

148478

May 1981

---

# Patterns of Multiple Drug Use

The National Youth Survey  
Project Report No. 15

A Descriptive Analysis of Static Types  
and Change Patterns, 1976-1978

by  
Tim Brennan  
Delbert S. Elliott  
Brian A. Knowles

U.S. Department of Justice  
National Institute of Justice

This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the National Institute of Justice.

Permission to reproduce this ~~copyrighted~~ material has been granted by

Public Domain/LEAA/OJJDP  
U.S. Department of Justice

to the National Criminal Justice Reference Service (NCJRS).

Further reproduction outside of the NCJRS system requires permission of the ~~copyright~~ owner.

Patterns of Multiple Drug Use: A Descriptive Analysis  
of Static Types and Change Patterns, 1976-1978

by

T. Brennan, D.S. Elliott, and B.A. Knowles

A Report of the National Youth Survey  
(Project Report No. 15)

Delbert S. Elliott, Principal Investigator (NIMH & LEAA)  
Suzanne S. Ageton, Co-Principal Investigator (NIMH)  
Brian A. Knowles, Assistant Project Director (LEAA)  
Tim Brennan, Investigator (LEAA)  
Rachelle J. Canter, Investigator (NIMH)  
David Huizinga, Investigator (NIMH)

Behavioral Research Institute  
Boulder, Colorado

This Report was prepared under grant number 78JN-AX-0003 from the Office of Juvenile Justice and Delinquency Prevention, The Law Enforcement Assistance Administration, U.S. Department of Justice. Points of view or opinions expressed in this document are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice.

The drug use data for 1976 utilized in this report were obtained under a separate grant (MH27552) from the Center for Studies in Crime and Delinquency, The National Institute of Mental Health, U.S. Department of Health and Human Services.

## Executive Summary

Two empirical typologies of multiple drug use are developed employing self-reported drug use data from a national youth panel of adolescents aged 11 to 17 in 1976. The first typology is based upon reported use of seven drugs (alcohol, marijuana, hallucinogens, amphetamines, barbiturates, cocaine, and heroin) by the youth panel in 1976. The second is an integrated typology based upon reported use of an expanded set of twelve drugs (including tobacco; angel dust and inhalants) by the youth panel in 1977 and 1978. The latter typology is of special significance since it involves a stable set of drug-use types observed in both 1977 and 1978 and thus permits a detailed analysis of changing patterns of drug use over this two year period.

A major conclusion from this analysis is that adolescent drug consumption is characterized by multiple drug use rather than single drug use. Of the youth who consume drugs, the vast majority use more than one drug during a given period of time. The attempt to describe adolescent drug use through an analysis of individual drugs considered one at a time clearly results in a fragmented and incomplete picture of the drug use context and may be quite misleading.

A second general conclusion is that the empirical patterns of drug use are fairly complex. For example, a pattern may involve the regular use of two drugs and an experimental or intermittent use of two or three other drugs. Yet the data suggest that there are several general paths or developmental sequences from non-use to the regular use of multiple illicit drugs. The most frequent sequence involves 1) occasional use of alcohol, 2) regular use of beer and hard liquor, 3) regular use of alcohol and tobacco, 4) regular use of

alcohol, tobacco, and marijuana, and 5) multiple illicit drug-use patterns. A second and less frequent path begins with regular use of tobacco and moves to regular alcohol and tobacco use, to regular alcohol, tobacco, and marijuana use and then to multiple illicit drug use.

Highlights of the findings concerning the demographic characteristics of drug use-types and the patterns of onset, termination, increasing use and decreasing use are as follows:

- o 76 percent of youth in 1977 (aged 12-18) and 80 percent in 1978 (aged 13-19) reported some drug use.
- o 44 percent of youth in 1977 and 53 percent in 1978 reported more than an occasional use of alcohol (2 or 3 times a year).
- o Age was the only demographic variable systematically related to increasing drug use and the progression from non-use to multiple illicit drug use. Males were overrepresented in the multiple illicit use types for 1978, but not for 1977.
- o The dominant pattern of onset is from no use to occasional use of alcohol. The next most frequent onset is from no use to regular tobacco use.
- o The dominant pattern of termination is from occasional alcohol use to non-use. This pattern accounts for 75 percent of all terminations.
- o The major pattern of increasing use is the transition from occasional use of alcohol to moderate or regular use of alcohol.
- o The transition to illicit drugs (typically marijuana) is predominantly from a regular alcohol and tobacco use pattern. The transition to a multiple illicit drug use pattern is predominantly from an alcohol, tobacco, and marijuana use pattern. Twenty-three percent of those in the regular alcohol and tobacco use type added marijuana the next year. Likewise, 23 percent of those in the regular use of alcohol, tobacco, marijuana pattern added use of another illicit drug in the next year.
- o The dominant transition involving a declining use of drugs was the transition from regular use of alcohol to occasional use of alcohol.

Apart from the highly complex drug-use types, the majority of drug use patterns were highly stable across time. These patterns of consumption and change for the years 1976, 1977, and 1978 are described in detail.

Finally, there was a clear association between the drug use patterns ordered by the frequency and number of drugs used and various types of problem behavior, delinquency, and measures of bonding to conventional groups norms and activities. Those in the multiple illicit drug use patterns systematically had the most negative scores on all of these measures while non-users and occasional alcohol users typically had the most positive scores.

Table of Contents

	<u>Page</u>
Grant Citation.....	i
Executive Summary.....	ii
List of Figures and Tables.....	vi
Introduction.....	1
The Objectives of the Drug Typology.....	1
The National Youth Survey.....	5
Methodology.....	7
Classification Attribute Space.....	7
Data Analytic Methods.....	8
Developing an "Integrated Taxonomy".....	10
Establishing Patterns of Change.....	11
Validation of the Constructed Taxonomy.....	12
Taxonomy of Multiple Drug Use - 1976.....	12
Concurrent Validity for 1976 Taxonomy.....	20
Predatory Crimes Against Persons and Property.....	23
Developing the Integrated Taxonomic System.....	25
The Overall Taxonomic Structure of Multi-Drug Use.....	27
Summary Description of the Types.....	29
Detailed Type Descriptions.....	30
A Hierarchical Ordering of Multiple Drug Use Styles.....	40
Multivariate Discriminations Between the Drug Profiles.....	42
The Relative Importance of Each Drug.....	44
The Meanings of the Discriminant Functions.....	44
Evaluating the "Goodness" of the 1976 Classification.....	49
Change Patterns in Drug Use Between 1977 and 1978.....	52
Relative "Stability" of Different Types.....	52
Major Patterns of Change: Transitions 1977 - 1978.....	54
Patterns of Onset.....	54
Patterns of Termination.....	61
Patterns of Increased Drug Use.....	62
Patterns of Decreased Drug Use.....	64
Graphic Presentation of Major Change Patterns.....	65
Change Patterns in Multiple Drug Use 1976-1977.....	67
Patterns of Onset.....	67
Patterns of Termination.....	67
Patterns of Increased Drug Use.....	68
Validation of the Integrated Typology.....	69
Problem Behavior and Drug Types.....	69
Drug Types and Delinquent Behavior.....	73
Drug Types and Social Psychological Variables.....	73
Conclusions.....	80
References.....	81
Appendix A.....	84

List of Figures and Tables

	<u>Page</u>
<b>Figures:</b>	
Figure 1 - Taxonomy of Multiple Drug-Use..... Profiles among Youth at Wave 1 (1976)	14
Figure 2 - Taxonomic Structure of Adolescent Drug..... Use, 1977 - 1978	28
Figure 3 - Major Patterns of Onset, Termination, and..... Increased Drug Consumption: 1977-1978	66
 <b>Tables:</b>	
Table 1 - Profile of Drug use for 1976 Taxonomy..... of Youth: Raw Frequency of Consumption Scores	15
Table 2 - Cross Classification of 1976 Drug Types..... Against Sex, Ethnicity, and Age	16
Table 3 - Cross Classification of Wave 1 (1976) Drug..... Types Against Grades and Peer Disapproval of Drugs	21
Table 4 - Cosine and Distance Scores between Drug..... Profile Clusters for Years 1977 and 1978	25
Table 5 - Descriptions of Youth Across the Drug..... Profiles of the Integrated Taxonomy	29
Table 6 - Type Profiles of Youth Multiple Drug Use:..... Raw Cluster Scores and Standardized Mean Scores for Wave 2 Users in Integrated Typology from K-Means Analysis	32
Table 7 - Type Profiles of Youth Multiple Drug Use: Raw..... Cluster Scores and Standardized Mean Scores for Wave 3 Users in Integrated Typology from K-Means Analysis	34
Table 8 - Age and Sex Breakdown Across the Various..... Drug Use Types (1977-1978)	38
Table 9 - Ethnic and Social Class Proportions of the..... Various Drug Use Clusters (1977-1978)	39
Table 10 - Summary Table of Discriminant Analysis..... of Drug Use Classification	43
Table 11 - Statistical Information Regarding Discriminant..... Functions for Youth Drug-Profile Classification	45
Table 12 - Standardized Discriminant Function..... Coefficients	46
Table 13 - Centroids of Groups in Reduced Space for..... the First Six Discriminant Functions	48
Table 14 - Predicted vs. Actual Class Membership..... from Discriminant Analysis	50
Table 15 - Main Directions of Change in Multiple Drug..... Use Between 1977 and 1978	53
Table 16 - Transition Table for Change in Drug Style,..... 1977 to 1978 (Total Sample)	55
Table 17 - Transition Table for Change in Drug Style,..... 1977 to 1978 (Male)	56



	<u>Page</u>
Table 18 - Transition Table for Change in Drug Style,.....	57
1977 to 1978 (Female)	
Table 19 - Transition Table for Change in Drug Style,.....	58
1977 to 1978 (Ages 13, 14)	
Table 20 - Transition Table for Change in Drug Style,.....	59
1977 to 1978 (Ages 15, 16)	
Table 21 - Transition Table for Change in Drug Style,.....	60
1977 to 1978 (Ages 17, 18)	
Table 22 - One-Way ANOVA Tables for Drug Type Classification.....	71
Against Drug/Alcohol Related Problems	
Table 23 - One-Way ANOVA Tables for Drug Type Classification.....	74
Against Self-Reported Delinquency	
Table 24 - One-Way ANOVA Tables for Drug Type Classification.....	75
Against Delinquent Behavior Scales	
Table 25 - One-Way ANOVA Tables for Drug Type Classification.....	77
Against Family, Peer, and School Relations	

## INTRODUCTION

This report focuses upon the general problem of multiple drug use in the American Youth Population. A concern with multi-drug use patterns is critical to our general task of epidemiological description, and has theoretical significance as well. Most frequently, researchers have approached this descriptive task with the presentation of separate univariate frequency tables in which each drug is examined separately. However, this approach deals only with part of the descriptive problem. The separate univariate approach takes each drug out of context, ignoring the fact that youth who use drugs often consume two, three, or more drugs. This loss of context leads to a fragmented, partial, and possibly misleading description of adolescent drug use. A further weakness in univariate and bivariate approaches to epidemiological description is their lack of "integrative power" (Cattell, 1965). Such analyses inundate us with very large numbers of disconnected bits of data. This mass of information requires some kind of integration in order that the main structures/patterns within the data can become visible. In an area such as drug consumption which is inherently multi-dimensional, with great variation between styles of consumption and a large number of potential use patterns, there is a critical demand for highly integrated description.

### The Objectives of the Drug Typology

The delineation and description of multi-drug use patterns has been a continuing concern to researchers (Goode, 1969, 1974; National Commission on Marijuana and Drug Abuse, 1972; Kandel, 1975; Johnson, 1973; Josephson, 1977; Jessor and Jessor, 1977). The purposes of descriptive classification of multiple drug use are varied. In the present chapter the following major purposes are involved in our classification system.

Clarification and Simplification. If major empirical patterns of multiple drug use exist, they are embedded and hidden in a complex mass of data. With only 10 major drugs (tobacco, alcohol, marijuana, cocaine, etc.) and a simple dichotomy of use/nonuse, the possible number of patterns of multiple use is  $2^{10}$ . Our current state of theoretical knowledge concerning drug use is very limited and provides little direction in the effort to identify recurrent empirical patterns within this enormous number of possibilities. Descriptive classifications can help to reveal the interactions which may exist within this large data matrix. The classification approach can operate as a "multivariate histogram" to reveal the microstructures which would be otherwise hidden in the data.

Serendipitous Discovery. This is a second main function of descriptive classification. We may discover complex patterns of multiple drug use which might have been overlooked, or which may have been theoretically unexpected according to prior theory.

Criterion Clarification: New Units of Analysis. Given that drug use is a complex behavior involving multiple dimensions, it is often difficult to conceptualize and formulate the exact units of behavior to be explained. There are simply too many possibilities. The discovery of highly recurrent patterns or new patterns hidden in the data may allow the specification of new units of analysis or new model structures, each of which may demand its own theoretical explanation. Alternatively, these new "units" may simply provide a sharper focus for further conceptualization. Description in this sense clearly interacts with theory development, providing the empirical grounds for both initial theory development and the modification and elaboration of existing theoretical explanations of drug use.

Enumeration by Means of Classification. A further goal of our descriptive classification involves the enumeration of the number of youth falling into each of the various classes of multiple drug use. The earlier report on the Epidemiology of Delinquent Behavior and Drug Use (Elliott et al., 1981) provided enumeration of the numbers of youth who use each specific drug. Our interest in the present volume is to examine the frequency of occurrence of the major drug-profile types. This component of our multivariate analysis should, therefore, provide a complement to the earlier univariate enumerations. It should help in the integration and clarification of the findings that emerge from the incidence studies of each drug taken separately.

The Description of Change: Differential Change Versus Homogeneous Change.

We are interested in the changes in multiple drug use across time. The purpose of our research also involves the descriptive analysis of the manner in which youth move into (or out of) different styles of multiple drug use across time. In the study of change the first task is to specify the particular change being studied. In conventional univariate change models we examine each drug taken separately. A change score is obtained or some comparison of scores for the samples at  $t_1$  and  $t_2$  is made. Global averaging over the samples on these mean scores makes assumptions about the homogeneity of the "change" across the samples. In practice, differential starting points, differential rates of change, and differential ending points may all be lost in the "averaging" process of computing group means for across time comparisons.

Our interest in this analysis is focused on the examination of change in a multivariate sense. We will examine change as a result of transitions between multivariate patterns of drug use. Our unit of analysis is the person rather

than any particular drug. Our model of change will attempt to describe the overall process which may involve different starting points (or multiple drug use patterns), different kinds of transitional changes, and different ending states. We have attempted to limit or minimize our assumptions about starting points, change patterns, and ending points. Different youth may, for example, start at different states but end up in the same state. An important part of our analysis will be the discovery and specification of the kinds of "change patterns" which have high recurrence. These "patterns" may become useful units of analysis for future theoretical studies of the development of styles of drug use among adolescents.

Given the emphasis upon the multi-drug context and our desire not to violate this multivariate context, it is inevitable that we have relied upon multivariate models for statistical analysis. In the discovery and description of multiple-drug profiles that optimally describe the adolescent population, we have relied heavily upon cluster analytic methods. A variety of cluster analysis models have been applied to our data. Some of these models incorporate quite different definitions of a "class" or "type" (e.g., K-means clustering, hierarchical mode-seeking methods, minimum-variance clustering, etc.). We compare results across these different models to ascertain that the syndromes of drug use that we discovered were robust and were not simply an artifact of any particular method.

Our concept of a multiple drug-use profile or multi-drug type depends heavily on the ideas of internal homogeneity, mutual similarity, and boundary conditions. Each youth has provided a set of scores for his/her frequency of consumption of a large number of drugs. This set of scores forms a pattern, or vector, which is classified together with "highly similar" patterns. High

mutual similarity of patterns is the basis on which cluster analysis methods group patterns into the same class (Everitt, 1974). However, there is absolutely no reason to assume that each specific drug is equally important in defining the emerging type-pattern. The drugs that are most important in defining a type-pattern are those that have high homogeneity for that particular type. Homogeneity calculations, therefore, are a critical part of our delineation of the exact meaning of any type-profile. We have used the H-coefficient (Tryon and Bailey, 1970) as a general indication of the homogeneity of each class across each drug. Finally, in regard to boundary conditions, the linkage-criteria within each cluster analysis model provides an implicit definition of boundary. Youth will be classified into an emerging multiple-drug type only if they satisfy the linkage criteria. The linkage criteria for the methods used in the present research are described in Anderberg (1973), Everitt (1974), and Hartigan (1975).

The present analysis fulfills a number of basic purposes including the discovery of "real types" of multiple drug use; the description of change; and the provision of new "units of analysis" for future theoretical studies of adolescent drug use.

#### The National Youth Survey

The National Youth Survey (NYS) was initiated in June of 1975 with a five year grant from the Center for Studies of Crime and Delinquency, NIMH. The focus of this study was upon the epidemiology of delinquent behavior in the American youth population and the test of a new integrated theory of delinquency (Elliott et al., 1979). The NIMH study design called for an initial survey in 1977 with a national sample of youth aged 11-17 in 1976, and two follow-up surveys in 1978 and 1979 with those in the original odd-aged

cohorts i.e., those 11, 13, 15, and 17 in 1976. Prior to the 1978 survey, a second grant was obtained from the National Institute for Juvenile Justice and Delinquency Prevention, LEAA, to study the epidemiology of drug use and the relationship between delinquency and drug use among youth in the original even-aged cohorts (12, 14, and 16). As a result, the 1978 and 1979 annual surveys were jointly funded by NIMH and LEAA and involved the total original youth panel. The drug data utilized for the 1976 drug typology as reported herein involves the total NYS sample. The data for the 1977 and 1978 typologies is limited to the original even-aged cohorts in this sample which were involved in the more detailed study of delinquency and drug use.

The National Youth Survey employed a probability sample of households in the continental United States based upon a multistage, cluster sampling design. The sample was drawn in late 1976 and contained approximately 2,358 eligible youth aged 11-17 at the time of the initial interview. Of these, 1,725 (73 percent) agreed to participate in the study, signed informed consents, and completed interviews in the initial (1977) survey. An age, sex, and race comparison between non-participating eligible youth and participating youth indicates that the loss rate from any particular age, sex, or racial group appears to be proportional to that group's representation in the population. Further, with respect to these characteristics, participating youth appear to be representative of the total 11 through 17-year-old youth population in the United States as established by the U.S. Census Bureau.

Respondent loss over the first three surveys was small. The completion rate for the 1978 survey was 96 percent (N=1,655) and for the 1979 survey it was 94 percent (N=1,625). A comparison of participants and non-participants at the second and third waves revealed some selective loss by ethnicity,

class, and place of residence. There did not appear to be any selective loss by sex or age, nor does it appear that there was any selective loss relative to self-reported levels of delinquency. The few significant differences found suggest that those lost were less delinquent than those participating each year. Comparisons of participants across the first three waves indicated that the loss by age, sex, ethnicity, class, place of residence, and reported delinquency did not influence the underlying distributions on these variables in any substantial way. We thus conclude that the representivity of the sample with respect to these variables has not been affected in any serious way by the loss over the first three surveys. For a more detailed description of the NYS as well as formal incidence and prevalence estimates of delinquency and drug use, study design and documentation of the sample, see Elliott, D.S., Knowles, B.A., and Canter R.J., The Epidemiology of Delinquent Behavior and Drug Use Among American Adolescents: 1976-1978, Behavioral Research Institute, March, 1981.

