+

Figure 8 shows the mean MMPI Standard Scale Profiles illustrating the parallelism of group 1 and 2 and group 3 and 4 respectively with no differences between 1 versus 2 and 3 versus 4. Thus, the MMPI Profile does not differentiate between those who show activated delta-theta and those who do not, although as reported above the psychiatric data does differentiate between these high and low activated delta-theta groups. However, comparison of the MMPI Profiles for those who show high dyscontrol symptoms (group 1 and 2) versus those who show low dyscontrol symptoms (group 3 and 4) indicates that the tetrad of Pa, Pt, Sc, and Ma are significantly higher and at or in the interpretable range for the dyscontrol group, although both the dyscontrol and the non-dyscontrol groups have very high Pd scores.

Looking at these profiles in more detail, we see that in group 1 and 2 the validity scales reflect the veracity of the individual's self report and a candid admittance to socially unacceptable feelings or behavior. The clinical picture is one of severe problems with impulse control in individuals who, as a group, should be considered extremely dangerous. These individuals lack basic sensitivity to and the ability to empathize with others. Their thinking is quite deviant. As a group they are erratic and unpredictable; quick to explode into verbal rage and/or physical violence. They show the highest level of irritability, restlessness, tension, and negativism. In interpersonal relations, they are likely to be aggressive and provocative leaving others quite uneasy and intimidated. Such individuals are capable of bizarre and heinous crimes of violence.

On the other hand, the group lacking dysncontrol symptoms (group 3 and 4) are more defensive, rigid and less comfortable regarding their impulsive problems. They would be considered immature, irresponsible, childish, demanding and egocentric, as well as emotionally unstable. Their low frustration tolerance leads them to become tense, moody and depressed. Suicide attempts, assaultiveness, aggressive outbursts towards women, and heavy drinking would be prominent in the histories of these men. They would show a poor work adjustment and a lower financial status.*

Summary

The two dimensional classification of aggressive criminals utilizing a measure of central nervous system instability and a self-rating of dyscontrol symptoms seems to have clinical relevance.

*MMPI interpretations were made by Lawrence Donner, Ph.D., Associate Professor of Psychiatry (Psychology), University of Maryland School of Medicine, Baltimore, Maryland 21201.

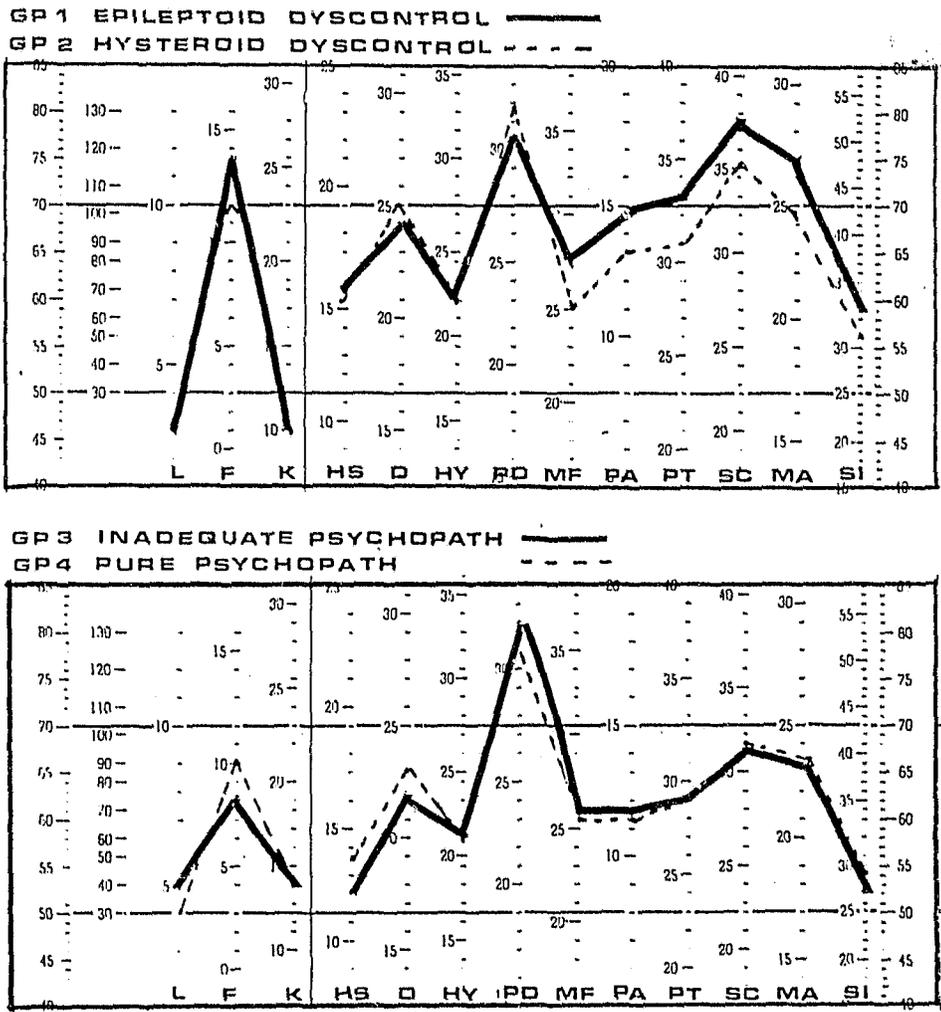


FIGURE 8
 MEAN MMPI PROFILE SCALES FOR THE FOUR GROUP SYSTEM

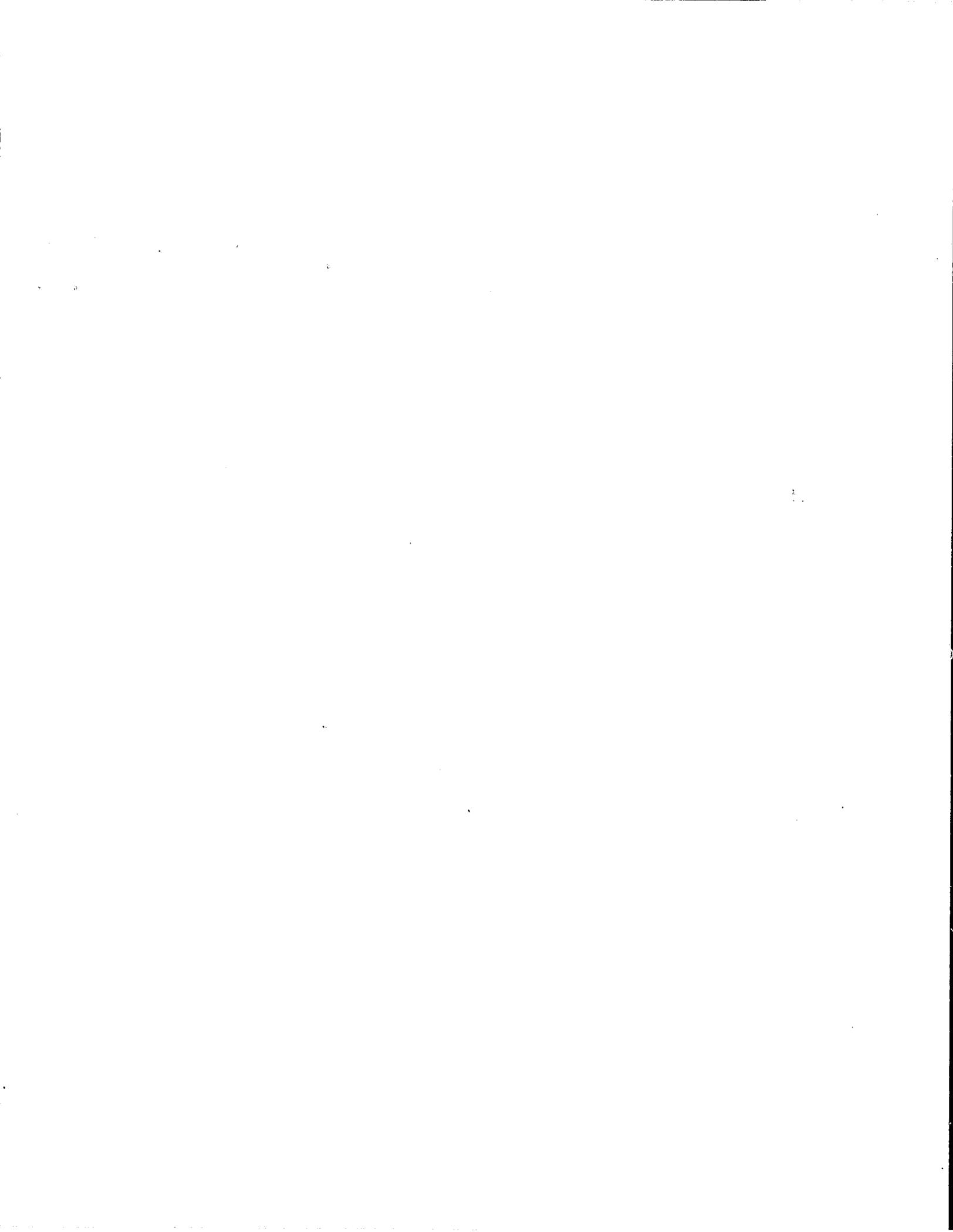
The heuristic value of such a classification depends on the effectiveness of different therapeutic regimens for the four subgroups. For example, group 1 the "epileptoid" dyscontrol group would be expected to respond to anticonvulsant medication if the underlying mechanism is, as hypothesized, a focal limbic system seizure. Clinical anecdotal information supports this view. The results of a more sophisticated double-blind crossover study (4) are more complex and confounded by order effects as well as the fact that a prison environment with strict external controls in itself inhibits dyscontrol behavior. Nevertheless, there was some evidence that the anticonvulsant drug primidone (Mysoline) had positive clinical effects. Many prisoners reported that under the regimen they "thought more clearly." When asked to elaborate, they said that they could reason better by anticipating the future consequences of current behavior. In support of this subjective statement was the fact that the epileptoid group showed a significant improvement on the Porteus Maze Quality Score during the drug regimen when compared to their placebo performance. However, the final test of the validity of this classification in predicting drug response will depend upon studies of individuals who are on parole status.

Assignment to these four groups other than through use of the criterion variables depends upon multiple measures of behavioral performance, particularly: psychiatric history; neurologic history; neurologic examination for soft neurologic signs; behavior of the individuals in the treatment setting; and to a lesser extent psychometric examination. The last point is not surprising in view of the episodic quality of the dyscontrol syndrome. Tests for central nervous system integration and cognitive control can not be done during the dyscontrol act itself, and might well show abnormalities during these episodes that would not be apparent when measured during the inter-episode epoch. However, personality characteristics, particularly as assessed by the MMPI did reveal significant differences particularly when comparing recidivist criminals with dyscontrol symptoms and criminals without such symptoms.

Collaborators in this study included the following faculty of the Department of Psychiatry, University of Maryland School of Medicine: George U. Balis, M. D., J. David Barcik, Ph.D., Barbara Hulfish, M.D., John R. Lion, M.D., Duncan McCulloch, E.E., Matthew McDonald, Ph.D., David A. Paskewitz, Ph.D. and Jeffrey S. Rubin, B.A.

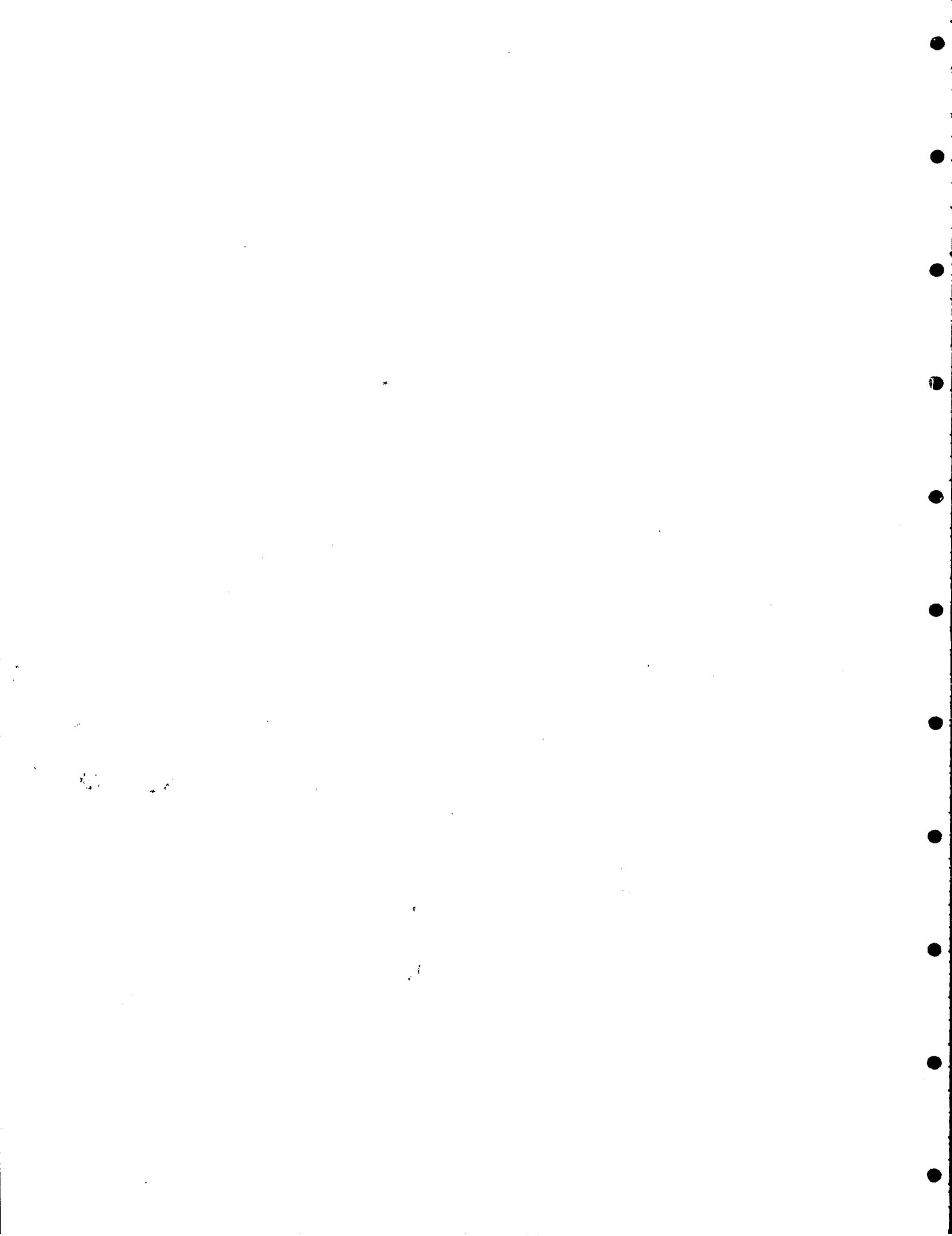
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CONTINUED

2 OF 4



PHYSIOLOGICAL DETERMINANTS OF HUMAN AGGRESSION

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INTRODUCTION

In order to understand the physiological determinants of human aggression, it is necessary to have an overview of the basic mechanisms involved. In this paper I will attempt to provide that understanding by presenting a model of aggressive behavior. I will draw on the experimental evidence from animal studies as well as the experimental and clinical evidence based on humans.

It should be pointed out first that aggression is not a unitary construct. There are a number of different kinds of aggressive behavior (Moyer, 1968). This means that it is not going to be possible to construct a single model that will fit all of them in detail. However, we can deal with the mechanisms or the kinds of mechanisms that are common to some if not most of the different kinds of aggressive behavior.

The basic premise of this model is that there are in the brains of animals and humans neural systems that when fired in the presence of a relevant target result in aggressive or destructive behavior towards that target. In the case of humans, the actual aggressive behavior may be controlled, but the individual will have the appropriate feelings of hostility. There is now abundant evidence to support that premise.

BRAIN STIMULATION AND AGGRESSION

Some of the most fundamental work in this area has been done by John Flynn at Yale. He has worked with cats and has enlarged on techniques that were developed in the early 1940s. It is possible to implant an electrode in specific areas deep in an animal's brain. The electrode can then be attached to a plug that is cemented to the skull. The plug can then be attached to a stimulation source and it is possible to stimulate the depths of the brain of an animal that is awake and free to move around. When the experiment is finished for the day, the subject can be returned to its home cage none the worse for the experience.

The cats used by Flynn were non-predatory and would not normally attack rats. Some, in fact, would live with a rat for months and not molest it. If an electrode implanted in the cat's lateral hypothalamus is electrically activated, the animal will ignore the experimenter standing there, but it will immediately attack and kill an available rat. The kill will be quite precise resulting from a bite in the cervical region of the spinal cord in the typical predatory behavior of the feline. However, if the electrode is located in the medial hypothalamus, and the cat is stimulated in the presence of the rat, it will ignore the rat, and turn and attack the experimenter. The attack on the experimenter will be highly directed. It is not similar to the random attacks of a decerebrate animal. This cat appears as though it intends to do the experimenter harm, and in fact, it will (Egger & Flynn, 1963).

One particularly interesting experiment that illustrates a number of things was done by Robinson and his colleagues (Robinson et al., 1969). They took a small Rhesus monkey and implanted an electrode in the anterior hypothalamus. They then put the animal in a primate chair, activated the electrode, and showed that the monkey did not become aggressive towards inanimate objects, nor did it become aggressive towards the experimenter. It was then put in a cage with another monkey, that was larger and dominant to the experimental animal, and with the dominant monkey's female consort. When stimulated in this situation the experimental monkey vigorously and immediately attacked the dominant monkey. It did not attack the female. It attacked only the dominant male monkey. This appeared to be a valid primate attack because the dominant monkey reacted by counterattacking just as viciously as it usually would if attacked by a submissive animal. This scenario was repeated a number of times and although the result is quite unusual, Robinson et al. found that the dominance relationship changed. The stimulation induced attacks were so intense that the formerly dominant animal ultimately became submissive to the experimental monkey.

This experiment shows first that the particular brain stimulation used resulted in one specific kind of aggression, which I have called "inter-male," that is, the specific tendency for one male to attack another. Second, this experiment demonstrates that aggressive behavior is stimulus bound. In the absence of the relevant stimulus, that monkey, even though stimulated time and again, showed no irritability or increased tendency to attack other targets.

It is important not to generalize too quickly from one species to another. One must be particularly cautious in generalizing from animals to man. However, we now have good evidence that man, for all of his encephalization, has not escaped from the neural determinants of his aggressive behavior. There are now several hundred

people who have electrodes implanted in their brains. The wires are attached to small sockets cemented to the skull. These patients can be brought into the laboratory, plugged in, and precise areas deep in the brain can be electrically stimulated.

A case reported by King (1961) is particularly instructive. This patient was a very mild-mannered woman who was a generally submissive, kindly, friendly person. An electrode was implanted in the area of her brain called the amygdala. Dr. King stimulated this patient in the amygdala with a current of four milliamperes and there was no observable change in her behavior. (One cannot tell when one's brain is stimulated. There are no receptors that can indicate it. Thus, she was unaware of the stimulation.) When the amperage was increased to five milliamperes, she became hostile and aggressive. She said such things as "take my blood pressure. Take it now." Then she said, "If you're going to hold me you'd better get five more men." Whereupon she stood up and started to strike the experimenter. He then wisely turned down the current.

It was possible to turn this woman's anger on and off with a simple flick of the switch because the electrode was located in a part of the neural system for hostility. She indicated having felt anger. She also reported being concerned about the fact that she was angry. She did not report pain or other discomfort. She was simply "turned on" angry. Similar findings have been reported by other investigators (Sem-Jacobsen, 1968; Heath, 1964).

One of the best-reported cases is that of Julia (Mark & Ervin, 1970; Mark et al., 1969; Mark et al., 1972). Julia was a 22 year old girl with a history of brain disease that evidently began with an attack of encephalitis before she was two years old. She was subject to seizures and showed severe temper tantrums, which were usually followed by intense remorse. On 12 different occasions Julia seriously assaulted people without apparent provocation. When other treatments failed, electrodes were implanted in the temporal lobe of Julia's brain. The electrodes were connected to a radio controlled stimulo-receiver that could be activated remotely without attached wires. It was then possible to stimulate in the depths of the temporal lobe without connecting wires and in a natural setting. In one instance stimulation of the hippocampus, while she was talking to her psychiatrist, resulted in gradually increasing EEG and clinical abnormalities. Over a period of several seconds after the termination of the stimulation, she lost responsiveness to the examiner and suddenly began to furiously attack the wall with her fist. In another instance stimulation was applied to the amygdala while she was playing a guitar and singing for her psychiatrist. Again after a buildup lasting a few seconds, she lost contact, stared ahead blankly, and was unable to answer questions. Then, during a storm of subcortical

electrical activity, she swung her guitar just past the head of the psychiatrist and smashed it against the wall.

BRAIN PATHOLOGY AND AGGRESSION

There are a number of pathological processes in the human brain which result in the activation of the neural systems for feelings of hostility. Tumors with an irritative focus frequently result in increased irritability and rage attacks if they are located in particular portions of the brain. It is important to note that all brain tumors do not produce pathological aggression. Many, in fact, produce apathy and somnolence. However, if they develop in such a way as to impinge upon and activate the neural systems for aggressive behavior, the syndrome of pathological aggressivity may appear. Tumors in the septal region, the temporal lobe, and the frontal lobe have produced this reaction. In 1962, Sano reported on 1800 cases of brain tumor and found the irritability syndrome in those that involved the temporal lobe and the anterior hypothalamus.

The literature contains many cases of pathological aggressiveness induced by brain tumors. Only a few examples are cited. Two violent patients with tumors of the temporal lobe are described by Sweet et al. (1969). One man, a powerful individual, attempted to kill his wife and daughter with a butcher knife. When brought to the hospital, he was in a full-blown rage reaction, during which he snarled, showed his teeth, and attempted to hit or kick anyone who came close enough. History taking revealed that over a period of six months, his personality had gradually changed and that he had complained of blurred vision and intense headaches. When the tumor pressing on the anterior temporal lobe was removed, his symptoms rapidly abated.

Another patient who had shown hyperirritability for years began to show serious destructive rages. He drove his car recklessly and began to direct his outbursts of rage against his wife and son. Although intellectually capable as a chemist, he was unable to hold a position for longer than a few months because of his volatile and irritable behavior patterns. After the removal of a slow-growing tumor that had evidently been invading the temporal lobe over a period of several years, his symptoms disappeared. He became more stable, more placid, and functioned adequately as a chemist during the 19-month follow-up.

Vonderahe (1944) describes the onset of sudden outbursts of aggression in a female patient who on autopsy was found to have a tumor the size of a cherry on the anterior and inner aspect of the left temporal lobe encroaching on the amygdala.

A number of other types of brain lesions also produce personality changes that include loss of impulse control with increases in irritability. In some instances it is possible to specify the area damaged; in others the trauma may be diffuse. Head injuries caused by falls or automobile accidents frequently result in loss of consciousness. As the individual regains consciousness he goes through a period of uncontrolled violence and aggression towards those around him (Mark & Ervin, 1970). The behavior of children is particularly affected by injury to the brain. The child's personality may show a complete reversal; the child may change from a lovable youngster to an antisocial and unmanageable one. Such children show emotional instability with a characteristic unrestrained aggressiveness and a lack of impulse control. They may be cruel and show such asocial behaviors as lying and stealing (Blau, 1937; Kasanin, 1929; Strecker & Ebach, 1924).

There are a variety of disorders that involve generalized damage to the central nervous system, including cerebral arteriosclerosis, senile dementia, Korsakoff's syndrome, and Huntington's chorea. These dysfunctions frequently present a common symptomatology referred to as chronic brain syndrome, which is characterized by memory deficit, orientation loss, and affective disturbances. There are wide fluctuations of mood and a general emotional instability, but the affective pattern is dominated by anger, rage, and increased irritability (Lyght, 1966).

