

MAINE STATE LEGISLATURE

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ANALYSIS OF
AVAILABLE STATISTICAL DATA
RELATED TO CRIMINAL AND NON-CRIMINAL BEHAVIOR

An Interim Report

Prepared for:

The Maine Commission to Revise
Statutes Relating to Juveniles

By:

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September 13, 1976

Progress and Problems

Analysis of the juvenile crime statistics, represented by arrest rates for various categories of offense, has proven time-consuming. After approximately 20 person-days of effort, we have produced a correlation matrix* using six categories of arrest and 17 socio-economic indicators, involving 264 correlations. To date we have tested seven "causal" models, attempting to explain only one of the six arrest categories -- burglary, larceny and theft.

Each of these causal models required more than a day to develop and test, and the best model, which is described later, is still not satisfactory.

Because of the excessive time necessary to accomplish this work, we are investigating the feasibility of purchasing computer time to complete the analyses of both "criminal" (rape, robbery, assault, arson, burglary, larceny, and theft) and other juvenile offenses and behavior (loitering, curfew violation, run-away, and drop-outs). Without some electronic data processing assistance, it will not be possible to develop appropriate analytical models in time for the preliminary report.

Staff are making every effort to insure that satisfactory analyses of the available data will be available for inclusion in the report of preliminary findings and recommendations.

*

See Attachment 1.

The "Best" Model to Date for Explaining Burglary,
Larceny and Theft

Partial correlation was used to test the relationships between pairs of variables while holding constant (or "controlling for" the effects of) other variables, according to procedures described in our previous report.*

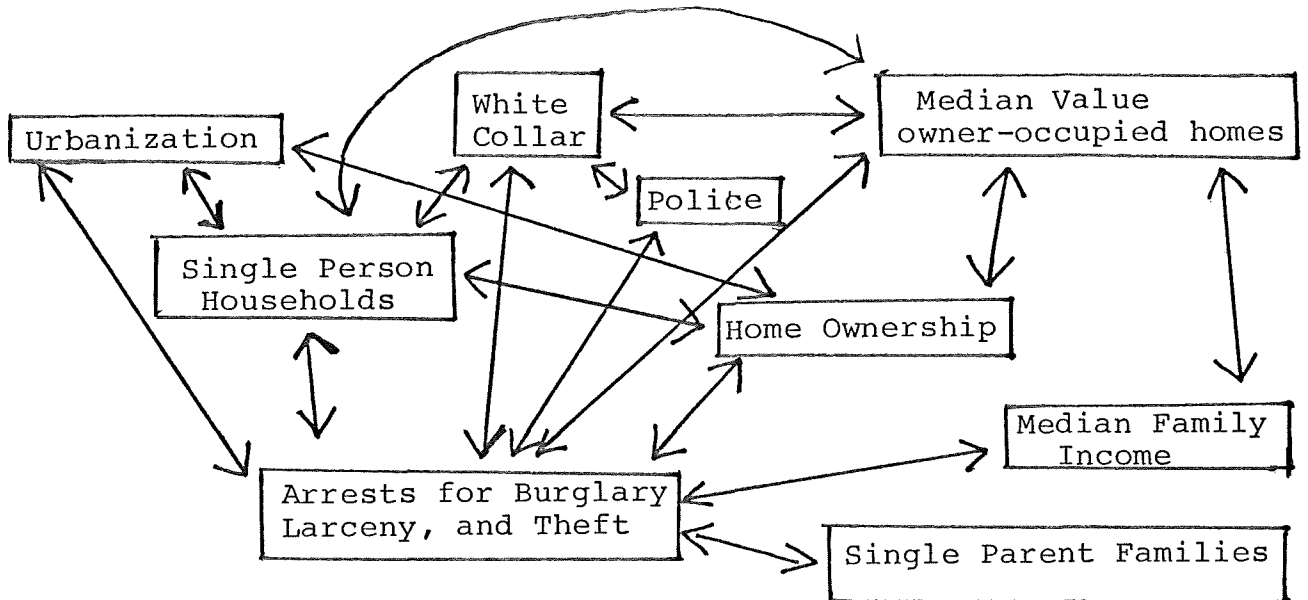
The major difference between the models tested in the previous report and the one presented below, is the introduction of more variables into the chain of causation, requiring that more variables be held constant mathematically. Thus, our "best to date" model involves what are called "third" and "fourth order" partial correlations.