## METHODOLOGY

### Classificatory Attribute Space

In developing a classification system to describe the multi-drug use behavior of youth, the choice of an attribute space or content domain is the first critical methodological step. A classification based upon strict behavioral items can be markedly different from one based on etiological considerations. Prior work with taxometric clustering methods has indicated that the attribute space should contain as many relevant axes as possible. This is analogous to the issue of content validity in conventional psychometric scaling. Thus, the selected variables should provide adequate



coverage of the various drugs used by adolescents. A second factor governing the inclusion of drugs in the attribute space for this analysis is the degree to which a drug can differentiate between users. If all youth have the same score for a drug then that drug is useless as a classificatory variable. It was found, for example, that over 99 percent of our sample scored zero for heroin use, indicating that for the vast majority of youth this variable had zero discriminating power. Based upon these considerations, the set of variables in the attribute space included the following drugs: beer, wine, hard liquor, tobacco, marijuana, barbiturates, amphetamines, tranquilizers, psychedelics, glue, and angel dust.

We found a very high correlation between the reported frequency of use and the reported volume consumed. The use of both of these dimensions of use would have both doubled the number of variables and would have built a large amount of redundant information into the attribute space. Therefore, only the frequency of use score was used for each drug. The frequency scores used in this analysis refer to use during the past calendar year, i.e., during 1976, 1977, or 1978. The frequency scores are as follows:

- 1 = never used (during the last year)
- 2 = once or twice
- 3 = once every two or three months
- 4 = once a month
- 5 = once every two or three weeks
- 6 = once a week
- 7 = 2 - 3 times a week
- 8 = once a day
- 9 = 2 - 3 times a day

#### Data Analytic Methods

Two phases of data analysis were involved in the creation of the present multivariate classifications. In the first phase, smaller samples (N = 200)

were analyzed by the hierarchical clustering methods--Wishart's HMODE (Wishart, 1969), UPGMA clustering (Anderberg, 1973), using both cosine and Euclidean distance as similarity coefficients between drug profiles. These produced full hierarchical taxonomies of drug styles among youth. The object of these analyses involved the examination of classifications stemming from radically different clustering methods. The results of these comparisons are laid out in an earlier Project Report (Brennan, 1979). It was established that the major drug styles (i.e., styles which have many youth adhering to them such as daily tobacco smoking) were extremely stable across both clustering methods and similarity coefficients.

The second phase involved tackling the full national sample. Hierarchical methods cannot deal with sample sizes larger than 200. Therefore, we selected the K-means clustering method (McRae, 1973) since it can deal with very large samples. Additionally, the more experimental hierarchical methods had already given us a good indication of the recurrent centroids and the K-levels of the hierarchies that seemed optimal for our descriptive purposes. Within the context of K-means analysis, the K level chosen basically indicates the level of inclusiveness (broadness) of the classes and high values of K (e.g., K = 20) would produce a large number of fine-grained particularized classes. A low level (e.g., K = 3) would produce broad, highly inclusive, less particularized classes. An optimal level of K will maximize the ratio of parsimony and inclusiveness to the inevitable loss of information incurred by any categorization. In the K-means analyses we experimented with different sets of (K) random starting points (chosen from the hierarchical methods) and we examined the effect of varying K between 5 and 15.

The gradual increase of K from 5 to 15 and the selection of an appropriate K-level were the critical aspects of this research. If K is too small important class distinctions may be missed. This prompted us to utilize larger values of K and to examine the salience of the new distinctions which were revealed at successively higher levels. At each level we examined the replication of clusters by using different starting solutions. These procedures were used for Wave 1 (1976), Wave 2 (1977), and Wave 3 (1978) samples. We developed an optimal taxonomy for each of the three successive waves of data.

Developing an "Integrated Taxonomy" for Wave 2 (1977) and Wave 3 (1978)

The set of drugs available for this analysis was severely restricted at Wave 1 in comparison with Waves 2 and 3. As a result, the attribute space for the Wave 1 taxonomy is not consistent with the later phases and is much less complete. Therefore, in developing an "integrated" taxonomic system which could be used for assessing transitions between the waves we confined our attention to the data waves which had comparable data on the extended set of drugs, i.e., Waves 2 and 3. The following procedure was used in developing an optimal "integrated" taxonomy of youth drug use:

1. The two taxonomies developed from Wave 2 and Wave 3 were compared. Each centroid from Wave 2 was compared to each centroid from Wave 3 using both D (Euclidean distance) and the cosine between the two profiles.
2. The commonly identified types for each of the two waves were identified as those with cosine values above 0.75. This value is arbitrary but may be regarded as indicating very high mutual similarity. It indicates that these "pairs" of centroids conform to virtually identical drug use habits.

3. The pairs of centroids not matching at these levels were examined to ascertain whether or not they could be interpreted in similar ways. If they indicated that the same drugs were being consumed at perhaps different levels we formed "composite" profile centroids by taking mid-points of use for each drug involved in the centroid.

4. If a centroid could not be matched it was retained unchanged for the integrated taxonomy.

5. Using all matched and nonmatched centroids, the total samples from Wave 2 and Wave 3 were re-clustered using an enlarged version of K-means.

6. The new integrated clusters were then evaluated. It was found that all of the replicated and partially replicated (averaged) centroids were retained in virtually unchanged states. Similarly, the clusters that were unique to Waves 2 or 3 were also retained in the composite analysis.

7. The "goodness of classification" (i.e., the tightness of each cluster) was then examined by computing probability of membership of each youth from each cluster for both waves. An "outlier" category was created and those cases which did not fall into any cluster were relegated into the outlier class. Various statistics were also computed to assess the goodness of the classification. These included: H-coefficients for each separate variable by each cluster, average H-coefficients for each cluster, and finally Wilk's Lambda to assess the overall quality of the entire classification.

#### Establishing Patterns of Change in Multiple Drug Use between 1977 and 1978

Following the development of an integrated taxonomic system which adequately describes all of the major types of multiple drug use in the adolescent population, we examined how individual youth are distributed across these types in the years 1977 and 1978. Memberships of each individual youth

were ascertained for the year 1977 and for the year 1978. We then examined the kinds of transitions occurring between the two years. This is accomplished by constructing cross-tabulation contingency tables in which 1977 class membership is cross-classified against 1978 class membership. The diagonals of these tables indicate the youth whose pattern of drug consumption remained the same. The off-diagonals indicate the main kinds of changes which occurred.

#### Validation of the Constructed Taxonomy

The internal "goodness" of the taxonomy represents only one approach to evaluation. The cross-classifications against other relevant variables is also an important step, initially constituting the concurrent or predictive validity of the system. Starting with Age, Sex, Race, and Social Class, we provide an examination of the usefulness of this taxonomy. Contingency tables, X-square, and one-way ANOVA's are the usual approach to this kind of validation.

#### TAXONOMY OF MULTIPLE DRUG USE - 1976

The Wave 1 (1976) analysis is not readily comparable with the taxonomies of Waves 2 and 3. This stems from the fact that the classificatory attribute space is different. This difference adds a problem to the utilization of the first wave taxonomy for our analysis of change-transitions. The classes which emerge from this analysis are defined by a more limited set of drugs and are, therefore, not directly comparable to those that have been developed for the "integrated" taxonomy which covers both Waves 2 and 3. The following discussion of the development and testing of the Wave 1 taxonomy is, therefore, substantially briefer than that given for the integrated taxonomy.

Attribute Space. The attribute space for the Wave 1 drug taxonomy consisted of the following drugs: alcohol, marijuana, hallucinogens, amphetamines, barbiturates, heroin, and cocaine. It can be seen that the alcohol variable in Wave 1 integrates the three separate alcoholic beverages beer, wine, and hard liquor available for waves 2 and 3. A number of other drugs, e.g., tobacco, angel dust, inhalants, were not utilized in this set. As noted earlier, we utilize the "rate of use" in the past year as the basic measurement scale for each of these drugs. To test whether each of these drugs could possibly differentiate across the samples, we conducted frequency distributions for all of them. It was found in these analyses that there were only four heroin users in the entire sample. Thus heroin was removed from the attribute space leaving the 6 basic variables.

Clustering Methods. The basic method utilized was a K-means analyses. We experimented with different K levels and different random starts at the same K level.

In evaluating the developed taxonomy, we utilized separate random starts and cross-classified these against each other searching for the existence of replicated types. This approach, therefore, examines the reliability of the emerging cluster. Secondly, we examined the external correlates of the clusters in the search for concurrent validity. This taxonomy was cross-classified against a number of other external variables.

General Description of the 1976 Taxonomy. In this section we describe each of the multiple drug use patterns that were discovered in the Wave 1 taxonomy. Figure 1 outlines the general structure of this classification. The following descriptions are based upon Tables 1 and 2.

Figure 1

Taxonomy of Multiple Drug-Use Profiles  
among Youth at Wave 1 (1976)

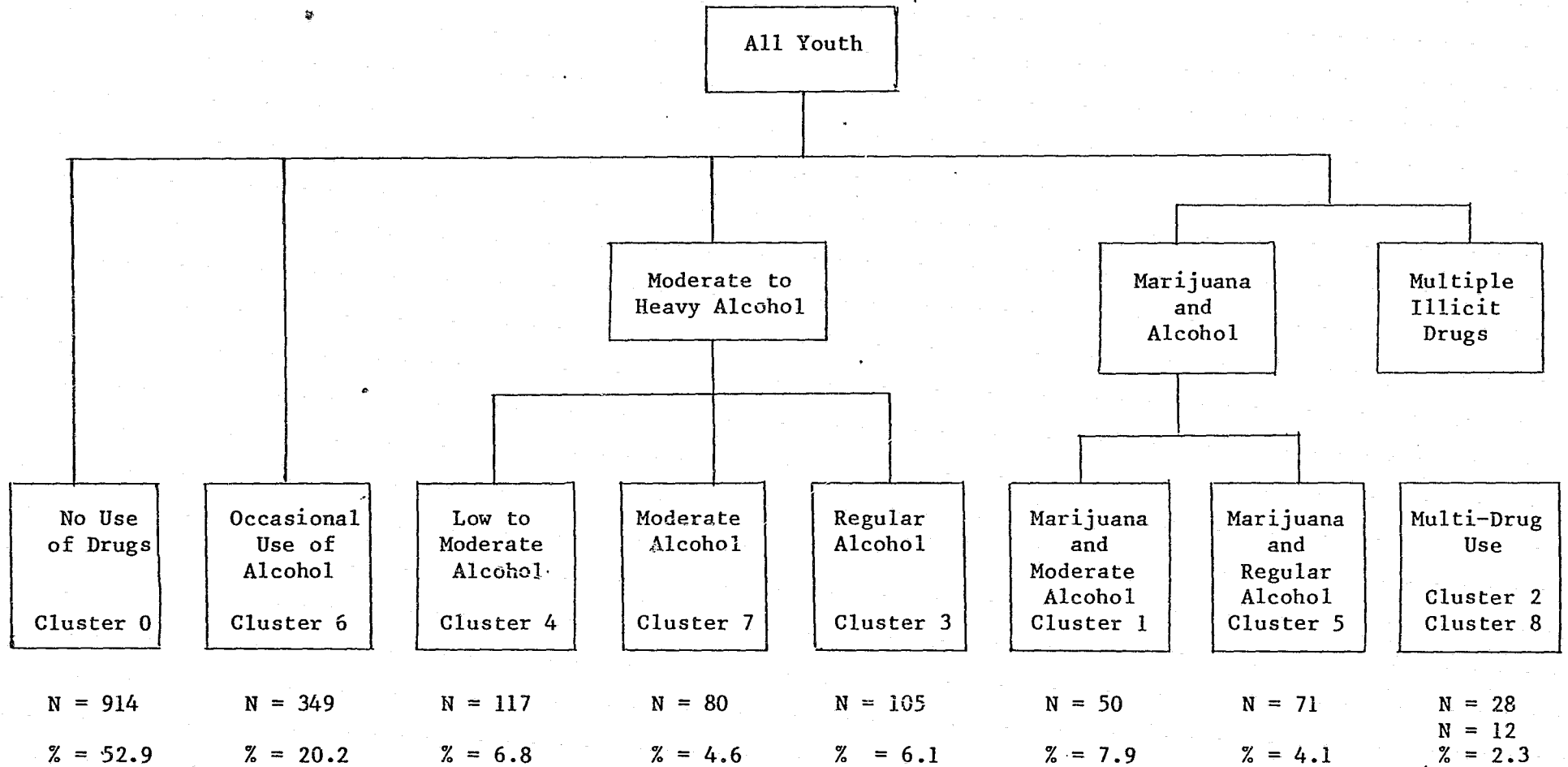


Table 1

Profile of Drug Use for 1976 Taxonomy of  
Youth: Raw Frequency of Consumption Scores

	Type No.							
	1	2	3	4	5	6	7	8
N =	50	28	105	117	71	349	80	12
<u>Drug Consumed</u>								
Alcohol . . . . .	2.92	5.71	5.63	3.00	5.83	1.96	4.00	6.17
Marijuana . . . . .	5.76	6.89	1.34	1.47	5.72	1.16	1.33	7.00
Hallucinogens . . . . .	1.08	1.36	1.00	1.00	1.10	1.01	1.00	4.25
Amphetamines . . . . .	1.16	3.21	1.00	1.00	1.16	1.01	1.01	2.25
Barbiturates . . . . .	1.02	1.82	1.03	1.01	1.03	1.00	1.04	1.42
Cocaine . . . . .	1.04	1.43	1.00	1.03	1.10	1.00	1.00	1.83



Table 2

Cross Classification of 1976 Drug Types Against  
Sex, Ethnicity, and Age

Demographic Class	Drug Type from Wave 1 (1976)								Total			
	1	2	3	4	5	6	7	8				%
	N = 50 %	28 %	105 %	117 %	71 %	349 %	80 %	12 %				
Sex												
Boys	58.0	50.0	60.0	54.7	69.0	51.3	68.8	50.0	56.5	459	Raw Chi square = 14.67 7 degrees of freedom Significance = .0404	
Girls	42.0	50.0	40.0	45.3	31.0	48.7	31.3	50.0	43.5	353		
Ethnic Group												
Anglo	76.0	89.3	86.7	88.0	80.3	81.7	88.8	100.0	84.0	682	Raw Chi square = 25.02 35 degrees of freedom Significance = .8939	
Black	16.0	7.1	11.4	9.4	16.9	12.6	6.3	0.0	11.6	94		
Hispanic	6.0	3.6	1.0	2.6	2.8	3.4	2.5	0.0	3.0	24		
Other	2.0	0.0	1.0	0.0	0.0	1.4	2.4	0.0	1.5	12		
Age												
13 & Under	8.0	0.0	7.7	24.0	4.2	31.5	9.8	0.0	19.9	161	Raw Chi square = 127.38 49 degrees of freedom Significance = .001	
14	24.0	0.0	11.4	13.7	15.5	18.9	16.2	8.3	16.1	131		
15	24.0	28.6	24.8	14.5	18.3	20.1	25.0	25.0	20.8	169		
16	22.0	35.7	26.7	17.9	23.9	16.0	31.3	25.0	21.1	171		
17	22.0	35.7	27.6	27.4	35.2	12.3	17.5	33.3	20.7	168		
18	0.0	0.0	1.9	2.6	2.8	1.1	0.0	8.3	1.5	12		

Cluster 1: Regular Marijuana Use with Moderate Alcohol Use. These youth use two drugs, alcohol and marijuana. Their use of marijuana is more extensive and more regular than their use of alcohol. They tend to use marijuana almost every week while their consumption of alcohol tends to be approximately once per month. They have virtually no use of any of the other drugs (within this drug set). However, the absence of tobacco in the present attribute space complicates the interpretation of this cluster since it is known from the Wave 2 and 3 data that the use of marijuana - particularly a regular use - is highly related to the regular use of tobacco. About 3% of the total sample of youth fall into this cluster.

This cluster contains about an equal number of boys and girls. Youth in this cluster are 16% black as opposed to an overall sample average of 12%; 6% are Hispanic as opposed to an overall sample average of 3%. Thus both blacks and Hispanics are overrepresented. The cluster also contains a larger proportion of older youth (youth 14 and older).

Cluster 2: Regular Alcohol, Marijuana, and Amphetamine Use. The youth in this cluster exhibit multi-drug use. Most use marijuana two or three times a week and many of them use it daily. They also drink alcohol once or twice a week on the average. Finally, many of these youth have used amphetamines once a month or every second month, during the reporting year. A smaller number of them have tried barbiturates but only to a level of twice in the past year. This small cluster also falls into the multi-drug class. It has only 28 members thus constituting just under 2% of the total sample.

This cluster contains about an equal number of boys and girls. Anglos are, perhaps, slightly over-represented (89 percent versus 84 percent for the overall sample). This cluster is dramatically under-represented in the ages

11 through 14. The cluster contains a much greater proportion of older youth than in the overall sample. For example, 35% of these youth are in the 17-year-old bracket as opposed to an overall sample average of 20%.

Cluster 3: Regular Alcohol Drinkers. Virtually all of these youth drink alcohol once per week. The cluster also contains a small number of marijuana users. It can be noted, however, that the use of marijuana within this cluster is restricted to only once or twice a year. In fact, the vast majority have not used marijuana. Additionally, they have not used any of the other drugs in this attribute space. Thus, this cluster might be regarded as regular alcohol drinkers.

One hundred and five youth fall into this cluster. It thus constitutes 6% of the overall sample. Boys and girls are equally represented. In regard to age, the cluster is overrepresented by youth in their later teenage years.

Cluster 4: Low to Moderate Alcohol Use. The youth falling into this cluster show complete homogeneity in the fact that they have all used alcohol only once every two or three months during the prior year. A small number of them have also indicated that they have tried marijuana once or twice in the past year. No other drugs are used. This pattern suggests first time, or experimental use, of these two drugs. The cluster contains 117 youth and thus constitutes nearly 7% of the overall sample.

This cluster contains an equal representation of boys and girls. Regarding age and ethnicity the cluster contains distributions close to those in the overall sample.

Cluster 5: Regular Alcohol and Marijuana Use. The youth in this cluster are very similar to those falling into Cluster 1 in that they regularly use alcohol and marijuana. The major difference between the 2 clusters is that

the use of marijuana and alcohol by the present youth is more regular than in cluster 1. In the present cluster the majority of youth use marijuana from once, to two or three times per week. Their use of alcohol is approximately once a week. They show virtually no use of any of the other drugs in the inventory. The cluster contains 71 youth and thus constitutes just over 4% of the overall sample.

This cluster is dominated by boys. The cluster contains 69% of boys as opposed to an overall sample average of 56%. Regarding ethnicity, the only atypical tendency is the over-representation of black youth; i.e., 17% compared to an overall sample mean of 12%. The cluster is dramatically over-represented by older youth; 35 percent of the youth are 17 years as opposed to 21 percent in the overall sample.

Cluster 6: Occasional Use of Alcohol. The youth falling into this cluster are characterized by the fact that they have tried alcohol only once or twice during the prior year. There is no evidence of any use of other drugs. This cluster shows the lightest use of drugs among all of the clusters here examined. The cluster contains 349 youth and thus constitutes slightly over 20% of the overall sample.

This cluster contains an equal proportion of boys and girls. The ethnic distribution is also essentially similar to the overall sample breakdowns. This cluster is overrepresented by youth in the younger age brackets. This is one of the youngest of the eight clusters.

Cluster 7: Minimal to Moderate Alcohol. The youth in this cluster have virtually no use of any drug except alcohol. They drink alcohol once a month. About a tenth of these youth indicate that they have tried marijuana once or twice during the prior year. This cluster contains 80 youth and therefore constitutes close to 5% of the overall sample.

This cluster is also dominated by boys. Sixty-nine percent of the cluster are boys. This contrasts with an overall sample mean of 56%. The cluster contains a slight over-representation of Anglo youth (89% versus a sample mean of 84%). In regard to age, there are virtually no 11 and 12 year olds in this cluster. In contrast, the cluster is overrepresented substantially for ages 15 and 16.

Cluster 8: Multi-drug Users: Marijuana and Hallucinogens. This small cluster provides a good example of multi-drug use. Three drugs are used regularly. These are alcohol, marijuana and hallucinogens. Marijuana is the most frequently used drug with a majority of youth using this drug about two or three times a week. Alcohol is also used about two or three times a week while hallucinogens are used about once a month. There is also a sprinkling of use of amphetamines, barbiturates and cocaine, although at a much less frequent level of use (i.e., about once or twice a year for those who report using these drugs).