Brain lesions produced by the virus responsible for rabies also produce hyperaggressivity. The disease involves bizarre behavior changes, which may include excesses in sexuality, and violent rages involving irrational assaults. The rabies virus produces damage in many parts of the brain, but as might be suspected from the behavioral symptomatology, there is a particular involvement of the limbic system with damage most extensive in the temporal lobe.

Encephalitis lethargica also produces neural damage which results in a loss of impulse control and an increase in hostile behavior. The effect of this disorder on children is more profound than it is on adults. Brill (1959) gives a good description of the behavioral characteristics of these children.

Children who had previously been normally behaved would lie, steal, destroy property, set fire, and commit various sexual offenses, without thought of punishment. The motivation was less comprehensible and less subject to immediate control than in the so-called psychopathies, but the capacity for real remorse was strikingly well retained.

There was marked instability of emotion which, coupled with disinhibition of action led to serious aggression, usually against others, but occasionally against the patient himself, resulting in gruesome self-mutilation. (p. 1167)

Another neurological disorder which may result in an increase in aggressive tendencies is epilepsy, particularly temporal lobe epilepsy. It is certainly true that temporal lobe epilepsy is not necessarily accompanied by an increased tendency to impulsiveness and hostility, but the evidence indicates that the probability of that behavior occurring is increased.

Ictal aggression (that occurring during the seizure) is relatively rare. However, there is abundant evidence that uncontrolled, impulsive, assaultive behavior is not uncommon as an interictal behavior pattern, particularly among temporal lobe epileptics (Gastaut, 1954). Falconer et al. (1958), reporting on 50 patients, indicated that 38 percent of them showed spontaneous outbursts of aggression. About half of the psychomotor epileptic patients studied by Schwab et al. (1965) developed destructive behavior and paroxysmal bursts of anger as a part of a behavior disorder. Other investigators have reported similar results (see Walker & Blumer, 1972; Serafetinides, 1970; Glaser et al., 1963).

It is important to emphasize that the subjects in the preceding studies were from a highly selected population of individuals with epilepsy. They were, in general, persons who had been committed to an institution or who were candidates for surgery. There are, of course, thousands of epileptics who are making an adequate adjustment in the real world and do not suffer from personality disturbances, impulsiveness, or uncontrolled aggressive tendencies. Behavior pathology occurs only when certain specific neural systems are involved.

BRAIN LESIONS AND AGGRESSION

There are a variety of therapeutic reasons for making brain lesions, and much can be learned about the neural mechanisms underlying aggressive behavior through the brain lesion technique. Lesions in a number of loci in the brain result in the reduction of aggressive behavior. Several species of animals have been surgically tamed by the ablation of precise brain areas that apparently interfere with the function of the underlying neural systems for hostility. For example, one can take the wild cat *Lynx rufus rufus* which will attack with the slightest provocation, and convert it to a nonaggressive house cat by burning out a very small part of the brain called the amygdala. After the operation it will never be violent again (Schriener and Kling, 1953).

The same thing can be done with the wild Norway rat, one of the few animals which will attack without apparent provocation. If a bilateral amygdectomy is done on this animal, as soon as it comes out of the anesthetic, it becomes docile. You can pick it up and carry it around in your lab coat pocket (Woods, 1956).

There have now been several hundred cases reported in which aggressive behavior in man has been reduced, in many instances dramatically, by specific brain lesions. These are individuals who are confined to the back wards of mental hospitals under either constant sedation or constant restraint.

A number of surgeons have now done essentially the same operation on humans as described above for the cat and the rat, that is, a complete or partial bilateral amygdectomy. The Japanese investigator Narabayashi and his colleagues for example, indicate that they get 85 percent success in the reduction of violent behavior after a bilateral amygdectomy (Narabayashi et al., 1963). Dr. Heimburger in Indiana claims that he gets 92 percent increase in docility in these extremely violent patients through the same operation. Not only was it possible to put those individuals in the open wards, that is, take them out of isolation, but two of his patients have been released into society and are making at least a reasonable adjustment (Heimberger et al., 1966).

It is clear that neural systems rather than neural centers are involved. Therefore, one would expect that lesions in other parts of the brain might also be effective in reducing excessive aggressiveness. Following Ward's (1948) demonstration of the calming effects of cingulectomy on monkeys, LeBeau (1952) did cingulum ablations on humans in an attempt to control agitated behavior, obsessive-compulsive states, and epilepsy. He concluded that, "Cingulectomy is especially indicated in intractable cases of anger, violence, aggressiveness, and permanent agitation." Other investigators have also found that cingulate lesions reduce the intensity and duration of outbursts of anger (Tow & Whitty, 1953; Whitty et al., 1952; Sano, 1962; Turner, 1972).

Lesions have also been made in a number of other parts of the brain in an attempt to reduce pathological aggressiveness. Sano (1962, 1966; Sano et al., 1972) reports "remarkable success" with patients showing intractable violent behavior by lesioning the posterior hypothalamus. Thalamic lesions have also been used to reduce aggression and destructive behavior (Andy, 1966, 1970; Andy & Jurko, 1972).

There can be no doubt that a number of different brain lesions can reduce the tendency of an individual to both feel and express hostility. That fact is of considerable theoretical significance. It confirms many of the findings on animals and substantiates predictions from the model described in this paper. However, it should be made clear at

this point that as a practical therapy for the control of aggressive behavior, it leaves much to be desired. There are very few individuals for whom such a drastic approach would be indicated. The most serious problem with the use of lesions for the control of aggression is that the operation is not reversible. Once the lesion is made, nothing can be done to restore the individual to the preoperative state. When the operation is not successful, and it sometimes is not, the patient is brain damaged to no avail. It therefore appears clear that surgery should be a last resort therapy and should be used only after all other types of control, both psychological and physiological, have been tried. There is evidence that in some of the hospitals around the world in which aggression control operations are performed, relatively little care is taken to ensure that brain surgery is, indeed, the "last resort therapy" that it should be.

NEURAL INHIBITION AND AGGRESSION

The sensitivity of the neural systems which underlie aggressive behavior is influenced by the input from other neural mechanisms which have an inhibitory influence. Flynn (1967) has experimentally defined many of the brain areas in the cat that tend to decrease the sensitivity of the hypothalamic portions of the predatory system (and to some extent the system responsible for what is probably irritable aggression). Delgado has repeatedly shown that vicious rhesus monkeys can be tamed by the stimulation of aggression suppressor areas.

In order to eliminate the need for restraint and the necessity for connecting wires to the head, a technique was developed by which the brain of the subject could be stimulated by remote, radio control. The monkey wore a small stimulating device on its back that was connected by leads under the skin to the electrodes implanted in various locations in the brain. The leads were connected through a very small switching relay which could be closed by an impulse from a radio receiver bolted to the animal's skull. The radio receiver could then be activated by a transmitter some distance away. With this system it was possible to study the monkeys while permitting them to roam free in the caged area (Delgado, 1963).

In one experiment the subject was the aggressive boss monkey which dominated the rest of the colony with his threatening behavior and overt attacks. A radio controlled electrode was implanted in the monkey's caudate nucleus. When the radio transmitter was activated the boss monkey received stimulation in the caudate nucleus with the result that his spontaneous aggressive tendencies were blocked. His territoriality diminished and the other monkeys in the colony reacted to him differently. They made fewer submissive gestures and showed less fear of the boss. When the caudate nucleus was being stimulated, it was possible for the experimenter to enter the cage and catch the monkey with his bare hands.

During one phase of the experiment described above, the button for the transmitter was placed inside the cage near the feeding tray and thus made available to all of the monkeys in the colony. One small monkey who was short on brawn but long on brains, learned to stand next to the button and watch the boss monkey. Every time the boss would start to threaten and become aggressive the little monkey would push the button and calm him down. I'll leave it to the reader to decide what the political implications of this experiment are. I must say that it's the first experimental evidence I know of, of St. Mathew's prediction that the meek shall indeed inherit the earth.

There are suppressor areas for aggressive behavior in the brains of humans as there are in the brains of animals, and there is good reason to believe that those suppressor areas are associated with other motivational systems. Heath (1963) described the reaction of a psychomotor epileptic patient to septal stimulation. The patient was exhibiting agitated, violent, psychotic behavior when the septal stimulation was introduced without his knowledge. His behavioral state changed almost instantaneously from disorganization, rage, and feelings of persecution to happiness and euphoria. The patient described the beginnings of a sexual motive state and was unable to explain the sudden shift in his behavior when he was directly questioned about it. Heath goes on to point out that the case described is not unique, but has been repeated in a large number of patients in his laboratory.

Recently Heath (1977) has reported a significant reduction in pathological violence and aggression in a number of patients after repeated stimulation in the vermal region of the cerebellum.

The aggression-suppression effects of brain stimulation may also be relatively prolonged. Sem-Jacobsen and Torkildsen (1960) report that stimulation in the ventromedial frontal lobes calmed a violent manic patient. A similar effect resulted from stimulating the central area of the temporal lobe. When both points were stimulated in rapid succession the calming, antihostility action was greater and of some duration.

The suppression of aggression by electrical stimulation is, I think, of considerable theoretical importance. We know that humans possess these neural suppressor systems and we are gradually learning many characteristics of suppression mechanisms. However, like brain lesions, this is not yet a reasonable or a useful therapeutic technique except for a very limited number of patients.

The surgical risk of mortality through electrode implants is even lower than that of stereotaxic brain lesions and can be considered negligible. There are, however, other serious side effects which merit a great deal more research before electrical stimulation of the brains of humans can be considered risk free. Although there are no data on

humans, it has been shown in mice, rats, cats, and monkeys that repeated, brief, subthreshold stimulation of the amygdala results in a progressive lowering of seizure threshold and ultimately in behavioral convulsions. This increase in seizure potential resulting from brain stimulation has been referred to as the "kindling effect." Goddard (1972) who has studied this phenomenon in some detail, concludes that the kindling effect is a relatively permanent transynaptic change resulting from the stimulation. It is not due to tissue damage or scar formation.

It may someday be possible to circumvent the kindling effects. Until then, however, any procedure which involves repeated electrical stimulation of the human brain places the patient at risk.

AGGRESSION SYSTEM THRESHOLDS

It is a fortunate fact that in neither humans nor animals is aggression very frequent. It is relatively uncommon. Thus, in order to understand the physiology of aggression, we must understand what it is that turns on these neural systems and what it is that turns them off. Perhaps one of the best ways to think about this is in terms of thresholds for the systems. In certain circumstances the threshold for the firing of the neural systems for aggression is very high. In that case it takes a great deal of provocation to activate them. There are other circumstances in which the threshold is very low and relatively little provocation will result in the activation of the neural systems with the result that the individual has an increased tendency to behave aggressively.

HEREDITY AND AGGRESSION

Some of the variables that influence the thresholds of the neural systems for aggression appear to be hereditary. For example, we have shown in my laboratory that some strains of rats behave aggressively towards small chickens in significantly greater numbers than do other strains (Bandler & Moyer, 1970).

It is also possible, as Dr. Lagerspetz of Finland (1964) has shown, to take a large population of mice and select from them the aggressive and non-aggressive animals. Within a relatively few generations, if the very aggressive animals are mated, it is possible to develop a highly aggressive strain in which mice will attack immediately when they are put together. If the non-aggressive animals are bred, a strain can be developed that will not fight no matter what you do to them. Obviously, we do not have any comparable data on human beings. However, if this model has any validity and if there are specific neural systems for different kinds of aggressive behavior, it must be that different thresholds for aggression are inherited. Neurological differences must be inherited in the same way that differences in the shapes of noses are.

BLOOD CHEMISTRY AND AGGRESSION

Another significant variable which contributes to differences in the aggression threshold level is blood chemistry. It has been known for centuries, of course, that one can take the raging bull and convert it into a gentle steer by the operation of castration which reduces the level of testosterone in the blood stream. The formal work on this problem was done in 1947 by Elizabeth Beeman (1947). It has been repeatedly confirmed in many laboratories and on many animal species. Dr. Beeman worked with a strain of mice that would fight on being put together. She castrated the animals of the experimental group prior to puberty. After maturity when those mice were put together they did not fight at all. The control group showed the usual amount of aggression characteristic of that strain. She then carried the experiment a step further and implanted pellets of testosterone subcutaneously in the castrated mice. When the testosterone became effective they fought at the same level as the control animals had. She then surgically removed the pellets of testosterone whereupon the mice once again became docile. It was possible to manipulate the aggressive behavior of these mice simply by changing the testosterone level.

Until recently, essentially no information has been available relating the endocrine function and affective response tendencies in man. However, with improvement in assay techniques (see Hamburg & Lunde, 1966) such studies are beginning to appear. Persky et al. (1971) studied two groups of men. The 18 individuals in the younger age group ranged from 17 to 28 years of age, and the 15 older men were between the ages of 30 and 66 years. The average testosterone production rate of the older men was about half that of the younger men and when all the subjects were considered as a group, a significant negative correlation ($r = -0.62$) was shown between age and testosterone production rate. This is an interesting finding in itself inasmuch as it has been shown that violent crime in the United States is most prevalent among males between the ages of 15 and 24.

This study also showed that in the younger men the production rate of testosterone was highly correlated with a measure of aggression derived from the Buss-Durkee Hostility Inventory, and a multivariate regression equation was obtained between the testosterone production rate and four different measures of aggression and hostility. This equation accounted for 82 percent of the variance in the production of testosterone for the younger men. In the older age group the only variable that correlated highly with testosterone production was age, and the regression equation that was highly predictive for the young men was not valid for the older age group.

In another study aggressive behavior and plasma testosterone were assessed in a young criminal population (Kreuz & Rose, 1972). The

subjects were selected to provide a high-aggression and a low-aggression group using the number of times that an individual had been placed in solitary confinement as the index for assignment to the two groups. That index was associated with fighting behavior and resulted in highly differentiated groups. Fighters were defined as those individuals who had been in more than one fight during their imprisonment. Plasma testosterone was measured in six plasma samples taken within one hour of awakening. Although there was a significant difference between the two groups in terms of actual fighting behavior and verbal aggression, the differences in plasma testosterone were not significant. Paper and pencil tests were also given to the subjects. Hostility was measured by the Buss-Durkee Inventory but no significant correlation was found between the hostility test scores and fighting in prison, and the hostility scores did not correlate with plasma testosterone. An investigation of the type of crime for which the subjects were incarcerated revealed that those individuals who had committed violent and aggressive offenses during adolescence had a significantly higher testosterone level. However, the past history of assaultive behavior was not correlated with either fighting in prison or hostility as measured by the paper and pencil test.

The results of the Kreuz and Rose study are somewhat surprising in light of the Persky et al. study, which used the same hostility inventory. It may well be that a variety of potent pressures in the prison setting influence the instrumental aggression of the subjects. Reinforcement in the prison tends to be swift and severe and may be a more important determinant of actual behavior than whatever internal tendencies to hostility are set up by the testosterone level. The behavior that did correlate with plasma testosterone took place outside the prison. The reasons for the lack of relationship between the scores on the Buss-Durkee Inventory and testosterone level are not clear at the moment.

A further understanding of the role of hormones in aggression comes from the study of the control of sex-related aggression. This behavior is manifested by violent individuals for whom the object of aggression is the same as the object for sexual behavior. These are the men who commit the brutal sexual murders.

Aggressive behavior which is directly associated with sexual behavior, either heterosexual or homosexual, can most generally be controlled by reducing or blocking the androgens in the blood stream. The simplest and most obvious method of accomplishing this is through the operation of castration. There is now considerable evidence that this operative procedure is effective in reducing the level of sexual arousal regardless of its direction. This is a drastic therapy and there are obvious problems with it. It is permanent and irreversible. There are also a variety of physical and psychological side effects.

However, it has been offered to sex criminals as an alternative to prison in some countries (Bremer 1959; Hawke, 1950; Sturup, 1961; LeMaire, 1956).

More recently some investigators have attempted to block the effects of the male hormone by giving estrogenic or progestogenic hormones or antiandrogenic drugs. Aggressive behavior, both sex-related and irritable, have been reduced by this procedure. Much more work needs to be done on this problem to determine the details of the effect (Field & Williams, 1970; Chatz, 1972; Laschet 1967; Laschet et al., 1967; Blumer & Migeon, 1973).

There are a variety of other blood chemistry changes that influence the thresholds for aggression. For example, we know that frustration and stress are important variables in inducing aggressive behavior, particularly if the frustration and stress are prolonged. It seems likely that this occurs because the stressors change the hormonal status and thus change the thresholds for the neural systems for aggression. Although we do not yet have experimental evidence to support this conjecture, there are a number of people working on the problem

It is also true, as many women have found, that there is a period during the week before menstruation when a significant percentage of women feel irritable, hostile and are easily aroused to anger (Dalton, 1959; 1960; 1961; 1964). Those who have had inadequate training in impulse control sometimes behave and act on those impulses. In fact, one study which was conducted on 249 female prison inmates showed that 62 percent of the crimes of violence were committed in the premenstrual week, whereas only 2 percent of the crimes of violence were committed in the postmenstrual week (Morton et al., 1953).

There appears to be good clinical evidence that a limited number of individuals show an irritable aggression reaction when their blood chemistry is altered by a sudden drop in blood sugar. This is the state of hypoglycemia (Aldersberg & Dolger, 1938-1939; Greenwood, 1935; Podolsky, 1964). Wilder (1947) has summarized a wide variety of crimes committed during a hypoglycemic state.

At least one controlled study supports the clinical findings. Dr. Ralph Bolton (1973) spent considerable time with a very hostile tribe of Peruvian Indians, called the Qolla. He hypothesized that the exceptionally high level of social conflict and hostility in the society could be explained, in part by the tendency to hypoglycemia among the community residents. Peer ratings of aggressiveness (which had an acceptable reliability) were studied in relationship to blood sugar levels as determined by a four-hour glucose tolerance test. The aggression ratings were not known to the individuals who read the

glucose levels. A Chi Square analysis of the data showed a statistically significant relationship between aggression ranking and the change in blood glucose levels during the test. In view of all of the other possible causes of aggressive behavior, this is a remarkable finding and indicates that the relationship must be a powerful one.

Another change in the blood chemistry which can result in irritability and hostile tendencies is that produced by certain allergens in some particularly susceptible people. The term "allergic tension-fatigue syndrome" was introduced in 1954 to describe the allergic behavior pattern (Speer, 1954). It is important to note that behavior disturbances are only one of many possible allergic reactions and that all individuals with allergies do not show a behavior alteration.

A classification of allergic reactions in the nervous system includes the following:

Emotional Immaturity Reactions: Included under this heading are temper tantrums, screaming episodes, whining, impatience and excitability. Patients of this type are inclined to be erratic, impulsive, quarrelsome and irresponsible. Many admit to having "childish" compulsions.

Antisocial Behavior: These patients are inclined to be uncooperative, pugnacious, sulky, and perhaps cruel. Most have learned enough self-control to avoid serious aberrations of behavior. (Campbell, 1970, p. 31).

It is difficult to determine how extensive a problem allergic aggression is. There are relatively few studies comparing aggressive tendencies in allergic individuals with control subjects. Since it is clear that all allergic individuals do not have nervous system involvement, such studies would not be particularly meaningful. Although there are a large number of case studies in the literature showing that individuals with allergic tension-fatigue syndrome lose that symptomatology under allergy management, the only reasonable way to determine whether the syndrome is an allergic one is to eliminate the allergen from the environment until the symptoms abate and then reproduce the symptoms by reintroducing the allergen into the environment, the so-called challenge technique. Crook et al. (1961) reported on 50 patients who had five signs and symptoms of allergy: fatigue, irritability and other mental and emotional symptoms, pallor, circles under the eyes, and nasal congestion. The majority of the patients in this study had their symptoms relieved and reproduced by the challenge technique. The 50 patients reviewed in this research

were seen in the group pediatric practice during a four-year period. The authors concluded that allergy as a systemic or generalized illness is much more common than is usually recognized by most allergy textbooks.

Allergens that can produce the allergic tension-fatigue syndrome are highly varied. It can be produced by pollens (Kahn, 1927); a variety of inhalants (Eisenberg, 1970; Randolph, 1962); drugs (Gottlieb, 1970a; Schaffer, 1953); and many foods, of which milk, chocolate, cola, corn, and eggs are the most common (Speer, 1970; Crook et al., 1961). The sensitivity of the individual varies idiosyncratically and according to the type of allergen. One patient showed such exquisite sensitivity to onions that she could tell when they were being cooked, not by the odor but because she had a sudden and intense nervousness and irritability (Frederichs & Goodman, 1969).

The basic physiological cause of the irritable allergic reaction is not yet clear. Perhaps the most reasonable hypothesis is suggested by Gottlieb (1970b), who considers the possibility that the symptoms are due to allergically caused circumscribed angioedema (noninflammatory swelling) of the brain. There is some evidence that such localized edema occurs in the brain as a result of allergies just as localized edema occurs in the skin. Both types of edema are reversible. As with the skin, there is evidence that the edema may be localized in different parts of the brain. Thus the number and kinds of symptoms will be a function of the particular location of the resultant pressure in the brain. If the angioedema occurs in any one of several portions of the brain through which the neural system for irritable aggression courses, the pressure of the swelling may sensitize or activate those neural systems with the resultant feeling of hostility and/or aggression.

LEARNING AND AGGRESSION

Our discussion so far has been concerned with physiology. It should be obvious, however, that learning has an important influence on behavior that we label aggressive just as it does on any other category of behavior. With the proper use of reward and punishment, an animal can be taught to overeat or to starve to death. By the same method, animals and humans can be taught to exhibit or inhibit their tendencies to hostile behavior. It is clear that aggressive acts which are rewarded have a higher probability of recurring than those that are not. Those that are punished are less likely to occur later.

Human beings, of course, learn better and faster than all other animals. It is therefore reasonable to expect that the internal impulses to aggressive behavior would be more subject to modification

by experience in humans than in any other animal. Also, because of the human's additional ability to manipulate symbols, and to substitute one symbol for another, one would expect to find a considerable diversity in the stimuli which will elicit or inhibit activity in the aggression systems. One would also expect that the modes of expression of aggression would be more varied, diverse, and less stereotyped in humans than in other animals.

CHRONIC BEHAVIOR TENDENCIES

The interactions of all of the preceding factors contribute to the determination of the aggressive tendencies of a given individual at a given time. One might be thought of as having a chronic behavior tendency to hostility if these factors function to produce activity in or a sensitivity of the neural systems for aggressive behavior over a prolonged period of time. The underlying factors that contribute to a chronic behavior tendency may vary considerably from one individual to another. The following are some examples.

A particular person may frequently react with anger to a wide variety of stimuli because his heredity has determined that the threshold for the activation of his neural substrates for hostility is relatively low.

The heredity of another individual may dictate that his neural substrates for aggression have a threshold well within the normal range. However, his environment may be such that he is subjected to constant frustration and stress, which may result in a hormone balance that sensitizes the neurons in the hostility systems so that they are readily activated by a wide range of stimuli.

In another case an individual may be born with a neural system for some positive affect with a particularly low threshold. Other things being equal, he may have a chronic behavior tendency to react to many stimuli with positive approach tendencies. If inhibitory neurons to the neural substrates for aggression are a part of that system, that individual will have less of a tendency to behave aggressively.

It is also possible for an individual to have a chronic behavior tendency to hostility without having the neural systems for aggression particularly involved. He may simply have learned that aggressive behavior is what is expected of him if he is to receive the kinds of approbation that are rewarding to him. He may just live in a "sub-culture of violence" (Wolfgang & Ferracuti, 1967).