The correlation matrix (see Attachment 1) shows 17 highly significant correlations that relate to our burglary-larceny-theft variable:

<u>Variables</u>	<u>Correlation</u>
1. B,L,T and Home Ownership	-.8440
2. B,L,T and Single Person Households	.8240
3. B,L,T and Police	.7089
4. B,L,T and Single Parent Families	.6457
5. B,L,T and White Collar	.6186
6. B,L,T and Median Value Owner Occ. Homes	.7639
7. B,L,T and Urbanization	.8431
8. B,L,T and Median Family Income	.6935
9. Urbanization and Home Ownership	-.9292
10. Urbanization and Single Person Households	.7033
11. Home Ownership and Single Person Households	-.7719
12. White Collar and Single Person Households	.6793
13. Median Value Owner Occ. Homes and Single Parent Households	.7018
14. Median Value Owner Occ. Homes and Median Family Income	.8449
15. Median Value Owner Occ. Homes and White Collar	.6979
16. Median Value Owner Occ. Homes and Home Ownership	.6509
17. Police and White Collar	.6216

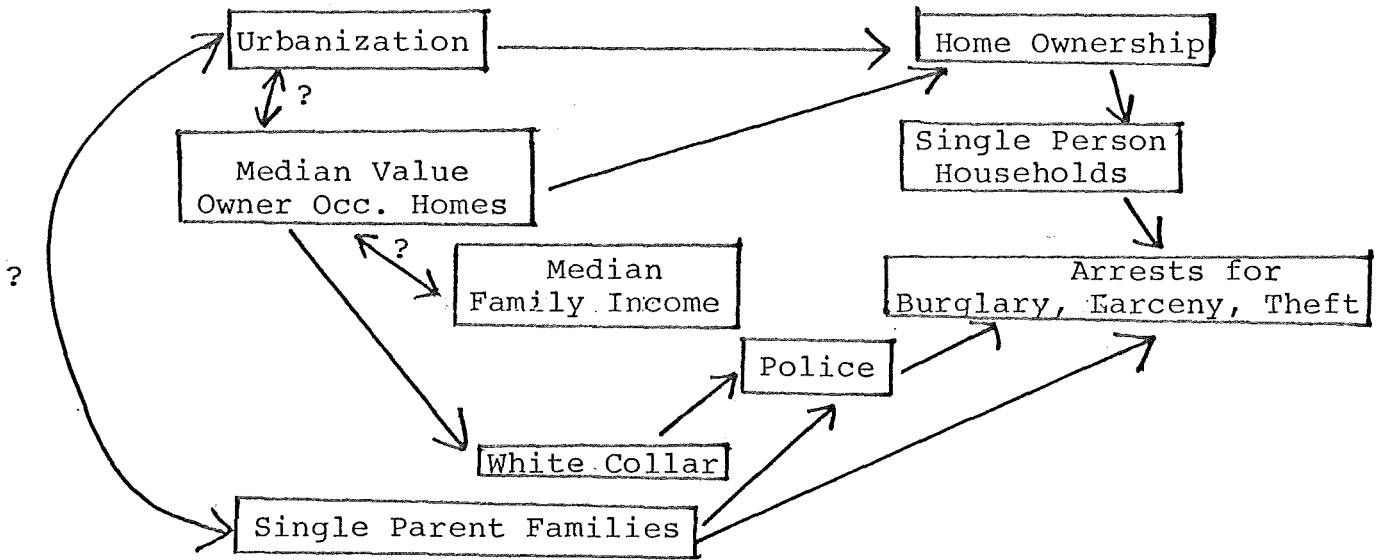
*See Analysis of Available Statistical Data Related to Prevention Issues, August 5, 1976, pp. 5-8.

These 17 correlations represent 17 "ambiguous" relationships. At this point, prior to using partial correlation techniques, we cannot describe any inferred causal relationships. The causally unstructured model would look like the following chaotic diagram:



Causal modeling using partial correlation permits us to (1) eliminate some of the "arrows" in the diagram, and (2) infer a "direction" of causality. An arrow can be eliminated when a partial correlation coefficient for two variables, holding another (or more than one other) variable constant, approaches zero.

After several unsuccessful attempts to make sense of the 17 correlations described above, we tested the following model:



If the above model were correct, the following set of prediction equations would be satisfied:

1. The partial correlation between B,L,T and urbanization, holding constant home ownership, single person households, single parent families, and police, would approach 0 (the actual value was $-.1017$).
2. The partial correlation between B,L,T and median value of owner occupied homes, holding constant home ownership, single person households, single parent families, and police, would approach 0 (the actual value was $.1493$).
3. The partial correlation between B,L,T and median family income, holding constant the same variables as in numbers 1 and 2 above, would approach 0 (the actual value was $.2416$).