This cluster contains an equal proportion of boys and girls. All of the members of this cluster are Anglo. There are no blacks, Hispanics or other minorities included in this small cluster. There are no 11, 12 or 13 year olds in this cluster. White youth aged 15, 16, and 17 are substantially over-represented.

#### Concurrent Validity for 1976 Taxonomy

The 1976 taxonomy described above has been cross-validated against a number of external variables. The evidence regarding the demographic correlates of each of the clusters indicated that the clusters differed substantially in regard to age, sex, and ethnicity in ways that were intuitively expected. However, the demographic characteristics of these

Table 3

Cross Classification of Wave 1 (1976) Drug Types Against  
Grades and Peer Disapproval of Drugs

	Drug Type from Wave 1 (1976)								Total		
	1	2	3	4	5	6	7	8			
	N = 50 %	28 %	105 %	117 %	71 %	349 %	80 %	12 %	%	N	
<b>Grades</b>											
1 (Mostly F's)	2.0	3.6	0.0	0.9	0.0	0.6	1.2	0.0	00.7	6	Raw Chi square = 62.94 28 degrees of freedom Significance = .0002
2 (Mostly D's)	8.0	25.0	5.7	3.4	9.9	3.2	6.3	9.1	5.6	46	
3 (Mostly C's)	48.0	46.4	34.3	42.2	52.1	34.1	28.8	63.6	38.0	207	
4 (Mostly B's)	28.0	21.4	46.7	40.5	32.4	47.1	51.3	27.3	42.9	346	
5 (Mostly A's)	14.0	3.6	13.3	12.9	5.6	15.0	12.5	0.0	12.8	103	
<b>Levels of peer disapproval of marijuana</b>											
1-2 Low	57.1	60.7	13.5	10.4	59.1	3.5	8.8	58.3	17.3	139	Raw Chi square = 321.21 28 degrees of freedom Significance = .0001
3	26.5	21.4	27.9	33.9	31.0	18.5	30.0	41.7	25.1	202	
4	14.3	17.9	31.7	33.9	8.5	43.4	41.3	9.0	33.9	273	
5 High	2.0	0.0	26.9	21.7	1.4	34.7	20.0	0.0	23.7	191	
<b>Levels of peer disapproval of alcohol</b>											
1-2 Low	46.9	53.6	39.5	25.2	59.1	13.0	30.0	41.7	27.7	223	Raw Chi square = 173.69 28 degrees of freedom Significance = .0001
3	32.7	39.3	45.2	47.8	29.6	34.6	45.0	58.3	38.8	313	
4	16.3	7.1	13.5	19.1	9.9	40.9	23.8	0.0	26.6	214	
5 High	4.1	0.0	2.9	7.8	1.4	11.5	1.2	0.0	6.9	56	

various drug classes are not the most compelling evidence of the concurrent validity of the classification system. We also point out that establishing the validity of a taxonomic system would imply extensive examination of many external correlates of the clusters and whether the clusters could be differentiated from each other on theoretically salient external variables. The essence of establishing the concurrent, or predictive validity of any classification system is to find relevant or salient variables (perhaps theoretically linked to the domain of interest) upon which the various classes differ at highly significant levels. The following represents initial evidence regarding the concurrent validity of the present taxonomic system.

Grade Level. Cross-classifying the eight clusters against school grade produces a highly significant result (a chi-square of 147.2 with 70 degrees of freedom is significant at .001). The grade in school data indicate that the high drug using clusters; i.e., clusters 1, 2, and 5, are in the more senior grades (older students).

Academic Performance. The clusters have also been cross-classified by the dominant grade received at school (5=A's; 4=B's; 3=C's; 2=D's; 1=F's). Again, a highly significant chi-square of 62.9 is found and with 28 degrees of freedom, this is significant at beyond  $p=.001$ . This confirms the generally poorer performance at school of the high drug using clusters. For example, clusters 1, 2, 5, and 8 are dramatically underrepresented at grade levels 4 and 5 while being overrepresented at grade levels 1, 2, and 3. The reverse is true for those clusters which have lower drug use.

Peer Disapproval of Marijuana. It might be expected to find some relationship between the degree to which the youth's peers approve or

disapprove of the use of marijuana and the various drug use types. In cross-classifying the drug use types against peer disapproval of marijuana, a highly significant chi-square of 321.2 is found, and with 28 degrees of freedom, this is significant at .0001. A high score indicates peer disapproval. It is found that clusters 1, 2, 5, and 8 are dramatically under-represented at levels 4 and 5 in this 5-point scale.

Peer Disapproval of Alcohol. As in the prior examination, it was expected that peer disapproval of alcohol would be higher in the low use groups and lower in the high drug using groups. This result is emphatically established by the cross-classification. Again, a highly significant chi-square (173.6 with 28 degrees of freedom and significant at beyond the .0001 level) is found. As might be expected, there is high disapproval of the use of marijuana and high disapproval of the use of alcohol for clusters 4 and 6 which show relatively low levels of the use of these drugs. The high alcohol groups, in contrast, have rather low scores and are over-represented at the low end of this scale.

#### Predatory Crimes Against Persons and Property

One-way ANOVA analyses were run between these two predatory crime scales (i.e., against persons and against property) and the various drug use classes. The data indicate that in each case a highly significant F ratio was found. In both cases, the finding was significant at beyond the .0001 level. Thus, with increasing drug use there is also increasing levels of both of these particular kinds of offenses.

The above results constitute only an initial step in examining the general validity of the various empirical drug use types that have been established in these analyses. They do, however, offer an encouraging start in that all of



the expected relationships hold at highly significant levels. Increasing use of drugs is demonstrated to be related to poor school performance, higher levels of delinquent behavior of various kinds, and a more permissive attitude among the peer group toward alcohol and drug use.

The Reliability of the 1976 Taxonomy. Our initial examinations of the reliability of the present taxonomy were confined purely to results emanating from different analyses of the same data set. The basic concept in this reliability test was whether or not the same classification could be recovered when the data was analyzed with the different methodological options. A variety of approaches are available in the K-means to change the basic parameters of the data. At the K=8 level of analysis a number of runs were utilized in which different random selections of "seed points" were used. It was found recurrently that the analyses converged upon the same general partitioning structure of the data. For example, two separate partitionings of this data were obtained by different random starts at K=8 and these were found to relate to each other with a Symmetric Lambda score of 0.73. This indicates that the two partitions have a very high probability of being able to predict class membership from one partition to the other partition with correct placement of points (or subjects). The chi-square between these partitions was significant at .0001. The Rand coefficient for the relationship between these two partitions is 0.83, again indicating a very strong relationship of similarity between the two partitions. This type of experiment was conducted a number of times with similar results. In each case the same classes were consistently recovered in the various partitions.

DEVELOPING THE INTEGRATED TAXONOMIC SYSTEM FOR  
DRUG USE PROFILES: 1977 and 1978

Separate Classifications for 1977 and 1978. The separate K-means classifications for the 1977 and 1978 waves of data were to be combined, if possible, into one general classification system which could subsume both years. The requirements of this joint system were that it should be sufficiently comprehensive and accurate to contain all of the major profiles which appear in both waves of data, provide a high coverage for the samples of both years, and finally, that the profiles be stable enough to allow for the assessment of any movement between drug patterns across the two years.

Table 4

Cosine and Distance Scores between Drug Profile  
Clusters for Years 1977 and 1978

<u>Drug Use Profile</u>	Number of Members in		<u>Cosine Between Profiles</u>	<u>Distance Between Profiles</u>
	<u>1977</u>	<u>1978</u>		
1. Occasional Alcohol	233	190	.998	.110
2. Regular Tobacco	67	60	.993	.205
3. Wine Only	32	32	.982	.415
4. Beer Only	57	64	.976	.325
5. Beer and Liquor	30	33	.947	1.032
6. Alcohol & Tobacco	21	45	.986	.377
7. Alcohol & Marijuana	37	37	.944	.617
8. Alcohol, Tobacco & Marijuana	23	47	.945	.927
9. Alcohol, Tobacco, Marijuana and Cocaine	(7)	(25)	---	---
10. Alcohol, Tobacco, Marijuana & Amphetamines (Multi-Drug 1)	6	5	.916	3.019
11. Multi-Drug (2)	(5)	(4)	---	---
12. Multi-Drug (3)	(2)	(7)	---	---
13. Multi-Drug (4)	(1)	(3)	---	---
14. Glue, Inhalants	(3)	(3)	---	---
15. Outliers	(8)	(4)	---	---

Following the development of separate classification systems for the two separate years, we compared the profiles for each cluster between the two years. Both cosine and distance matrices were computed between all profiles for years 1977 and 1978. The results of these similarity comparisons are given in Table 4 above.

This table indicates that nine drug profiles were found that replicated across the two years of data at very high levels of similarity. Clusters 1 through 8 and cluster 10 have inter-centroid cosines of over 0.90 between their representatives in the two years. This indicates that these clusters match almost identically in terms of profile shapes. Additionally, the cases classified into these matched clusters, including the nonuse class, account for 95.8% and 93.5% of the total samples, respectively, in the years 1977 and 1978. Thus, the great majority of youth are classified in clusters that are stable across the testing periods. This will allow the accurate mapping of change patterns for the great majority of youth in the samples.

The smaller multi-drug profiles are much less stable across the two years of data and were not replicated well. For example, cluster 9 (Alcohol, Tobacco, Marijuana, and Cocaine) appeared with a very low frequency in 1977 (7 youth) but with a fairly high frequency in 1978 (with 25 youth so classified). This was probably the result of the increased age of the sample in 1978. But these unique multi-drug clusters contain so few cases that their central profiles cannot be regarded as reliable. This is confirmed by the fact that they were not replicated across the two years of testing. Rather than discard these unique profiles we chose to retain them as part of the integrated typology for the two years. Basically, this adds 5 small clusters (Multi-drug 1 through 4, plus Glue inhalers) to the overall typology. The

Multi-drug clusters all have in common the joint use of alcohol, tobacco, and marijuana. The differences between them occur as a result of the varying levels of use of the other illegal drugs.

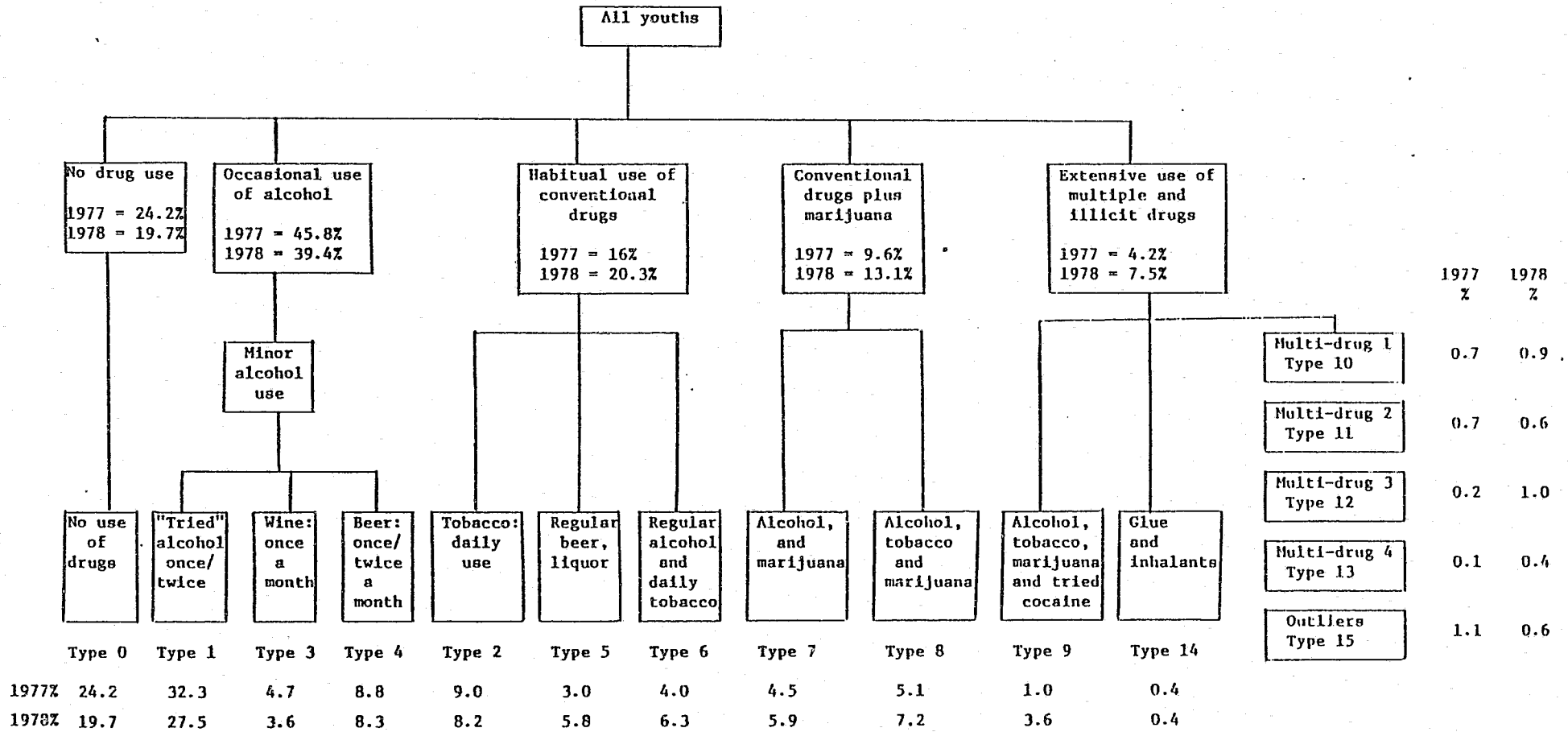
An Integrated "Common" Classification. The final step in constructing the integrated common classification system to cover the two years involved re-classifying the total joint (1977 and 1978) sample into a single system using the K-means analysis. Fourteen centroids were fed into this analysis--the 9 matched centroids and the 5 unique centroids. The analysis led to virtually no change in these "stable" centroids and converged easily upon a solution. This common classification is now evaluated extensively in the sections below.

#### THE OVERALL TAXONOMIC STRUCTURE OF MULTI-DRUG USE: 1977 and 1978

The hierarchical structure of this taxonomic system of adolescent drug use is graphically shown in Figure 2. We have ordered the various drug types into different levels of generality. Five general classes can be seen at an intermediate level of the hierarchy. These are (1) No use of drugs, (2) Occasional use of alcohol, (3) Habitual use of conventional drugs, (4) Conventional drugs with regular marijuana use, and (5) Multiple and illicit drug use. These five classes, however, provide only a partial and overgeneralized description of the full complexity of the drug consumption patterns. The more detailed patterns are shown at the base of the tree diagram. The percentages of youth falling into these patterns for years 1977 and 1978 are shown at the base of the tree. Full descriptions of each profile type are given later in this section.

Figure 2

Taxonomic Structure of Adolescent Drug Use, 1977-1978



Summary Description of the Types and Extent of Drug Use: Integrated

Classification

Table 5 provides the drug use "label" for each of the identified profile types and indicates the numbers and proportions of youth who were classified into these types for the years 1977 and 1978.

Table 5  
Distributions of Youth Across the  
Drug Profiles of the Integrated Typology

<u>Drug Profile Label</u>	Integrated Total		1977 (Wave 2)		1978 (Wave 3)	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
TOTAL NONUSERS	309	21.0	172	24.2	137	19.7
1. Occasional Alcohol	420	29.9	229	32.3	191	27.5
2. Regular Tobacco	121	8.6	64	9.0	57	8.2
3. Moderate Wine	58	4.1	33	4.7	25	3.6
4. Moderate Beer	120	8.6	62	8.8	58	8.3
5. Moderate Beer and Liquor	61	4.3	21	3.0	40	5.8
6. Regular Alcohol & Tobacco	72	5.1	28	4.0	44	6.3
7. Regular Alcohol plus Marijuana	73	5.2	32	4.5	41	5.9
8. Regular Tobacco, Alcohol & Marijuana	86	6.1	36	5.1	50	7.2
9. Marijuana, Tobacco, Alcohol, & Cocaine	32	2.3	7	1.0	25	3.6
10. Multi-drug (1)	11	0.8	5	0.7	6	0.9
11. Multi-drug (2)	9	0.6	5	0.7	4	0.6
12. Multi-drug (3)	9	0.6	2	0.2	7	1.0
13. Multi-drug (4)	4	0.3	1	0.1	3	0.4
14. Glue sniffers	6	0.4	3	0.4	3	0.4
15. Outliers	12	0.9	8	1.1	4	0.6
TOTAL USERS	1094	80.0	536	75.7	558	80.3
GRAND TOTAL	1403	100.0	708	100.0	695	100.0

Detailed Type Descriptions

Type 1: Occasional Alcohol Use

Drug Use Profile: Beer and/or wine has been consumed by these youth only once or twice in the past year. Their experience with these alcoholic beverages is, therefore, minimal. Furthermore, their profile indicates that they have not yet experienced any of the other drugs mentioned in the inventory.

Demographic Profile: At Wave 2 (1977) boys and girls are equally represented in this cluster. The ethnic and class distributions are similar to that of the overall sample. This cluster, however, contains much fewer older youth than overall sample (25.9% vs. 34.2% for youth 17+). These demographic features are repeated at the third wave of testing.

Type 2: Regular Tobacco Use

Drug Use Profile: The most predominant feature of the profile of this cluster of youth is daily tobacco use. Alcohol appears in this profile with only occasional use of beer or wine (about once every two or three months). No other drug is used to any regular extent.

Demographic Profile: At Wave 2 this cluster contains a higher proportion of Anglo youth (87.5%) than any other cluster. It is also overrepresented with youth from higher class backgrounds. Age and sex distributions are close to the overall sample distributions.

Type 3: Moderate Wine Use

Drug Use Profile: Moderate consumption (once or twice a month) of wine is the prevalent feature of the members of this cluster. A few of them also occasionally consume beer, but the general pattern is predominantly that of moderate wine consumption with a much lower frequency of beer drinking. Tobacco is not consumed by these youth.

Demographic Profile: This class of youth is not clearly atypical with regard to age, sex, or ethnic characteristics. However, there is a disproportionately high number of higher social status youth; i.e., 47% of the youth in the cluster fall into the top third of the social class scale. In the 1978 survey this cluster shrinks in size and the proportion of girls in it increases (to 64%). Other changes include an increased percentage of Anglo youth (96%) and a further increase in the proportion of upper social status youth (52% vs. 25% in the overall sample).

Type 4: Moderate Beer Use

Drug Use Profile: Beer is consumed only once or twice per month by these youth. The other alcoholic beverages also appear in the profile but are consumed very infrequently.

Demographic Profile: During 1977 boys accounted for 2/3 of this cluster. Older youth (17 and over) are over-represented (58% vs. 34% in the sample). Class and ethnic proportions are similar to the overall sample. In the second year the overrepresentation of boys is the only atypical feature.

Type 5: Moderate Beer and Liquor Use

Drug Use Profile: Whereas types 3 and 4 exhibited moderate (once or twice per month) drinking of only a single alcoholic beverage, the present youth drink both beer and hard liquor at this frequency. Most of them also consume wine, but at the lower frequency of only three or four times during the year.

Demographic Profile: In 1977 boys and older youth (17+) are over-represented in this cluster. There is also a high proportion of members falling into the intermediate social class group (52% vs. 30% in the overall sample). In 1978 there is a continued over-representation of boys, older youth (18+), and Anglo youth (90% vs. 78% in the overall sample).