Interactions of all the determining factors are, of course, the rule. The individual with an inherited low threshold for the

activation of the neural system for hostility will be even more readily and intensely aroused to anger if he lives in a deprived, frustrating, and stressful environment. If, on the other hand, he is surrounded by love and protected from much of the harshness of the world and is exposed to relatively little provocation, his aggressive behavior will be limited.

NEUROLOGICAL SET

Chronic behavior tendencies refer to the long-run probabilities of a particular kind of behavior. Set, however, involves the proclivities toward a given kind of behavior at the moment. It should be emphasized here that the reaction to the environment is an interaction between what is going on in the environment and what is going on at the same time in the nervous system. It is obvious that what constitutes a provocation at time A is not necessarily a provocation at time B. If there is ongoing activity in a neural system for aggression or if it is highly sensitized, the amount of provocation required by a relevant external stimulus to elicit an aggressive action will be less. The reason for the neural activity or hypersensitivity is irrelevant.

A teenage girl may have a highly sensitized neural system for irritable aggression because of the hormone balance characteristic of the third day before her menstrual period. At a different time that neural system may be sensitive or active because she has been frustrated by the cutting and sarcastic remarks of a high school teacher. In either case she has an increased probability of responding aggressively to any appropriate external stimulus. Whether this increased probability of aggressive responding actually results in aggressive behavior in a given instance is determined in part by her previous experience with the eliciting stimuli. If she has been negatively reinforced for expressing hostility toward her parents, she will be less likely to make that response. However, if she stumbles over her dog, she may very well swear at it or kick it.

In the second instance, in which the girl's neural system is activated by the sarcasm of her teacher, her act of kicking the dog is referred to as displaced aggression. In the traditional psychoanalytic formulation the aggressive "energy" is transferred from one subject to another. In the analysis presented here it will be seen that the two instances are not essentially different, except in the manner in which the neural system was initially activated or sensitized. In both instances the tendency to respond aggressively may be the same, and in both cases the particular stimulus responded to depends on the individual's reinforcement history.

It is also possible to have a neurological set in which the tendency to aggression is decreased. If the individual is in a "happy frame of mind," it will take more provocation to elicit an aggressive response. As suggested, this is due in part to inhibitory neurons from the neural substrate of the "happy state of mind" that tend to block activity or reduce the sensitivity in the neural substrates for hostility.

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URBAN FAMILIES AND ASSAULT: A FRAMEWORK FOR
RESEARCH FOCUSED ON BLACK FAMILIES

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INTRODUCTION

It has been repeatedly documented (Steinmetz and Straus, 1973 1974; Steinmetz, 1977) that one of the most common locations of assaultive behavior is within the family, and between family members. The irony of such destructive hostility in the group which should be a primary source of comfort and affection is clear. In this paper, we will relate environmental stressors and family processes to the occurrence of assaultive behavior, with a focus on urban black families. A conceptual framework will be presented which will guide the development of our hypotheses and structure some suggested research designs. When available, we shall draw research results from the Detroit area, an urban setting characterized by small, more or less homogeneous neighborhoods.

Official statistics indicate that the problem of assaultive crime in families is most acute among blacks, and particularly among lower-class black families. A recent study conducted by Wilt and Bannon in Detroit (1977) highlights the magnitude of the problem. This study examined what the authors call "conflict motivated" violence--those crimes resulting from a conflictual situation between persons who know or are related to each other. Two types of crimes were included in their study--conflict-related homicides, which in Detroit represented 50.3 percent of all homicides recorded in 1972, and all reported cases of conflict-related assaults between 1971 and 1973. The general statistics reported on these types of crimes confirmed the findings of many other studies that a disproportionate

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percent of such crimes occur among blacks (Rushforth, et al., 1977). In 335 cases of homicide in 1972, 83 percent of perpetrators and 81 percent of the victims were black. A similar pattern was observed for assaults during 1973.

Almost half (49 percent) of the homicides involved family members or friends living in primary relationships. Approximately one third (34 percent) occurred between friends, acquaintances, and friends living together. The remaining 18 percent involved persons who know each other in a range of other situations. A similar pattern emerged when examining the relationship of persons involved in the assault cases; 57 percent involved family members, about a third, friends, acquaintances and 11 percent others. The vast majority of both conflict-related homicides and assaults occurred in private homes and most frequently in high density neighborhoods. A range of conflict patterns in families were identified in the study. In addition, several key factors known to be associated with social class, including unemployment, use of alcohol, low education and the presence of multiple offenses, were reported to be positively related to both type of crimes. These compelling statistics reflect the severity of the problem among blacks, and point to an urgent need for a critical and close look at the phenomenon of assaultive crimes in black families.

It must be noted that there is some question as to the validity of the racial distributions of official statistics, since there are many ways in which the individual and bureaucratic biases of those in the criminal justice system might affect the determination of which suspected offenders are arrested, tried, incarcerated, and so on (Ryan, 1971, Chapter 8). Hindelang (1978) found that the racial composition of reported offenders in victimization surveys was very close to the racial composition found in official statistics. Since the victimization surveys assess the prevalence of crime by interviewing random samples of individuals and businesses, these results are independent of the workings of the criminal justice system, and support the contention that assaultive crime is more frequent within the black community. At the same time, there is evidence that the victimization surveys themselves are least reliable in the area of assault (Hindelang, 1978). Given the reluctance of police officers to intervene in family disputes, and the reluctance which families may feel towards calling outsiders into private quarrels, it is our assumption that assaultive crime within families is particularly under-reported.

However reluctant, police are directly concerned with domestic violence, since responding to "disturbance calls" involves about 30-35% of weekend radio dispatches in Detroit (Bannon, Personal Communication) and places the officers themselves in physical

jeopardy. In 1975 in Detroit, 28 percent of assaults on police officers and 15 percent of officers killed were during responses to disturbance calls (Police Foundation, 1977). Also, as Wilt and Bannon point out,

...for various reasons the police response to any point along the continuum of interpersonal violence fails to deal with the underlying problems which led to the violence. The police response is thus unlikely to have any effect on the possibility of future violence.

It is clear, then, that the police agencies on the front lines of domestic violence should be one of the primary consumers of research findings on the dynamics of interpersonal violence, along with other family service agencies.

We will argue in this paper for a comprehensive approach to the study of assaultive behavior in families. We believe that structural and functional processes working in communities interact with and influence aspects of family functioning, including assaultive behavior. The family is a micro system, functioning within, interacting with, influencing and being influenced by the broader macro system of the community. Further, in the study of crime the focus has too often been only upon the forces precipitating violence. Less attention has been given to those forces or processes which serve to constrain crimes. It is necessary to understand both types of processes in any comprehensive approach to family assault.

We will focus on assaultive behavior as it affects black families, and particularly black families in high stress urban neighborhoods. Much of the literature deals with this group, and, as the available data indicate, this is the group for which the problem is most acute. However, the black family must be investigated in the context of the larger, white dominated society.

Assaultive crime, and violence in general, is an emotional issue, which contributes through the mass media to community and personal feelings of fear. The concern for alleviating these fears should not be allowed to overshadow the larger issue of reducing more ubiquitous types of crime, collectively referred to as "white collar crimes," which may, in the long run, be most damaging to the fabric of the social structure as well as contribute to problems related to violence. For example, corruption in urban government can curtail services to low income neighborhoods. This paper, however, will focus on interpersonal violence.

The remainder of this paper is divided into four sections. The next section gives the major definitions, followed by a presentation

of the broad conceptual design in which our research ideas will be discussed. The third section is devoted to a discussion of family processes, and suggested hypotheses for future research. The final section is a summary.

DEFINITIONS

Assaultive Behavior

While our introduction dealt primarily with a few official statistics on assaultive crime, we would like to avoid the implications of the legal and criminal process, and discuss the more general concept of "assaultive behavior," or "violence," rather than use the more legalistic phrase, assaultive crime. This terminology allows us to concentrate on the dynamics of the situation in which the assault takes place, rather than the legal implications of the behavior for society. Assaultive behavior in this paper therefore covers the use of force, rather than reasoning or withdrawal in conflict situations, and ranges from verbal abuse to homicide.

Another advantage of using the concept of assaultive behavior rather than assaultive crime is that it allows coverage of a wider range of the phenomenon. Our premise is that most people, even those who are fundamentally peaceful, can be pushed into violence. Previous studies have focused on assaultive crime--that is, assaultive behavior which is severe enough to require some form of official intervention. This may lead to a distorted view of the processes which lead to the use of force in families, since this is only one end of a long continuum. In particular, the focus upon the extremely assaultive family may account for explanations based on family pathology, in which these families are seen as being qualitatively different from others, rather than as distinct primarily in their degree and form of violence.

Until the work of Billingsley (1968), poor and single-parent families in lower economic strata in particular were described as being "pathological," especially if they were black (Ryan, 1971; McQueen, 1977). These biases and assumptions of pathology may have prevented investigators from objective study of violence in the middle-class family. While the incidence of assault is probably lower in this class, they may be less likely to come into contact with the authorities as a result, since these families have more resources for dealing with the aftermath of violence (e.g., private health services). In any case, violence within families has been studied as a lower class phenomenon. The focus upon the extreme case may also account for the lack of attention to the forces which inhibit the expression of violence in potential conflict situations.

We would like to emphasize the need to look at forces which control as well as forces which precipitate assault. We believe that assault can only be understood if both assaultors and non-assaultors are studied. This applies to groups and classes as well as to individuals and families.

Family

Our definition of family quite explicitly includes persons committed to relationships over time, whether or not they are bound together by the traditional forms of blood or marriage ties. The variety of possible family structures within the black community has been documented by Billingsley and others (Billingsley, 1968; Hill, 1972; Babchuk; Kellam et al., 1977), in works which emphasize the inadequacy of conceptualizing family dynamics in terms of the nuclear family alone. In some cases, even persons not living in the same household may relate to each other in ways which make it appropriate to consider them "family." A prime example would be the natural father of an illegitimate child who maintains his close relationship with the child or the mother. In short, we recognize the need to expand the concept of the family to cover the variety of living situations which are found in the real world. This is particularly crucial in the study of the black community, where alternative family structures may be responses to economic and social pressures imposed by American culture.

Socioecological Stressor Areas

We argue that assaultive behavior in families is strongly affected by the context in which the family lives---i.e., the neighborhood. Studies of neighborhood impact on crime, delinquency, and mental health have a long tradition in the field of sociology, although relatively little work has been done relating the family group to the neighborhood. There is a history of research into social niches in urban settings starting with the classic study by Du Bois (1899), through the works of Parks and Burgess in the twenties (Burgess, 1924; Parks, Burgess and McKenzie, 1967) to Faris and Dunham's classic on socioecology (1939), and the social ecology work of many others (Schmid, 1945). Recently, Harburg, Erfurt et al. (1973) have conceived of such socioecological areas as varying in rates of stressor events which generate problem situations requiring group and individual adaptations and which differ in the resources for managing solutions. The extremes of such areas are called "high and low stress areas."

To operationalize this concept, census tract data in the city of Detroit were factor analyzed, resulting in two correlated factors, one an index of socioeconomic status, and the other an index of

instability or disorganization. These indices were used together to form an index of the total stress of the neighborhood. Thus, living in an area with a high crime rate and a high level of marital instability, in which the median income is low and most people in the neighborhood have low levels of education is considered as being more stressful to the individual than living in an area which has the opposite pattern of these indicators. The same two social factors were found by James and Kleinbaum (1976) in an analysis of counties in North Carolina and stress areas were related to mortality from hypertension.

It should be clear that selecting social areas which are at the extremes of the distribution of a total stress index is one way of obtaining two samples with sharply different levels of socioeconomic status. Indeed, much of the importance of studying families within the neighborhood context is the ability to separate the effects of the personal attributes of social class from the influence of the external structural events which are correlated with social class.

The concept of social class, in itself, is an amalgamation of presumed patterns of life style, resources, values, and personal attributes. The indices of neighborhood stress attempt to measure one important aspect of social class, the social milieu. Early sociological accounts of class-related differences in criminal statistics, for example, stressed the importance of the impact of peer groups on the socialization of values and behaviors. Perhaps the best example of this is Sutherland's theory of differential association (Sutherland and Cressey, 1960). More recently, social learning theorists have investigated the impact of role models on the expression of aggressive behavior (Bandura, 1971). It is assumed that the neighborhood provides a context in which both the generation and the consequences of violent behavior can be observed. Further, in high stress neighborhoods, residents can be expected to observe more violence, including more successful violence, than would residents of low stress neighborhoods (Kasl and Harburg, 1975). The explicit or tacit approval of violence by others, we believe, can result in a weakening of controls against violence by individuals and groups.

It should be clear, from this discussion, that the level of individual or familial participation in the activities of the neighborhood might mediate the impact of neighborhood stress variables on the residents. Persons who work, go to school, and socialize outside of the immediate neighborhood should be affected differently than those whose lives are intimately entwined with the local niche. This may be especially true for adults, who have greater mobility and freedom to select their social groups than do children. In other circumstances, people in unskilled but stable jobs, e.g.,

black male garbage collectors, gain a level of prestige within the neighborhood system that they are denied in the larger society (Walsh, 1975). Neighborhoods also differ in their patterns of helping and seeking help by residents. Warren (1976) found that married blacks were twice as likely¹ as married whites to seek help from police for a range of problems. Furthermore, some aspects of neighborhood may have an impact on the lives of residents regardless of their degree of contact with other locals. In particular, the perceived crime rate in high stress neighborhoods may result in suspicion and defensiveness even in persons who do not participate in the life of the community, and affect the desire to move out (Kasl and Harburg, 1972).

CONCEPTUAL FRAMEWORK

Our emphasis on the interactional process between the environment and families in assaultive crimes and our emphasis on better understanding forces of control suggest the research framework shown in Figure 1. This calls for comparing black and white families in high and low stress areas, and within this, comparing families which engage in a high level of assaultive behavior with those who do not. At this stage, we are advocating using this dichotomization of the two conceptual continua, neighborhood stress and assaultive behavior, in order to make the clearest possible comparisons. Later, information about families in the "middle ranges" can be added in order to complete our understanding.

This framework requires a number of comparisons to be made. Among the most important and interesting are those between assaultive and non-assaultive behavior between blacks and whites at the same level of neighborhood stress, and comparisons of assaultive families across levels of neighborhood stress. A natural extension from the basic framework is a longitudinal study, with both multiple inputs and multiple outcomes.

Assaultive behavior is patently only one of several possible responses to the types of stress to be measured in this design. Other critical events such as blood pressure, weight, and stress-related disease, as well as behavioral variables such as mental health, drug abuse, and delinquency can be profitably studied in this design.

¹This finding may have implications for racial differences in rates of reported assaultive crime. The greater reliance of blacks on police in problem situations may lead to a higher rate of official police intervention, as part of the help given by police officers. Any insights into the decision to deal officially with violent behavior can be of major importance to the accurate interpretation of official crime rates over time.

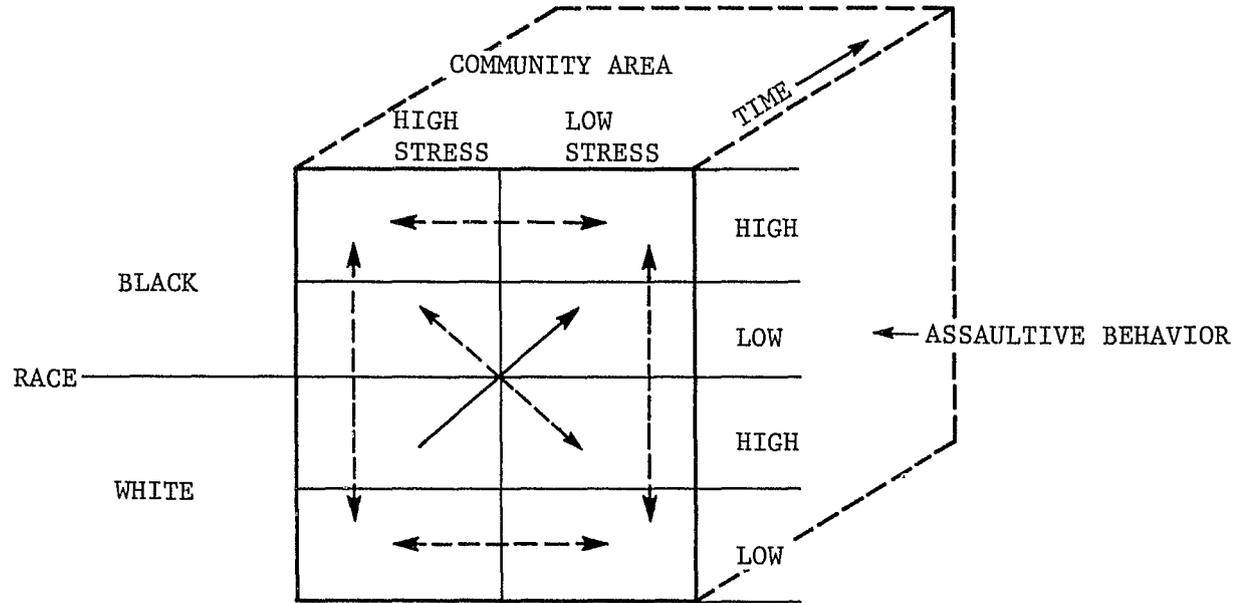
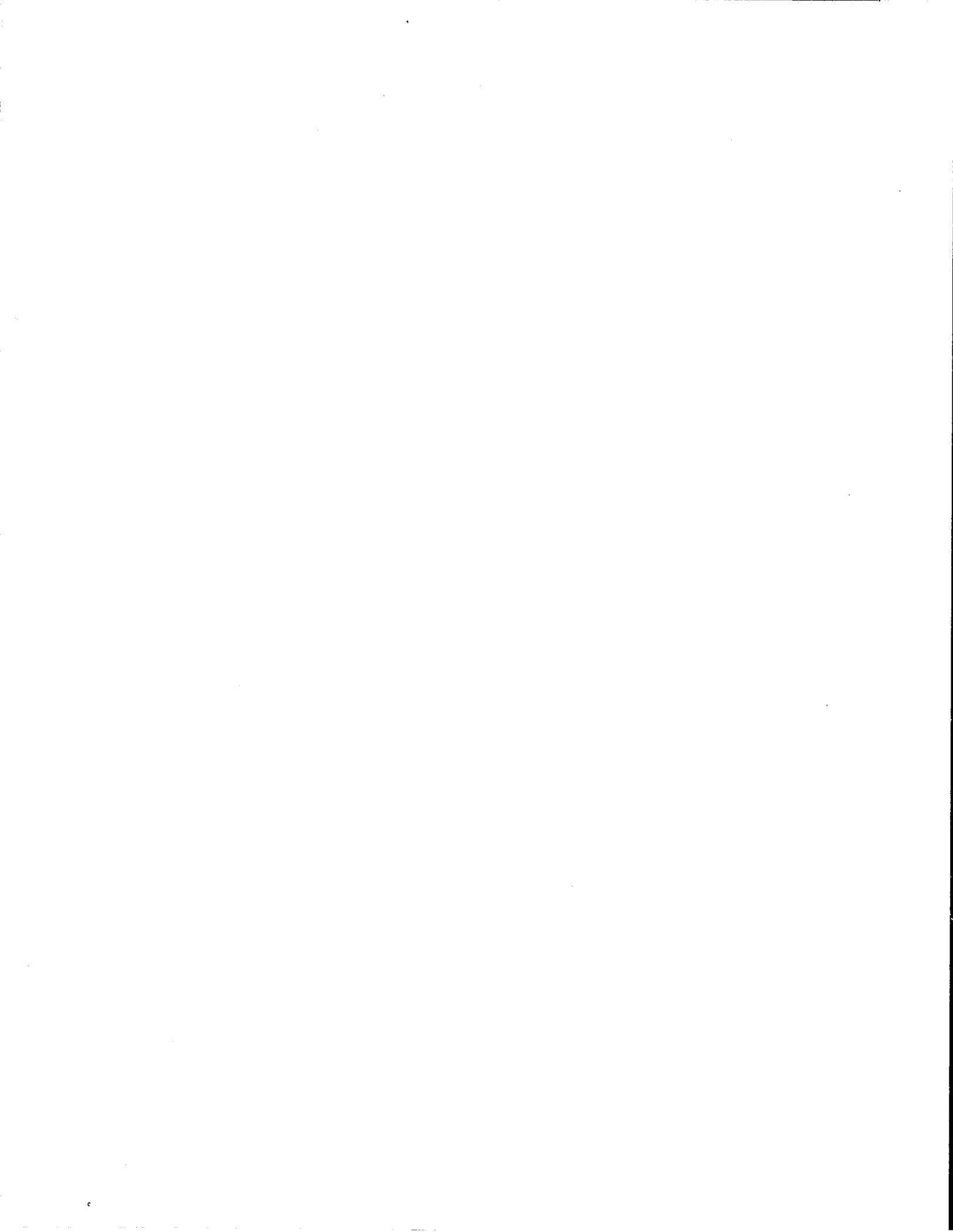


FIGURE 1
DESIGN FOR THE STUDY OF ASSAULTIVE BEHAVIOR IN FAMILIES



Indeed, the measurement of such alternative responses to stressors may be crucial in unraveling how specific types of family situations relate to assaultive behavior. Such a comprehensive design requires a multi-disciplinary approach.

Recent work has supported the need for such cross-disciplinary collaboration. Biological correlates of aggressive behavior have been found (Prescott and Wallace, 1978; Moyer, 1978; Mednick, 1978;), which argue that assault cannot be fully explained by social factors. Evidence of ecological impact on physiological functions, such as increase in blood pressure levels from lack of privacy (D'Atri, 1978), on the other hand, argues that biological functions cannot be studied in isolation from situational factors. Collection of data from family units facilitates explorations of genetic, biological, ecological, and social contributions to the various outcomes studied which could not be disentangled if limited measures only on a single family member were taken.

One caution which must be noted in designing such projects is the recognition that neither "blacks" nor "whites" are strictly homogeneous groups. Particularly within white areas, there are substantial ethnic variations which can affect the interpretation of black-white differences. It is clearly not appropriate to generalize from e.g., a strongly Albanian community to the general run of white culture. Neither is it economically feasible to study a large sample of neighborhoods in the depth which we are suggesting here. Researchers should be resigned to the need to carefully select urban areas for study which can provide adequate comparisons for ethnic groups.

Theoretical Considerations, Research Hypotheses and Questions

This section will deal with the application of this framework to concepts drawn from the literature on family assaultive behavior. The discussion will focus upon the study of black families, since this is the area where the problem has been most intensively studied.

In the discussion which follows, assaultive behavior will be assumed to be the resultant of two general types of processes: the weakening of inhibitions against using violence on other human beings, and the increase in the level of stress or provocations to violence. Both of these processes must be examined to understand the nature of assaultive behavior in families. Most of the literature deals with stress and provocations to violence--factors such as economic instability, a history of violence in the backgrounds of current family members, and blockage of opportunities in society. Much less has been said about factors which curb the expression of violence. We believe that many of the controls come from the socialization processes of childhood, and their interactions with the adult life

situation. While we will not explore the implications of the developmental aspects of such processes as moral internalization and identification with others, this is an area which might be fruitful in the search for the origins of aggression within families (Montagu, 1978). One source of control over assaultive behavior which we will explore later is the use of coping processes and mechanisms.

