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Adolescent Drug Abuse:

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ITMENT OF HEALTH AND HUMAN SERVICES
Alcohol, Drug Abuse, and Mental Health Administration

Adolescent Drug Abuse: Analyses of Treatment Research

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Adolescent Drug Abuse: Analyses of Treatment Research

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Treatment Services for Adolescent Drug Abusers: Introduction and Overview

Elizabeth R. Rahdert

The annual High School Senior Survey conducted by the University of Michigan's Institute for Social Research reported that the number of senior high school students who used cocaine, as well as most other drugs, remained exceptionally high during 1985 (Johnston et al. 1986). And these estimates of late adolescent drug use would be even greater had the high-risk, difficult-to-sample high school dropouts been surveyed. Unfortunately, the 1987 results from the ongoing study indicate only a modest improvement over the 1985 figures (Johnston 1988). While the 1987 data suggest only a slight, albeit statistically significant, decline in the use of cocaine, marijuana, stimulants, and sedatives, there appears to be little to no change in the student use of inhalants, LSD, heroin, or other opiates. In addition, the most recent figures show that 4 in every 10 students surveyed said they tried one or more illicit drugs at least once during the last 12 months. And nearly 5 percent of those questioned said that during the past month they had used one or more illicit drugs on a daily basis, some of which were potentially toxic and highly addictive.

These patterns of exposure to one or more potent psychoactive agents indicate that many teenagers are far past the experimental phase of illicit drug use, and provide a basis for predicting that a clinically significant number will or already do suffer serious physical, mental, and/or social effects after a relatively short period of abusing drugs. And this prediction, in turn, suggests that different types of therapeutic interventions will be necessary to treat these more severely affected youth.

The first addiction facilities, designed to treat the adult male alcoholic, admitted only a small fraction of the older, addicted adolescents. Few of these programs made any adjustment to accommodate even the most obvious developmental differences

evident in young drug-dependent clients. In any case, as the numbers of drug-involved teenagers from the middle and upper socioeconomic levels rose, so too did the number of treatment facilities created solely to address the adolescents' age-related problems. Often these newly established programs advertised a broad range of therapeutic services, including different combinations of and variations on drug education, family-based therapy, parent training, peer group counseling, individual psychotherapy, and/or social skills training, with psychiatrically oriented facilities at times offering medication as a therapeutic option. What each program appeared to share was the common belief that it was the appropriate place for any and all adolescent clients. Few referred to other available programs, on a timely basis, those teenagers they should not or could not treat.

Such all-inclusive admission policies reflect the fact that there often is insufficient staff time, budgetary support, or perhaps even administrative inclination, to critically self-evaluate each service alone and on an interactive basis, to determine which young clients they could and could not effectively treat. So too these policies indicate the paucity of scientific evidence to support specific optimal therapeutic combinations for treating diagnostically different types of chemically dependent youth. The current need for adolescent drug abuse treatment research is apparent. As with most clinical research, designing and conducting the necessary controlled clinical studies represents a difficult, but challenging, task.

The contributors to this monograph have presented an overview of adolescent treatment research with the dual aims of targeting the specific difficulties associated with adolescent clinical studies and providing a critical review of what has already been learned about each step in the treatment process: 1) the initial screening of high risk teenage populations in order to single out the affected youth; 2) the diagnostic procedure for identifying specific impaired or dysfunctional areas; 3) the selection of the most appropriate treatment facility and/or program for the individual adolescent, with choice of treatment based on the results of a diagnostic assessment; 4) the delivery of specific types of treatment such as family-based therapy or pharmacotherapy; and 5) the establishment of aftercare programs designed for school-age youth. It is evident from each review that the field of adolescent treatment research shares a significant number of design problems common to any study involving human subjects, young or old. In addition, many practical issues are identified that appear unique to studies involving youth rather than adults.

What is most timely is the emphasis placed on the need to reliably and cost efficiently examine the positive as well as negative effects of therapeutic programs already in operation. Concurrently, more creative effort should be channeled toward developing new and innovative techniques to meet the treatment needs so apparent in the results of our national adolescent surveys.

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Assessing Adolescents Who Abuse Chemicals: The Chemical Dependency Adolescent Assessment Project

Ken C. Winters and George Henly

INTRODUCTION

There are opportunities and challenges in the treatment of adolescent chemical dependency. Survey data continue to indicate that American teenagers are using alcohol and drugs at an uncomfortably high rate (Johnston et al. 1984). More adolescents are being served by a greater number of chemical dependency treatment programs than at any time before. At the same time, society as a whole is both becoming more interested in chemical abuse problems and their treatment and calling for more accountability by those service providers.