4. The partial correlation between B,L,T and white collar, holding constant the same variables as in numbers 1, 2 and 3 above, would be 0 (the actual value was .1136).
5. The partial correlation between B,L,T and home ownership, holding constant single person households, single parent families, and police, would not = 0 (actual value was -.7220).
6. The partial correlation between B,L,T and single person households, holding constant home ownership, single parent families and police, would not = 0 (actual value was .5289).
7. The partial correlation between B,L,T and police, holding constant home ownership, single person households and single parent families, would not = 0 (actual value was .2837).
8. The partial correlation between B,L,T and single parent families, holding constant home ownership, single person households, and police, would not = 0 (actual value was .7337).

Thus, while our best model is not entirely confirmed (equations #1, 2 and 4 could be closer to 0; equation #3 is too high, and equations 5, 6, and 7 are satisfied) it indicates a productive direction for future work.

With the help of electronic data processing, staff will be able to significantly accelerate the process of formulating, testing and refining causal models which will satisfactorily explain the relationships among juvenile arrest rates and the other indicators we are able to analyze.

The final report on this process will be incorporated in the complete preliminary report which is distributed to Commission members.

ATTACHMENT 1

Lower Half Correlation Matrix:

Juvenile Arrests and Socio-Economic Variables

(All coefficients $\times 10^{-4}$)

Definition of Variables Included

in Correlation Matrix

- R, R, A & A - Juvenile arrests for forcible rape, robbery, aggravated assault and arson, 1975, per 1,000 population under 18; 1970 (1).
- Robbery - Juvenile arrests for robbery, 1975, per 1,000 population under 18; 1970 (1).
- Agg. Assault- Juvenile arrests for aggravated assault, 1975, per 1,000 population under 18; 1970 (1).
- B,L,T - Juvenile arrests for burglary, breaking and entering, larceny, theft, and motor/vehicle theft, 1975, per 1,000 population under 18; 1970 (1).
- Curfew and Loitering - Juvenile arrests for curfew and loitering law violations per 1,000 population under 18; 1970 (1).
- Run-away - Runaways, 1975, per 1,000 population under 18; 1970.
- Dropout - Dropouts per 100 enrolled; 1974-1975.
- Urb. - Percent population living in urban areas; 1970.
- Pov.- Children living in families below poverty as percent population under 18; 1970.
- Med. Fam. Income - Median family income in 1969 (2).
- Unemploy.- Average monthly unemployed as percent of labor force, 1975 (3).
- Divorce - Divorces as percent of marriages; 1974.
- S/P/F - Children living in single parent families as percent population under 18; 1970.
- White Collar- Percent of civilian labor force, employed as white collar workers; 1970 (2).
- Educ. - Persons 25 years old and over who have completed 4 years of high school or more; 1970 (2).
- 1-Person Households- One-person household per 1,000 population; 1970 (2).

Definitions (continued)

Residential Mobility -	Percent housing units moved into during 1965-1970 (2).
Home Ownership -	Percent owner occupied housing units; 1970 (2).
Manuf. Services, Construct. -	Percent of civilian labor force employed in manufacturing, services, and construction; 1970 (2).
Overcrowding -	Percent housing units with 1.01 or more persons per room; 1970 (2).
Med. Val. Occ. Homes -	Median value, owner-occupied, single family housing units; 1970 (2).
Illegitimacy -	Illegitimate births as percent of live births; 1974 (4).
Migrant Pop. -	Percent of population, 5 years and over, which is migrant; 1970 (4).
Police -	Number of full-time law enforcement officers per 1,000 population; 1975 (5).

(1) Source: Uniform Crime Reports

(2) Source: U. S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census, County and City Data Book 1972

(3) Source: Department of Manpower Affairs, Employment Security Commission, Maine Manpower. Jan. - Dec., 1975

(4) Source: U. S. Department of Commerce. Bureau of the Census. U. S. Census, 1970

(5) Source: State of Maine, Department of Public Safety, Crime in Maine, 1975.