Change and conflict are inherent in any ongoing relationship between and among individuals and groups (Coser, 1956). The impulses and desires of one individual in a relationship often conflict with those of the other, and a mutually satisfactory means of resolution may not be found. The family, as a group whose members interact frequently on issues of importance to the individuals, can be a source of intense conflict in which the use of force may be an attractive means of resolving an issue in favor of the more physically or verbally aggressive family member. Thus, any theory of assaultive family behavior must be a theory of the management of change and conflict (Safilios-Rothchild, 1970; Sprey, 1969). This is contrary to earlier conceptualizations of the family as an equilibrium-disequilibrium system. Resolution of a given conflict does not restore the pre-existing equilibrium; it is only one episode in a continuous process of conflict resolution. Safilios-Rothchild (1970) and Sprey (1969) reject the model of family harmony and suggest that the family must be viewed as a system existing in an on-going state of change requiring reciprocal manipulation

This can help to explain both absence and degree of prevalence of assaultive behavior in families. The closer and more intimate the relationship, the more interaction, the more affective investment, the higher the potential for conflict (Coser, 1956). Because of the affective ties, there is a tendency to suppress or manage conflict. However, this may produce an accumulation of suppressed hostility, intensifying conflict when it does arise. Thus, the expression of conflicts at a low level may serve to maintain a relationship under stress, serving a positive function (Coser, 1956). However, storing up of hostility, or expression of conflict in ways which focus on attacking the other rather than upon problem solving may lead to a greater likelihood of destructive modes of dealing with the conflict in the family (Straus, 1974).

The conception of the family as a system of change and conflict management has important implications for studying assaultive behavior. First, it would be important to examine the nature of the relationship between conflict and assaultive behavior. Specifically, what are the issues, the varieties, and the levels of conflict which facilitate or constrain assaultive behaviors? What type of family affective processes increase or decrease conflict? Are there differences

between families and high and low stress areas or between blacks and whites in styles of conflict management?

In addition to these general questions, several hypotheses related to assaultive behavior seem to be suggested by the conceptualizations above:

- (1) The greater the suppression and accumulation of hostility, the greater the potential for more serious assaultive behavior when the hostility is finally expressed.
- (2) Expressions of conflict which are directed towards problem solving are more likely to constrain assaultive behavior in families, while expressions of conflict directed towards the domination or towards punishment of the other are more likely to facilitate assaultive behavior.

THE FAMILY SYSTEM AND ASSAULTIVE BEHAVIOR

We have identified two aspects of the family system that we believe are salient in studying assaultive crime: selected family structures and processes related to the internal functioning of the family unit, and family modes of managing environmental conditions and stress--i.e., coping.

Family Structures and Processes

Several aspects of family structure have been noted in the literature as being associated with family violence. We will focus on family composition, sex-role perceptions, particularly between spouses, economic stability (in many ways a special case of sex-role expectation), and child rearing practices, particularly with respect to divorce and the child as victim.

Family Composition

The concept of the nuclear family characterized by stability and harmony has been in the forefront of psychological and sociological theoretical formulations and study. As such, the nuclear family has been regarded as most desirable and has been used as the primary model with which to compare other family compositions. Deviations from the above model have more often than not been viewed as evidence of family instability, impaired family functioning, and family disorganization.

In recent years, however, the conception of the nuclear and stable family model has been challenged. On the structure of the black family, Billingsley (1968) has elaborated on the variety of

family structures that exist in black communities, and he has emphasized the importance of these structural variations on aspects of family functioning. He developed typologies of black family structures which include various extended and augmented family units, and some single parent structures as well as the nuclear family. He also described the types of functions which a family must fulfill. He rejects the pathological concept of the black family, including the assumption that only the nuclear family can successfully fulfill functions ascribed to the family. One of his major themes is the need to examine the range of strengths in black families, particularly in the non-nuclear structures.

In a study of 321 black households, William and Stockton (1973) identified family structures consistent with Billingsley's original typology. They added single parent surrogates and an extensive list of individuals living alone or with non-relatives. These authors also investigated the association between family structures and the level of fulfillment of the family functions described by Billingsley. Several of the findings from this study seem relevant to the study of assaultive behavior. For example, they suggest that there might be more potential for conflict when a grandparent lives with a single parent and children than when the single parent and children live alone, stemming from the disputes over child rearing practices between the grandparent and adult offspring. Married couples living alone reported fewer problems in their marriage roles than did couples with children or couples who were living in extended families. Overall, families with both husband and wife present were more successful in terms of what is called instrumental functions (adequate levels of income, housing, health care, etc.) than were other family structures. Feelings of self-worth, social isolation, and family cohesiveness were also systematically related to family structure, as were adjustment to the parent role and the mental health of the children.

More recently, Kellam *et al.* (1977) examined family structure and mental health of children in a poor black community in Chicago. They identified some 86 family types, and found the presence of the grandmother to be an important mediating force affecting children's adjustment in female headed households. These studies indicate that not only the frequency of conflict but also the nature of the conflict was affected by family composition.

More work needs to be done to clarify the processes by which family composition affects family life, including rates of assaultive behavior. To give one example, D'Atri's recent work shows that the lack of privacy may be a stressor associated with higher blood pressure (D'Atri, 1978). Privacy (however defined) is probably hardest to come by in large, complex family structures, resulting in stress responses of various types. Such ecological variables may

provide links between family composition and assaultive behavior. The specific types of dyadic or group interactions possible in various types of families must also be explored. William and Stockton (1973) offer a number of interesting speculations in this area which can be further specified and tested empirically.

Thus, in our framework, some of the potential research questions related to family composition would be:

- (1) Is the absence or presence of assaultive patterns associated with various types of family structures? Is this relationship different within high and low stress neighborhoods?
- (2) What processes constrain or facilitate assaultive behavior in the various family structures? How do they differ between families in high and low stress areas? Does the presence or absence of certain family members (i.e., grandmothers) serve to constrain assaultive behavior in families?
- (3) What ecological correlates of family structure constrain or facilitate assaultive behavior? How are they associated with high or low stress neighborhood? (Warren, 1976).

Economic and Sex Roles

The family system is characterized by the presence of age and sex roles, which ascribe to each member certain expectations and functions. Traditionally, the husband is expected to be a source of steady income, while the wife provides a stable, nurturant home life. Thus, economic security is a significant variable influencing the male role in general. The black male has historically been impeded by a racist society from fulfilling the provider and protector roles, failing in the normative expectations of husband and father. Black unemployment is generally double the rate of whites (Bednarzik and St. Marie, 1977), with the urban black youths having the highest rates of all (McQueen, 1977). The exclusion of black males from the full range of job opportunities, accompanied by low income and high rates of periodic unemployment, serves to undermine the role of the black man in his family and generates hostile attitudes toward society (Street and Leggett, 1961; Parker, 1969).

This structural constraint on black males directly results in the large economic role traditionally played by black women in their families. More black females are in professional jobs than are their counterpart males (Ginzberg and Hiestand, 1969). And as (1975) suggests, economic satisfaction helps to account for perceptions of marital satisfaction. Male unemployment has been tentatively related to increased levels of interpersonal aggression and

crime (Bachman, 1978; Brim, 1961). A Detroit study on women in marital dissolution revealed that among black women, male economic role performance was one of the major factors contributing to marital dissatisfaction (Brown, 1976). These findings seem to indicate that black females do in fact expect their men to be the bread-winner of the family.

The combination of economic instability and traditional role expectations in turn are believed to have serious consequences on black male and female relationships, particularly within the family unit. In one interpretation, the chronic frustration in the economic role experienced by the black male is reflected in male degradation of the female, who may serve the role of key provider for the family, which the man is unable to fill consistently (Moynihan, 1965). Hauenstein and Harburg (1976) report that black females in both high and low stress areas in Detroit are more concerned about economic achievement than are white females, and are more dissatisfied with their marital relations. Both male degradation of the woman and female rejection of the man as stable provider can create a cyclical pattern of resentment and antagonism between the black male and female (Staples, 1967; O'Brien, 1971). The lack of respect for the other individual in the relationship may be an important factor in releasing controls against physical aggression. Interestingly, both black males and females tend to evaluate marital satisfaction less positively than do whites (Scanzoni, 1971; Brown, et al., 1977).

Given the impact of the economic structure on black male/female relationship, the theoretical formulations of Goode (1971) can provide another framework for studying assaultive crimes in black families. Goode suggests that family violence could be viewed in the light of a power system based upon possession and control over resources which yield power. With reference to family violence, he views force and its threat as most salient. And one of his postulates which seems relevant to black families is that persons who lack the other resources such as economic control, may be impelled to use overt force to exercise power. One area that might be examined in relation to sex roles is the extent to which assaultive behavior is associated with possession and control of resources.

From this review, the following hypotheses can be examined:

- (1) Assaultive behavior is more likely to occur in families where the female has more stable income than does her spouse than in families where the male is the primary provider. Where economic resources are shared by the partners, assaultive behavior should be lower.

- (2) Assaultive behavior is more likely to occur in families with fewer total resources that yield power than in families with more of these resources.
- (3) Where economic resources are low and unstable, and mates perceive low friendship, love, and respect, then assaultive behavior is more frequent.
- (4) Assaultive behavior by males will be more likely to occur where degradation of the female accompanies male economic instability.
- (5) The difference in the rates of assaultive behavior between high and low stress neighborhoods and between blacks and whites can be largely accounted for by the difference in the rates of economic instability.
- (6) These problems related to financial instability can be counteracted by appropriate coping mechanisms. The interaction between stressors and coping mechanisms may determine the level of assaultive behavior.

In addition to the above hypotheses some general areas could be explored, including whether assaultive crimes in families are more prevalent during marital dissolution, and what influence the various methods of handling resources have on assaultive crimes in the family. There may be a time in the life-career of a family when constraints recede and conflicts escalate, such as in the young children phase, or again after the children leave the home (Gould, 1978).

Child Rearing Practices

Children can enter into the processes which lead to assaultive behavior either as precipitators or inhibitors of intra-adult violence, or themselves as victims or participants in violence.

While considerable literature exists on child abuse and use of physical punishment as a form of discipline, less has been written on the child-parent relationship in violent interactions between adults. Preliminary data from work by Brown and Manela (personal communication) showed that among the sub-sample of divorcing families where violence was noted, the most frequently mentioned precipitating cause of violence was related to the handling of children and/or parental disagreement over children in the family. It might be reasonable to assume that, when parents are engaged in marital dissolution, conflict is more intense and children are frequently

manipulated by one or the other parent, further escalating an already stressful situation. We would hypothesize, also, that disagreements between adults over raising children would be a possible source of conflict in general, and a precipitating factor in assaultive incidents.

The impact of stresses surrounding child rearing on the marital relationship may be quite different in high and low stress families and in black and white families. Harburg *et al.* (1978), for instance, find that black women, while experiencing less satisfaction from their marital relationship, especially around economic issues, find greater satisfaction than their husbands in the area of child raising. This contrasts with the relatively sheltered environment of the low stress white families, where more emphasis is placed upon the parental role. The multiple demands upon black women may make them more satisfied with their relationships with their children, relationships where they can experience a reasonable amount of control, even when they are powerless in the rest of their life space. These considerations lead to the hypothesis that parental disagreement over child rearing will be more intense in low stress areas than in high stress areas, and that this incongruence will be more likely to be associated with assaultive behavior in low stress areas than in high stress areas. The same analysis leads to an analogous hypothesis about racial differences--the role of parental disagreement over child rearing practices should be greater in the precipitation of assault among whites than among blacks.

Child abuse and use of force in discipline provide two salient factors concerning assault in families: as historical preconditions and as current expressions of violence. It has been repeatedly hypothesized that people who abuse their families as adults were themselves abused or exposed to the abuse of others as children. That is, there is a generational transmission of the use of physical force in family conflicts. An important addition to research in this area would be to identify processes in situations where violence is not present in adult families despite the person's exposure to a high degree of violence in the family of origin. Conversely, it would be important to look at situations where there was little if any violence in the earlier family setting, but where violence is shown in the family of progeneration.

With respect to on-going family dynamics, the discipline literature fairly consistently reports an association between lower social class and more frequent use of physical punishment, along with a concomitant relationship between race and physical punishment. The strength of these correlations has been called into question by Erlanger (1974), who finds that the relationship is indeed consistent, but not large. The relationship between the approval of the use of physical punishment and the occurrence of child abuse in families

should be explored, especially in light of the numerous findings that approval and/or use of violence in one situation is directly related to the expression of further violence in another (Bandura, 1971; Straus, 1974). This also raises the issues of the boundaries between acceptable use of force to gain compliance by the child to parental commands and force which is of such an extreme level as to be labelled child abuse (Shah, 1978). Most reports of child abuse involve the discipline situation--the parent makes demands which the child does not or cannot fulfill, triggering the fury of the parent. Goode's formulation of the power relationships within the family may be relevant here, as parents who feel they have no other source of control over the situation may be more likely to resort to force, escalating into abuse under certain conditions.

A key area for exploration is the selection of the victim, particularly in the study of child abuse. Gelles, (1973) in his formulation of a sociological approach to child abuse, points out that battered children are frequently under the age of three, and therefore both more vulnerable to physical damage from adult forces and less able to comply with parental demands for conformity. Abused children are also likely to be the result of an unwanted pregnancy, and to represent a significant economic strain for a family which is unstable economically. Thus, the child which is abused is often the youngest child in a larger family. This child may be the "last straw"--the additional strain which overcomes the inhibitions about assaultive behavior in an already stressful situation. For women, the lack of control over their own fertility may be the ultimate form of powerlessness, making it more likely that they will use their physical power over the infants. There is also some evidence that child abuse is more common within families where there are cultural differences between the parents, and in cases where there is a high level of marital and family conflict.

Other researchers have looked at the phenomenon of the victim child--a child who for irrational reasons is selected for differential treatment by the parents (Johnson, 1949; Bermann, 1973). In such circumstances one might hypothesize that assaultive actions are more likely to occur (1) against the victim child if both parents reject the child, (2) against a spouse when there is rejection of the child by one parent and protection of the child by the other. The rejection of the child by the parents may, in turn, make it more likely that the siblings will direct their assaultive behavior towards the selected victim (Bermann, 1973). The dynamics of designating one child in a family for such scapegoating is an area that clearly requires further investigation, especially since we suspect that these systems are widespread.

A final topic in the area of the relationship of child rearing practices and assaultive behavior is what is referred to as the dual socialization process of black children. This refers to the explicit

socialization of black children not only in how to behave in the family, but also in how to deal with a harsh, racially oppressive society in which physical aggression may be seen as necessary for survival, particularly in high stress areas. A frequently heard type of statement is "survival, man, it's survival of the fittest, you do unto others before they do unto you, only do it to them first." This explicit acceptance of expediency may loosen controls against assaultive behavior, particularly among siblings and peers. The socialization of such norms in the family or in the neighborhood may provide a link between research on family violence and such sociological concepts as alienation (Merton, 1964) and the "subculture of violence" (Wolfgang and Ferracuti, 1967). An integral part of the concept of the socialization of the ethos of survival in young blacks is the notion that in a white-dominated society blacks may express their hostility against other blacks, rather than directly against whites. This shift in the target of aggression may account for at least part of the higher rates of violence generally within the black community. A generalization of this notion would imply that any individuals who feel themselves victimized and unable to direct their hostility directly towards the source of their victimization will be likely to displace their hostility against other victims. This notion has some support in the consistent findings that wife beating is associated with unstable employment of the husband (Steinmetz and Straus, 1973).

Management of Stress: Coping

Coping processes

The coping process as viewed in this paper is seen as a general problem solving process whereby individuals and groups attempt to respond, master, prevent, or alleviate stress-inducing situations. As one reviews the literature on coping and adaptation, there is general consensus regarding several dimensions useful in describing these concepts. First, it is acknowledged that there is a wide range of individual (and group) responses to stress. Secondly, the responses are very often shaped by general societal values and norms and the socialization processes within the family unit. Finally, the nature of the responses will determine the effectiveness of the problem solving efforts. The type of coping mechanisms used by family members may determine to a large extent whether or not high levels of stress will produce increases in assault.

Several typologies of individual, internal coping styles have been developed and tested. For example, using various ways of coping with anger, Harburg et al. (1973) found that suppression of anger was associated with living in high stress areas. Use of "discussion" responses to verbal attack was more common in women and in the middle class (Blakelock and Harburg, 1976). In a study of women experiencing marital

dissolution, Brown (1976) developed a typology of coping styles ranging from those characterized by evasion and withdrawal to those using direct purposive action resulting in some degree of problem resolution. In investigating coping styles of women experiencing marital dissolution, this study revealed that black women tended to be "compartmentalizers" when coping with problem situations. They more often were described as being able to segment or isolate their work life, functioning well in this area. However, they tended to avoid dealing with problems in interpersonal relationships. Behavior resulting from this method of coping might be perceived by black males as indifference on the part of the female or as her inability to deal with important problems in the relationship. Men in general tend to suppress their feelings and to deny their marital conflicts, even more than women (Brown, 1976). If such coping patterns are characteristic within black families, it may well intensify the vicious cycle described earlier in the black male/female relationship.

Statistics reveal that women are more often victims of assaults (Wilt and Bannon, 1977). Several factors might contribute to this in black families--notwithstanding that the male is physically stronger, the black female often controls significant economic resources. Further, if there is a tendency to compartmentalize, she may consciously or unconsciously precipitate the assault. More in-depth research on coping styles of black women might shed light on this issue. It would be important to know if, in fact, black females are generally compartmentalizers, whether there are variations between females in high and low stress areas, and whether the compartmental coping style is at all associated with assaultive crimes. It would be equally important to understand black male coping styles. Further, understanding of the interactions between the coping styles of various family members is likely to be required in order to understand the occurrence of assaultive behavior.

One form of coping with stressor situations within the family may be the expression of assaultive behavior outside of the home. It is not known at this point whether familiar conflict is substantially involved with the high levels of violence reported within the black high stress neighborhoods. However, the findings of Straus (1974) and Bandura (1971) that expression of hostility or aggression leads to further expressions of hostility, suggest that fights outside the home will not effectively reduce the likelihood of fights within the home.

In seeking to answer the question of what facilitating and constraining forces might impact upon assaultive crime, we suspect an understanding of the manner in which different families as groups cope with stressors in general is very important. McQueen (1977),

looking at poor black families, found that even at poverty levels of income, some families were able to function without the welfare dependency which is the stereotype of the extreme poor. Indeed, some families below the poverty level were able to maintain small savings, stay out of debt, and purchase homes. This study is highly suggestive, since it dramatizes the presence of families which manage effectively with a high level of stressor conditions. We suspect that not only is skill in problem solving high in such families but that their activities reflect a cohesive value system, and an ability to deal flexibly with problems as they arise (Koos, 1946).

The family is often viewed as a social system where the values and interactions influence modes of adaptation among family members. In some families values and modes of behaving might de-emphasize open verbal expression as well as physical expression (fighting) among family members and with persons outside the primary unit, while in others the reverse might be the case. Some of the data on family violence suggest that poor working class families tend to have values which support the use of physical and aggressive behavior in parent/child and sibling relationships more than do middle class families. The dual socialization concept for black families, with its rationalization of exploitative behavior, may relate to both assaultive behavior and manipulative coping mechanisms. This whole issue of how values are related to coping and to violence needs more systematic examination.

This discussion leads to several hypotheses which could be investigated in the framework offered here.

- (1) Higher incidence of assaultive behavior would be expected within family units in which open expression of anger and hostility directed at other family members were sanctioned.
- (2) Individuals whose coping styles tended to reflect denial or avoidance of feelings of anger would be more likely to be victims of assaultive behavior.
- (3) The rate of assaultive behavior would be lower in those families which have developed more effective methods of coping with general environmental stress.
- (4) The rate of assaultive behavior in families will vary with the type of neighborhood support systems available.

Coping devices

Coping devices are response behaviors which involve the use of external artifacts or social structures to stressor situations. Thus, while alcohol itself is just a liquid, the use of alcohol to aid in dealing with a marital problem is a coping device. Every person seems to select a device or set of devices to aid in managing feelings of stress. The drinker also smokes, the unemployed watch TV and "hang out," the housewife listens to music and makes out schedules, and so on. We will call these overt, external factors coping devices, in order to distinguish them from the coping processes already discussed. The timing, frequency, duration, chronicity, and cyclic patterns of coping devices are largely unknown, particularly as they relate to stress and assaultive behavior. Family coping devices such as shared play-time, family get-togethers, TV watching, and church attendance may serve as important constraints on the level of conflict within the family. These are all external routines as contrasted with internal processes and interpersonal dynamics.

Mechanisms of coping related to presence and absence, and degree of assault of most interest here are alcohol, religion, and use of weapons. Alcohol, in particular, has been associated with assaultive crime. Research however tends to ignore that physical confrontation may be avoided as one party leaves the home to go to drink. Most of the literature, therefore, deals with the presence of alcohol in conflicts which have escalated to the level of physical assault. Much of this association is attributed to the function of alcohol as a releaser of inhibitions against violence. However, it has also been pointed out, particularly in the context of wife and child abuse, that the use of alcohol may be used as an excuse to justify the use of physical force. "I was drunk and didn't know what I was doing" can be a convenient explanation for violence which the individual would have committed anyway. We also know very little about the inhibiting effects of alcohol, or use of liquor as a drug which constrains confrontations, when used moderately or outside the home after the day's work.

Religion is another coping device which can be associated with either the control or the expression of assaultive behavior. On the one hand, a heavy involvement with religion can provide a resource for coping with stress, particularly authoritarian religions which stress punishment by a powerful and vengeful God, can serve as justification for extremely violent behavior. In areas of widespread fundamentalism, for example, child abuse may be justified as "beating the sin" out of the child. In the black community, the church has historically served to instill values, provided a range of social and economic services, and generally helped to ameliorate oppressive social conditions. An ideology which stresses future rewards for

virtuousness may make it easier to cope with the lack of economic resources in everyday life. Involvement with such church activities may serve as a buffer, especially in high stress neighborhoods, against the influence of local disorganization and instability. In any case, McQueen (1977) found that poor families who seem to cope well despite economic hardship were more heavily involved in church activities than were other poor families.

Use of weapons as coping devices in the black neighborhood, in particular, is almost universally associated with a high level of serious assaultive behavior. Anecdotal evidence, at least, associates the habitual carrying of a weapon with a need to establish control in people who feel themselves to be without power in a threatening environment. It is clear that the availability of weapons in conflict situations can seriously escalate the consequences of assaultive behavior. The extent to which the presence of weapons may serve as a deterrent to violence is unclear.

Alcohol, religion, and weapons are only a few examples of coping devices which could have important impacts upon the expression of assaultive behavior. Others which should be explored are social activities, eating, smoking, humor, and most especially, television. The use of the "idiot box" in reducing or facilitating interpersonal interaction and conflict may be an important factor, particularly in high stress neighborhoods, where the limited resources prevent the family members from participating in other forms of entertainment. Gorney *et al.* (1977) in an experiment with high-income professional families, found that families exposed to large doses of violent TV programming had higher scores on measures of family arguments and tension than did families exposed to "family" type programming. We cannot close this discussion without noting that the function of "humor" as an individual and family coping mechanism in the management of stressor events in black family life simply has not been explored except in literature (Wright, 1963; Malamud, 1971).