Table 6

Type Profiles of Youth Multiple Drug Use: Raw Cluster Scores and Standardized Mean Scores for Wave 2 Users in Integrated Typology from K-Means Analysis

DRUG	CLUSTER NUMBER											
	Occasional Alcohol		Tobacco		Wine		Beer		Beer and Liquor		Alcohol and Tobacco	
	1		2		3		4		5		6	
N	229		64		33		62		21		28	
Avg. Sq.Deviation	.60		1.12		2.24		1.28		2.31		5.31	
Avg. H-Coefficient	.95		.91		.81		.89		.80		.54	
	<u>Std.</u>	<u>Raw</u>	<u>Std.</u>	<u>Raw</u>	<u>Std.</u>	<u>Raw</u>	<u>Std.</u>	<u>Raw</u>	<u>Std.</u>	<u>Raw</u>	<u>Std.</u>	<u>Raw</u>
	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>	<u>Mean</u>
Beer	-.70	1.88	-.48	2.31	-.23	2.82	.91	5.10	1.20	5.67	1.38	6.04
Wine	-.39	1.66	-.45	1.58	1.97	4.97	-.24	1.87	.73	3.24	.59	3.04
Hard Liquor	-.51	1.16	-.45	1.25	-.16	1.67	-.33	1.42	1.71	4.33	1.38	3.86
Tobacco	-.62	1.18	1.52	8.20	-.57	1.33	-.60	1.24	-.47	1.67	1.61	8.50
Marijuana	-.52	1.11	-.46	1.25	-.40	1.36	-.45	1.27	.05	2.38	.14	2.57
Psychedelics	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00
Tranquilizers	-.13	1.01	-.15	1.00	-.03	1.06	-.15	1.00	-.15	1.00	-.15	1.00
Amphetamines	-.20	1.00	-.18	1.02	-.20	1.00	-.20	1.00	-.20	1.00	-.20	1.00
Barbiturates	-.14	1.00	-.14	1.00	-.14	1.00	-.14	1.00	-.14	1.00	-.14	1.00
Cocaine	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00
Glue	-.09	1.03	-.04	1.05	-.14	1.00	-.07	1.03	-.14	1.00	.09	1.11
Angel Dust	-.20	1.00	-.20	1.00	-.20	1.00	-.20	1.00	-.10	1.05	.03	1.11

Table 6 (Continued)

DRUG	Alcohol and Marijuana		Alcohol, Tobacco, Marijuana		ATM & Cocaine		ATM & Amphetamines		ATM, Amphetamines & Barbit.	
	7		8		9		10		11	
N	32		36		7		5		5	
Avg. Sq.Deviation	5.10		7.43		12.92		13.65		22.18	
Avg. H-Coefficient	.56		.36		-.26		-.42		-1.31	
	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>
Beer	.55	4.38	.66	4.58	1.15	5.57	.96	5.20	1.47	6.20
Wine	.21	2.50	.33	2.67	.46	2.86	.42	2.80	.85	3.40
Hard Liquor	.38	2.44	.99	3.31	.88	3.14	1.61	4.20	1.48	4.00
Tobacco	-.60	1.25	1.52	8.22	.67	5.43	.54	5.00	1.27	7.40
Marijuana	1.74	6.13	1.88	6.44	2.39	7.57	1.86	6.40	1.95	6.60
Psychedelics	-.12	1.00	.01	1.06	.55	1.29	-.12	1.00	2.66	2.20
Tranquilizers	.03	1.09	.07	1.11	.67	1.43	.24	1.20	1.00	1.60
Amphetamines	.01	1.16	.06	1.19	1.17	2.00	6.37	5.80	2.54	3.00
Barbiturates	-.06	1.03	-.07	1.03	.20	1.14	-.14	1.00	5.03	3.20
Cocaine	-.12	1.00	-.12	1.00	2.26	2.00	-.12	1.00	.36	1.20
Glue	-.08	1.03	-.03	1.05	-.14	1.00	.28	1.20	-.14	1.00
Angel Dust	.14	1.16	.46	1.31	1.04	1.57	.24	1.20	1.53	1.80

Table 7

Type Profiles of Youth Multiple Drug Use: Raw Cluster Scores and Standardized Mean Scores for Wave 3 Users in Integrated Typology from K-Means Analysis

DRUG	CLUSTER NUMBER													
	Occasional Alcohol		Tobacco		Wine		Beer		Beer and Liquor		Alcohol and Tobacco		Alcohol and Marijuana	
	1	2	3	4	5	6	7							
N	191		57		25		58		40		44		41	
Avg. Sq. Deviation	.75		1.09		1.70		.89		2.54		3.47		4.74	
Avg. H-Coefficient	.94		.91		.85		.93		.78		.70		.60	
	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>
Beer	-.86	1.83	-.63	2.33	-.40	2.84	.63	5.09	1.06	6.03	.88	5.64	.38	4.54
Wine	-.39	1.70	-.51	1.53	1.91	4.92	-.19	1.97	.49	2.93	.50	2.93	.04	2.29
Hard Liquor	-.59	1.29	-.60	1.26	-.32	1.72	-.41	1.57	1.56	4.88	.98	3.90	.03	2.32
Tobacco	-.71	1.17	1.34	8.33	-.70	1.20	-.71	1.19	-.65	1.40	1.39	8.50	-.64	1.42
Marijuana	-.64	1.20	-.56	1.39	-.56	1.40	-.57	1.36	-.06	2.60	-.28	2.07	1.37	6.10
Psychedelics	-.18	1.01	-.19	1.00	-.20	1.00	-.19	1.00	-.19	1.00	-.19	1.00	.17	1.12
Tranquilizers	-.13	1.00	-.13	1.00	-.13	1.00	-.13	1.00	-.13	1.00	.03	1.05	-.13	1.00
Amphetamines	-.21	1.02	-.23	1.00	-.23	1.00	-.23	1.00	-.23	1.00	-.23	1.00	-.14	1.07
Barbiturates	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.12	1.00	-.07	1.02	-.12	1.00
Cocaine	-.21	1.00	-.21	1.00	-.21	1.00	-.21	1.00	-.21	1.00	-.21	1.00	-.21	1.00
Glue	-.06	1.02	-.06	1.02	-.11	1.00	-.11	1.00	.01	1.05	.00	1.05	-.11	1.00
Angel Dust	-.17	1.00	-.13	1.02	-.17	1.00	-.17	1.00	-.17	1.00	-.17	1.00	-.01	1.07

Table 7 (continued)

DRUG	CLUSTER NUMBER													
	Alcohol, Tobacco, Marijuana		ATM, Cocaine		ATM, Amphetamines		ATM, Amphetamines, Barbit.		ATM, Psychedelics, Angel Dust		ATM, Reg. Cocaine		ATM, Glue	
	8		9		10		11		12		13		14	
N	50		25		6		4		7		3		3	
Avg. Sq. Deviation	5.34		10.68		22.95		21.76		32.20		39.68		17.32	
Avg. H-Coefficient	.55		.07		-1.30		-1.42		-2.13		-3.96		-1.16	
	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>	<u>Stnd. Mean</u>	<u>Raw Mean</u>
Beer	.53	4.86	.99	5.88	.82	5.50	1.16	6.25	.85	5.57	1.96	8.00	.14	4.00
Wine	.19	2.50	.00	2.24	.54	3.00	-.70	1.25	1.46	4.28	.07	2.33	-.41	1.67
Hard Liquor	.39	2.92	.77	3.56	.84	3.67	1.48	4.75	1.38	4.57	1.83	5.33	-.36	1.67
Tobacco	1.35	8.38	.40	5.04	1.15	7.67	.67	6.00	1.53	9.00	1.53	9.00	1.34	8.33
Marijuana	1.40	6.16	1.70	6.88	1.68	6.83	1.64	6.75	2.04	7.71	2.43	8.67	.37	3.67
Psychedelics	-.13	1.02	.76	1.32	1.78	1.67	.55	1.25	4.46	2.57	4.74	2.67	-.19	1.00
Tranquilizers	.01	1.04	.42	1.16	.44	1.17	1.57	1.50	.36	1.14	4.40	2.33	-.13	1.00
Amphetamines	.10	1.28	.52	1.64	6.36	6.67	1.22	2.25	1.93	2.86	2.48	3.33	-.23	1.00
Barbiturates	-.08	1.02	-.03	1.04	.63	1.33	5.55	3.50	-.12	1.00	2.15	2.00	-.12	1.00
Cocaine	-.21	1.00	2.83	2.12	-.21	1.00	.47	1.25	.95	1.43	9.74	4.67	-.21	1.00
Glue	-.11	1.00	-.11	1.00	-.11	1.00	-.11	1.00	-.11	1.00	-.11	1.00	12.37	6.33
Angel Dust	-.08	1.04	.17	1.16	.88	1.50	.88	1.50	4.93	3.43	2.63	2.33	-.17	1.00

Type 6: Regular Alcohol and Tobacco Use

Drug Use Profile: Daily tobacco smoking and regular use of beer, hard liquor (once or twice a month) and wine (once a month) is the dominant drug use pattern of this cluster. A majority have tried marijuana at least once and most of them have used this drug about three times in the preceding year.

Demographic Profile: The only pronounced atypical feature of this cluster in 1977 is the striking over-representation of older (17+) youth. This continues in 1978, although in this phase the cluster grows markedly and is also characterized by high proportions of boys and Anglo youth.

Type 7: Regular Marijuana and Alcohol Use

Drug Use Profile: Daily use of marijuana is the main feature of this group of youth. Furthermore, a majority of members of the cluster also show light to moderate use of alcohol, primarily beer.

Demographic Profile: In 1977 this cluster contains an over-representation of boys and older youth. Class and ethnic proportions are close to those in the overall sample. In 1978 this demographic profile continues with boys, older youth, and black youth being over-represented.

Type 8: Alcohol, Tobacco, and Marijuana Use (ATM Profile)

Drug Use Profile: The joint use of alcohol (primarily beer) with daily tobacco and weekly marijuana use represents the modal pattern of these youth. Let us call this the ATM profile. In the present group there is virtually no use of any of the other heavier drugs.

Demographic Profile: This cluster increases in frequency from 1977 to 1978. In 1977 both sexes are about equally represented. Girls are a majority (54%) in 1978. In both 1977 and 1978 this type contains an overrepresentation of older youth.

Type 9: The ATM Profile, with Occasional Cocaine

Drug Use Profile: Daily use of tobacco and marijuana, with regular use of alcohol (the ATM profile) is augmented by the experimental use of cocaine. All of these youth tried cocaine once or twice during the year preceding the interview.

Demographic Profile: In both years 1977 and 1978 older youth dominate this small cluster. In 1978 the cluster grows in frequency and boys more obviously dominate the membership.

Type 10: The ATM Profile, with Regular Amphetamine Use

Drug Use Profile: The recurrent alcohol, tobacco, and marijuana profile is augmented in this small cluster with regular (one to three times per month) amphetamine use.

Demographic Profile: This cluster contains insufficient numbers for any reliable statements.

Type 11: The ATM Profile, with Amphetamine and Barbiturate Use

Drug Use Profile: Regular use of alcohol, tobacco, and marijuana (ATM) is coupled in this cluster of youth with monthly use of both amphetamines and barbiturates. Additionally, these youth also seem to have tried some of the other hard drugs on the inventory.

Demographic Profile: This cluster contains insufficient numbers for any reliable statements.

Type 12: The ATM Profile, with Inconsistent Use of Psychedelics,  
and Angel Dust

Drug Use Profile: The ATM profile is coupled with the varied use (from once a week to 2-3 times per year) of psychedelics, amphetamines, and angel dust. The group is small and the members show various patterns in their frequencies of using these particular drugs.

Table 8

## Age and Sex Breakdown Across the Various Drug Use Types (1977-1978)

Drug Use Pattern	Sex				Age					
	Female		Male		13-14		15-16		17-18	
	1977	1978	1977	1978	1977	1978	1977	1978	1977	1978
	%	%	%	%	%	%	%	%	%	%
Cluster 0 (no use)	47.1	46.7	52.9	53.3	61.6	67.2	21.5	18.2	16.9	14.6
Cluster 1 (low alcohol use)	49.6	49.5	50.4	50.5	36.8	42.6	37.3	32.6	25.9	24.7
Cluster 2 (tobacco)	42.2	49.1	57.8	50.9	25.0	33.3	37.5	40.4	37.5	26.3
Cluster 3 (wine)	48.5	64.0	51.5	36.0	24.2	32.0	39.4	36.0	36.4	32.0
Cluster 4 (beer)	33.9	37.9	66.1	62.1	17.7	20.7	24.2	37.9	58.1	41.4
Cluster 5 (beer-liquor)	38.1	35.0	61.9	65.0	4.8	12.5	23.8	15.0	71.4	72.5
Cluster 6 (beer-liquor- tobacco)	42.9	38.6	57.1	61.4	3.6	9.1	25.0	27.3	71.4	63.6
Cluster 7 (alcohol and marijuana)	34.4	35.9	65.6	64.1	9.4	17.9	46.9	43.6	43.8	28.5
Cluster 8 (alcohol, marijuana, tobacco)	47.2	54.3	52.8	45.7	8.3	15.2	50.0	41.3	41.7	43.5
Cluster 9-15 (multi- drug)	45.1	30.7	54.8	69.2	6.4	17.3	35.4	40.3	58.0	42.3
Total	% = 45.3	45.1	54.7	54.9	33.2	35.5	32.5	31.4	34.2	33.1
Sample	N = 320	310	387	387	235	244	230	216	242	228

Table 9

Ethnic and Social Class Proportions of the Various Drug Use Clusters (1977-1978)

Drug Use Pattern	Ethnic Classes								Social Class					
	Anglo		Black		Hispanic		Other		Lower		Middle		Upper	
	1977 %	1978 %	1977 %	1978 %	1977 %	1978 %	1977 %	1978 %	1977 %	1978 %	1977 %	1978 %	1977 %	1978 %
Cluster 0 (no use)	77.3	73.0	18.0	22.6	4.1	3.6	.3	.7	49.4	52.6	27.7	25.9	22.9	21.5
Cluster 1 (low use)	78.9	74.2	12.7	16.3	5.7	6.3	2.6	3.1	43.4	34.4	30.3	36.7	26.2	28.9
Cluster 2 (tobacco)	87.5	82.5	9.4	10.5	1.6	5.3	1.5	1.7	53.6	63.3	32.1	28.6	14.3	8.2
Cluster 3 (wine)	81.8	96.0	9.1	4.0	9.1	0	0	0	25.0	26.1	28.1	21.7	46.9	52.2
Cluster 4 (beer)	71.0	77.6	17.7	13.8	4.8	1.7	6.4	6.8	41.1	47.3	33.9	32.7	25.0	20.0
Cluster 5 (beer-liquor)	76.2	90.0	19.0	5.0	0	5.0	4.7	0	23.8	43.6	52.4	23.1	23.8	33.3
Cluster 6 (beer-liquor- tobacco)	85.7	95.5	10.7	4.5	0	0	3.5	0	29.6	45.2	51.9	33.3	18.5	21.4
Cluster 7 (alcohol and marijuana)	81.3	71.8	12.5	25.6	6.3	2.6	0	0	33.3	38.9	30.0	27.8	36.7	33.3
Cluster 8 (alcohol- marijuana- tobacco)	77.8	80.4	19.4	15.2	0	4.3	2.7	0	58.8	55.6	11.8	22.2	29.4	22.2
Cluster 9-15 (multi- drug)	83.8	82.6	9.6	9.6	6.4	3.8	0	3.8	60.0	50.0	24.0	26.0	16.0	23.9
Total Sample	% = 79.2	78.9	14.3	15.0	4.4	4.1	2.1	2.0	44.5	45.2	30.4	29.7	25.1	25.1
	N = 560	543	101	103	31	28	15	14	297	294	203	193	168	163



Demographic Profile: This cluster contains insufficient numbers for any reliable statements.

Type 13: The ATM Profile, with Regular Cocaine Use

Drug Use Profile: This small cluster is basically similar to that of type 9, with the major difference being that whereas type 9 youth have only "tried" cocaine, the present youth appear to be regular users. All of them report using cocaine at least monthly. This is in addition to their regular use of alcohol, tobacco, and marijuana.

Demographic Profile: This cluster contains insufficient numbers for any reliable statements.

Type 14: Glue Sniffers

Drug Use Profile: The regular sniffing of glue or other inhalants is the most distinguishing feature of this small cluster. These youth additionally report use of marijuana, tobacco, and alcohol. The patterns, however, are quite varied and glue sniffing is the common theme.

Demographic Profile: This cluster contains insufficient numbers for any reliable statements.

A Hierarchical Ordering of Multiple Drug Use Styles

Each of the multiple drug use styles that have been developed in the present analysis can be ordered according to the range of drugs involved in the style. This ordering is approximate and clearly would not conform to the statistical requirements of Guttman scaling. Our decisions regarding the approximate ordering of these classes of drug use are as follows:

<u>Cluster Number</u>	<u>Names of Drugs Involved</u>	<u>Ordering Level</u>
0	No use of any drug	0
1	Occasional use of Alcohol	1
2	Regular Tobacco use	2
3	Moderate Wine	2
4	Moderate Beer	2
5	Regular Beer and Liquor	3
6	Regular Alcohol and Tobacco	4
7	Regular Alcohol and Marijuana	5
8	Regular Alcohol, Marijuana, and Tobacco	6
9 thru 15	Collective class of multiple drug users	7

The above table indicates that we have used the number of drugs and frequency of use involved in each profile as the basic ordering principle. This ordering of drug user types starts with 0 for 'no use' of any drug. The next level of 1 indicates occasional use (once/twice per year) of some conventional alcoholic drink. Level 2 is more complex, bringing together three sub-types who use conventional drugs (tobacco or alcohol) with a higher frequency. Levels 3 and 4 are both moderate alcohol users, except that 4 also used tobacco every day. The gap between Levels 4 and 5 is critical in the sense that Level 5 adds the illegal drug marijuana. The ordering principles therefore include: numbers of drugs, frequency of use, illicit or legal, and our own judgments about the seriousness of each syndrome that has been identified.

A second set of classes; i.e., those involving various styles of severe multi-drug and illicit drug use, have not been ordered. The clusters 9 through 15 each represents a form of severe drug abuse. Distinctions between these classes would be particularly arbitrary. Further reasons for avoiding making distinctions among these multi-drug clusters are that they are all

extremely small in terms of numbers of members. They are not well replicated across the two waves of testing, and they are not particularly homogeneous. They do, however, collectively represent the most "serious" end of the multiple drug use continuum. The most conservative treatment of these various styles (clusters 9 through 15) is to avoid distinctions and to treat them as one general class.

A further methodological difficulty in ordering these classes as strictly hierarchical in a Guttman sense is that they are polythetic in nature, rather than monothetic (see Bailey, 1973a, 1973b). This implies that they do not have strict well-defined boundary conditions but are formed on the basis of multivariate central tendency or "family resemblance". The classes in the present system, in fact, exhibit an encouraging level of internal homogeneity as indicated by their H-coefficients. However, due to the ill-defined nature of the boundaries of polythetic classes, we again stress the approximate rather than exact ordering of these classes of drug consumption.

#### MULTIVARIATE DISCRIMINATIONS BETWEEN THE DRUG PROFILES

The results of a discriminant analysis provide useful information on the structure of this classification and on the differences between the various types. Table 10 indicates the ordering of the drug use variables in terms of their importance for discriminating between the drug classes.

Table 10

Summary Table of Discriminant Analysis of  
Drug Use Classification

<u>Order of Entry</u>	<u>F to Enter or Remove</u>	<u>Wilk's Lambda</u>
1. Cocaine	1764.06	.07
2. Tobacco	1262.71	.01
3. Marijuana	492.45	.00
4. Beer	157.60	.00
5. Wine	67.71	.00
6. Hard Liquor	56.59	.00
7. Amphetamines	5.72	.00
8. Tranquilizers	3.35	.00
9. Psychedelics	2.13	.00
10. Glue	2.08	.00
11. Angel Dust	.62	.00
12. Barbiturates	.47	.00

Cocaine and tobacco emerge as the most important discriminators between the nine drug classes that were used in the present analysis. It should be noted that the four small multi-drug use profiles (types 10 through 14) and the outlier group were removed from consideration in this analysis. These groups were too small to be reliably considered and would have added undue complexity and error to the discriminant analysis.