	R,R, A&A	Robbery	Agg. Assault	B,L,T	Curfew & Loitering	Run-Away	Dropout	Urb
R,R, A & A								
Robbery	*							
Agg. Assault	*	2439						
B,L,T	7159	4392	4920					
Curfew & Loitering	1562	2137	-1827	5397				
Run-away	3762	0167	4897	6456	3352			
Dropout	6354	6812	5464	4437	0200	3656		
Urb.	5430	3167	3094	8431	6023	5255	1742	
Pov.	-2782	-3188	-1384	-4796	-2316	-2767	-1481	-363
Med. Fam. Income	6198	4659	4870	6935	2960	4730	4044	556
Unemploy.	-3593	-1918	-4953	-4930	0895	-4776	-3900	-441
Divorce	5379	3347	3763	5068	1755	6246	3638	551
S/P/F	6071	3441	2612	6457	3096	4661	4567	484
White Collar	7035	2887	7159	6186	-1140	3820	4853	499
Educ.	4232	2440	4994	1392	-5013	1083	4340	-154
1-Person Households	7292	5329	5089	8240	3616	2907	3111	703
Residential Mobility	5683	3531	4448	6303	3879	4263	0883	801
Home Ownership	-4674	-3596	-2456	-8440	-6181	-5074	-1520	-929
Manuf. Services, Construct.	-4667	-3423	-4251	-1945	3045	0608	-4744	-203
Overcrowding	-3337	-2048	-2149	-2894	0577	-1575	-4774	103
Med. Val. O-Occ. Homes	7197	6868	4768	7639	3370	4723	7028	556
Illegitimacy	-2375	-3806	-3449	-0815	1741	-1718	-5186	018
Migrant Pop.	4360	-0074	7026	2290	-0876	5657	3267	184
Police	6119	3796	5170	7089	2189	6086	3750	499

*Because Robbery and Aggravated Assault are included in the R,R,A&A variable, it is redundant to display these correlations

idential
lity

Home
Ownership

Manuf. Services
Construct.

Overcrowding

Med. Val.
O-Occ. Homes

Illegitimacy

Migrant
Population

70

74

66

71

90

88

16

1523

-1460

-6509

1011

-0968

-5497

-0067

-2890

2610

-0965

-0923

-3886

1326

-1660

-4350

-5097

3203

7100

-2136

-4393

5012

ATTACHMENT

Lower Half Correlation Matrix:
20 Variables relating to cause
and prevention of juvenile arrest
and school dropout rates

(all correlation coefficients 10^{-4})

	JA	DO	Urb	Pov	Med	Div	SPF	HO	WC	RM	Uner
JA											
DO	3102										
Urb	7841	1742									
Pov	-4074	-1481	-3630								
Med	5677	4044	5560	-8640							
Div	5589	3638	5516	-2744	4355						
SPF	5717	4567	4848	-1584	2527	6127					
HO	-7625	-1520	-9292	4768	-6564	-3896	-3012				
WC	4035	4853	4993	-4008	6292	3750	3360	-4785			
RM	5565	0883	8017	-4236	6530	5109	1410	-7970	5505		
Unem	-2694	-3593	-4256	6889	-7919	-2520	-2520	4297	-3831	-5932	
Pol	7108	3750	4999	-4592	5421	3770	5246	-5497	6216	4716	-2449
MH	6226	4311	4953	-2800	3731	4569	4402	-4463	3511	1447	-0556
AFDC	1192	-0375	0630	2922	-1986	3514	4679	0621	-4290	-1003	-0054
Cam	2013	6158	2717	-2684	4124	2397	3522	-2951	4073	1309	-2316
Home	2222	-0446	4182	-0354	2373	0775	0783	-3789	2759	3199	-3077
Foster	-4190	-3555	-1739	3366	-2820	-5354	-2255	1550	-3433	-2105	1004
CW	-3378	-3581	-0602	-0557	-1561	-2177	0804	0156	-3326	-3161	0532
SE	-0770	4543	-3243	3222	-0564	-0708	-0933	3249	0.00	-0667	-0019
LIED	-4318	-1146	-3023	9661	-8220	-3064	-1744	3843	-3806	-3464	6098
PE/CT	-0724	-2235	-2136	0481	-0347	-2799	-1304	1111	-4930	-1969	0568

JA=Juvenile arrests
 DO=Dropouts
 Urb=Urbanization
 Pov=Children in families below
 poverty level
 Med=Median family income
 Div=Divorces
 SPF=Single-parent families

HO=Owner-occupied housing units
 WC=White collar
 RM=Residential mobility
 Unem=Unemployed
 Pol=Police
 MH=Children admitted to Mental
 Health Clinics
 AFDC

Cam=~~Camper~~ Campership
 Home=Family home workers
 Foster=Foster care homes
 CW=Child welfare
 SE=Special Education
 LIED=Low income/educationally
 disadvantaged
 PE/CT=Pupils enrolled per
 classroom teacher

Unem	Pol	MH	AFCD	Cam	Home	Foster	CW	SE	LIED	PE/CT
2449										
0556	4283									
0054	-1657	0989								
2316	2845	4603	0294							
3077	0017	1565	1285	1908						
1004	-5517	-3480	3415	0318	5254					
0532	-3207	-0395	2773	1905	0976	4970				
0019	-0823	-3016	0999	0519	-0942	0621	-6479			
6098	-4519	-3627	2516	-2064	-0139	3865	-0011	3273		
0568	-2081	-2853	2610	0895	0048	4089	2828	1467	0309	