Summary

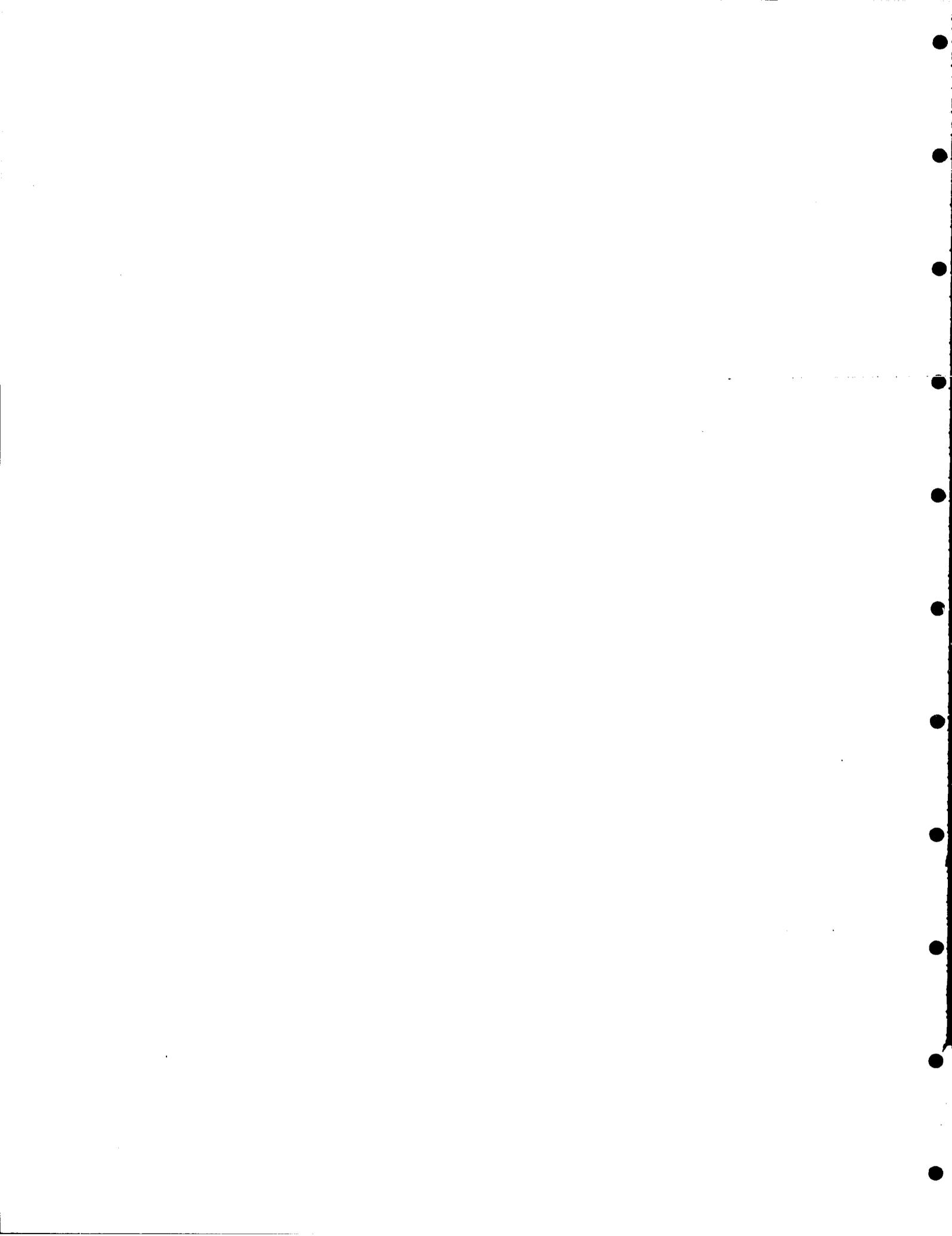
This paper has attempted to provide a framework for the study of assaultive behavior, focused on black families. We emphasize taking a comprehensive approach which allows future research to be developed from a variety of leads. Our research framework incorporates the following assumptions:

- 1) A wide range of assaultive behaviors must be examined.
- 2) Both the factors which provoke assaults and factors which inhibit assaults must be considered. Further, the interactions between these two sets of factors will provide a more comprehensive explanation of assaultive behavior.

- 3) The family must be studied in the context of the community within which it resides.
- 4) The family is viewed as a conflict management system. This means that the focus of the study of assaultive behavior in the family will be on the role of such behavior in response to various forms of internal and external change and conflict.
- 5) Any design for comprehensive research on assaultive behavior must allow for multiple comparisons to be made within and between racial and neighborhood stress groups.
- 6) Multiple health outcomes should also be included in the research.

Within the contexts of these general assumptions, several specific areas of study were reviewed. Family structure including family composition, sex role performance and expectations, family resources such as economic stability, and child rearing practices were discussed. Variations in these dimensions of family life were hypothesized to be related to the absence or presence of assaultive behaviors. Coping processes and devices were also suggested as possible mediators of the effect of stressors on family assaultive behaviors. We have presented, then, a conceptual framework for the study of assaultive behavior in the family. We do not claim to have been exhaustive of the forces which affect the incidence of violence in the family setting, but to have selected some of the aspects which we consider most salient and promising.

The need for further understanding of familial violence is underscored by the statistics on the frequency of homicides and assaults in the family, as well as the danger to police who are called on to control violence as it occurs. Eventually, research in this area should help to develop effective programs for intervention, for training of police and other service agencies and, ultimately, for prevention of at least some of the most damaging types of family assault.



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ROLE OF PAIN AND PLEASURE IN THE DEVELOPMENT OF
DESTRUCTIVE BEHAVIORS: A PSYCHOMETRIC STUDY OF PARENTING,
SEXUALITY, SUBSTANCE ABUSE AND CRIMINALITY

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INTRODUCTION

It has been long recognized that early life experiences influence the course of development and contribute substantially to the quality of intellectual, social and emotional functioning (1-60). The relationship between the early environment and later juvenile and adult behaviors have been studied with considerable success at both the animal and human levels. In particular, major insights into the origin of social and emotionally destructive behaviors have been achieved through the systematic, comparative animal studies of "maternal-social" deprivation conducted by the Harlows, their colleagues and many other students of comparative animal behavior (8-11, 61-73). These studies have demonstrated that separation of the newborn from the mother and peers shortly after birth and reared in social isolation where they could see, hear and smell other animals but could not touch or be touched by other animals resulted in severe social and emotional pathologies of behavior. During early life these symptoms include depressive, withdrawn, autistic-like behaviors; stereotypies, e.g., rocking, head-banging and chronic self-stimulation (toe and penis sucking); and hyperactive and hyper-reactive syndromes. In adolescence and adulthood violent behaviors would emerge which includes self-mutilation; violent unprovoked attacks upon other animals; and mothers brutally attacking their newborns (1, 11, 14-16, 42-43, 62, 65-80).

There appears to be little question that the primate social isolation rearing studies provide the best animal model for understanding human violence and pathological aggression. Similar abnormal social and emotional behaviors have been described in human infants, children and adults who have an early history of "maternal-social deprivation" or social isolation (2-7, 18-24, 28, 52, 58-59, 81-86).

*The views expressed are those of the author and do not necessarily reflect the views of the National Institute of Child Health and Human Development, DHEW.



Neurobiological Foundations

In an attempt to provide a neurobiological foundation and understanding of these abnormal social-emotional behaviors, an analysis of the sensory environment of "maternal-social deprivation" and social isolation rearing studies have lead to the conclusion that the abnormal developmental outcomes of these early environments can be attributed to sensory deprivation of the emotional senses, i.e., touch (somesthetic sense) and movement (vestibular sense) and not to the cognitive senses (vision and hearing). Additionally, it was postulated that these early sensory deprivation environments represented a special instance of partial functional sensory deafferentation according to Cannon's Law of Denervation Supersensitivity that would induce both neural structural (morphological) and/or neurofunctional (neurochemical and electro-physiological) abnormalities in brain development (87-95).

A specific rationale was given to expect abnormalities in the cerebellum, limbic and inhibitory forebrain structures, and specifically, those structures that are recipients of sensory afferents from the somesthetic and vestibular senses (12, 96, 97). Studies have now documented both electrophysiological and neuromorphological abnormalities in the primate brain consequent to social isolation thereby providing a sensory neurobiological foundation for these "social-cultural" environmental effects (61, 94-95, 98-104).

A particular significant finding was the identification of deep-brain spike discharges in the cerebellum and limbic structures of isolation reared primates (61, 98-99). Saltzberg (105)* developed an innovative signal analyses detection program which permitted the detection of these deep-brain spike discharges from ordinary surface scalp EEG recordings. This technological breakthrough raises the possibility of being able to detect the occurrence of deep-brain spike discharges in individuals who have a history of pathological violent behavior. Such findings would define a subset of violent individuals who have a pathological loss of impulse control associated with impaired brain

*Although this methodology was developed in 1968-1970 and described in 1970-1971 (12, 105) it has not been possible to obtain the necessary continued research support to determine the human clinical usefulness of this neuropsychological diagnostic method. Research support for the identification of deep-brain spike discharges in isolation reared rhesus and the development of signal analyses methods to detect deep brain spike activity from scalp EEG recordings (105) was provided under NICHD Contract PH 43-68-1412 "Mathematical Quantification of Developmental Electrophysiology of Brain Function-EEG," Bernard Saltzberg, Principal Investigator; James W. Prescott, Scientific Project Officer

functioning. Since spike discharges have been traditionally associated with outbursts of violent behaviors (106-109), it appears possible to develop an independent neurobiological criteria to aid the courts in determining whether individuals with a history of violent behavior can be safely returned to the community; to assign such individuals to rehabilitation programs and to assess their effectiveness; to assign reduced responsibility for violent behavior in such individuals; and in the tragic area of child abuse to be able to determine whether it is safe to return an infant/child to parent(s) who have seriously physically assaulted their child. It would seem clear that if such parent(s) had evidence of depth-spike discharges it would be unsafe to return their children into their custody. The prevention of further child abuse and loss of child life could possibly be realized if this technology was proven to have reliability and validity.

The studies of Riesen, et al. (103), and Struble, et al. (104) are also particularly noteworthy since they confirm not only the general principles of the sensory deprivation model but provide specificity of sensory modality mediation in their findings of abnormalities in somatosensory and motor cortex but not in visual cortex. Additional neurobiological support for this theoretical model are provided by studies of Berman, et al. (110) who demonstrated that paleocerebellar but not neocerebellar decortication resulted in a profound elimination of the pathological violent behavior in isolation-reared rhesus.

Studies of isolation rearing in rodents are also relevant since neuromorphological and neurochemical abnormalities have also been found in the brains of these animals (13, 111-118).

The studies of Erway and his associates on the role of manganese and zinc deficiency in otoconia abnormalities (calcium carbonate crystals located in the utricle and saccule of the vestibular sensory receptor mechanism) and their relationship to behavioral abnormalities including stereotypies (head shaking and circling), hyperactivity-hyperreactivity and violence need to be mentioned and integrated within the vestibular-cerebellar mechanisms mediating and regulating social-emotional behaviors (119-120).

The demonstration of impaired pain perception in isolation reared animals and somatosensory deprived children with alterations of brain and/or platelet serotonin linked to social isolation and altered pain perception are another set of phenomena to consider within this context (11, 15, 18, 68, 78, 121-134). Special emphasis should be given to those studies that document the role of the cerebellum in pain perception and the mediation and regulation of sensory-emotional and motor behaviors particularly violent/peaceful behaviors (12, 101, 128-142).

The common observation of neurosurgeons of the "sweet-tempered" state of children following surgery for meduloblastoma, a cerebellar tumor most common in children, is not well known to most non-neurosurgical professionals and is another example of the role of cerebellum in affective processes (Berman, 110). A more systematic review of the literature relating cerebellum to social-emotional behaviors has been presented elsewhere for those interested in pursuing this aspect of the sensory deprivation theory (143). Other reviews on the relationship of brain mechanisms to violence should be consulted since a review of these data is beyond the purview of this paper (83, 107-109).

Cross-Cultural Foundations

The sensory deprivation model of social-emotional dysfunctioning, alienation and violence lead to cross-cultural studies of parenting and sexuality in pre-industrial societies. Utilizing the information available in Textor (144), it was possible to account for 98% of the variance in 49 cultures of "killing, torturing and mutilation" of the enemy from two independent predictor variables: (a) degree of infant affectional deprivation; and (b) degree of repression of premarital coitus.* These data were interpreted as providing strong support for the central thesis that deprivation of physical affection or somatosensory pleasure (mediated by the somesthetic and vestibular senses) in human relationships is the primary developmental factor in the ontogenesis of pathological violent behaviors (12, 59, 60).

These cross-cultural studies were based upon data collected by three different sets of cultural anthropologists whose coded behaviors of these pre-industrial cultures were related in accordance with the sensory deprivation model of human alienation and violence. This constituted a triple-blind study. In addition, the cross-cultural studies are interpreted by the senior author as a true experimental study of "nature" and not simply a correlation study. "Nature" provided (for whatever reason) a set of cultural phenomena that could be experimentally contrasted (Nature and not the human investigator was the experimental agent). It was found that Nature's experimental

*The Jivaro was the only exception who were characterized by high infant physical affection, permissive premarital coitus but high adult physical violence. Harner (1972, 1976) has stated that the Jivaro have been misclassified with respect to their classification on infant physical affection which is low not high and therefore results in a 100% correct classification. Other reasons are cited that also question their classification concerning their sexual permissiveness (Harner, 1972; Prescott, 1977).

conditions fitted well a theoretical model with a high degree of predictive validity (98% correct classification of peaceful/violent behaviors). It is argued that this analyses of human cultures is comparable to the astronomers' observations and study of celestial bodies where lawful relationships among the celestial bodies can be derived from such observations and study. Astronomy, as a science, is not dependent upon the experimental manipulation of celestial events to function as a scientific discipline, nor to be able to identify and describe lawful relationships--the ultimate validating criteria of a scientific discipline. Similarly, for cross-cultural studies of human cultures where manipulation of these human cultures is not required to derive lawful relationships among behavioral patterns expressed by these cultures. A detailed review of these data and the acknowledgment of the pioneering studies of the Whitings (145-148) is presented elsewhere and will not be further elaborated upon herein (143).

The above synoptic overview of the history of the development of somatosensory deprivation theory of human alienation and violence is provided as a background to the psychometric studies undertaken on a modern culture to provide cross-validation of the principles derived from comparative animal and cross-cultural studies of the consequences of affectional deprivation during the formative periods of development. The following data is the result of these psychometric studies.

Psychometric Foundations

A questionnaire "Somatosensory Index of Human Affection" has been developed over the past several years to evaluate the role of pain and pleasure in human development and their relationship to social, sexual, cultural and moral values and behaviors. Questions focused upon parent-child relationships; sexual values and behaviors; drug and alcoholic behaviors; and moral values concerning pain and pleasure in human relationships. The questionnaire was initially 43 items and has grown with added items over the years to 104 items. Questions were rated 1-6 from agree strongly to disagree strongly.

There are three sets of data to be reported. Study A involved an analysis of all existing data in the data bank which included question items 1-56 with a total sample of 1955 subjects (1976). Sub-samples were constructed by grouping those respondents who agreed to both maternal deprivation questions, i.e. #2: My mother did not hug and kiss me a lot; and #4: My mother does not really care about me and grouping those respondents who disagreed to both maternal deprivation questions. These two groups were then compared with respect to each of the other items on the questionnaire for male and female

subjects separately. A similar procedure was followed to assess the correlates of paternal deprivation (questions #3 and #5).

Table 1 lists the sample sizes for this comparative analysis where variations in sample size for questions 44-56 can be observed due to the addition of questions to the questionnaire over time. The sample consisted of high school and college students; attendees of public lectures given by the authors; attendees of the annual meeting of the Society for the Scientific Study of Sex and sexuality programs; drug addicts in a treatment program; institutionalized alcoholics; a humanist group; an abortion group; a lesbian group; and American Indian group; and members of a "growth community" in California where most of the sample was collected. This diversity of sample was considered to give a better general estimate of the correlates of parental deprivation than just a college sample. The mean and standard deviation of ages ranged from 20.5 (2.3SD) years for the college sample to 44.7 (10.7 SD) years for the SSSS group.

STUDY A: PARENTAL AFFECTIONAL DEPRIVATION: NORMATIVE STUDIES

Maternal Affectional Deprivation

Table 2 lists the nine correlates of maternal deprivation that were significant for both males and females. Chi-square values, associated PHI coefficients and the significant differences of the PHI coefficients between the males and females are reported. This table illustrates that maternal deprivation of affection and caring is significantly linked with lack of observable spousal affection; parental arguments and punishment; a need for touching; and feeling like hitting someone. Females have significantly higher correlates of maternal affectional deprivation with paternal affectional deprivation and parental arguments than do male subjects and also a significantly greater correlate with a need for touching than male subjects. Males, however, report that maternal deprivation has a greater linkage with paternal punishment than reported by females.

Table 3 lists the significant correlates of maternal affectional deprivation for males which are not significant for females. There are four significant correlates, two of which involve alcohol (alcohol induced aggression and alcohol is more satisfying than sex) and two body aversion items (body odors and nudity).

Table 4 lists the significant correlates of maternal affectional deprivation for females which are not significant for males. There are eleven (11) significant correlates which is approximately four times as many significant correlates than found for males. The most significant correlate is failure of mother to discuss sex; the next

TABLE 1

NORMATIVE STUDY
SAMPLE SIZES: MATERNAL AND PATERNAL DEPRIVATION

QUESTIONS	MOTHER		FATHER	
	MALES	FEMALES	MALES	FEMALES
1-43	456	842	375	760
44-52	267	496	218	450
53	129	251	100	228
54	61	129	51	115
55	62	130	51	117
56	55	96	44	85

TABLE 2

MY MOTHER DID NOT HUG AND KISS ME A LOT
 MY MOTHER IS OFTEN INDIFFERENT TOWARD ME

M = 456; F = 842

MALE		FEMALE		CORRELATES: NORMAL MALES AND FEMALES
X ²	PHI	X ²	PHI	
49.78	.34	134.54	.40	I have rarely seen my parents hug and kiss each other.
33.54	.28	179.64	.46*	My father did not hug and kiss me a lot.
87.61	.45	195.08	.49	My father does not really care about me.
6.84	.13	76.40	.31*	My parents have many unfriendly arguments.
9.85	.15	6.07	.09*	I remember when my father punished me a lot.
28.39	.26	78.83	.31	I remember when my mother physically punished me a lot.
14.74	.19	103.82	.35*	I do not get enough touching.
8.47	.14	26.94	.18	My father has not adequately discussed sex with me.
4.72	.11	15.58	.14	I often feel like hitting someone.

*P < .005: Significant differences between PHI-coefficients.

TABLE 3

MY MOTHER DID NOT HUG AND KISS ME A LOT
 MY MOTHER IS OFTEN INDIFFERENT TOWARD ME

M = 456; F = 842

CHI-SQUARE		CORRELATES: NORMAL MALES
MALE	FEMALE	
13.93	NS	I get hostile and aggressive when I drink alcohol.
8.41	NS	Alcohol is more satisfying than sex.
5.89	NS	Natural fresh body odors are often offensive.
4.25	NS	Nudity within the family has a harmful influence upon children.

TABLE 4

MY MOTHER DID NOT HUG AND KISS ME A LOT
 MY MOTHER IS OFTEN INDIFFERENT TOWARD ME

M = 456; F = 842

CHI-SQUARE		CORRELATES: NORMAL FEMALES
MALE	FEMALE	
NS	61.04	My mother has not adequately discussed sex with me.
NS	41.71	I often get "uptight" about being touched.
NS	18.35	I remember when I ran away or wanted to run away from home.
NS	13.69	Little or no current religious affiliation.
NS	8.45	I usually do not get much pleasure from my sexual activity.
NS	8.34	I usually feel more powerful or aggressive when I have sex with someone.
NS	6.51	Sexual pleasures help build a weak moral character.
NS	6.17	I often dream of either floating, flying, falling or climbing.
NS	4.54	I drink alcohol more often than I experience orgasm.
NS	4.40	Society should interfere with private sexual behavior between adults.
NS	3.93	I tend to be extreme in my political view.

most significant correlate is getting "uptight" about being touched followed by wanting to run away from home and having little or no current religious affiliation. The next three most significant correlates involved impaired ability to experience sexual pleasure; having aggressive/power feelings in the sexual relationship and believing that sexual pleasure helps build a weak moral character. Other significant correlates include dreaming of either floating, flying, falling or climbing--an item that taps psycho-vestibular functioning and was included since vestibular sensory deprivation has been linked to dysfunctional behaviors; alcohol is experienced more frequently than orgasm; societal interference with private adult sexual experiences and political extremism. These data indicate that maternal affectional deprivation has stronger and more widely pervasive influence upon psycho-social and sexual functioning for females than for males. Affectional-sexual domains of functioning appear to be primarily adversely affected in females by maternal-affectional deprivation than in males.

STUDY A: PARENTAL AFFECTIONAL DEPRIVATION: NORMATIVE STUDES

Paternal Affectional Deprivation

Table 5 lists the eight correlates of paternal affectional deprivation that were significant for both males and females. Chi-square, PHI coefficients and significant differences in PHI coefficients between males and females are given. The majority of significant correlates involve maternal and parental attitudes and behaviors that reflect affection; arguments; punishment and failure to discuss sex matters. The last item in the table "Sexual pleasures help build a weak moral character" is the only item that is significantly linked with paternal affectional deprivation for males but not females. It will be recalled that a similar relationship occurred for females, i.e., this item of immorality of sexual pleasure was significantly linked with maternal affectional deprivation for females but not males (Table 3). Thus, attitudes toward the morality of sexual pleasure appear to be influenced along same-sex identities in the parent/offspring relationship. It should be noted that all five significantly different PHI coefficients between males and females are larger for the females. These findings again support the conclusion that females are more strongly influenced by paternal affectional deprivation experiences than are males.

Table 6 lists the ten correlates of paternal affectional deprivation that are significant for females but not for males. There are ten times as many items of behavioral functioning that are significantly linked to paternal affectional deprivation for females than for males. This provides additional support for the conclusion that females are more vulnerable in the magnitude and diversity of behavioral functions

TABLE 5

MY FATHER DID NOT HUG AND KISS ME A LOT
MY FATHER IS OFTEN INDIFFERENT TOWARD ME

M = 375; F = 760

MALE		FEMALE		CORRELATES: NORMAL MALES AND FEMALES
X ²	PHI	X ²	PHI	
80.75	.47	195.54	.51	I have rarely seen my parents hug and kiss each other.
78.48	.46	243.95	.57**	My mother did not hug and kiss me a lot.
48.96	.37	193.55	.51***	My mother does not really care about me.
21.89	.25	98.04	.36*	My parents have many unfriendly arguments.
25.38	.27	117.64	.40**	I do not get enough touching.
11.01	.18	61.07	.29*	My mother has not adequately discussed sex with me.
40.70	.37	60.71	.29	My father has not adequately discussed sex with me.
4.54	.12	38.71	.23	I remember when my mother physically punished me a lot.
3.77	.11	NS	.07	Sexual pleasures help build a weak moral Character

* P < .05

** P < .02 = Significant differences between PHI-coefficients.

*** P < .005

TABLE 6

MY FATHER DID NOT HUG AND KISS ME A LOT
 MY FATHER IS OFTEN INDIFFERENT TOWARD ME

M = 375; F = 760

CHI-SQAURE		CORRELATES: NORMAL FEMALES
MALE	FEMALE	
NS	32.38	I often get "uptight" about being touched.
NS	23.04	Little or no current religious affiliation.
NS	16.73	I remember when my father physically punished me a lot.
NS	15.55	I remember when I ran away or wanted to run away from home.
NS	13.70	The establishment has dehumanized America.
NS	9.23	Responsible extramarital sex is agreeable with me.
NS	8.74	I get hostile and aggressive when I drink alcohol.
NS	6.32	I often feel like hitting someone.
NS	5.06	I usually do not get much pleasure from my sexual activity.
NS	4.10	I enjoy affectional pornography.

adversely affected by affectional deprivation than are males. This issue will be returned to later. The most significant correlates of paternal affectional deprivation for females include getting "uptight" about being touched; little or no current religious affiliation; paternal punishment; running away from home; and believing that the establishment has dehumanized America. Other significant correlates include acceptance of responsible extramarital sex; alcohol-induced aggression; feeling like hitting someone; lack of pleasure in sexual activity; and enjoyment of affectional pornography. These data are particularly interesting since it documents the major role of the father in producing social/sexual dysfunctioning in females consequent to parental affectional deprivation which is significantly linked with paternal physical punishment. Is it so surprising to find daughters with such depriving and punitive fathers to be "uptight" about being touched; running away from home; expressing a greater need for physical affection through acceptance of extramarital relationships and at the same time being impaired in their ability to find pleasure in their sexual activity? The rejection of religious affiliation appears to be a part of the rejection of the patriarchal-monistic dyad where religion in American society is highly male-oriented and male-dominated. These data strongly indicate that the father must assume a positive affectionate relationship with his daughters (and mothers as well) if they are to develop a satisfactory social, emotional and sexual life. It has been suggested elsewhere (Prescott, 1977) that the human female has an evolutionary biological advantage to experience and integrate pleasure into higher levels of consciousness (higher brain centers) than do males but are also more vulnerable to the deprivation of physical affectional pleasure than are human males. This difference was suggested to account for sex differences in aggression and violence when its absence facilitates violent behaviors (59).