This analysis confirms an important structural feature of this taxonomy; i.e., the extreme differentiation of type 9 (Marijuana and Cocaine users) from the other types. Although the first eight groups show some tendency toward the use of various illicit drugs, type 9 is highly unique in that ALL of its members have tried cocaine. In stark contrast, virtually none of the members of the other groups have tried this drug.

A second structure revealed by this analysis is the major differentiation between the daily tobacco using clusters (types 2, 6, and 8) and those clusters in which tobacco is not used daily (types 1, 3, 4, 5, and 7).

The Relative Importance of Each Drug in Discriminating between the Groups

Using the change in Rao's V statistic as an indication of the significance of the contribution of each successive variable in the stepwise procedure, it was found that each of the 12 variables in the attribute space made significant contributions to the group separation. The relative contributions, however, are quite unequal and if we turn to the relative change in Wilk's Lambda, it is clear that after the first six steps of the analysis there is virtually no change in the "goodness" of the derived classification. Thus, the "best" subset of discriminating variables consists of:

Tobacco	Beer
Cocaine	Wine
Marijuana	Hard Liquor

This "best" subset contains virtually all of the discriminatory information within the full set of 12 variables. Again, it should be recalled that only 9 classes are being described, and that the various multi-drug subtypes were eliminated from consideration.

The Meanings of the Discriminant Functions

Tables 11 and 12 below indicate the relative importance and standardized discriminant function coefficients of the first six discriminant functions. The discriminant functions can be described as follows.

Function 1, Cocaine Use. This separates the cocaine using cluster 9 from the rest of the classes. The dominant coefficient is the use of cocaine (see Table 12). This function is not useful in separating the other clusters from each other.

Function 2, Tobacco Use. This function is almost as important as function 1 in terms of its discriminating value. It is dominated by the frequency of use of tobacco (see Table 12). It is useful in separating the users of tobacco from the nonusers.

Table 11

Statistical Information Regarding Discriminant Functions for  
Youth Drug-Profile Classification

Number Removed	Eigenvalue	Canonical Correlation	Percent Of Trace	Wilks Lambda	Chi-Square	D.F.	Significance
0	15.16	.97	48.5	.0002	8594.72	96	.0001
1	10.21	.95	32.6	.0039	5724.25	77	.0001
2	3.49	.88	11.1	.0436	3231.11	60	.0001
3	1.65	.79	5.3	.1956	1682.85	45	.0001
4	.46	.56	1.5	.5182	678.14	32	.0001
5	.30	.48	1.0	.7573	286.70	21	.0001

Table 12  
Standardized Discriminant Function Coefficients

Name of Drug	Discriminant Functions					
	1	2	3	4	5	6
Beer	.11	.15	.00	-1.28	.59	-1.01
Wine	.00	-.03	.08	-.27	-1.21	-.36
Hard liquor	.07	.01	.03	-.72	.02	1.41
Tobacco	-.38	3.17	.90	.28	-.09	-.13
Marijuana	.64	.42	-2.37	.81	-.01	-.06
Psychedelics	.09	-.00	-.00	.12	-.05	.02
Tranquilizers	.11	.11	.08	.02	-.12	-.11
Amphetamines	-.01	.04	-.06	.23	-.04	-.01
Barbiturates	.04	-.01	.02	-.01	.07	-.01
Cocaine	3.66	-.51	1.16	-.04	-.03	.01
Glue	-.03	-.01	.10	-.06	.08	.11
Angel dust	-.06	-.02	.01	-.02	-.02	.09

Function 3, Marijuana Use. This third significant function is defined by the frequency of use of marijuana. The loading is negative, hence a high score on the function indicates absence of marijuana use. This is illustrated in Table 12 in which the high marijuana using groups 7 and 8 are clearly discriminated from the other groups by their low scores on the function.

Function 4, Beer Drinking. Once again, the major defining discriminant coefficient--beer drinking--is negatively correlated with the discriminant function. Thus, a low score on the function indicates beer drinking. The smokers of cluster 2, in contrast, have a high score on this function. The power of this function and the remaining two discriminant functions to separate these groups is considerably less than that of the first three functions (see Table 11).

Function 5, Wine Drinking. The coefficient for wine drinking dominates the meaning of this function (Table 12). This coefficient is negative, thus a low score on the function implies the presence of wine drinking. As might be expected, cluster 3 has a low score on this coefficient. This function contributes only a small percentage of the overall discriminatory power of the full set. Its eigenvalue falls to 0.46 and its canonical correlation to 0.56. It serves primarily to differentiate cluster 3 (moderate wine drinkers) from the other clusters.

Function 6, Hard Liquor Use. The use of hard liquor emerges as the clearest defining feature of this function. The function contributes much less to the overall discrimination between these 9 classes than the other functions. However, as can be seen in Table 11, it remains highly significant making an important contribution to the separation between certain groups.



Centroids of Groups in Reduced Space  
for the First Six Discriminant Functions

	1	2	3	4	5	6
Occasional alcohol use	-.87	-2.25	.47	.78	.09	.28
Regular tobacco use	-1.61	4.62	2.21	1.15	.15	-.15
Moderate wine use	-.71	-2.08	.46	-.62	-2.58	-.67
Moderate beer use	-.64	-1.95	.31	-1.38	.82	-1.13
Regular beer or liquor	-.12	-1.40	-.80	3.21	.09	1.20
Regular alcohol and tobacco	1.03	5.28	1.41	-2.25	-.08	.25
Regular alcohol and marijuana	.83	-.92	-4.91	.45	.13	-.21
Regular tobacco, alcohol and marijuana use	.12	5.86	-3.19	.62	-.15	-.01
Marijuana, tobacco, alcohol, and cocaine	21.54	.32	1.56	.22	.01	-.00
MAJOR DEFINING DRUG	Cocaine	Tobacco	Marijuana	Beer	Wine	Hard Liquor

The particular contribution of the present function is to separate types 4 and 5; i.e., the moderate beer drinkers (4) from the drinkers in 5 who consume both beer and hard liquor.

EVALUATING THE "GOODNESS" OF THE 1976 CLASSIFICATION OF DRUG USE TYPES

Different analytical approaches allow us to draw certain conclusions regarding the "goodness" of the present classification. These evaluations are descriptive in their intent and we are emphasizing their numerical values rather than drawing probabilistic conclusions.

Wilk's Lambda. This coefficient is a measure of the "goodness" of classification systems. It varies between 0 and 1, with low values indicating good classification. In our present system  $\Lambda = .00024$ , thus indicating that the clusters are very homogeneous, or tight, in relation to the overall dispersion. This numerical value for Lambda is, therefore, a first indication that the present classification complies with the general requirement that within-class dispersion is small in relation to between-class dispersion. A good value for Lambda might be expected for this classification since the MIKCA procedure aims to minimize Determinant W; i.e., the clustering criterion is  $\min. W$ . This, in turn, is the critical term in computing Wilk's Lambda. Nevertheless, the actual obtained value for this coefficient is extremely encouraging.

Proportion of Cases "Correctly" Classified and Probabilities of Correct Classification

Classification systems in which cases can be easily classified into their "correct" classes at very high probability levels are also generally regarded as good systems. In contrast, low membership probabilities, with many cases misclassified or equally balanced between competing classes, would generally

be an indication of inadequate differentiation between the classes and "fuzzy" boundaries. We acknowledge that accuracy of classification is also a function of the adequacy of the derived discriminant functions. The present discriminant analysis, therefore, reflects both the power of the discriminant functions as well as the goodness of the classification system. A high proportion of cases correctly classified indicates that the classes are well differentiated. Further, a large number of cases correctly classified at very high probability levels suggests that the clusters are internally compact and homogeneous. Table 14 indicates that 96% of the cases were correctly classified.

Table 14

Predicted vs. Actual Class Membership from Discriminant Analysis

Gp. No.	Name	N of Cases	Predicted Classification % Correct)								
			1	2	3	4	5	6	7	8	9
1	Occasional Alcohol	420	100	0	0	0	0	0	0	0	0
2	Regular Tobacco	121	1	99	0	0	0	0	0	0	0
3	Moderate Wine	58	22	0	78	0	0	0	0	0	0
4	Moderate Beer	120	17	0	0	83	0	0	0	0	0
5	Regular Beer and Liquor	61	0	3	0	2	.95	0	0	0	0
6	Regular Tobacco & Alcohol	72	3	0	0	0	0	97	0	0	0
7	Regular Alcohol and Marijuana	73	3	0	0	0	0	0	97	0	0
8	Regular Tobacco and Marijuana	86	0	0	0	0	0	1	0	99	0
9	ATM and Cocaine	32	0	0	0	0	0	0	0	0	100

Chi-square = 7605.1      Significance = 0.001

The above matrix reflects the fact that a very high proportion of cases in all of the clusters were correctly classified. The only major class overlap seems to be that between class 1 (occasional alcohol) and class 4 (moderate beer consumption) and class 3 (moderate wine consumption). This indicates that the boundaries of class 1 with those of class 3 and class 4 are not clearly demarcated.

Turning to the actual probabilities of class membership it was found that requiring a probability of membership of .70, only 8.6% of cases were not classified correctly at that level. Conversely, 91.4% are correctly classified at beyond .70 probability. This is encouraging in regard to the internal cohesion of the classes.

Homogeneity Coefficients. The homogeneity coefficients provide an indication of the tightness of each cluster in terms of the internal similarity of the numbers. Seven of the clusters show extremely high internal similarities with average homogeneity coefficients over .50. As might be expected, the particular clusters which do not have high internal mutual similarity among members are those polydrug using groups in which large numbers of drugs are involved. Basically, the first eight drug types (classes 1 through 8) all exhibit high mutual similarity in their use patterns. On the other hand, classes 9 through 14 are all characterized by poor homogeneity coefficients, indicating that the clusters are loosely dispersed in the extreme regions of measurement space. These five clusters are also extremely small at both measurement waves (1977 and 1978) and this also leads to very small H-coefficients and instability of the clusters.

The relative size of the homogeneity coefficients for each separate cluster is useful in taking us further than Wilk's Lambda in describing the homogeneity of the classification. The global coefficient; i.e., Lambda, gives the general impression of an extremely homogeneous classification. The H-coefficients go beyond this general result and indicate that while the eight largest classes of the classification system are extremely homogeneous, the five smallest classes are relatively weak in their classificatory structure. Yet, the fact that they are located in extremely atypical regions of the measurement space allows them to be identifiable.

CHANGE PATTERNS IN DRUG USE BETWEEN 1977 and 1978

In this section we examine transitions between type membership in 1977 and type membership in 1978. Each youth will, therefore, be characterized in terms of his/her transition from an initial drug use type in 1977 to a drug use type in 1978. This will allow "changes" to be identified for movement between the drug profiles.

Relative "Stability" of the Different Types

Using the ordering of the various drug classes outlined earlier, Table 15 indicates the stability and the percent of each class at 1977 who either show increases or decreases in their drug consumption in 1978.

The most "stable" pattern between the two years is the nonuse (cluster 0) class. Over 60% of these youth remained abstainers in 1978. The other 40% showed some kind of initial drug use in 1978. The most predominant kind of "onset" was to try a conventional drug (beer, wine) once or twice in 1978. This was the predominant onset pattern of three out of four of the youth who started using drugs. A second form of onset was to start smoking.

A second highly "stable" pattern across the two years was the high level of multi-drug use (clusters 9 through 15). Over 65% of the youth who were multi-drug users in 1977 remained so in 1978. This stability level is, however, somewhat misleading because many of these youth switched between the various kinds of multi-drug use. Thirty-four percent of these youth show some form of diminished use of drugs. No specific pattern of diminished use was found to predominate.

In general, the change from 1977 to 1978 involves an increasing level of drug use. There are two exceptions. Those in the Moderate Wine Use cluster and those in the Alcohol, Marijuana, Tobacco Use cluster were more likely to

Table 15

## Main Directions of Change in Multiple Drug Use between 1977 and 1978

Initial Style of Multiple Drug Use in 1977	% Remaining Stable	Increased Use of Drugs (%)	Decreased Use of Drugs (%)	Predominant Direction of Change (% of Changers Making this Choice)
0 No Use of Drugs	60.4	39.6	0.0	1 Occasional Use of Alcohol (29.6%)
1 Occasional Use of Alcohol	49.5	38.6	11.9	4 Moderate Beer (11%)
2 Regular Tobacco Use	43.5	39.4	12.9	6 Regular Alcohol & Tobacco (17.7%)
3 Moderate Wine	32.3	22.6	25.8	4 Moderate Beer (16.1%)
4 Moderate Beer	37.3	37.4	17.0	5 Regular Beer & Liquor (15.3%) 6 Regular Alcohol & Tobacco (11.9%)
5 Regular Beer and Liquor	47.6	28.6	23.8	No dominant direction, many (19%) give up on drugs
6 Regular Alcohol & Tobacco	46.2	38.5	15.3	8 Regular Alcohol, Tobacco, (23.1%)
7 Regular Alcohol & Marijuana	50.0	36.7	13.3	9 Multi-drug (23.3%)
8 Regular Alcohol, Marijuana, Tobacco	39.4	24.2	36.4	9 Multi-drug (24.2%) 7 Some of these youth gave up on tobacco (12.1%)
9 Multi-drug*	65.4	---	34.6	No predominant choice emerged for these youth

\* Many of the "multi-drug" users changed their particular combinations of drugs chosen. Therefore, the figures for %'s remaining "stable" or "increasing" should be interpreted with caution. Additionally, in this multi-drug class we have collapsed 7 very small groups of multi-drug users.

be involved in a lower level of drug use in 1978. The predominant direction of change was nevertheless toward increasing or higher levels of drug use. The movement out of cluster 0 obviously constitutes the "onset" of drug use for these youth. The movement back into cluster 0 constitutes the "termination" of drug use.

Tables 16 to 21 provide the full information on the movement of youth from their 1977 style of drug consumption to their 1978 style. The percentage in each case is based on the 1977 class sizes. In these tables we have again collapsed classes 9 through 15 into one general multi-drug class.

#### MAJOR PATTERNS OF CHANGE: TRANSITIONS 1977-1978

Of all the logically possible patterns of change between these years we have attempted to pinpoint those transitions which occur with high frequency. Additionally, we identify those transitions which involve the use of illicit drugs. The figures given in sections for each change are proportions of the total samples of youth, rather than of specific clusters.

##### Patterns of Onset

1. No Use (0) into Occasional Alcohol Use (1). This transition occurs with a higher frequency than any other change (7.4% of the total sample). It is the mildest kind of "onset". It implies that the youth "tried" beer or wine once or twice during the second year of assessment. As might be expected, this particular form of onset occurs with high frequency among the youngest age group (12.7%).

2. No Use (0) into Regular Tobacco Use (2). The transition from no use of drugs into daily tobacco use is the second most important kind of onset. 1.2% of the sample fall into this particular change pattern. This pattern is

Table 16

Transition Table for Change in Drug Style, 1977-1978 (Total Sample)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)											Row %	Total N
	0	1	2	3	4	5	6	7	8	9-15			
Cluster 0 (no use)	60.4	29.6	4.7	1.8	1.8	0	1.2	0	0	.6	25.0	169	
Cluster 1 (occas.alcohol)	11.9	49.5	5.5	3.7	11.0	4.6	3.2	4.6	3.2	2.8	32.3	218	
Cluster 2 (tobacco)	1.6	11.3	43.5	1.6	1.6	3.2	17.7	1.6	8.1	9.6	9.2	62	
Cluster 3 (wine)	9.7	16.1	3.2	32.3	16.1	9.7	0	9.7	0	3.2	4.6	31	
Cluster 4 (beer)	3.4	13.6	5.1	3.4	37.3	15.3	11.9	1.7	6.8	1.7	8.7	59	
Cluster 5 (beer-liquor)	0	19.0	0	0	4.8	47.6	4.8	9.5	9.5	4.8	3.1	21	
Cluster 6 (beer-liquor- tobacco)	0	3.8	7.7	3.8	0	7.7	46.2	0	23.1	7.7	3.9	26	
Cluster 7 (alcohol and marijuana)	0	0	6.7	0	3.3	3.3	0	50.0	13.3	23.3	4.4	30	
Cluster 8 (alcohol, marijuana, tobacco)	0	3.0	8.1	0	3.3	8.1	6.1	12.1	39.4	24.2	4.9	33	
Cluster 9-15 (multi- drug)	3.8	3.8	0	0	0	0	3.8	11.5	11.5	65.4	3.6	26	
Column Total	%	20.0	27.4	8.4	3.7	8.6	5.8	6.4	5.8	6.5	7.3	100%	
	N	135	183	57	25	58	39	43	39	44	50		675



Table 17

Transition Table for Change in Drug Style, 1977-1978 (Male)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)										Row %	Total N	
	0	1	2	3	4	5	6	7	8	9-15			
Cluster 0 (no use)	59.6	32.6	3.4	0	1.1	0	2.2	0	0	1.1	24.1	89	
Cluster 1 (occas.alcohol)	14.5	44.5	5.5	1.8	10.9	7.3	4.5	5.5	1.8	3.6	29.8	110	
Cluster 2 (tobacco)	0	8.6	45.7	2.9	2.9	2.9	20.0	0	5.7	11.5	9.5	35	
Cluster 3 (wine)	11.8	11.8	5.9	17.6	23.5	11.8	0	11.8	0	5.9	4.6	17	
Cluster 4 (beer)	0	15.8	2.6	5.3	42.1	15.8	13.2	2.6	2.6	0	10.3	38	
Cluster 5 (beer-liquor)	0	15.4	0	0	7.7	38.5	0	15.4	15.4	7.7	3.5	13	
Cluster 6 (beer-liquor- tobacco)	0	6.7	6.7	6.7	0	13.3	46.7	0	13.3	6.7	4.1	15	
Cluster 7 (alcohol and marijuana)	0	0	5.0	0	0	0	0	60.0	10.0	25.0	5.4	20	
Cluster 8 (alcohol, marijuana, tobacco)	0	0	0	0	5.6	5.6	5.6	5.6	38.9	38.9	4.9	18	
Cluster 9-15 (multi- drug)	7.1	0	0	0	0	0	0	7.1	14.2	71.3	3.8	14	
Column Total	%	19.5	24.9	7.9	2.4	9.8	6.8	7.3	6.8	5.4	9.1	100%	
	N	72	92	29	9	36	25	27	25	20	34		369

Table 18

## Transition Table for Change in Drug Style, 1977-1978 (Female)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)										Row %	Total N	
	0	1	2	3	4	5	6	7	8	9-15			
Cluster 0 (no use)	81.2	26.2	6.3	3.7	2.5	0	0	0	0	0	26.1	80	
Cluster 1 (occas. alcohol)	9.3	54.6	5.6	5.6	11.1	1.9	1.9	3.7	4.6	1.9	35.3	108	
Cluster 2 (tobacco)	3.7	14.8	40.7	0	0	3.7	14.8	3.7	11.1	7.4	8.8	27	
Cluster 3 (wine)	7.1	21.4	0	50.0	7.1	7.1	0	7.1	0	0	4.6	14	
Cluster 4 (beer)	9.5	9.5	9.5	0	28.6	14.3	9.5	0	14.3	4.8	6.9	21	
Cluster 5 (beer-liquor)	0	25.0	0	0	0	62.5	12.5	0	0	0	2.6	8	
Cluster 6 (beer-liquor- tobacco)	0	0	9.1	0	0	0	45.5	0	36.4	9.1	3.6	11	
Cluster 7 (alcohol and marijuana)	0	0	10.0	0	10.0	10.0	0	30.0	20.0	20.0	3.3	10	
Cluster 8 (alcohol, marijuana, tobacco)	0	6.7	13.3	0	0	6.7	6.7	20.0	40.0	6.7	4.9	15	
Cluster 9 (multi- drug)	0	8.3	0	0	0	0	8.3	16.7	8.3	58.3	3.9	12	
Column Total	%	20.6	30.4	9.2	5.2	7.2	4.6	5.2	4.6	7.8	5.2	100%	
	N	63	93	28	16	22	14	16	14	24	16		306