These issues will be returned to later.

STUDY B: PRISON STUDY OF NON-ADJUDICATED ALLEGED OFFENDERS*

Through the interest and cooperation of Gordon C. Kamka, Warden Baltimore City Jail; Richard W. Friedman, Director, Mayor's Coordinating Council on Criminal Justice; Dan Lipstein, Associate Director for Evaluation, Mayor's Coordinating Council on Criminal Justice (Baltimore); Doreen Riggin, Criminal Justice Evaluator, Mayor's Coordinating Council on Criminal Justice (Baltimore) and Marty Katzenstein, Director, Treatment Services, Baltimore City Jail, it was possible to obtain the

*Baltimore City Jail is primarily a pre-trial detention facility. The majority of prisoners housed at the City Jail have not been adjudicated of the offenses for which they have been charged.

interest and support of prisoners in participating in this survey. Special acknowledgement is given to Dan Lipstein who took a particular interest in the theoretical and experimental research underlying the survey instrument and arranged meetings with the Warden; members of the Governor's Commission on Crime; law enforcement officers; and other interested parties to view films and slide material related to this study. The successful use of the survey instrument where certain word modifications for the prison sample was necessary is due to Marty Katzenstein who pretested the questionnaire. Very special thanks goes to Doreen Riggin who made possible the selection and arrangement of the prisoner sample for testing. The basic support and continuing interest of Gordon Kamka, Warden, Baltimore City Jail in attempting to find new knowledge and alternatives in dealing with social offenders made this study possible. Hopefully, this information will help contribute to those objectives. Additional details of the prison sample and the administrative procedures in enlisting the support of the prisoners in this survey is given in Appendix A.

The total prison sample was 158 subjects with 117 male and 41 female participants. The male sample consisted of 74 prisoners from the general population; 27 from a homosexual ward; and 16 from a special drug rehabilitation ward within the prison. The above sample was culled from a larger sample size where questionnaires were deleted that were seriously incomplete or were not meaningfully responded to, e.g., checking mostly all 6's or all 1's.

The first set of analyses of the prisoner data involved an analyses of the correlates of parental affectional deprivation that was previously reported for normal subjects. Only male prisoner responses are reported in this analyses since establishing groups with a double criteria of agreeing with both maternal affectional deprivation (Q2) and maternal indifference (Q4) versus disagreeing with both yielded too small a sample size for the female sample (N=41) to provide stable statistical values

Table 7a presents a comparison of prisoners who agreed with both statements: "My mother did not hug and kiss me a lot" (Q2) and "My mother does not really care about me (Q4) versus those prisoners who disagreed with both of these statements. This yielded a sample size of N=75 and the x^2 , P value and PHI coefficients associated with the relationship between maternal affectional deprivation and other questionnaire items are listed in the table. In addition, the PHI coefficients for normal males are listed and were tested for significant differences with the prison sample. It can be seen for the prison sample that maternal affectional deprivation and indifference are significantly linked to (a) not getting enough touching; (b) suicidal impulses; (c) paternal indifference and several items of sexual

TABLE 7a

MY MOTHER DID NOT HUG AND KISS ME A LOT
 MY MOTHER IS OFTEN INDIFFERENT TOWARD ME

MALE PRISONERS (N = 75)			NORMAL MALES (N = 456)	
X ²	P	PHI	PHI	CORRELATES
22.41	.0000	.59*	.19	I do not get enough touching.
17.14	.0000	.51	NT	I sometimes feel like killing myself.
16.95	.0000	.52	.45	My father does not really care about me.
12.07	.0005	.44*	.06	Drugs are more satisfying than sex.
11.54	.0007	.44*	.00	Sexual pleasures help build a bad moral character.
10.85	.001	.43*	.15	Alcohol is more satisfying than sex.
10.48	.001	.42*	.02	Prostitution should be punished by society.
9.65	.002	.40*	.13	My parents have many unfriendly arguments.
8.85	.003	.39*	.01	I take drugs more often than I experience orgasm.
8.70	.003	.39*	.08	I often feel I am sexually taken advantage of.
8.30	.004	.39*	.06	I usually do not get much pleasure from my sexual activity.

*PHI-coefficient significantly greater than normal males.

NT = Not Tested.

behavior including (a) drugs are more satisfying than sex; (b) immorality of sexual pleasures; (c) alcohol is more satisfying than sex; (d) punishment of prostitution; (e) drugs preferred to orgasm; (f) sexual exploitation; and (g) impaired ability to experience sexual pleasure. It is striking that 8 of the 11 significant correlates relate to items of touching and sexuality. Equally striking is that all correlates except one are significantly greater for the prison males than normal males. These findings indicate that the prison male's behavior, particularly sexual behaviors, are more strongly influenced by maternal deprivation than are the same behaviors for normal subjects.

Table 7b reports additional significant correlates of maternal deprivation for the male prisoners which include additional items of sexual dysfunction, e.g., sado-masochism; knowledge of incest; enjoyment of rape scenes in movies; impulses to rape; and being "uptight" about being touched. Homicidal impulses, marijuana induced aggression (an unexpected correlate); preference for alcohol to marijuana; and "head-banging" are also significantly linked to maternal deprivation. All PHI coefficients (except one) are significantly greater for the prisoners than the normals, again indicating that maternal deprivation is more significantly and more strongly linked to items of sexual dysfunction and sexual violence (rape and sado-masochism) than it is for normal subjects. These data strongly support the role of maternal affectional deprivation and indifference as a developmental factor in sexual violence and in predisposing such individuals to be influenced by rape films to commit rape. These relationships are also linked to deprivation of physical affection from the father which are examined in the next table.

Table 8 presents the significant correlates of paternal affectional deprivation for the male prisoners with associated x^2 , P, and PHI coefficient. As in Table 7 the PHI coefficients for normal males is given and evaluated for significant differences with the male prison sample. There are 11 significant correlates with paternal affectional deprivation compared to 22 significant correlates with maternal affectional deprivation (Table 7). This finding again emphasizes the greater importance and significance of maternal affection than paternal affection for a variety of social, emotional and sexual attitudes and behaviors. There are only three variables that were found to be significantly linked to both maternal and paternal affectional deprivation. These are: (a) I do not get enough touching; (b) knowledge of father/daughter incest; and (c) homicidal impulses. There was only one sexually violent item linked to paternal affectional deprivation and that was attitudinal in nature, viz. "Some women enjoy being raped." This is in marked contrast to maternal-affectional deprivation where the predominate correlates were sexual in nature and frequently violent in character. Paternal affectional deprivation is also linked

TABLE 7b

MY MOTHER DID NOT HUG AND KISS ME A LOT
MY MOTHER IS OFTEN INDIFFERENT TOWARD ME

MALE PRISONERS (N = 75)			NORMAL MALES (N = 456)	CORRELATES
X ²	P	PHI	PHI	
7.10	.008	.38*	.05	I get hostile and aggressive when I smoke marijuana.
6.99	.008	.34	.28	My father did not hug and kiss me a lot.
6.19	.01	.34*	.02	I enjoy sex films where the sex partner is physically beaten or hurt.
5.91	.02	.32	NT	I personally know a family where the father had sex with his daughter.
5.58	.02	.34	NT	Rape scenes in the movies gives me ideas about raping someone.
5.32	.02	.30*	.08	I often get "uptight" about being touched.
5.30	.02	.32*	.03	I sometimes feel like raping someone.
4.64	.03	.30*	.16	I sometimes feel unhappy, sad or depressed.
4.57	.03	.29	NT	I sometimes feel like killing someone else.
4.21	.04	.28*	.09	I would rather drink alcohol than smoke marijuana.
3.87	.05	.27	NT	I remember when I used to "head-bang" or rock back and forth.

*PHI-coefficient significantly greater than normal males.

NT = Not tested.

TABLE 8

MY FATHER DID NOT HUG AND KISS ME A LOT
 MY FATHER IS OFTEN INDIFFERENT TOWARD ME

MALE PRISONERS (N = 68)			NORMAL MALES (N= 456)	CORRELATES
X ²	P	PHI	PHI	
32.34	.0000	.72*	.46	My mother did not hug and kiss me a lot.
17.36	.0000	.54*	.34	My father has not adequately discussed sex with me.
16.44	.0001	.53	.47	I have rarely seen my parents hug and kiss each other.
8.31 ^A	.004	.39	.27	I do not get enough touching.
7.86 ^A	.005	.38	NT	I personally know a family where the father had sex with his daughter.
5.72	.02	.33*	.05	I often feel like hitting someone
5.58	.02	.33	NT	Some women enjoy being raped.
5.07 ^A	.02	.31	NT	I sometimes feel like killing someone else.
4.25	.04	.28	.25	My parents have many unfriendly arguments
3.77	.05	.27	.18	My mother has not adequately discussed sex with me.
3.68	.05	.27	NT	I personally know a family where a brother and sister had sex together.

^A Apart from the parental variables these three variables were the only variables that significantly correlated for both maternal and paternal affectional deprivation for prison males.

*PHI = Coefficient significantly greater than normal males.

NT = Not Tested.

to failure of both parents' to provide adequate sex discussion with their sons. Three of the PHI coefficients were significantly greater for prisoner sample than for the normals where "feeling like hitting someone" was one of these differences.

Although the data on significant correlates of maternal and paternal affectional deprivation and indifference give greater importance to maternal deprivation there is a special role of the father in these relationships which appears to set the "affectional tone" of the family which facilitates or inhibits the mother's affectional role. This is discussed below.

Table 9 presents the PHI coefficients for the relationship of reported paternal deprivation upon reported maternal deprivation and its converse, i.e., the relationship of reported maternal deprivation upon reported paternal deprivation for males, females, normals and prisoners. In short, if subjects report affectional deprivation from the father, to what extent do they also report affectional deprivation from the mother? and conversely to what extent do reports of affectional deprivation from the mother relate to their reports of affectional deprivation from the father? Answers to the nature of this interrelationship and the direction of influence, namely, "father effects upon mother" and "mother effects upon father" were provided by examining the linkages between (a) those who agreed or disagreed to both paternal affectional deprivation (Q3) and paternal indifferences (Q5) with their response to maternal affectional deprivation (Q2); and (b) comparing those who agreed or disagreed to both maternal affectional deprivation (Q2) and maternal indifference (Q4) with their responses to paternal affectional deprivation (Q3).

An examination of Table 9 indicates the following:

1. Reports of affectional deprivation from the father are more highly correlated with reports of affectional deprivation from the mother than is the converse, namely, reports of affectional deprivation from the mother are less strongly correlated with reports of affectional deprivation from the father. In other words, it is possible to predict with greater reliability the affectional characteristics of the mother from the affectional characteristics of the father than it is to predict the affectional characteristics of the father from the affectional characteristics of the mother.
2. Predicting maternal affection from paternal affection is significantly greater than predicting paternal affection from maternal affection for (a) normal males; (b) normal females; and (c) male prisoners. Although this effect is in the same direction for prison females it is not significant which may be due, in part, to the small sample size of this group (N=25).

TABLE 9

PARENTAL DEPRIVATION CORRELATIONS

	N	FATHER EFFECT UPON MOTHER	MOTHER EFFECT UPON FATHER	P
Normal Males	375	.46	.28	.0001
Normal Females	760	.57	.46	.0001
P <		<u>.02</u>	<u>.001</u>	
Male Prisoners	75	.72	.34	.001
Female Prisoners	25	.51	.43	NS
P <		<u>.05</u>	<u>NS</u>	

3. The influence of paternal affectional characteristics upon maternal affectional characteristics is significantly greater for normal females than male normals but is significantly greater for male prisoners than for female prisoners.

4. The influence of maternal affectional characteristics upon paternal affectional characteristics is significantly greater for normal females than normal males but is not significantly different for male-female prisoners.

In summary, these data may be interpreted to conclude that the role of the father in his affectional behaviors (high or low) strongly influences the affectional role of the mother (high or low). The father appears to be a dominant influence in setting the "affectional tone" of the family, specifically the extent to which maternal affectional behavior is expressed. Although affectional relationships between mother and child are more important in predicting developmental outcomes than affectional relationships between father and child, the father appears to play a crucial role in the regulation of expression of maternal-child affectional behavior. Additionally, normal females report greater associations of father/mother affectional relationships than do normal males suggesting a greater sensitivity and/or vulnerability to affectional behaviors for females than males. This latter relationship is reversed for the prisoner sample where males report a greater influence of affectional behaviors of the father upon affectional behaviors of the mother than do the females. This could be attributed to the homosexual group in the male sample but would require an explicit evaluation.

STUDY C: COMPARISON OF PRISONERS WITH COLLEGE STUDENTS FROM AMERICAN AND CANADIAN UNIVERSITIES

The previous analysis was based upon answers to the first 56 questions which was the size of the questionnaire in the beginning of the survey program. Subsequent to those initial efforts data on the 95 item questionnaire became available and is the subject of this analysis which reports the results of Chi-square, PHI and % Agree on an item by item basis. The availability of data for comparison and the desire to contrast some of the most disadvantaged (predominantly black prisoners) of our society with some of the most advantaged (white college students) prompted this comparison. It is recognized that this comparative approach is not traditional since much effort is usually expended to provide matched samples for comparison. However, it was felt that there was merit to comparing some of the extremes in our society where differences occur along a number of dimensions, e.g., age, race, educational level, income level, family background, religious background, etc. This is referred to as an "holistic" or "gestalt" comparison which takes advantage of the total context of differences that naturally occurs in society.

It is recognized that other comparative analyses are needed, particularly a black college population to compare with the black prisoner population and a white prisoner population to compare with the white college population. These kinds of data collection are planned as future efforts.

Table 10 in the manuscript lists all those questionnaire items that significantly discriminates normal male college students from the male prisoners. The most significant discriminant is "capital punishment should be permitted by society" with 66% of college males and 20% of prisoners agreeing with that statement. This is followed by "alcohol induced aggression" reported by 11% of the normals and 48% of the prisoners. An inspection of Table 10 indicates for the prison sample that there is significantly greater parental indifference, punishment and lack of affection; inter-spousal violence and lack of affection; family incest (father-daughter; mother-son; brother-sister); mistrust of men and women; sexual violence-prejudice-discrimination; rejection of oral-genital sex; and drug/alcohol use which is also "more satisfying than sex" when compared to normal college student males.

Table 11 presents a similar analysis for female prisoners compared to college female students. The most significant discriminator is preference for homosexual or lesbian sex relationships (26% of prisoners and 1% college students agree with this statement). The next most significant discriminators are parental indifference; alcohol is more satisfying than sex; and sex discrimination concerning equality of women in expressing their sexuality. Similar to the discriminants obtained for males, family incest (father/daughter; mother/son; brother/sister); distrust of women and men; sexual violence and prejudice; drug/alcohol use which is found more satisfying than sex and rejection of oral-genital sex were salient and significant discriminators between female prisoners and female college students.

These data clearly define a constellation of variables in the affectional domain, specifically parent/child affection and punishment which apparently influences the quality and equality of male/female sexual relationships. Dysfunction in both of these affectional domains is highly linked with the expression of violence and alcohol/drug use.

Tables 12 and 13 list the non-significant discriminators between the normal and prison populations. These are provided because of the percentage agreement information that is of interest as well as which items do not discriminate between normal and prison populations. Tables 10-13 can be fruitfully explored with respect to the percent agreement to each of the questions.

TABLE 1C

SIGNIFICANT MALE DISCRIMINATORS:
 NORMALS (146) vs. PRISONERS (117)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
52.64	.46	.0000	66	20	Capital punishment should be permitted by society. (32)
41.96	.41	.0000	11	48	I get hostile and aggressive when I drink alcohol. (15)
41.25	.41	.0000	11	47	I have been or need to be treated for venereal disease. (48)
40.97	.41	.0000	10	45	Abortion should be punished by society. (31)
40.36	.40	.0000	01	28	I have been accused of raping someone before. (59)
35.55	.38	.0000	07	38	My father does not really care about me. (5)
35.01	.38	.0000	13	47	I remember when my father physically hit my mother. (91)
34.74	.38	.0000	00	23	I personally know a family where the mother had sex with her son. (78)
30.00	.35	.0000	16	48	I do not enjoy oral-genital sex. (49)
27.10	.33	.0000	86	56	I am proud of my country. (95)
27.05	.34	.0000	19	51	I do not trust men very much. (84)
26.62	.33	.0000	01	22	Drugs are more satisfying than sex. (18)
26.08	.33	.0000	08	34	I personally know a family where the father had sex with his daughter. (77)
24.59	.32	.0000	63	31	Laws should not be passed to eliminate rape scenes in our movies. (93)
23.86	.31	.0000	01	20	My mother does not really care about me. (4)
21.08	.29	.0000	72	43	I can tolerate pain very well. (11)
20.49	.29	.0000	10	34	I personally know a family where a brother and sister had sex together. (79)
19.56	.28	.0000	37	66	I smoke marijuana quite often. (13)
19.27	.28	.0000	11	34	The government should have more control of the people. (42)
16.94	.26	.0000	21	46	I use and experiment with drugs quite often. (12)
16.69	.26	.0000	21	46	I do not trust women very much. (85)
14.68	.25	.0000	46	71	I have rarely seen my parents hug and kiss each other. (1)

TABLE 10
(Continued)
SIGNIFICANT MALE DISCRIMINATORS:
NORMALS (146) vs. PRISONERS (117)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
14.27	.24	.0000	28	52	I often have had sex when I didn't want it. (69)
13.83	.24	.0002	56	32	I would rather drink alcohol than smoke marijuana. (16)
12.24	.23	.0005	01	11	Alcohol is more satisfying than sex. (17)
12.08	.23	.0005	10	28	I do not enjoy sex films where the sex partners give each other pleasure. (27)
11.91	.22	.0006	46	68	I have several scars on my body. (61)
11.21	.22	.0008	06	21	I often feel I am sexually taken advantage of. (54)
11.03	.21	.0009	11	28	White men should not have sex with black women. (65)
10.84	.21	.001	67	46	As a child I rarely, if ever, masturbated. (74)
10.35	.21	.001	63	82	I frequently pray to God for help with my problems. (55)
10.34	.21	.001	02	13	Marijuana is more satisfying than sex. (45)
10.28	.21	.001	50	30	Married persons having sex affairs with their lovers is wrong. (25)
10.14	.21	.001	05	18	I prefer homosexual or lesbian sex relationships. (62)
9.44	.21	.002	01	11	I get hostile and aggressive when I smoke marijuana. (53)
9.40	.20	.002	22	40	Some women deserve to be raped. (63)
9.11	.20	.003	03	15	Society should interfere with private sexual behavior between adults. (30)
8.49	.19	.004	12	26	I sometimes feel like killing someone else. (58)
7.18	.18	.007	10	23	We would be better off if blacks and whites lived in their own neighborhoods and went to their own schools. (68)
6.87	.17	.009	29	46	My mother did not hug and kiss me a lot. (2)
6.84	.17	.009	25	41	I tend to be extreme in my political points of view. (41)
6.62	.17	.01	76	60	I would like to be held and hugged without having to have sex. (71)
5.97	.16	.01	50	66	Some women enjoy being raped. (86)
5.91	.16	.02	25	40	I remember when my mother physically punished me a lot. (35)

TABLE 10
 (Concluded)
 SIGNIFICANT MALE DISCRIMINATORS
 NORMALS (146) vs. PRISONERS (117)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
5.76	.16	.02	04	13	Sexual pleasures help build a weak moral character. (38)
5.43	.15	.02	27	14	I sometimes feel like raping someone. (50)
4.94	.15	.03	30	44	Nudity within the family has a harmful influence upon children. (9)
4.83	.15	.03	23	37	My parents have many unfriendly arguments. (6)
4.26	.14	.04	18	30	Women should not have the same sexual freedoms as men. (70)
4.24	.13	.04	43	56	I drink alcoholic beverages quite often. (14)
4.22	.14	.04	26	39	Religion and not science will ultimately solve our problems. (94)
4.21	.14	.04	08	17	I usually enjoy rape scenes in the movies. (51)
4.15	.14	.04	16	28	I remember when I used to "head-bang" or rock back and forth. (73)

TABLE 11

SIGNIFICANT FEMALE DISCRIMINATORS:
NORMALS (277) vs. PRISONERS (41)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
46.41	.41	.0000	01	26	I prefer homosexual or lesbian sex relationships. (62)
41.93	.38	.0000	07	44	My father does not really care about me. (5)
39.45	.37	.0000	05	37	My mother does not really care about me. (4)
37.91	.37	.0000	02	26	Alcohol is more satisfying than sex. (17)
36.87	.19	.0000	07	42	Women should not have the same sexual freedoms as men. (70)
32.14	.33	.0000	87	49	I am proud of my country. (95)
29.38	.34	.0000	01	18	Drugs are more satisfying than sex. (18)
24.74	.30	.0000	04	26	Abortion should be punished by society. (31)
23.57	.29	.0000	08	37	I personally know a family where the father had sex with his daughter. (77)
20.63	.27	.0000	04	24	I have been or need to be treated for venereal disease. (48)
19.98	.27	.0000	13	44	I use and experiment with drugs quite often. (12)
19.26	.26	.0000	15	46	I tend to be extreme in my political points of view. (41)
18.81	.26	.0000	14	44	Some women deserve to be raped. (63)
18.54	.25	.0000	24	59	I do not trust women very much. (85)
18.04	.26	.0000	04	23	Sexual pleasures help build a weak moral character. (38)
17.03	.25	.0000	11	37	The government should have more control of the people. (42)
16.67	.25	.0000	05	24	Society should interfere with private sexual behavior between adults. (30)
15.85	.24	.0001	25	58	I do not enjoy oral-genital sex. (49)
15.24	.25	.0001	01	13	I personally know a family where the mother had sex with her son. (78)
14.50	.23	.0001	10	34	I personally know a family where a brother and sister had sex together. (79)
14.13	.23	.0002	92	71	I frequently feel unhappy, sad or depressed. (56)
14.03	.22	.0002	20	49	Some men deserve to be raped. (64)
13.17	.22	.0003	04	21	Physical punishment and pain help build a good moral character. (37)
12.93	.23	.0003	02	15	I enjoy sex films where the sex partner is physically beaten or hurt. (26)

TABLE 11
(Continued)
SIGNIFICANT FEMALE DISCRIMINATORS:
NORMALS (277) vs. PRISONERS (41)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
11.88	.21	.0006	06	24	I get hostile and aggressive when I drink alcohol. (15)
11.59	.23	.0007	01	10	I have been accused of raping someone before. (59)
11.50	.20	.0007	36	65	Brothers and sisters who agree to have sex together should be severely punished. (82)
10.99	.20	.0009	08	27	Hard physical punishment is good for children who disobey a lot. (21)
10.65	.19	.001	59	29	Married persons having sex affairs with their lovers is wrong. (25)
10.34	.19	.001	72	45	As a child I rarely, if ever, masturbated. (74)
9.83	.19	.002	18	41	I remember when my mother physically punished me a lot. (35)
8.64	.18	.003	60	32	I would rather drink alcohol than smoke marijuana. (16)
7.05	.16	.008	30	53	I do not trust men very much. (84)
6.96	.16	.008	37	60	Mothers and sons who agree to have sex together should be severely punished. (81)
6.86	.16	.009	07	20	We would be better off if blacks and whites lived in their own neighborhoods and went to their own schools. (68)
6.54	.16	.01	21	42	I often get "uptight" about being touched. (8)
6.09	.15	.01	15	32	I remember when my father physically hit my mother. (91)
5.85	.15	.02	11	26	I do not enjoy sex films where the sex partners give each other pleasure. (27)
5.22	.14	.02	52	32	I usually experience orgasm about once a week or less than once a week. (47)
4.96	.14	.03	22	40	I remember when my father physically punished me a lot. (34)
4.87	.14	.03	11	26	I like to bite, scratch or hit my sex partner when having sex. (90)
4.76	.13	.03	42	62	Some women enjoy being raped. (86)
4.70	.13	.03	37	57	Fathers and daughters who agree to have sex together should be severely punished. (80)
4.30	.13	.04	47	67	Some men enjoy being raped. (87)

TABLE 11
 (Concluded)
 SIGNIFICANT FEMALE DISCRIMINATORS:
 NORMALS (277) vs. PRISONERS (41)

X ²	PHI	P	% AGREE		QUESTION
			N	P	
4.25	.12	.04	30	49	I have several scars on my body. (61)
4.16	.14	.04	04	13	Rape scenes in the movies give me ideas about raping someone. (83)
4.14	.13	.04	15	29	I have been "knocked-out" (unconscious) at least once in my life. (60)
4.12	.13	.04	18	33	Nudity within the family has a harmful influence upon children. (9)
3.91	.12	.05	60	43	As a teenager I rarely, if ever, masturbated. (75)
3.70	.12	.05	34	51	I often have had sex when I didn't want it. (69)

TABLE 12

NON-SIGNIFICANT MALE DISCRIMINATORS:
 NORMALS (146) vs. PRISONERS (117)

% AGREE		QUESTION
N	P	
58	67	My father did not hug and kiss me a lot. (3)
35	36	I do not get enough touching. (7)
23	34	I often get "uptight" about being touched. (8)
50	43	Natural fresh body odors are often offensive. (10)
20	24	I take drugs more often than I experience orgasm. (19)
31	22	I drink alcohol more often than I experience orgasm. (20)
17	20	Hard physical punishment is good for children who disobey a lot. (21)
28	21	Physical punishment should be allowed in the schools. (22)
12	14	Unmarried persons having sex with their lovers before marriage is wrong. (23)
47	52	I often do things without thinking about them. (24)
06	10	I enjoy sex films where the sex partner is physically beaten or hurt. (26)
62	57	My mother has not adequately discussed sex with me. (28)
60	58	My father has not adequately discussed sex with me. (29)
10	16	Violence is necessary to really solve our problems. (33)
40	39	I remember when my father physically punished me a lot. (34)
27	37	I often feel like hitting someone. (36)
15	14	Physical punishment and pain help build a good moral character. (37)
25	22	Prostitution should be punished by society. (39)
42	42	I often dream of either floating, flying, falling or climbing. (40)
54	58	People in government and business do not care about me and my family. (43)
64	60	I remember when I ran away or wanted to run away from home. (44)
44	34	I usually experience orgasm about once a week or less than once a week. (47)
24	25	I usually enjoy rape scenes in the movies. (51)
42	50	I usually feel more powerful or aggressive when I have sex with someone. (52)
88	84	I frequently feel unhappy, sad or depressed. (56)
21	29	I sometimes feel like killing myself. (57)
41	48	I have been "knocked-out" (unconscious) at least once in my life. (60)
24	27	Some men deserve to be raped. (64)
14	22	Black men should not have sex with white women. (66)
22	24	I am against marriages between blacks and whites. (67)
53	41	Bottle-fed infants are just as happy as breast-fed infants. (72)
35	37	As a teenager I rarely, if ever, masturbated. (75)

TABLE 12
 (Concluded)
 NON-SIGNIFICANT MALE DISCRIMINATORS:
 NORMALS (146) vs. PRISONERS (117)

% AGREE		QUESTION
N	P	
39	37	As an adult I rarely, if ever, masturbate. (76)
43	53	Fathers and daughters who agree to have sex together should be severely punished. (80)
44	54	Mothers and sons who agree to have sex together should be severely punished. (81)
43	48	Brothers and sisters who agree to have sex together should be severely punished. (82)
16	14	Rape scenes in the movies give me ideas about raping someone. (83)
65	56	Some men enjoy being raped. (87)
28	33	Violence in movies and TV makes me want to be "part of the action." (88)
15	14	I would rape someone if I knew I wouldn't be caught. (89)
08	14	I like to bite, scratch or hit my sex partner when having sex. (90)
27	30	"Law and Order" is more important than my personal "rights." (92)

TABLE 13

NON-SIGNIFICANT FEMALE DISCRIMINATORS:
NORMALS (277) vs. PRISONERS (41)

% AGREE		QUESTION
N	P	
45	49	I have rarely seen my parents hug and kiss each other. (1)
25	40	My mother did not hug and kiss me a lot. (2)
39	48	My father did not hug and kiss me a lot. (3)
31	47	My parents have many unfriendly arguments. (6)
28	43	I do not get enough touching. (7)
48	41	Natural fresh body odors are often offensive. (10)
50	48	I can tolerate pain very well. (11)
24	39	I smoke marijuana quite often. (13)
35	26	I drink alcoholic beverages quite often. (14)
13	22	I take drugs more often than I experience orgasm. (19)
27	15	I drink alcohol more often than I experience orgasm. (20)
18	29	Physical punishment should be allowed in the schools. (22)
14	15	Unmarried persons having sex with their lovers before marriage is wrong. (23)
47	64	I often do things without thinking about them. (24)
54	38	My mother has not adequately discussed sex with me. (28)
73	60	My father has not adequately discussed sex with me. (29)
47	29	Capital punishment should be permitted by society. (32)
05	11	Violence is necessary to really solve our problems. (33)
20	34	I often feel like hitting someone. (36)
21	31	Prostitution should be punished by society. (39)
48	43	I often dream of either floating, flying, falling or climbing. (40)
67	60	People in government and business do not care about me and my family. (43)
62	59	I remember when I ran away or wanted to run away from home. (44)
00	05	Marijuana is more satisfying than sex. (45)
11	23	I usually do not get much pleasure from my sexual activity. (46)
11	20	I sometimes feel like raping someone. (50)
11	15	I usually enjoy rape scenes in the movies. (51)
24	36	I usually feel more powerful or aggressive when I have sex with someone. (52)
04	03	I get hostile and aggressive when I smoke marijuana. (53)
28	35	I often feel I am sexually taken advantage of. (54)
75	82	I frequently pray to God for help with my problems. (55)
25	31	I sometimes feel like killing myself. (57)
08	12	I sometimes feel like killing someone else. (58)

TABLE 13

NON-SIGNIFICANT FEMALE DISCRIMINATORS:
 NORMALS (277) vs. PRISONERS (41)

% AGE		QUESTION
N	P	
11	18	White men should not have sex with black women. (65)
11	21	Black men should not have sex with white women. (66)
18	18	I am against marriages between blacks and whites. (67)
89	80	I would like to be held and hugged without having to have sex. (71)
62	68	Bottle-fed infants are just as happy as breast-fed infants. (72)
19	32	I remember when I used to "head-bang" or rock back and forth. (73)
55	46	As an adult I rarely, if ever, masturbate. (76)
06	08	Violence in movies and TV makes me want to be "part of the action." (88)
02	03	I would rape someone if I knew I wouldn't be caught. (89)
21	34	"Law and order" is more important than my personal "rights". (92)
51	46	Laws should not be passed to eliminate rape scenes in our movies. (93)
34	47	Religion and not science will ultimately solve our problems. (94)

CONTINUED

3 OF 4

Summary Conclusions

The findings from the psychometric study indicate that the quality of male-female relationships is perhaps the most significant area of concern in understanding the prison personality and should be the primary area for intervention and treatment. It appears to be a reasonable interpretation of these data that the most damaging effects of parental affectional deprivation is mediated through disturbed sexual functioning, as an individual, and in male-female relationships. It appears that the common pathway of violence and crime is the pathway of dysfunctional affectional relationships that begin with the parent/child relationship and continues through youth and adult sexual relationships. It is apparent that the design of the prison environment facilitates, if not maximizes, the affectional deprivation and dysfunctioning of its inhabitants. The prison environment, in part, replicates and reinforces the impoverishment of human affectional relationships which is the very condition that propelled these men and women into a prison environment. These data suggest that a radical transformation of the prison environment is necessary to prevent the continuing deterioration of human affectional relationships of its inhabitants which can only assure the basic conditions necessary for continuing a life of alienation, depersonalization, dehumanization, crime and violence.

APPENDIX A

In response to a request from Dan Lipstein, Associate Director for Evaluation, Mayor's Coordinating Council for Criminal Justice, the senior author presented a seminar on the developmental factors that contribute to alienation, violence and crime to the MCCCJ. The implications for prevention and prison reform were discussed. Attending this seminar were staff members, MCCCJ; Gorden Kamka, Warden, Baltimore City Jail; Marty Katzenstein, Director, Treatment Services, BCJ; members of the Governor's Commission on Crime; and other individuals interested in crime-violence and law enforcement.

This meeting generated a continuing dialogue and subsequent meetings with Gorden Kamka resulted in the psychometric evaluation of a prisoner population to determine whether statistically reliable data could be obtained that relates affectional deprivation to alienation, crime and violence.

In presenting this survey project to the prisoners we met with the Prisoner's Council to outline the purposes of the survey and to obtain their support and cooperation. Notices were distributed to segments of the prison population requesting that they participate in the study and that participation would in no way affect their status in prison--positive or negative.

With the major assistance of Doreen Riggin, a number of volunteers were obtained and these are listed by category of offense in Table A. The survey began with the showing of the film "Rock-a-Bye Baby" which describes the emotional disturbances in animals and children consequent to "maternal-social" deprivation or affectional deprivation. It was explained to the volunteers that there were no right or wrong answers to the questionnaire; that some questions would not apply to everyone but that they should answer them as best as possible; that we wanted an honest and factual reply as possible; and that they should not place their name on the questionnaire since all answers would be confidential. It was emphasized that it would not be possible to relate any specific questionnaire to any particular person. It was stressed that we were interested in the response of the total group and that we were not interested in any individual's particular responses to the questionnaire. It was explained that we would be comparing their responses, as a group, to the responses of individuals who were not in prison. Individuals who participated in the survey were given a package of cigarettes as a token of appreciation for their participation.

As stated earlier, Marty Katzenstein, Director, Treatment Services, Baltimore City Jail, pretested the survey instrument for understanding. The pretesting resulted in minor word changes to increase understanding

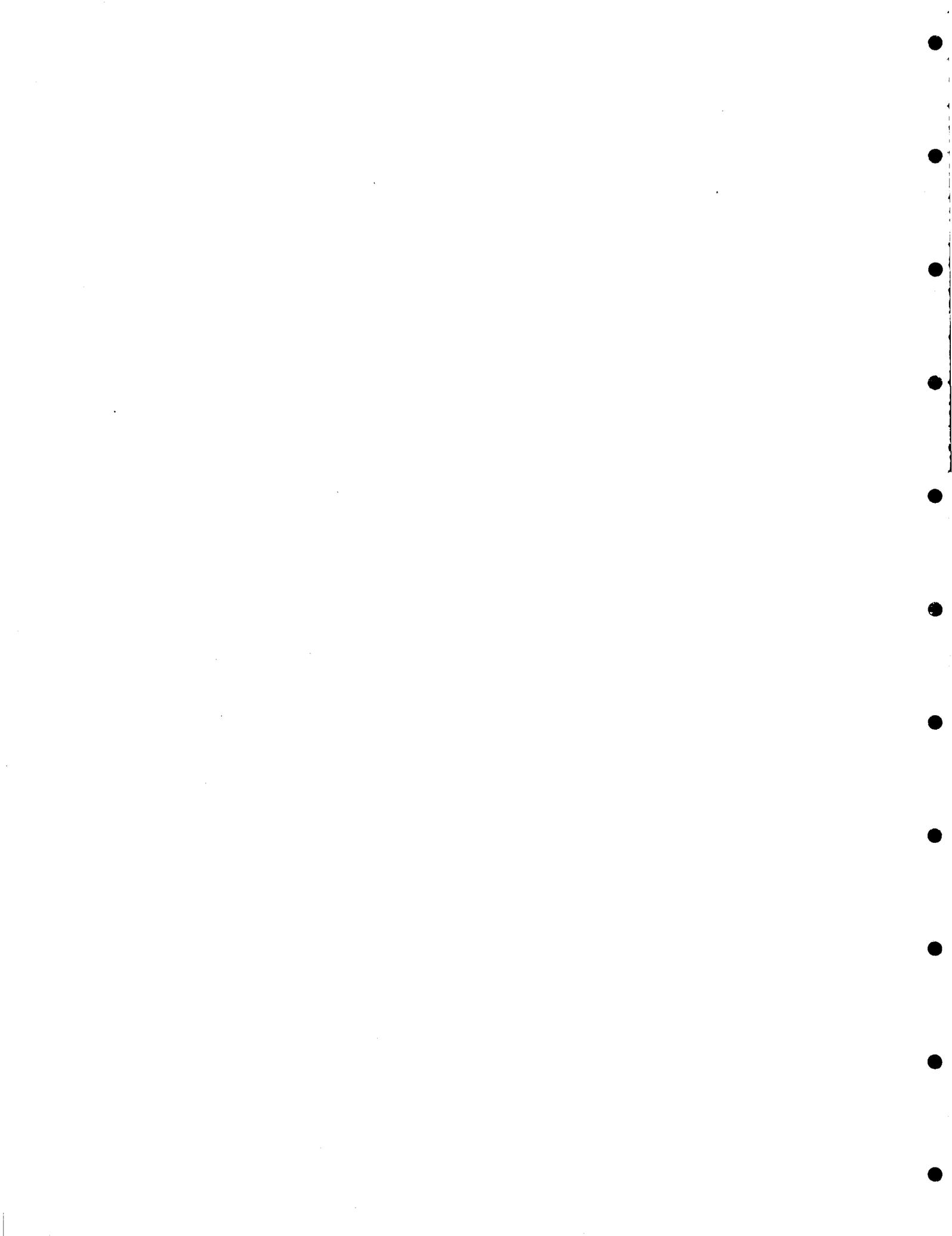
TABLE A
ALLEGED OFFENSES

	HOMICIDE ATTEMPTED HOMICIDE	RAPE	ASSAULT	ARMED ROBBERY ASSAULT AND ROBBERY	PROPERTY (LARCENY BURGLARY BREAKING AND ENTERING)	MISCEL- LANEOUS VIOLATIONS	NARCOTICS	PROSTI- TUTION SOLICITING LOITERING	ARSON	CHILD ABUSE	KIDNAP- PING	CHARGE NOT IDENTI- FIED BUT QUES- TION- NAIRE COMPLETE	TOTAL BY TEST- ING GROUP
General Population (BCJ-GP)	17	3	7	22	20	15	11					3	98
Homosexual Section (BCJ-HS)		2	2	4	4	3		5	2			1	23
CASH Program (BCJ-CASH)	5	3		10	5		2						25
Womens' Detention Center (BCJ-WDC)	6		1	4	16	5	3	3	1	1	1	7	48
TOTAL by Offense Classifi- cation	28	8	10	40	45	23	16	8	3	1	1	11	194

and comprehension of the questions. Despite these precautions a number of respondents had difficulty in filling out the questionnaire. The most serious of these were noted and later discarded. The group testing environment was not the optimal testing condition but individual testing was simply not feasible. Some individuals seemed to hurry their completion of the questionnaire which could affect the reliability of these respondents. A few individuals worked together on the questionnaire where one person was helping the other in interpreting the questions. Possibility of "copied" responses exist in this situation but the instances of this was too few to be a major concern. The offense categories listed in Table A should be treated with caution since they were obtained by asking the prisoners to state on the questionnaire the offense for which they were in prison for. The effects of "plea-bargaining" and reduced seriousness of charge, e.g., a rape charge being reduced to "assault" or to "burglary" could not be ascertained since there was no way to trace the individuals stated offense on the questionnaire to be the actual offense listed in the official record.

The findings and conclusions from this psychometric study should be considered tentative until replication and cross-validation with additional prison groups can be obtained. It is recognized that showing the film "Rock-a-Bye Baby" and being explicitly frank about the purposes of the study could have biased the results, e.g., test questions #1, #2, and #3 relating to hugging and kissing by parents were not significantly different in the female prisoner population; nor was question 2 (paternal affectional deprivation) significantly different for prison and normal males. These responses were contrary to expectation and it should be noted, in this context, that questions 4 and 5-- "mother and father do not really care about me" do significantly discriminate between prisoners and normals for both sexes. This suggests that a bias may exist in an underreporting of parental affectional deprivation by the prison group. It should be emphasized, however, that the mean level of responding is only one aspect of the analyses and that it is the relationship among the questionnaire items that are of primary significance. These data have been factor analyzed and these results will be the subject of a later report.

The authors would like to again acknowledge our appreciation to the staff of the Mayor's Coordinating Council for Criminal Justice, Baltimore and to Gordon Kamka, Warden Baltimore City Jail and his staff for making this prison survey possible.



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ALCOHOL AND CRIME IN VETERANS

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THE RELATIONSHIP BETWEEN LEVEL OF DRINKING AND CRIME IN VIETNAM VETERANS

That there is some relationship between alcohol and crime has been known for many years. In his 1958 volume, Wolfgang cites a 1938 reference to this association. There may well be much earlier mentions as well. Wolfgang also points out that determining the degree of association between alcohol and crimes of violence and property on the basis of police records is very unsatisfactory even when police regularly take blood levels of those apprehended. The apprehension may be so distant in time from the commission of the crime that it is impossible to determine whether the perpetrator was intoxicated at the time. Further, much of the association between drinking behavior and crime does not depend on blood levels at the time of committing the crime. An alcoholic who has expended all his funds on liquor or who has been fired for drunkenness on the job may be under such severe economic pressure that he steals when sober, either to obtain liquor or money to purchase it, or to obtain funds for the necessities of life that his drinking has prevented his obtaining in legitimate fashion. Further his drinking may have estranged those he cares most about, and this estrangement may lead to violence against the loved person or those accused of alienating the loved person from him, irrespective of his state of intoxication. Finally, there are crimes of omission, such as non-support and failure to pay debts, which may be indirect effects of a combination of estrangements and depleted resources that are the effects of drinking. None of these would be detectable by means of blood levels.

One alternative to attempts to ascertain the relation between alcohol and crime by physiological measurement of intoxication levels is to interview those apprehended. The difficulty here is that we cannot interpret our results because we do not have base rates for drinking in the population that are specific to the kinds of backgrounds out of which the apprehended come. If, as Wolfgang found, most murderers and their victims had been drinking at the time, we can assume that alcohol probably played a role, but we cannot quantify that role. That is, we cannot answer the hard question: how many fewer homicides would there have been if the same groups of persons had not had access to alcohol.

MICROFICHE

To answer such a question, one needs to start not with criminals but with a general population, and to study in that population the relationship between drinking and crime. In most surveys, this would be a rather fruitless enterprise, since alcoholism and criminality are both rare phenomena. It would require a very large sample of the general population to discover enough cases of both to provide reliable estimates of their overlap. Further, the kinds of surveys most often carried out--household surveys in defined geographic areas--miss the most affected cases: those in jail and those in treatment for alcohol problems.

We are fortunate in having access to what is a particularly useful sample for this enterprise. In the course of a follow-up study of the drug use of army enlisted men who had been in Vietnam during 1971, we inquired both about arrest history and level of drinking, as well as about illicit drug use, military history, childhood history, a number of aspects of psychiatric well-being and general adjustment level. This sample is useful for the purpose at hand because it is a reasonably large, general, national sample unselected with respect to crime record or drinking history. Since it is a sample of persons in the sex and age categories of maximum risk both for drinking and crime, it yields enough cases to enable us to study their relationship. Further, all subjects were selected from the Army roster as of the time they were still on active duty, before the period covered by our investigation, and they were followed regardless of whether they ended in jail or hospital, so that the sample is not shorn of the more extreme cases of criminality or alcoholism, as a household sample would be. The rate of follow-up was extremely high, with 94% of the target sample personally interviewed. Thus, we have not lost the more deviant cases as studies with low follow-up rates do, because the more deviant are also more difficult to locate and interview. Finally, such tests of validity as could be carried out by comparing interview data with military records from the Vietnam period showed high levels of candor. Of those with a military record of having used heroin in Vietnam, 97% admitted heroin use there in interviews, even though they had no reason to anticipate that we could check on their veracity. Thus we can hope that information about drinking and crime in the post-Vietnam period is equally reliable.

The availability of these data allows us not only to quantify the degree of association between drinking behavior and criminal records, but to ask the searching question: is this association compatible with the hypothesis that drinking causes crime, or is it only compatible with the observation that the same kinds of people who drink heavily also commit crimes. The causal question can be explored because extensive background information about the pre-induction era of the men's lives, a time before most heavy drinking had begun, allows comparing crime rates of heavy drinkers with rates for others from similar backgrounds.

Despite these advantages, there are limitations to our study. First, although we have a random sample of first-term Army enlisted men who served in Vietnam in 1971 and then returned to the United States, the very fact that they went to Vietnam as army enlisted men means they are not entirely representative of the nation's general population of males of this age group. Most of those with extreme records of crime or serious alcoholism by the ages of 17 to 19, the years of induction into service, are missing, because when such problems are known to the draft board or recruiting officer, men are not accepted into the Army. Those who developed or revealed such problems in the first few months of their service are also missing-- they were discharged before it was time for them to go to Vietnam. Being sent to Vietnam also meant that they appeared to be relatively fit, mentally and physically. They were not mentally retarded or grossly psychotic or physically disabled prior to their Vietnam tour. Further, few were college educated or from an upper middle class background. Despite the draft lottery operative at the time of their induction, the well educated were less likely to enter service and, if they entered, were more likely to become officers or to go to the more selective branches of the armed services, the Navy and Air Force. Thus our sample is somewhat "middle of the road," truncated at both the most deviant and the most advantaged ends of the spectrum. Despite this limitation, it is a reasonably representative sample of American young men in the 1970's.

In choosing the veterans, we had oversampled that portion who had been identified as drug abusers by having urines positive for opiates at the time of departure from Vietnam. These men are appropriately weighted in the results presented today so that our results represent findings in the general sample of men who returned from Vietnam in 1971.

We also interviewed a sample of non-veterans selected from Selective Service and school records to match the veterans with respect to age, place of rearing, and educational level at the age at which the veterans entered service. Both samples were interviewed in 1974, when the ex-servicemen had been back from Vietnam for three years. We had previously interviewed the veterans when they had been back only eight to twelve months, but the non-veterans had not been interviewed previously. Both samples were asked in detail about their drinking histories and problems as a result of drinking, and about their arrest histories. Interviews were conducted with 571 veterans and 284 non-veterans. The period during which we will examine the relationship between crime and drinking is 1973 and 1974, the two years prior to interview, i.e., the second and third years after the veterans' return from Vietnam.