Table 19

Transition Table for Change in Drug Style, 1977-1978 (Ages 13, 14)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)										Row %	Total N	
	0	1	2	3	4	5	6	7	8	9-15			
Cluster 0 (no use)	62.9	27.6	5.7	2.9	1.0	0	0	0	0	0	45.9	105	
Cluster 1 (occas.alcohol)	19.8	46.9	6.2	4.9	7.4	1.2	2.5	3.7	4.9	2.5	35.4	81	
Cluster 2 (tobacco)	0	26.7	33.3	6.7	0	6.7	0	0	6.7	20.7	6.6	15	
Cluster 3 (wine)	12.5	25.0	0	0	25.0	12.5	0	12.5	0	12.5	3.5	8	
Cluster 4 (beer)	18.2	36.4	0	0	18.2	9.1	18.2	0	0	0	4.8	11	
Cluster 5 (beer-liquor)	0	100.0	0	0	0	0	0	0	0	0	0.4	1	
Cluster 6 (beer-liquor- tobacco)	0	0	100.0	0	0	0	0	0	0	0	0.4	1	
Cluster 7 (alcohol and marijuana)	0	0	0	0	0	0	0	33.3	33.3	33.3	1.3	3	
Cluster 8 (alcohol, marijuana, tobacco)	0	0	33.3	0	0	0	0	33.3	33.3	0	1.3	3	
Cluster 9-15 (multi- use)	100.0	0	0	0	0	0	0	0	0	0	0.4	1	
Column Total	%	37.6	34.1	7.9	3.5	4.8	1.7	1.7	2.6	3.1	3.1	100%	
	N	86	78	18	8	11	4	4	6	7	7		229

Table 20

Transition Table for Change in Drug Style, 1977-1978 (Ages 15, 16)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)										Row %	Total N
	0	1	2	3	4	5	6	7	8	9-15		
Cluster 0 (no use)	58.3	22.2	5.6	0	5.6	0	5.6	0	0	2.8	16.7	36
Cluster 1 (occas.alcohol)	8.8	51.3	8.8	2.5	11.2	3.7	1.2	7.5	1.2	3.7	37.2	80
Cluster 2 (tobacco)	0	4.2	45.8	0	4.2	4.2	16.7	4.2	12.5	8.4	11.2	24
Cluster 3 (wine)	18.2	18.2	9.1	45.5	9.1	0	0	0	0	0	5.1	11
Cluster 4 (beer)	0	13.3	6.7	6.7	53.3	6.7	0	6.7	6.7	0	7.0	15
Cluster 5 (beer-liquor)	0	40.0	0	0	0	20.0	20.0	0	20.0	0	2.3	5
Cluster 6 (beer-liquor- tobacco)	0	0	0	0	0	14.3	28.6	0	42.9	14.3	3.3	7
Cluster 7 (alcohol and marijuana)	0	0	7.1	0	7.1	0	0	50.0	14.3	21.4	6.5	14
Cluster 8 (alcohol, marijuana, tobacco)	0	6.7	6.7	0	6.7	0	0	13.3	33.3	33.3	7.0	15
Cluster 9-15 (multi- drug)	0	0	0	0	0	0	0	12.5	12.5	75.0	3.7	8
Column Total	% 14.0	26.5	11.2	3.7	10.7	3.3	4.7	8.4	7.9	9.8	100%	
	N 30	57	24	8	23	7	10	18	17	21		215

Table 21

Transition Table for Change in Drug Style, 1977-1978 (Ages 17, 18)

Drug-type Cluster at Wave 2 (1977)	Drug-type Cluster in Wave 3 (1978)										%	N
	0	1	2	3	4	5	6	7	8	9-15		
Cluster 0 (no use)	53.6	46.4	0	0	0	0	0	0	0	0	12.1	28
Cluster 1 (occas.alcohol)	5.3	50.9	0	3.5	15.8	10.5	7.0	1.8	3.5	1.8	24.7	57
Cluster 2 (tobacco)	4.3	8.7	47.8	0	0	0	30.4	0	4.3	4.3	10.0	23
Cluster 3 (wine)	0	8.3	0	41.7	16.7	16.7	0	16.7	0	0	5.2	12
Cluster 4 (beer)	0	6.1	6.1	3.0	36.4	21.2	15.2	0	9.1	3.0	14.3	33
Cluster 5 (beer-liquor)	0	6.7	0	0	6.7	60.0	0	13.3	6.7	6.7	6.5	15
Cluster 6 (beer-liquor- tobacco)	0	5.6	5.6	5.6	0	5.6	55.6	0	16.7	5.6	7.8	18
Cluster 7 (alcohol and marijuana)	0	0	7.7	0	0	7.7	0	53.8	7.7	23.1	5.6	13
Cluster 8 (alcohol, marijuana, tobacco)	0	0	0	0	0	13.3	13.3	6.7	46.7	20.0	6.5	15
Cluster 9-15 (multi- drug)	0	5.8	0	0	0	0	5.8	11.7	11.7	64.7	7.4	17
Column Total	% 8.2	21.6	6.5	3.9	10.4	12.1	12.6	6.5	8.7	9.5	100%	
	N 19	50	15	9	24	28	29	15	20	22		231

also quite important for youth in the youngest age bracket. 2.6% of these youth fell into this pattern.

3. Other Forms of Onset. The data indicates that the above two forms of onset account for the vast majority of the movement from "no use" of drugs into some use of drugs between the second and third waves of the survey. Very small numbers of youth move directly into regular wine or regular beer drinking (clusters 3 and 4). However, these numbers are so small that these forms of transition are essentially not represented in this large sample.

The data indicates that the onset of drugs is generally characterized by a gradual and careful initiation into the minimal or experimental use of conventional drugs; i.e., alcohol (beer and wine), or much less frequently, tobacco. The precipitous move from nonuse into a high level of consumption is virtually absent in the present sample. These findings hold for all three of the age groups.

#### Patterns of Termination

The transition matrices indicate that some youth decided between 1977 and 1978 to terminate their use of drugs. The following represent the most predominant patterns in the termination of the use of particular forms of drugs.

1. Occasional Alcohol Use (1) into Nonuse (0). This is the most predominant kind of termination. It indicates that the youth have tried (at some minimal level) either beer or wine during 1977 and have completely abstained from any drug during 1978. Of the terminations that exist in these data, over 75% are accounted for by this particular pattern.

2. Other Kinds of Termination. The data indicate a sprinkling of other kinds of terminations in the third year of testing. One youth gives up his

habit of daily tobacco smoking. Three youth give up their pattern of regular wine drinking, and two youth give up their pattern of regular beer drinking. The numbers involved in these patterns are extremely small and these forms of termination are dwarfed by the move from occasional alcohol use into nonuse. Similar findings occur for all three age groups, and for boys and girls analyzed separately.

#### Patterns of Increased Drug Use

In this section we examine the most highly recurrent styles of increased use of drugs from Wave 2 to Wave 3.

1. Occasional Alcohol Use (1) into Increased Alcohol Use. The most predominant kind of increased drug use is from minimal use into some form of increased alcohol use. Youth move from the minimal drug use cluster (1) into the following clusters: cluster 4 - Moderate Beer Use (3.6%), cluster 3 - Moderate Wine Use (1.2%), and cluster 5 - Moderate Beer and Liquor (1.5%).

2. Occasional Alcohol Use (1) into Regular Tobacco Use (2). Many youth move from the experimental stage of cluster 1 into the daily use of tobacco. 1.8% of the overall sample are involved in this particular transition.

3. Occasional Alcohol Use (1) into Marijuana Use (Clusters 7 and 8). A surprisingly large number of youth move from the experimental user stage 1 into the more regular use of marijuana, alcohol, and tobacco as in cluster 8, or the use of alcohol and marijuana as in cluster 7. These two transitions account for 2.5% of the overall sample. This represents a fairly dramatic transition in that these youth have moved from a state in which they have barely tried conventional drugs into a new state in which the youth consumes beer, wine, hard liquor, tobacco, and marijuana.

4. Occasional Alcohol Use into Heavy Multiple Drug Use. Very few youth are involved in this kind of transition. It does, however, exist and 0.6% of the overall sample move from occasional alcohol use in 1977 to some form of multi-drug use. The numbers, however, are very small for any reliable statements to be made about these youth.

5. Two Transitions from Regular Tobacco Smoking. Two forms of increased drug use stem from daily tobacco smoking. The first of these basically adds beer and liquor as regular features of the youth's drug consumption pattern (as exemplified by cluster 6). These youth, therefore, use all of the conventional drugs. This is the most common developmental increase from daily tobacco smoking. The second pattern of increase from daily tobacco use basically adds marijuana and alcohol to the tobacco consumption. This transition occurs at about half the frequency of the move shown into cluster 6. Whereas 1.6% of the overall sample is involved in the first of these patterns, only 0.7% of the sample is involved in the second of these patterns. There is a sprinkling of other youth scattered throughout the other cells indicating an increased use of drugs starting from the use of tobacco. However, all of these cells are extremely sparse.

6. Transitions which Start at Regular Beer Drinking (Cluster 4). Once again, there are two major ways in which youth starting at the regular use of beer in 1977 show increased use of drugs. The first of these involves the addition of regular use of hard liquor. 1.3% of the sample is involved in this transition. The second pattern involves the addition of both liquor and tobacco to the basic beer drinking pattern. 1.0% of the overall sample is involved in this transition. A much less frequent pattern of increase is to add marijuana and tobacco to the basic beer drinking pattern.



7. The Transition from Alcohol and Tobacco into Alcohol, Tobacco, and Marijuana: The Jump to Illicit Drugs. This particular transition is the most profound change occurring for youth who start with beer, liquor, and tobacco. Fully 23% of these youth decide to add marijuana to their repertoire of drugs. They end up in cluster 8 in the second phase of testing.

8. Two Patterns of Increase Starting at Alcohol and Marijuana. Many of the youth falling into the present cluster 7--alcohol with marijuana--remain stable in this pattern (50% show no change). However, one form of movement is to add daily tobacco to the prior alcohol and marijuana pattern. 13.3% decide to add extensive tobacco smoking to their prior alcohol and marijuana use. A second move shown by these youth is to add various other illicit drugs to their alcohol and marijuana pattern. Such drugs as cocaine, barbiturates, angel dust, etc., are added to the basic alcohol, tobacco, and marijuana pattern. Twenty-three percent of the youth who fell into the initial cluster 7 at Wave 2 end up included in one of the multi-drug categories, indicating that they have added further illicit drugs to their marijuana consumption.

#### Patterns of Decreased Drug Use

The cross-time change matrices also indicate that some youth show substantially reduced levels of drug use in the second phase of this comparison. We have already dealt with the various forms of termination and we now examine various forms of diminished use.

1. From Regular Alcohol into Occasional Alcohol Use (1). The data indicate that youth who were regular (monthly) users of wine (cluster 3), regular users of beer and beer and liquor (cluster 4 and cluster 5) may give up their regular use of alcohol and move back into sporadic and extremely infrequent use of these conventional drugs. 16.1% of wine users (cluster 3) move into the occasional alcohol use group, 13.6% of the beer drinking cluster

4, and 19% of the alcohol drinkers of cluster 5 move into the occasional alcohol use group.

2. From Regular Tobacco into Occasional Alcohol Use. A number of youth who were daily tobacco smokers at Wave 2 move into the minimal use group. Specifically, 11.3% of the daily tobacco users give up their daily habit.

3. Other Forms of Diminished Use. Some very small numbers of youth fall into other cells representing diminished use. The infrequency with which these patterns occur minimizes their importance for our research purposes. For example, it can be seen that a number of youth have given up their use of marijuana as shown by the fact that certain members of cluster 7 (a marijuana and alcohol cluster) have either given up marijuana and retained their alcohol use or have given up both marijuana and alcohol and have moved back into daily tobacco using. The numbers involved are so small that no generalizations can be made regarding these cells.

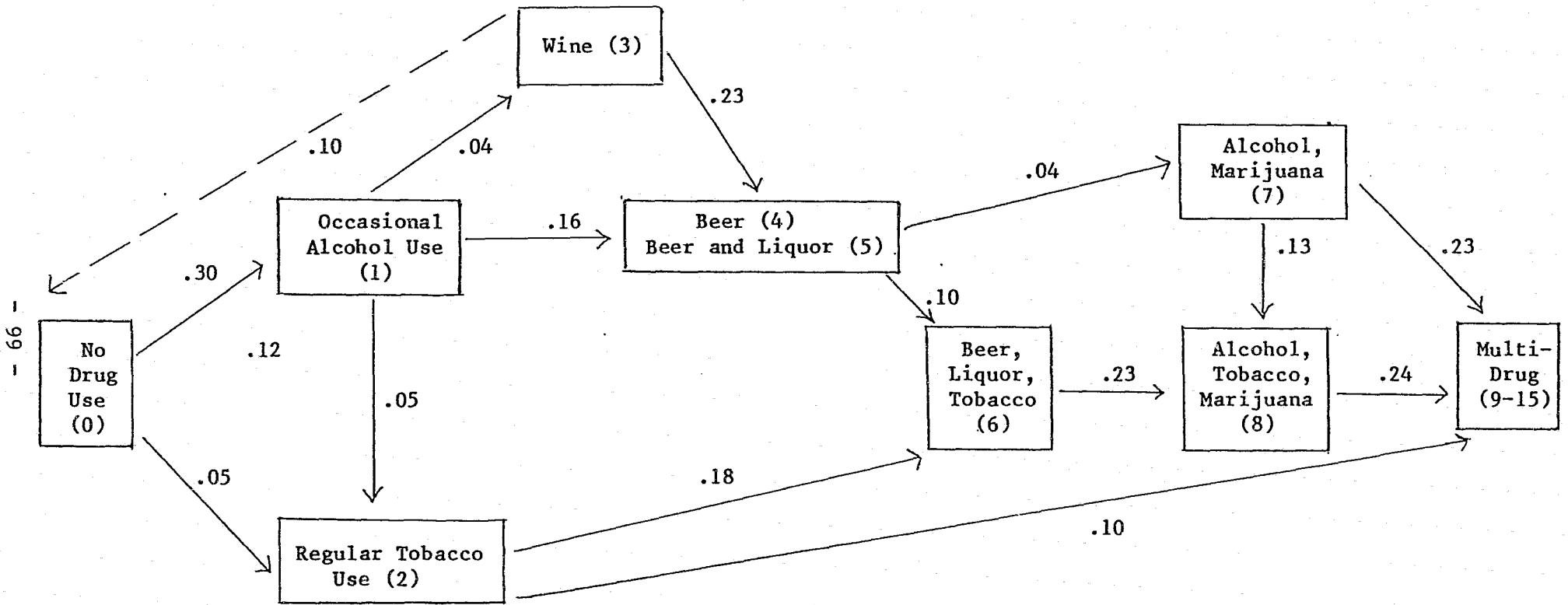
#### Graphic Presentation of Major Change Patterns

The delineation of the major patterns of change in styles of drug use can be simplified into a graphical presentation. The various linkages can be utilized to order the drug profiles into a model of overall change. The diagram below is based on the "strength" of the linkages stemming from the change matrices.

This diagram is useful in providing a summary of the main transitions that have been demonstrated to exist in this data. There are 81 possible cells in the overall change matrix. Sixteen cells account for virtually ALL of the change between patterns at Wave 2 and those at Wave 3. These 16 are set into the context of each other by this model. The model, incidentally, summarizes all of the major modes of onset, development, and termination that were discovered in this analysis.

Figure 3

Major Patterns of Onset, Termination and Increased  
Drug Consumption: 1977 - 1978\*



\* Based upon strongest transition probabilities between each style (cluster) of multiple drug consumption.

CHANGE PATTERNS IN MULTIPLE DRUG USE 1976-1977

The analysis of change from the Wave 1 (1976) classification to the Wave 2 (1977) classification is somewhat problematic due to differences in type-definitions for these two years. Consequently, we do not regard the comparison between these two years as being of the same importance as the change analysis between 1977 and 1978. However, the comparison between Wave 1 and Wave 2 classifications does, in fact, provide some useful information. The following represent some of the major findings.

Patterns of Onset

As in the 1977-1978 comparison, the major patterns of onset of drug use in the present comparison can be seen by examining the move out of the nonuser status. The most prevalent pattern of onset is from nonuse into occasional use of alcohol. Thirty-eight percent of the nonusers at Wave 1 move into this status. This group constitutes a total of 19.4% of all of the youth at Wave 1. The second most important transition out of the nonuser status is into daily tobacco smoking. This, again, repeats the finding from our other change comparison. Eight percent of the nonusers move into this status and this constitutes 4% of the overall sample at Wave 1. A variety of other forms of onset are present in the data but are overshadowed by the frequency of these two basic forms.

Patterns of Termination

As in our 1977 - 1978 change analysis, the major form of termination consists of those youth who move back from the occasional use of alcohol into the nonuse category. 7.4% of the youth who were in this lowest alcohol group at Wave 1 moved back into the nonuser group at Wave 2 (1977). This is the

only main form of termination which shows any reasonable frequency in examining the transition between Wave 1 and Wave 2.

#### Patterns of Increased Drug Use

In this section we examine the transitions between Wave 1 and Wave 2 which constitute major forms of increased use of drugs. In this section we will organize the findings according to the main starting point.

Transitions from Occasional Alcohol Use. A first important transition from occasional use of alcohol is to begin smoking. Fully 12.8% of the youth who were in the occasional alcohol group at Wave 1 become daily smokers. This represents the largest transition from the occasional alcohol group. A second important transition is to increase alcohol consumption and become a regular beer drinker. 7.4% of the lowest alcohol group move into the regular beer drinking category. A third transition of importance (5% of the occasional alcohol group) is the transition into a regular use of beer and liquor. Finally, 6% of the occasional alcohol users at Wave 1 move into regular wine consumption at Wave 2 and 4.7% move into the use of marijuana, alcohol, and tobacco.

The noncomparability of the types between these two years, coupled with the fact that there are a number of various levels of alcohol consumption at Wave 1, tends to blur and smooth out the transitions between groups at time 1 and time 2. For this reason, therefore, we will confine the present analysis to the examination of patterns of onset and patterns of termination. Patterns of increase are more difficult to identify in the present analysis due to the large number of types involved at the two waves and the noncomparability of the two types.

VALIDATION OF THE INTEGRATED TYPOLOGY AGAINST EXTERNAL VARIABLES

In this section the concurrent validity of the integrated drug classification system is examined. The intent of this section is to examine the relationship of this new classification system to a large set of external variables. These variables were not utilized in the construction of the classification system. This is generally regarded as testing the concurrent validity of the proposed classification system. All of these examinations are based upon the one-way ANOVA tables that are presented below. The information is ordered according to the general focus of the particular kind of variables being examined; i.e., family relationships, peer relationships, and so forth. These variables generally reflect dimensions of internal commitment to conventional norms and groups and levels of social integration into conventional groups and institutions. They are the measures of the explanatory variables developed to test the theoretical paradigm developed for the National Youth Surveys. The items and response sets for each variable in this section can be found in Appendix A.

Problem Behavior and Drug Types

In conducting the ANOVA examinations of the differences between the various types it is found that virtually every single "problem behavior" in our checklist (see Appendix A) is found to significantly differentiate between the various drug types (Table 22). With few exceptions, these analyses are significant beyond the .01 level. These analyses indicate that youth in the high drug using clusters, specifically clusters 6, 7, 8, and 9, experience virtually all of the "problems" at higher levels than do youth in the other clusters. In all of these analyses it should be recalled that clusters 9

through 15 have been collapsed into one general multi-drug cluster; i.e., cluster 9. We will now examine these findings in some detail.

Trouble in Relationships. Youth in clusters 6, 8, and 9, in particular, acknowledge significantly high levels of trouble with girlfriend or boyfriend as a result of their consumption of drugs.

In regard to trouble with family, youth in cluster 9 have significantly higher scores than do youth in the other clusters. Surprisingly, those in cluster 5 as well as 6 and 8, have high scores for getting into trouble with the family both as a result of alcohol and drugs. The high score for cluster 5 in regard to getting into trouble as a result of drug use is surprising since these youth largely confine their consumption to alcoholic beverages and show minimal use of drugs.

Regarding peer relationships and relationships to teachers, the same basic pattern reappears. Youth in clusters 5, 6, 7, and 9 all have significantly higher scores for getting into trouble with friends as a result of alcohol consumption. In regard to drugs, however, there are no significant differences between types. This is a surprising result and perhaps indicates that the high drug using types are embedded in a supportive peer group which does not disapprove of their drug taking practices. Turning to getting into trouble with teachers, again there are significant differences for both getting into trouble as a result of alcohol and as a result of drugs. In each case those in cluster 9, as expected, have the highest score.

Table 22

One-Way ANOVA Tables for Drug Type Classification Against Drug/Alcohol Related Problems

Variable	Drug Type Class									Total	F-Ratio	Probability	Student-Newman-Keuls Procedure
	1	2	3	4	5	6	7	8	9				
Trouble w/girl/boyfriend because use of alcohol	1.04	1.09	1.12	1.16	1.38	1.61	1.25	1.31	1.42	1.17	6.69	.000	[6,9,5,8]
Trouble w/girl/boyfriend because use of drugs	1.03	1.20	1.22	1.00	1.08	1.61	1.13	1.36	1.48	1.25	2.50	.013	-----
Problems w/family due to alcohol use	1.06	1.13	1.09	1.24	1.76	1.61	1.31	1.56	2.23	1.27	15.00	.000	[9]
Problems w/family due to drug use	1.03	1.00	1.00	1.05	1.75	1.09	1.28	1.31	2.13	1.31	7.50	.000	[9,5]
Problems w/friends due to alcohol use	1.05	1.06	1.00	1.10	1.48	1.50	1.28	1.11	1.29	1.13	6.11	.000	[6,5,9,7]
Problems w/friends due to drug use	1.03	1.05	1.00	1.00	1.42	1.17	1.09	1.05	1.23	1.10	1.70	.101	-----
Problems w/teachers due to alcohol use	1.10	1.00	1.00	1.03	1.05	1.04	1.06	1.15	1.43	1.05	6.72	.000	[9]
Problems w/teachers due to drug use	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.15	1.40	1.09	2.71	.007	[9,8,7,6,5,4,3]
Fights due to alcohol use	1.02	1.04	1.06	1.15	1.10	1.43	1.34	1.17	1.35	1.12	5.20	.000	[6,9,7,8,4,5]
Fights due to drug use	1.00	1.00	1.00	1.00	1.00	1.04	1.09	1.17	1.16	1.07	1.08	.380	-----
Problem health due to alcohol use	1.03	1.02	1.21	1.08	1.38	1.18	1.19	1.14	1.42	1.11	4.72	.000	[9,5,3,7,6,8]
Problem health due to drug use	1.00	1.00	1.00	1.00	1.33	1.17	1.13	1.14	1.26	1.11	1.40	.199	-----
Couldn't remember what happened due to alcohol	1.03	1.11	1.15	1.10	1.43	1.36	1.31	1.50	1.48	1.17	16.77	.000	[8,9,5,6,7]
Couldn't remember what happened due to drug use	1.05	1.15	1.44	1.05	1.33	1.04	1.19	1.11	1.23	1.15	2.34	.020	-----
Stayed drunk for days	1.00	1.00	1.00	1.00	1.05	1.04	1.03	1.14	1.16	1.03	7.12	.000	[9,8]
Stayed high for days	1.03	1.00	1.00	1.00	1.00	1.09	1.16	1.19	1.35	1.12	4.20	.000	[9,8,7,6,1,5,4,3]
Couldn't stop drinking	1.00	1.02	1.03	1.03	1.00	1.04	1.09	1.03	1.06	1.02	1.72	.091	-----
Couldn't stop drug use	1.00	1.00	1.00	1.00	1.00	1.04	1.06	1.03	1.03	1.02	.629	.753	-----
Arrested for alcohol/drug offenses	1.00	1.00	1.00	1.00	1.10	1.04	1.09	1.06	1.16	1.03	6.02	.000	[9,5,7]
Times high in last year	.78	2.20	1.89	1.05	15.92	6.09	53.78	42.69	132.39	35.63	10.18	.000	[9]



Getting into Fights. This variable is significantly related to the drug classification. Youth in clusters 9, 6, and 7 have particularly high scores for getting into fights as a result of alcohol. Turning to drugs, however, there is no significant difference between the drug types.

Problems with Health. Again, youth in clusters 9, 5, and surprisingly, cluster 3, have high scores for this type of problem. The relationship between the classification and this problem variable is significant at beyond the .001 level. However there is no significant relation between problems with health as a result of drug use and the drug classification system.

Loss of Memory. The loss of memory as a result of both alcohol and/or drug use is significantly related to the drug classification system. The significance level reaches beyond the .001 level for alcohol but is only beyond the .01 level for drugs. As might be expected, youth in clusters 8 and 9 have the highest reported levels of this problem.

Binge Behavior. Going on binges for days, or being high for days, represents a further kind of problem. It is found that these two variables relate significantly to the classification system, both beyond the .001 level of significance. Again, it is found that youth in the high drug using clusters (7, 8, and particularly 9) have the highest scores for these kinds of behaviors.

Addiction. Being addicted to either alcohol or drugs was also examined. It was found that there was only a weak relationship for alcohol (significant beyond the .10 level) and no significant relationship for drugs.

Being Arrested. Being arrested as a result of alcohol or drug use was significantly related to the drug classification at beyond the .001 level. Again, youth in clusters 9, 5, and 7 show particularly high scores for this variable.

Frequency of Being Drunk or High in the Last Year. Both of these practices; i.e., being drunk or being high, are found to be significantly related to the drug classification. Youth in Clusters 6, 7, 8, and 9, in order of increasing severity, had the highest scores for both of these practices.

#### Drug Types and Delinquent Behavior

One-way ANOVA tables (Tables 23 and 24) have been constructed to examine the mean scores of all the drug using types against all of the delinquent behavior items, as well as the delinquency scales that have been constructed on these items.<sup>1</sup> An examination of these ANOVA tables indicates that highly significant relationships exist between the drug classification and virtually all of the separate items and scales. It can be further noted that youth in the multi-drug use cluster 9 are generally the most delinquent. Youth in the occasional alcohol group (1) are usually the least delinquent. These findings provide substantial evidence of the close relationship between drug use and virtually all forms of delinquent behavior.

#### Drug Types and Social Psychological Variables

Table 25 illustrates the relationship between the drug classification system and the social psychological variables that are included within the present study (see Appendix A). This table provides further support for the concurrent validity of the drug classification system. Virtually all of these relationships are statistically significant. We have organized the findings of this section into a number of general categories. These deal with the separate social contexts within which the social psychological variables are constructed.

<sup>1</sup> For a detailed discussion of the delinquency items and scales, see Elliott et al., The Epidemiology of Delinquent Behavior and Drug Use Among American Adolescents, 1976-1978, Chapter I.

Table 23

One-Way ANOVA Tables for Drug Type Classification Against Self-Report Delinquency

Variable	Drug Type Class									Total	F-Ratio	Probability	Student-Newman-Kevis Procedure
	1	2	3	4	5	6	7	8	9				
Damaged property	1.25	1.22	1.21	1.19	1.24	1.46	1.16	1.36	1.71	1.28	2.33	.018	[9,6,8,1,5,2,3]
Stolen motor vehicle	1.00	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.03	1.66	.105	[2,9,8,7,6,5,4,3]
Stolen \$50.00	1.00	1.02	1.00	1.05	1.00	1.00	1.03	1.03	1.39	1.04	8.25	.000	[9]
Bought stolen goods	1.05	1.05	1.06	1.11	1.10	1.21	1.37	1.17	1.68	1.13	7.39	.000	[9]
Runaway	1.06	1.09	1.03	1.15	1.05	1.07	1.06	1.06	1.23	1.08	.952	.473	-----
Carried a hidden weapon	1.15	1.14	1.12	1.21	1.33	1.57	1.59	1.31	1.84	1.26	2.16	.029	-----
Stolen \$5.00	1.21	1.33	1.33	1.19	1.57	1.32	1.50	1.72	2.23	1.36	6.86	.000	[9]
Attacked someone	1.04	1.05	1.03	1.03	1.00	1.11	1.16	1.08	1.26	1.06	2.17	.028	-----
been paid for sex	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.166	.995	-----
Had sexual intercourse	1.29	1.64	1.41	1.45	1.86	2.14	2.09	2.91	3.65	1.72	4.81	.000	[9]
Gang fights	1.12	1.14	1.15	1.16	1.19	1.18	1.41	1.17	1.32	1.17	1.16	.323	-----
Sold marijuana	1.00	1.00	1.03	1.05	1.00	1.18	1.91	1.50	3.26	1.24	32.09	.000	[9]
Hit teacher	1.07	1.10	1.10	1.02	1.00	1.18	1.19	1.14	1.17	1.09	1.35	.215	-----
Hit parent	1.04	1.06	1.03	1.08	1.05	1.11	1.06	1.06	1.26	1.06	2.99	.003	[9]
Hit students	1.72	1.83	1.67	1.76	1.57	2.04	2.00	1.83	2.53	1.81	1.81	.073	-----
Been loud, rowdy	1.51	1.45	1.70	1.85	2.05	1.93	2.53	2.44	2.45	1.78	5.25	.000	[7,9,8,5,6,4,3]
Sold hard drugs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.32	1.02	4.55	.000	[9]
Take vehicle	1.03	1.03	1.03	1.11	1.10	1.07	1.06	1.11	1.48	1.08	6.45	.000	[9]
Sexual assault	1.00	1.00	1.00	1.00	1.00	1.06	1.03	1.06	1.03	1.01	1.68	.102	-----
Used force on students	1.02	1.13	1.06	1.06	1.05	1.00	1.31	1.00	1.03	1.06	1.94	.053	-----
Used force on teachers	1.00	1.02	1.00	1.00	1.00	1.00	1.09	1.00	1.00	1.01	1.80	.074	[7,2,9,8,6,5,4,3]
Used force on others	1.01	1.00	1.03	1.02	1.00	1.00	1.25	1.06	1.00	1.03	2.06	.038	[7,8,3,4,1,9,6,5]
Stolen \$5-50.00	1.03	1.09	1.12	1.11	1.00	1.04	1.19	1.11	1.71	1.10	8.07	.000	[9]
Stolen things at school	1.06	1.11	1.09	1.16	1.05	1.04	1.19	1.20	1.23	1.11	1.90	.057	-----
Broken into a bldg.	1.03	1.08	1.09	1.08	1.05	1.07	1.09	1.03	1.78	1.09	7.25	.000	[9]
Begged for money	1.01	1.05	1.03	1.02	1.00	1.00	1.03	1.00	1.26	1.03	2.62	.008	[9]

Table 24

## One-Way ANOVA Tables for Drug Type Classification Against Delinquent Behavior Scales

Variables	Drug Type Class									Total	F Ratio	Probability	Student-Newman-Keuls Procedure
	1	2	3	4	5	6	7	8	9				
Interpersonal violence	9.86	10.64	10.06	10.73	10.67	11.14	11.59	10.83	11.19	10.41	2.95	.003	[7,9,6,8,4,5,2,3]
Sexual assault	7.78	8.39	8.00	7.80	8.05	7.39	7.16	7.96	7.68	7.83	1.13	.342	[5,3,8,4,1,9,6,7]
Felony assault	3.17	3.19	3.18	3.19	3.19	3.32	3.59	3.31	3.61	3.24	2.45	.013	[9,7,6,8,4,5,2,3]
Minor assault	3.82	3.98	3.79	3.85	3.62	4.32	4.25	4.03	4.97	3.97	2.59	.009	[9,6,7,8]
Robbery	3.04	3.14	3.09	3.08	3.05	3.00	3.66	3.06	3.03	3.09	2.88	.004	[7]
Felony theft	4.08	4.31	4.15	4.24	4.14	4.29	4.50	4.22	5.94	4.29	8.17	.000	[9]
Minor theft	3.27	3.45	3.48	3.42	3.67	3.43	3.75	3.94	5.42	3.54	10.73	.00	[9]
Illegal services	3.00	3.00	3.03	3.05	3.00	3.18	3.91	3.53	5.58	3.26	28.69	.000	[9]
Illicit drug use	5.00	5.02	5.03	5.00	5.00	5.25	5.19	5.28	10.00	5.34	89.46	.000	[9]
Crimes vs. persons	10.03	10.32	10.06	10.13	9.86	10.64	11.50	10.40	11.63	10.30	3.23	.001	-----
General theft	7.35	7.77	7.64	7.66	7.81	7.71	8.25	8.17	11.35	7.83	12.05	.000	[9]
Index crimes	9.23	9.60	9.36	9.40	9.29	9.39	10.38	9.43	10.90	9.49	5.27	.000	[9,7]
General delinquency	27.47	28.73	28.09	28.79	29.95	31.82	38.09	37.26	45.63	30.45	40.29	.000	[9]
Attitudes toward delinquency	31.20	30.55	30.79	29.60	27.19	27.32	26.75	26.83	24.12	29.58	20.36	.000	[1,3,2]
Exposure to delinquent peers	15.52	17.35	17.58	18.15	19.80	21.52	23.29	24.14	26.55	18.44	29.61	.000	[9,8]

Family Relationships. Table 25 indicates that the family relationships of the high drug using groups are profoundly different from the family relationships of the low use groups. Virtually all of these relationships are statistically significant. The table indicates that the high drug using groups--groups 6, 7, 8, and 9--tend to experience higher levels of family normlessness, isolation in the family, labeling as bad, labeling as sick, and higher levels of general negative parental labeling. They also have lower scores for the importance of family aspirations and for feelings of current success in family aspirations. They participate to a lower extent in family activities. There are occasional anomalies in these findings, however. For example, perceived parental disapproval for delinquency, is found to have a significant relationship to the drug classification system. However, cluster 8 is included among the set of classes in which high perceived disapproval is found. Yet, this cluster is one of the high drug using clusters.

Peer Relationships. The high drug using groups experience higher levels of normlessness. They also experience significantly higher levels of peer labeling as sick and bad, and greater amounts of general negative labeling by friends. Exposure to delinquent peers and commitment to delinquent peers are also significantly higher for all of the high drug using types. Basically, the types referred to as high drug using types are those numbered 6, 7, 8, and 9.

School Relationships. A large number of significant associations also exist between the drug using types and educational variables. Table 25 indicates that the high drug using types are characterized by normlessness in school, low academic aspirations (importance), and low feelings of current

Table 25

One-Way ANOVA Tables for Drug Type Classification Against Family, Peer and School Relations

VARIABLE	Drug Type Class									Total	F-Ratio	Probability	Student-Newman-Keuls Procedure
	1	2	3	4	5	6	7	8	9				
Family aspirations-importance	22.86	21.06	22.39	22.32	20.71	22.36	20.94	22.83	20.16	22.17	4.87	.000	[1,8,3,6,4,2,7,5]
Family aspirations-current success	19.27	17.73	19.66	18.02	17.33	18.61	17.97	17.88	16.66	18.53	2.91	.004	-----
Peer aspirations-importance	13.51	12.46	14.61	13.65	13.62	15.14	13.73	15.89	14.32	13.78	3.75	.000	[8,6,3,9,7,4,5]
Peer aspirations-current success	13.60	12.86	14.93	14.24	15.00	14.76	15.14	15.15	15.31	14.08	4.28	.000	[9,8,7,5,3,6,4,1]
Academic aspirations-importance	20.61	18.33	20.94	20.15	19.19	18.85	17.38	19.11	17.00	19.66	6.62	.000	[3,1,4,5,8,6]
Academic aspirations-current success	17.30	15.76	18.56	17.30	18.11	16.31	16.69	15.19	17.09	16.99	3.09	.002	[3,5,1,4,9,7,6]
Friend role involvement	8.06	9.10	7.52	7.68	7.78	10.39	10.24	9.68	10.82	8.62	6.36	.000	[9,6,7,8,2]
School academic involvement	7.42	5.93	8.03	6.61	5.67	5.62	5.88	6.03	4.64	6.70	5.29	.000	[3,1,4,8,2,7,5,6]
School athletics involvement	6.31	7.16	7.22	7.72	8.78	6.79	8.08	7.93	6.15	6.97	2.05	.042	-----
School activities involvement	4.77	5.17	4.83	3.73	4.20	6.00	4.11	4.46	3.71	4.59	1.07	.385	-----
Community activity involvement	5.38	5.78	6.13	5.29	3.20	4.78	6.20	4.75	4.14	5.30	1.33	.231	-----
Family activity involvement	10.64	9.63	9.18	10.29	8.29	8.75	8.44	9.17	6.65	9.73	6.65	.000	[1,4,2,3,8,6,7,5]
Future family aspirations	6.95	6.28	6.67	6.55	7.52	7.14	6.56	6.89	6.47	6.78	.914	.504	-----
Social isolation-family	9.50	10.97	10.03	10.02	11.01	9.50	10.28	10.11	10.87	10.00	2.37	.016	-----
Social isolation-peer	10.44	11.69	10.09	10.42	10.57	9.43	10.72	9.22	10.00	10.43	3.55	.000	[2,7,5,1,4,3,9]
Social isolation-school	10.54	12.00	10.09	10.85	11.00	10.15	11.31	11.00	11.39	10.85	2.44	.013	[2,9,7,8,5,4,1,6]
Normlessness-family	8.28	9.18	8.88	8.97	8.95	9.96	10.69	10.03	11.03	9.04	9.15	.000	[9,7,8,6]
Normlessness-peer	8.28	9.06	8.33	9.02	8.43	8.89	9.44	9.00	9.55	8.69	2.82	.005	-----
Normlessness-school	10.79	11.44	10.43	11.43	11.50	12.86	13.22	13.08	13.26	11.50	8.31	.000	[9,7,8,6,5]
General labeling-parents	24.61	27.86	23.82	25.13	25.48	25.64	27.00	27.47	30.42	25.78	6.11	.000	[9,2,8,7]
General labeling-friends	22.43	24.56	21.76	22.69	23.86	24.07	25.03	25.71	27.42	23.48	7.11	.000	[9,8,7,2,6,5]
General labeling-teachers	24.66	27.30	23.68	24.76	24.81	26.38	27.72	28.26	30.53	25.77	7.29	.000	[9,8,7]
Conforming labeling-parents	16.23	15.57	16.73	16.24	16.43	16.39	16.00	16.53	15.81	16.18	1.92	.055	-----
Bad labeling-parents	7.84	9.16	7.58	8.15	9.29	9.14	9.78	9.92	11.29	8.60	10.37	.000	[9,8,7]
Sick labeling-parents	9.02	10.33	8.97	9.23	8.62	8.89	9.21	10.08	10.94	9.37	3.43	.000	-----
Conforming labeling-friends	11.91	11.79	12.12	11.97	12.05	11.71	11.72	12.06	12.29	11.93	.766	.633	-----

Table 25 (Continued)

VARIABLE	Drug Type Class									Total	F-Ratio	Probability	Student-Newman-Keuls Procedure
	1	2	3	4	5	6	7	8	9				
Bad labeling-friends	7.97	9.19	7.70	8.16	9.43	9.54	9.97	10.56	11.71	8.77	12.49	.000	[9,8]
Sick labeling-friends	8.36	9.14	8.18	8.50	8.48	8.25	8.78	9.22	10.00	8.64	2.79	.005	[9,8,2,7,4,5,1,6]
Conforming labeling-teachers	15.82	15.16	16.20	15.79	15.95	15.27	14.84	15.49	15.50	15.64	2.68	.007	[3,5,1,4,9,8,6,2]
Bad labeling-teachers	8.00	9.08	7.79	7.98	8.33	9.12	9.97	10.26	11.53	8.65	11.11	.000	[9]
Sick labeling-teachers	8.48	9.37	8.09	8.56	8.43	8.54	8.59	9.49	10.50	8.76	4.06	.000	[9,8,2]
Perceived disapproval-parents-delinquent behavior	41.43	40.17	40.58	40.76	39.76	40.36	38.97	40.81	38.23	40.65	5.38	.000	[1,8,4,3,6,2,5]
Perceived disapproval-parents-pro-social behavior	9.29	9.94	9.15	9.48	9.95	9.04	9.94	8.56	10.29	9.44	2.32	.019	[9,5,7,2,4,1,3,6]
Perceived disapproval-friends-delinquent behavior	36.06	33.38	35.27	34.61	33.81	31.96	30.44	30.08	28.58	34.04	17.31	.000	[1,3,4,5]
Perceived disapproval-friends-pro-social behavior	10.99	11.63	10.42	11.26	11.05	11.11	12.03	11.17	12.03	11.21	2.01	.043	-----
Counterlabeling-mother	12.80	12.03	12.97	13.18	11.46	12.86	12.61	12.75	12.16	12.66	1.57	.131	-----
Counterlabeling-father	12.41	11.44	12.29	12.86	11.48	11.16	13.03	11.82	10.68	12.14	3.02	.003	[7,4,1,3,8,5,2,6]
Counterlabeling-friends	12.43	11.56	13.03	12.55	12.40	13.29	12.81	13.72	13.10	12.57	3.25	.001	[8,6,9,3,7,4,1,5]
Commitment to delinquent peers	3.97	4.60	3.91	4.29	4.20	4.84	4.94	5.51	5.55	4.39	10.38	.000	[9,8,7,6]

success regarding academic aspirations. These types also have low involvement in school academic and athletic interests, and they experience higher levels of general negative labeling and labeling as bad and sick than do the non-drug using types.