RESULTS

The Frequency of Crime in the Two Year Prior to Interview

Twenty-three percent of veterans reported having had an arrest in the two years prior to interview, and 16% reported having been convicted (Table 1). Fifteen percent had spent some time in jail. The rate of incarceration is nearly as high as the rate of convictions because we include overnight stays preceding sentencing and time in jail at the beginning of the two-year period which resulted from a conviction prior to that period.

Conduct crimes, particularly those related to drug and alcohol use, were the most common reasons for arrest. Arrests for property crimes were reported by 4% and for crimes of violence by only 2%. The latter rate is not significantly higher than the rate for person crimes among non-veterans, an interesting finding itself in the light of the belief of some that participation in a war increases the likelihood of post-war violence.

Rates of arrest for alcohol, drugs, and property offenses and convictions were higher in veterans than in matched non-veterans. However, these findings should not be taken as evidence for the effects of the military experience. Non-veterans, despite our attempts at matching for age, education, and place of rearing, were of higher status of origin and had been less deviant than veterans even before the age at which the veterans were inducted. A monograph in preparation compares arrest records between veterans and non-veterans when these differences are taken into account. For today's purposes, the only point to be made is that arrest rates are so low in non-veterans that it will not be practical to do elaborate analyses of the relationship between their drinking and arrests.

Drinking Levels

Table 2 shows the drinking levels and types of drinking problems of the two samples in the two years just prior to interview. Fifteen percent of the veterans reported a period of very heavy daily drinking-- i.e., at least seven drinks a day, which amounts to better than four ounces of absolute alcohol per day. Another third drank this heavily at least once a week for the period of six months or more, and about half drank less than this. Almost half (43%) reported some drinking problem, the most common one being that the veteran himself thought he was drinking excessively. Fifteen percent reported at least three of the problems inquired about. Thus, a cut-off point of three or more problems produced the same proportion identified by daily heavy drinking. It would not be unreasonable to infer that about 15% should be considered potential alcoholics.

TABLE 1

CRIME IN THE SECOND AND THIRD YEARS AFTER RETURN FROM VIETNAM

	Veterans (571)	Non-Veterans (284)
<u>Number of Arrests</u>	%	%
None	77	91
One	17	5
Two	3	2
Three to 22	<u>3</u>	<u>2</u>
	100	100
<u>Number of Convictions</u>		
None	84	97
One	12	1
Two	2	0
Three to 20	<u>2</u>	<u>2</u>
	100	100
<u>Time Incarcerated</u>		
None	85	94
One month or less	12	4
Two months or more	<u>3</u>	<u>2</u>
	100	100
<u>Crimes* for which Arrested</u>		
Drunk	8	3
Drug	7	1
Other conduct	6	5
Property	4	1
Person	2	1

*Percents add to more than total arrested since some were arrested for more than one type of offence.

TABLE 2

DRINKING AMOUNTS AND PROBLEMS IN THE SECOND
AND THIRD YEARS AFTER RETURN FROM VIETNAM

<u>Amount</u>	Veterans (571) %	Non-Veterans (284) %
<u>Daily heavy</u> : at least one month of daily drinking seven or more drinks	15	7
<u>Heavy six months</u> : Not daily heavy, but at least six months of drinking seven or more drinks at least once a week	31	23
<u>Not heavy six months</u> : Never a heavy drinker or heavy less than six months	<u>54</u> 100%	<u>70</u> 100%
<u>Alcohol Problems</u>		
Thought he drank too much	32%	22%
Blackouts	20	11
Drink on arising	13	7
Accident due to drinking	10	4
Arrest due to drinking	9	4
Binges (staying drunk two days or longer)	7	4
Job or school troubles due to drink	3	1
Treatment for alcoholism	1	0
<u>Number of Alcohol Problems</u>		
None	57%	71%
One	20	17
Two	9	6
Three or more	15	7

Among non-veterans, the rate of potential alcoholism was about half the veterans' rate, whether calculated by daily drinking or three or more alcohol problems. It is striking that despite the difference in level of problems, their order of frequency is the same for non-veterans as for veterans and for both non-veterans and veterans the number of daily heavy drinkers is the same as the number with three or more problems. The interpretation of the non-veterans' lower rate is difficult for the same reason pointed out above with respect to their lower rate of crime: they differed from the veterans in deviance and social class even before the veterans entered service.

In the remainder of the paper, we will use level of drinking as our measure of drinking difficulties rather than number of problems stemming from drinking, even though the latter is the more conventional method of assessing alcoholism, because arrest due to drinking is a classic element in that list of problems. Since arrests for drinking contribute simultaneously to alcohol problems and to the arrest rate, using drinking problems as our measure of alcoholism would confound the relationship between drinking and arrests. We will use number of arrests rather than number of convictions as our measure of crime because while arrests are subject to varying police practices across the country, convictions are subject to this plus varying judicial practices. Besides, since the group arrested is larger than the group convicted, we have a greater chance of detecting important relationships.

The Association Between Drinking and Crime

Table 3 shows that for both veterans and non-veterans, daily heavy drinkers had more arrests and more multiple arrests than did others. Almost half (42%) of the daily heavy drinkers among veterans and one-third (32%) of the daily heavy drinkers among non-veterans had been arrested in the last two years, compared with 15% and 6% respectively of those who had not drunk heavily for as much as six of the last 24 months. Those who had drunk heavily for more than six months but had never been daily drinkers had intermediate arrest rates.

Most men arrested in the last two years had been arrested only once. Even among veterans who were daily heavy drinkers, multiple arrests were reported by less than one in five. Clearly many men who might qualify as alcoholics on the basis of the quantity and frequency of their drinking do not get into much trouble with the law. However, it must be remembered that most of these men were only 23 or 24 at interview, and were reporting on the years during which they were aged 22 and 23. It may have been too early still to see the full impact of chronic heavy drinking on arrests, although it should have been possible to detect the effects of episodes of intoxication.

TABLE 3

THE ASSOCIATION OF ALCOHOL CONSUMPTION
AND NON-TRAFFIC ARRESTS OVER A TWO-YEAR PERIOD

	Veterans			Non-Veterans		
		<u>Any Arrests</u>	<u>Two or More Arrests</u>		<u>Any Arrests</u>	<u>Two or More Arrests</u>
<u>Drinking Behavior</u>		%	%		%	%
Daily heavy	(118)	42	19	(19)	32	21
Heavy 6 months	(175)	27	5	(66)	9	3
Not heavy 6 months	(277)	15	3	(197)	6	3

Since heavy daily drinking was not sufficient to cause arrests, we need to specify the conditions under which drinking at this level does lead to arrest.

Conditions Under Which Drinking Is Associated With Crime

One condition we examined was the level of childhood deviance, since deviance might be related both to heavy drinking in adulthood and to arrest records. If early deviance did predict both drinking and arrests, we might find that drinking was irrelevant to arrests--the observed relationship between drinking and arrests could be merely a correlate of the fact that childhood deviance forecasts both drinking and arrests. On the other hand, we might find that heavy drinking is the clue to which deviant children go on to become criminals, if we find that early deviance is associated with arrest only among adults who drink excessively.

A second condition that we needed to consider was the concomitant use of illicit drugs. We have shown in previous work (Robins, Hesselbrock, Wish, and Helzer, in press) that veterans and non-veterans in this age range have considerable experience with illicit drugs, particularly marijuana, amphetamines, barbiturates, LSD, and cocaine. Heroin addicts in particular use a great variety of illicit drugs. Indeed, number of illicit drugs is a good measure of the seriousness of drug involvement. We had also noted that most illicit drug users report heavy drinking. Thus it is possible that some of the correlation between heavy drinking and arrests may actually be attributable to illicit drugs used by the heavy drinkers rather than to their alcohol intake.

In searching for these conditions under which drinking and arrests are associated, we will confine ourselves to the veterans, because the number of daily drinkers among non-veterans was so small (N=19) that we cannot divide them further in terms of childhood deviance or illicit drug use and still expect to get stable results. However, the fact that the patterning of drinking problems and the association between drinking frequency and arrests for non-veterans are so similar to that found for veterans makes us assume that the results we arrive at will be generalizable, and not confined only to ex-soldiers.

Pre-Service Deviance.

To estimate the level of pre-service deviance, we constructed a scale made up of five behaviors: truancy, high school dropout and expulsion, fighting, juvenile arrests, and early drunkenness. Each of these items was scored on a three-point scale (0, 1, 2) giving a possible maximum score of 10 (the scale is described in detail in Robins, Davis, and Wish, 1977). As we had anticipated, daily drinkers and those arrested twice or more were more likely to have had high deviance scores before

entering service (Table 4). One-fourth of the daily heavy drinkers, and one-third of the multiply arrested had been highly deviant youngsters, compared with eight and ten percent respectively of those who had not been heavy drinkers for six months and not arrested in the last two years. Those with intermediate drinking and arrest histories fall between.

To learn whether the arrests associated with heavy drinking were entirely due to the fact that the more deviant children were destined both to drink and be arrested, we looked at the effect of alcohol on arrests for men with different levels of deviance in childhood (Table 5). We found that daily heavy drinkers had more multiple arrests at every level of childhood deviance, although the rate of multiple arrests for daily heavy drinkers without pre-service deviance was extremely low (5%). Daily heavy drinkers who had little or no pre-service deviance often (48%) had a single arrest, while other men without pre-service deviance rarely were arrested at all.

We had noted previously that most daily heavy drinkers had not been arrested in the two years prior to interview. We note in Table 5 that this is not true of those who had also been highly deviant before service: two-thirds of them had an arrest, and more than one-third had multiple arrests. Interestingly, however, men with a history of early deviance who did not drink heavily daily usually did not get arrested, just as daily heavy drinkers who had not been deviant usually did not. Clearly early deviance and heavy drinking were not only both related to adult arrests, but additive in their efforts.

Polydrug Use.

As Table 6 shows, about half the daily heavy drinkers were also polydrug users, defined as having used four or more different types of illicit drugs in the last two years. Polydrug use was rare among men who drank less heavily. Similarly, about half of those arrested twice or more were also polydrug users, as compared with one-quarter of those arrested once and only 10% of those never arrested. We need therefore to see whether the arrests among the heavy drinkers might not be accounted for by their drug use rather than by their alcohol consumption.

Table 7 shows that when daily heavy drinkers were not also polydrug users their likelihood of arrest was only slightly greater than that of others. Less than one-fourth were arrested at all, and almost all of these had had only a single arrest. When daily heavy drinking was associated with polydrug use, however, arrest rates were very high (63%) and about half of those arrested had multiple arrests. While drugs and drinking were less obviously additive in their effects on arrest than early deviance and drinking, clearly the intersection of

TABLE 4

HAD HEAVY DRINKING AND ARRESTED VETERANS
BEEN DEVIANT EVEN BEFORE ENTERING SERVICE

<u>Last Two Years</u>		<u>LEVEL OF DEVIANCE BEFORE SERVICE</u> (In Percent)			
		High %	Moderate %	Low %	Total %
<u>Drinking Level</u>					
Daily heavy	(118)	26	63	11	100
Heavy 6 months	(175)	13	70	17	100
Not heavy 6 months	(277)	8	60	32	100
<u>Arrests</u>					
Two or more	(83)	35	57	8	100
One	(118)	16	73	11	100
None	(370)	10	62	28	100

TABLE 5

THE RELATIONSHIP BETWEEN HEAVY DRINKING AND
ARREST, CONTROLLING ON DEVIANCE BEFORE SERVICE

Pre-Service Deviance		Proportion with	
		2+ Arrests	Any Arrests
<u>Low</u>			
Daily	(12)	5%	48%
Heavy 6 months	(25)	0	7
Heavy < 6 months	(64)	2	7
<u>Moderate</u>			
Daily	(68)	15	30
Heavy 6 months	(113)	5	32
Heavy < 6 months	(181)	3	19
<u>High</u>			
Daily	(38)	36	68
Heavy 6 months	(37)	16	30
Heavy < 6 months	(32)	3	22

TABLE 6

POLYDRUG USE AMONG HEAVY DRINKING
AND ARRESTED VETERANS

<u>LAST TWO YEARS'</u>		<u>PROPORTION WHO USED FOUR OR MORE TYPES OF ILLICIT DRUGS IN THE LAST 2 YEARS</u>
<u>DRINKING</u>		%
Daily heavy	(118)	47
Heavy 6 months	(175)	13
Not heavy 6 months	(277)	9
<u>ARRESTS</u>		
2 or more	(83)	54
One	(118)	28
None	(370)	10

TABLE 7

DOES DRINKING LEVEL AFFECT ARRESTS,
INDEPENDENTLY OF ILLICIT DRUG ABUSE?

<u>NUMBER OF ILLICIT DRUGS USED IN THE LAST 2 YEARS</u>		<u>ARRESTS IN THE LAST TWO YEARS</u>	
		<u>2+</u>	<u>ANY</u>
<u>FOUR OR MORE</u>			
Daily heavy drinker	(52)	% 34	% 63
Heavy drinker 6 months	(134)	7	31
Not heavy 6 months	(230)	12	49
<u>THREE OR FEWER</u>			
Daily heavy drinker	(66)	6	23
Heavy drinker 6 months	(41)	5	27
Not heavy 6 months	(47)	2	12

daily heavy drinking and polydrug use produced remarkably high arrest rates.

Table 8 looks at the effects of heavy drinking on arrest when both pre-service deviance and concurrent drug use are held constant. While cell sizes are small when all three variables are considered together, it seems clear that these three variables work cooperatively to produce high arrest rates. When all three coincided--daily heavy drinking, polydrug use, and high pre-service deviance--60% had two or more arrests, and almost all (79%) had been arrested at least once. These are higher rates than obtained considering daily drinking alone or daily drinking paired with deviance or drug use. When there was no prolonged heavy drinking nor polydrug use among men who had not been deviant before service, only one in eight (12%) had any non-traffic arrest, and only 2% had two or more arrests. These rates are low, but no lower than those obtained when only two variables were considered--absence of both six months of heavy drinking and deviance or absence of both six months of heavy drinking and polydrug use. Indeed, they differ little from rates obtained by paying attention only to an absence of heavy drinking for six months (see Table 3). Thus, an absence of heavy drinking is enough alone to keep arrest rates low, but its presence alone is not enough to produce high arrest rates. Note that daily heavy drinkers who were not deviant children and who did not use a variety of illicit drugs along with alcohol had an arrest rate almost as low as that of men who were not heavy drinkers at all. The role of heavy drinking in arrest seems to be to facilitate the commission of crimes by drug users and those with deviant histories in childhood and adolescence, and presumably therefore a propensity to commit crimes. In vino veritas is an old saying, the correctness of which we seem to have confirmed. Drinking does not create crime in those without the predisposition, but it does disinhibit--or perhaps make clumsy enough to be caught--those who are so inclined.

So far we have shown that daily heavy drinking is related to criminality in those who were deviant children and who as adults are polydrug users. But we have not yet attempted to quantify the contribution of drinking behavior to the criminality of these young men. To set some quantitative estimate on its contribution, we entered our three predictor variables--polydrug use, pre-service deviance, and amount of drinking--into a multiple classification analysis (MCA) to learn how much these variables contribute to explaining arrest rates and what part of that explained variance can be attributed to drinking behavior independently of its relationship with deviance and drugs.

As Table 9 shows, the three variables together explained only 14% of the variance in arrest rates. Alcohol made as much of an independent contribution as did pre-service deviance, but not as much as did polydrug use. To estimate the size of alcohol's independent contribution, we repeated the MCA using only deviance and drugs as predictors of

TABLE 8

COMBINING PRE-SERVICE DEVIANCE, POLYDRUG USE,
AND DRINKING LEVEL AS PREDICTORS OF ARREST

<u>POLYDRUG USE</u>		<u>ARRESTS IN THE LAST TWO YEARS</u>	
		<u>2+</u>	<u>ANY</u>
<u>HIGHLY DEVIANT PRE-SERVICE</u>		%	%
Daily heavy drinking	(24)	60	79
Heavy 6+ months	(16)	12	24
Not heavy 6 months	(10)	5	29
<u>NOT HIGHLY DEVIANT PRE-SERVICE</u>			
Daily heavy drinking	(42)	22	56
Heavy 6+ months	(25)	5	34
Not heavy 6 months	(37)	15	57
<u>NOT POLYDRUG USERS</u>			
<u>HIGHLY DEVIANT PRE-SERVICE</u>			
Daily heavy drinking	(14)	3	53
Heavy 6+ months	(21)	17	32
Not heavy 6 months	(22)	2	19
<u>NOT HIGHLY DEVIANT PRE-SERVICE</u>			
Daily heavy drinking	(38)	7	15
Heavy 6+ months	(113)	3	26
Not heavy 6 months	(208)	2	12

TABLE 9

MULTIPLE CLASSIFICATION ANALYSIS:
THE CONTRIBUTION OF AMOUNT OF DRINKING, PRE-SERVICE DEVIANCE
AND POLYDRUG USE AS PREDICTORS OF ARREST

<u>DRINKING:</u>		<u>UNADJUSTED*</u>	<u>ADJUSTED*</u>
Daily heavy drinking	(118)	.61	.46
Heavy 6+ months	(175)	.32	.34
Not heavy 6 months	(277)	.18	.22
		Eta = .26	Beta = .15
<u>PRE-SERVICE DEVIANCE</u>			
High	(107)	.57	.43
Moderate	(362)	.30	.30
Low	(102)	.12	.18
		Eta=.23	Beta=.13
<u>POLYDRUG USE</u>			
Present	(154)	.71	.60
Absent	(417)	.21	.23
		Eta=.32	Beta=.24
R ² = .143			
R ² , without drinking, = .124			
Independent contribution of drinking behavior - 2%			

*Arrests were scored as None = 0, 1 = 1, 2 or more = 2.

arrests. The explained variance dropped 2% (to 12%), showing that the contribution of alcohol independent of these two variables with which it is associated was quite small. Our final test to learn whether that small contribution was statistically significant was via the ECTA program devised by Goodman (Table 10). To reduce the number of cells, we dichotomized all variables. We are thus looking at the contribution of daily heavy drinking to multiple (2+) arrests, above that provided by high pre-service deviance and polydrug use. The reduction in unexplained variance by adding alcohol to deviance and drugs was indeed significant ($\chi^2 = 7.07$, $df=1$, $p < .01$).

We can conclude then that heavy drinking does play a significant role in arrests independently of the fact that heavy drinking occurs disproportionately in young men who were deviant before service and who use a variety of drugs. If one could reduce heavy drinking, then, one could expect an improvement in crime rates, but the drop would be quite small and would affect mainly those who were deviant early in life or using a variety of illicit drugs.

DISCUSSION

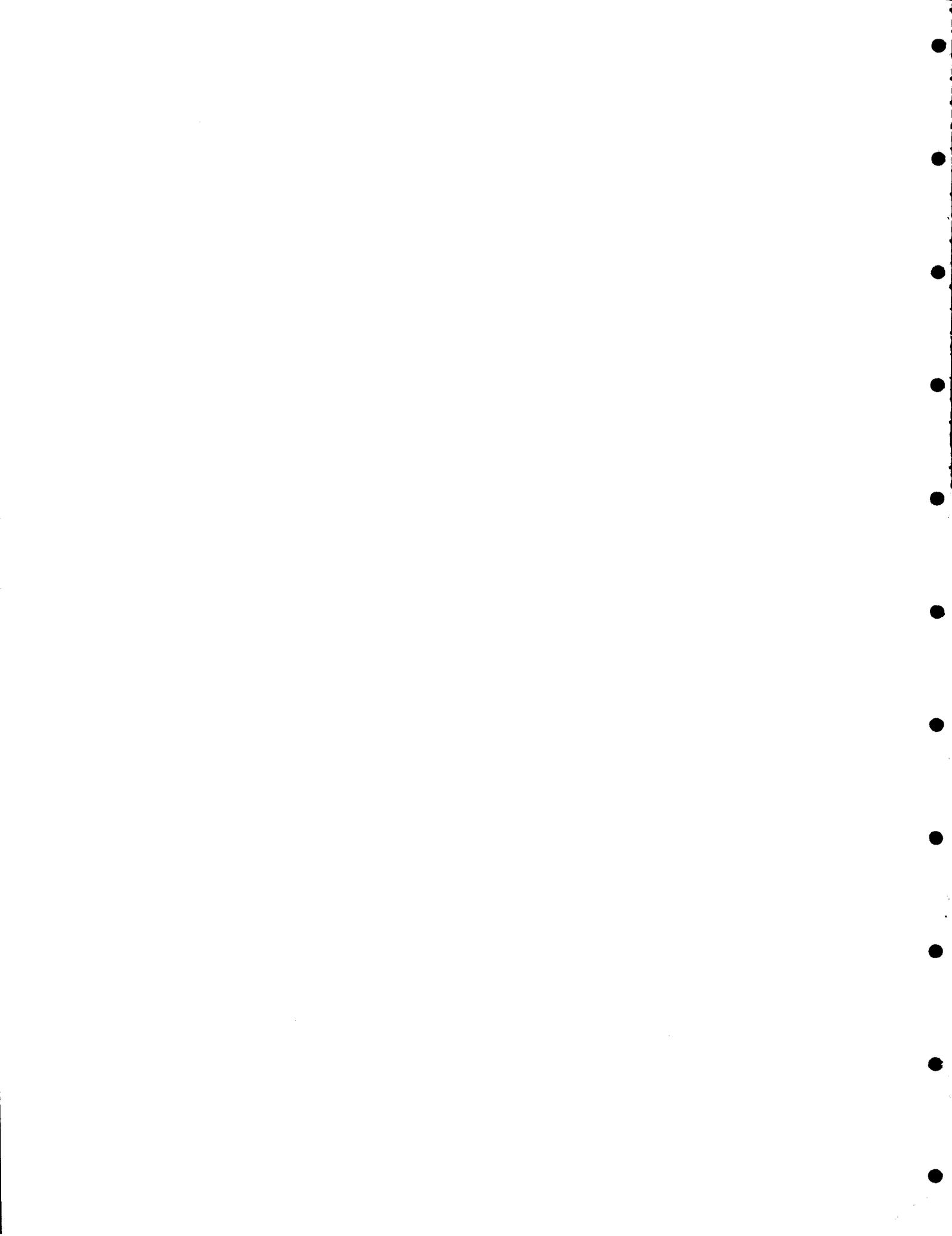
We have substantiated the widely held belief that heavy drinking is associated with crime--or at least crimes for which an arrest occurs, but its independent effect has been shown to be quite a modest one. The fact is that very heavy drinking is often part of a broad complex of deviant behavior which has its roots in childhood, and which is expressed in young adults as heavy drinking, use of illicit drugs, theft, fighting, and a host of other behaviors that lead to arrest. When heavy drinking is not part of this constellation of early-onset deviance, it rarely leads to arrest. While one may get modest reductions in crime by tackling these adult manifestations one at a time, it would be much more efficient if we could discover ways of intervening successfully much earlier. The payoff for such successful early intervention would be much greater than simply the reduction of arrest rates, since these early behavior patterns also forecast work disability and serious suffering in both the individual himself and those who care about him or suffer because of him.

TABLE 10

DOES DRINKING BEHAVIOR ADD SIGNIFICANTLY TO POLYDRUG USE
AND PRE-SERVICE DEVIANCE IN EXPLAINING MULTIPLE ARRESTS? (ECTA ANALYSIS)

	χ^2	DF	p <
TOTAL VARIANCE:	51.92	7	.000
UNEXPLAINED VARIANCE REDUCED TO			
High Deviance + Polydrug Use	13.07	5	.022
High Deviance, Polydrug Use, & Daily Heavy Drinking	5.40	4	.248*
Contribution of Daily Heavy Drinking	7.07	1	.01

*Note that no interactions need be considered to reduce unexplained variance to non-significance.



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