## CONCLUSIONS

The work of the present volume empirically supports and demonstrates the major conclusion that drug consumption, in general, is characterized by multiple rather than single use of drugs. Of the youth who consume drugs the vast majority use more than one drug. A second conclusion is that the patterns of drug use are fairly complex. For example, some youth types illustrate the regular use of two drugs coupled with the experimental or intermittent use of perhaps two or three other drugs. A third conclusion is that, aside from the highly complex types involved in multiple illicit drug use, the majority of drug use patterns are highly stable across time.

In comparing the type-profiles across the years 1977 and 1978, the profiles showed remarkable "sameness". In regard to the change analysis the data indicate that different youth may have different starting points, change patterns, and ending points. We have discovered and described, by means of exploratory multivariate analyses, all of the most prevalent kinds of drug styles of consumption and change patterns for the years 1976, 1977, and 1978.

The exercise of validating the drug classification system points to a further conclusion. This is the very strong relation between the drug classification and delinquent behavior. The high drug using groups of the integrated classification consistently show high levels of delinquent behavior across virtually all of the separate kinds of delinquent acts. We will utilize these findings more extensively when we examine the specific dynamics of the relationship between drugs and delinquency in a later volume.

References

- Anderberg, M.R.  
1973 Cluster analysis for applications. New York: Academic Press.
- Bailey, K.D.  
1973a "Monothetic and polythetic typologies and their relation to conceptualization, measurement and scaling." American Sociological Review, 38; 18-23.
- Bailey, K.D.  
1973b "Constructing monothetic and polythetic typologies by the heuristic method." Sociological Quarterly, 14; 291-308.
- Bailey, K.D.  
1975 "Cluster analysis." In D.R. Heise (ed.), Sociological methodology. San Francisco: Jossey-Bass.
- Brennan, T.  
1979 Patterns of multiple drug use in a national adolescent sample: a multivariate approach. National Youth Survey Project Report No. 6. Boulder, CO: Behavioral Research Institute.
- Cattell, R.R.  
1965 "Factor analysis: an introduction to essentials, II: the role of factor analysis in research." Biometrics, 2; 405-435.
- Elliott, D.S., S.S. Ageton, and R.J. Canter  
1979 "An integrated theoretical perspective on delinquent behavior." Journal of Research in Crime and Delinquency, 16(1); 3-27.
- Elliott, D.S., B.A. Knowles, and R.J. Canter  
1981 The epidemiology of delinquent behavior and drug use: 1976-1978. National Youth Survey Project Report No. 14. Boulder, CO: Behavioral Research Institute.
- Everitt, R.  
1974 Cluster Analysis. New York: Halsted Press.
- Goode, E.  
1969 Marijuana. New York: Atherton Press.
- Goode, E.  
1974 "Marijuana use and the progression to dangerous drugs." In L.L. Miller (ed.), Marijuana: effects on human behavior. New York: Academic.
- Hartigan, J.A.  
1975 Clustering algorithms. New York: John Wiley & Sons.

References, continued

- Jessor, R. and S.L. Jessor  
1977 Problem behavior and psychosocial development: a longitudinal study of youth. New York: Academic.
- Johnson, L.D.  
1973 Drugs and american youth. Ann Arbor, MI: Institute for Social Research.
- Josephson, E.  
1977 "Surveys of special populations." The epidemiologies of drug abuse, current issues. Research Monograph Series 10, NIDA.
- Kandel, D.B.  
1975 "Stages in adolescent involvement in drug use." Science, 190; 912-914.
- McRae, D.J.  
1973 "Clustering multivariate observations." Doctoral dissertation. University of North Carolina: Chapel Hill.
- National Commission on Marijuana and Drug Abuse  
1972 Marijuana: A signal of misunderstanding. New York: Signet.
- Tryon, R.C. and D.E. Bailey  
1970 Cluster analysis. New York: McGraw-Hill.
- Wishart, D.  
1969 "Numerical classification method for deriving natural classes." Nature, 221; 97-98.

Appendix A

1. Problem Behavior Items and Response Sets
2. National Youth Survey Measures

Problem Behavior Items and Response Sets

IF RESPONDENT HAS PREVIOUSLY INDICATED THAT HE/SHE DOES NOT USE ALCOHOL OR DRUGS, SKIP TO QUESTION 322. ASK QUESTIONS ONLY WITH RESPECT TO SUBSTANCE(S) USED.

Now I am going to ask you some questions about your use of alcohol and drugs and the effects it may have on your relations with your family and friends. Remember that your answers will be held strictly confidential and will not be revealed to anyone. Look at the responses on the tan card and select the one which best describes how often you have been involved in each behavior.

	<u>Never</u>	<u>Once or Twice</u>	<u>Three or Four Times</u>	<u>Five or Six Times</u>	<u>More than Six Times</u>	
How many times in the last year have you gotten into trouble with your girlfriend/boyfriend because of your drinking/use of drugs?						
301.	Drinking:	1	2	3	4	5
302.	Use of Drugs:	1	2	3	4	5
How many times in the last year have you had problems with your family because of drinking/drug use?						
303.	Drinking:	1	2	3	4	5
304.	Use of Drugs:	1	2	3	4	5
How many times in the last year have you gotten into trouble with your friends because of your drinking/drug use?						
305.	Drinking:	1	2	3	4	5
306.	Use of Drugs:	1	2	3	4	5
How many times in the last year have you gotten into trouble with your teachers or principal because of your drinking/drug use?						
307.	Drinking:	1	2	3	4	5
308.	Use of Drugs:	1	2	3	4	5
How many times in the last year have you gotten into physical fights because of your drinking/drug use?						
309.	Drinking:	1	2	3	4	5
310.	Use of Drugs:	1	2	3	4	5

Problem Behavior Items and Response Sets, continued

		<u>Never</u>	<u>Once or Twice</u>	<u>Three or Four Times</u>	<u>Five or Six Times</u>	<u>More than Six Times</u>
	How often in the last year has your use of alcohol/ drugs caused problems with your physical health?					
311.	Alcohol:	1	2	3	4	5
312.	Drugs:	1	2	3	4	5

Now I have just a few other questions about your use of alcohol and drugs.

Have you ever found that you couldn't remember what had happened to you because of your drinking/drug use?

		<u>Yes</u>	<u>No</u>
313.	Drinking:	2	1
314.	Drugs:	2	1

Have you ever stayed drunk or high on drugs for more than a day at a time?

		<u>Yes</u>	<u>No</u>
315.	Drunk	2	1
316.	Drugs:	2	1

Have you ever wanted to stop drinking/using drugs and found you couldn't?

		<u>Yes</u>	<u>No</u>
317.	Alcohol:	2	1
318.	Drugs:	2	1

319. During the last year, have you been arrested for any alcohol or drug related offenses?

	<u>Yes</u>	<u>No</u>
	2	1

If Yes: How many times for (READ LIST):

- Intoxication \_\_\_\_\_
- Driving under the influence of alcohol or drugs \_\_\_\_\_
- Possession of alcohol \_\_\_\_\_
- Possession of drugs \_\_\_\_\_
- Sale (or possession for sale) of drugs \_\_\_\_\_
- Other (Specify) \_\_\_\_\_

320. How many times in the last year have you gotten drunk or pretty high on alcohol? \_\_\_\_\_

321. How many times in the last year have you gotten high on drugs? \_\_\_\_\_

Now I'd like to know how many times each of the following things have happened to you in the last year, from the Christmas a year ago to the Christmas just past.

How many times in the Last Year:

322. has something been taken directly from you (or an attempt to do so) by force or by threatening to hurt you? \_\_\_\_\_

328 have you been sexually attacked, or raped (or an attempt to do so)? \_\_\_\_\_

### National Youth Survey Measures

The conceptual paradigm for this study is described in detail in "An Integrated Theoretical Perspective on Delinquent Behavior," Elliott et al., *Journal of Research on Crime and Delinquency*, 16 (1): 3-27, January 1979. It involves an integration of traditional control theory and anomie theory and postulates that delinquency and drug use are both the result of poorly developed or attenuated bonds to conventional norms, groups and institutions. There are four major classes of variables specified in the conceptual paradigm: 1) social integration, 2) personal commitment, 3) exposure to deviant learning and performance structures (e.g., deviant groups) and 4) delinquent behavior and drug use.

#### 1. Social Integration

In general, social integration is operationalized in terms of 1) the occupancy of conventional social roles, 2) the significance of these roles to the actor, i.e., their perceived importance and influence, 3) the time committed to each role, and 4) the presence/absence of sanctioning networks in these role relationships. Each of these variables is measured in the three major social contexts which influence adolescents - the home, school and peer networks. In some instances, the work context and community context are also considered, and as the youth become older, these contexts will become more significant and new items/scales will be developed and included as social integration measures.

For each of the relevant social contexts identified, a measure of whether the respondent occupies the implied role, a judgment about the importance of that role or relationship, a judgment about how influential that role or relationship has been for him/her and how much time is spent in that role

(involvement) is included. The success scales measure the respondent's perception of how well s/he is doing in that role, i.e., the perceived evaluation by others of his/her role performance. The reliabilities are not high for these scales, but appear adequate given the small number of items involved (Alpha is scale length dependent). The homogeneity of these scales looks good.

The presence and operation of sanctioning networks are measured with perceived labeling, counterlabeling, and perceived sanctioning scales. Labeling scales used here were developed initially by Klein, et al. (1978). This measure is a perceived measure of labeling from several relevant others. The respondent makes judgments about how these significant others view him/her on an adjective checklist. Utilizing a cluster analysis, Klein identified three dimensions for the total scale: a positive conforming dimension, a bad dimension and a sick dimension. Except for the conforming sub-scale, these sub-scales have adequate reliabilities and homogeneities. Across all reference groups, the conforming sub-scale has marginal reliabilities. The subscales involve only four items, however, and total scale reliabilities look good.

The perceived counter labeling scales were developed by BRI and constitute a measure of perceived positive sanctions and support by parents and peers, under conditions where others are attempting to apply negative labels. Earlier research with this measure suggested a differential impact of counterlabeling from mothers and fathers (perceived father counterlabeling was negatively correlated with perceived negative labeling from others whereas, perceived mother counterlabeling was not correlated with negative labeling by others). For this reason, this distinction was maintained in these scales.



The reliabilities for these scales are lower than we would like, but given the small number of items, we consider them adequate. The homogeneity looks good.

The two perceived sanctioning scales present a list of deviant and pro-social behaviors and ask for respondents to indicate the amount of approval or disapproval they would expect from parents and peers for involvement in each behavior. This measure is similar to one utilized by Jessor et al. (1968). The Perceived Sanctions for Deviance scale has good redundant ( $HR = .50$ ). The pro-social scales have relatively low reliabilities, although the homogeneities are good.

## 2. Personal Commitment

Hirschi (1969) notes that high aspirations reflect a personal stake in conventional lines of action, and are therefore a source of bonding. The three aspiration scales attempt to assess the degree of importance the respondent places on a number of potential aspirations or goals in his relationships with parents and family, peers, and at school. In addition, single items measure future educational, occupational and family aspirations (two items). Again the scales have relatively low, but adequate, reliabilities (given scale lengths) and good homogeneity ratios.

To establish the moral commitment or alienation from the social order, we have included two measures of alienation. The normlessness measure was developed by BRI in prior research work and is designed to measure the extent to which the respondent believes that socially unapproved behaviors are required to achieve socially valued goals. This form of alienation was postulated to characterize one of the major paths to delinquency in our theoretical paradigm. In earlier work with delinquent populations we found higher reliabilities ( $A = .75$ ) with this measure and were disappointed that

the reliabilities were not higher on our first data wave. The variable is critical to the test of the model and while the reliabilities are relatively low, we feel that Alpha's above .65 are adequate when four or five items are involved. Homogeneity ratios are satisfactory.

The social isolation measures are an expanded version of the nine-item scale developed by McClosky and Schaar (1963). These scales are intended to measure the sense of belonging and personal attachment to family, peers, and school. Reliabilities are again low, but adequate. Homogeneity ratios are in the satisfactory range.

We had anticipated including a measure of powerlessness. However, pretest results as well as the results of other research indicate no association between powerlessness (or internal/external control) and delinquency (Elliott, et al., 1975; Jessor et al., 1968) so we dropped this scale due to space and time restrictions.

The final commitment measure involves an Attitudes Towards Deviance scale, modeled after that developed by Jessor et al., 1968. This scale reflects the degree of tolerance or intolerance the respondent feels for specific acts of deviance, i.e., the internalization of judgments about right and wrong behavior. The scale has good scale characteristics.

### 3. Delinquent Learning and Performance Structures

Two general variables are included under this general heading - a set of three items indicating the degree of personal commitment of attachment to peers under conditions of deviant group behavior, and a measure of exposure to delinquent peers. Because of the small number of items we have not attempted to scale the first set of items. The exposure scale involves 10 items and has

good scale properties. For this scale, the respondent is asked to indicate how many of his friends are involved in a series of delinquent acts.

#### 4. Behavior

The SRD measure employed in this study has been described elsewhere (Elliott et al., 1981) and will be described here only briefly. The total SRD measure includes 47 items (7 of which reflect drug use). Interspersed among the delinquent items are five pro-social items to help break up the response set and the negative cast to this section of the interview.

In constructing the SRD measure, we attempted to obtain a representative set of offenses. Given our plan to compare SRD and UCR estimates, we began by listing offenses included in the UCR. Any specific act which involved more than one percent of the reported juvenile arrests for 1972 - 1974 (with the exception of traffic violations) was included in the SRD measure. We believe the resulting set of 47 items to be both more comprehensive and representative of the conceptual universe of delinquent acts than those found in prior SRD measures utilized in major, large scale studies. The item set includes all but one of the UCR Part I offenses (homicide is excluded), 60 percent of Part II offenses and a wide range of "Other" offenses which include delinquent lifestyle, misdemeanors, and some status offenses. The vast majority of items involve a violation of criminal statutes.

A listing of the scales with reliabilities (Alpha's) and homogeneity ratios (HR) as established for the 1977 survey are listed below.

<u>Social Integration</u>	<u>Items</u>	<u>Reliabilities</u>	<u>HR</u>
Involvement with Friends	3	-	-
Involvement at School	3	-	-
Involvement with Athletics	3	-	-
Involvement with Activities	3	-	-
Community Involvement	3	-	-
Family Involvement	3	-	-
Family Success	5	.72	.34
School Success	5	.71	.30
Peer Success	4	.69	.30
Labeling by Parents - General	12	.81	.27
Labeling by Parents - Conforming	4	.64	.31
Labeling by Parents - Sick	4	.67	.33
Labeling by Parents - Bad	4	.77	.48
Labeling by Peers - General	11	.80	.25
Labeling by Peers - Conforming	3	.55	.29
Labeling by Peers - Sick	4	.70	.36
Labeling by Peers - Bad	4	.82	.52
Labeling by Teachers - General	12	.84	.32
Labeling by Teachers - Conforming	4	.66	.28
Labeling by Teachers - Sick	4	.72	.41
Labeling by Teachers - Bad	4	.85	.58
Counter Labeling - Mother	4	.67	.30
Counter Labeling - Father	4	.72	.37
Counter Labeling - Peers	4	.65	.29
Perceived Sanctions - Parents	9	.84	.36
Perceived Sanctions - Peers	9	.90	.50
<u>Personal Commitment</u>			
Aspirations - Family	5	.70	.30
Aspirations - School	5	.70	.30
Aspirations - Peers	4	.63	.29
Social Isolation - Family	5	.72	.38
Social Isolation - School	5	.65	.22
Social Isolation - Peers	5	.64	.28
Normlessness - Family	4	.64	.31
Normlessness - School	5	.66	.26
Normlessness - Peers	4	.66	.29
Attitudes Towards Deviance	9	.84	.41
<u>Delinquency Learning and Performance Structures</u>			
Commitment to Delinquent Peers	3	-	-
Exposure to Delinquent Peers	10	.82	.38
<u>Behavior</u>			
Self Reported Delinquency	47	.91	.24
Drug Use	7	-	-
Victimization	9	-	-

One-Way ANOVA Tables for Drug Type Classification against Variables Indicating Exposure or Encouragement to Drink or Take Drugs

Variable	Drug Type Class									Total	F-Ratio	Probability	Student-Newman-Keuls Procedure
	1	2	3	4	5	6	7	8	9				
Friends suggest drinking	1.60	2.10	2.10	2.22	3.30	2.92	2.97	2.89	3.26	2.18	29.34	.000	[5,9,7,6,8]
Close friends pressure to drink	1.11	1.38	1.27	1.24	1.50	1.38	1.35	1.26	1.13	1.22	2.80	.005	-----
Friends suggest get drunk	1.22	1.75	1.42	1.31	1.40	1.77	1.32	1.37	1.58	1.38	4.36	.000	[6,2,9,3,5,8,7,4]
Friends offer marijuana	1.25	1.64	1.33	1.42	2.25	2.38	3.10	2.94	3.32	1.78	60.66	.000	[9,7,8]
Friends suggest have to get high for good time	1.14	1.38	1.21	1.19	1.20	1.62	1.35	1.37	1.81	1.28	5.16	.000	[9,6]
Close friends pressure to use drugs	1.04	1.17	1.10	1.14	1.15	1.27	1.35	1.20	1.03	1.12	2.72	.006	-----
Parents used alcohol	2.29	2.48	2.70	2.23	2.86	2.36	2.59	2.50	2.63	2.41	2.02	.043	-----
Parents gotten drunk	1.56	1.78	1.58	1.53	1.57	1.54	1.75	1.64	2.10	1.63	1.85	.066	-----
Parents used marijuana	1.03	1.02	1.00	1.02	1.00	1.00	1.22	1.06	1.23	1.05	3.75	.000	[9,7,8,1,4,2,6,5]
Parents used tranquilizers	1.34	1.66	1.21	1.27	1.67	1.64	1.48	1.44	1.68	1.42	2.90	.004	-----