Increased awareness of the problem has affected identification and treatment of adolescent chemical dependency. Those who abuse alcohol or drugs are being identified at earlier stages of involvement by a wide range of professionals and agencies, which include school teachers and administrators, officials in the juvenile justice system, and a wide array of therapists and counselors with varying degrees of clinical training. Earlier detection by diverse professionals may be a positive step for the adolescent user and the family. There exists the potential that abusers can be identified before severe problems develop, and identification may occur in settings that may encourage the individual to seek help. Yet this trend, in some respects, poses a strain on the treatment field. Increasingly, service providers are being asked to make objective decisions about diagnosis, need for treatment, and referral for adolescents whose problem configurations are either different or less well developed than those of adolescents treated in the past.

CHALLENGE FOR ADOLESCENT ASSESSMENT

The traditional concepts of the nature of chemical dependency are largely based on an adult model. When considering the case of what Jellinek (1960) would classify as a gamma alcoholic (e.g., a 45-year-old individual with a long history of problems resulting from excessive use of alcohol), it does not require a great deal

of sophistication to make a diagnosis of chemical dependency. There is not likely to be much disagreement among professionals about this diagnosis. Similarly, when an adolescent presents many of the hallmark symptoms of adult chemical dependency, it is unlikely that assigning a diagnosis of chemical dependency to this individual would prove controversial.

Professionals may become increasingly uncomfortable, however, about making diagnostic and treatment decisions as adolescent clients bear less and less resemblance to chemically dependent adults. They may be reluctant to tell those adolescents that they have a chronic, progressive disease for which lifelong abstinence is the only treatment route.

Much of this discomfort in assessing and diagnosing the problems of adolescents in the early stages of involvement with chemicals is warranted. Studies of general population samples indicate that, as in the past, substantial proportions of adolescent chemical abusers mature out of their problem use patterns without exposure to formal intervention or treatment. A recent study in Madison, WI, found that only about half of a sample of adolescents identified as alcohol abusers could still be so classified when assessed 6 months later (Moberg 1983). Data from more extended longitudinal research also indicate the transitory nature of adolescent chemical misuse (Jessor 1982). Although it is not known whether remitted abusers will resume a pattern of misuse later in life, data from the existing followup studies are provocative.

Another outcome of the increasing detection and treatment of youth chemical abuse is that insurers and other third-party payment organizations are facing mounting costs. Their reaction has been to require treatment organizations to further document and better justify the need for treatment. Consequently, and appropriately, treatment programs must develop assessment procedures that are more objective and reliable. They are also confronted with the situation of making diagnostic decisions based on criteria often formulated by those outside the field.

These strains on the assessment process are further compounded by the growing attractiveness of chemical dependency treatment and the reduced diagnostic stigma attached to the chemical dependency label. Adolescents or their parents may seek a diagnosis of chemical dependency in situations where chemical abuse may not be the primary difficulty. Parents would prefer to believe that their child is chemically dependent, rather than mentally disturbed, delinquent, or living in a chaotic family. The problem configurations of such clients may be so complex that it is difficult to pinpoint the central target problem or problems. The need to sort out target problems and make appropriate referral decisions will increase as adolescent chemical dependency treatment facilities become the programs of first resort rather than of last resort.

The development of increasingly diverse treatment programs along the health care continuum increases the demands made upon assessment procedures. The luxury rarely exists today of simply deciding whether or not the adolescent's problems are sufficiently severe to warrant placement in the one and only available treatment facility. Assessment procedures must become increasingly detailed and multifaceted, if they are to permit matching the client to an optimal treatment plan, as the trend moves toward developing a variety of treatment levels and modalities from which to choose.

The developments and issues described above pose major challenges for adolescent assessment. Four of these challenges are identified below.

First, there is a need for increased objectivity of client assessment. At the present time, assessment practices in the field rely heavily on clinical judgment. In a recent survey of adolescent chemical dependency programs (Owen and Nyberg 1983), the majority of respondents indicated that their assessment procedures are informal and typically based on in-house and relatively idiosyncratic questionnaires. As a result, it is problematic when different programs wish to communicate about the nature of their respective clientele, or when researchers hope to utilize assessment information from a variety of facilities for research purposes. This state of affairs is not necessarily the result of the treatment community's unwillingness to use clinically useful and standardized assessment tools. The reality is that such tools do not exist.

Second, there must be meaningful differentiation of adolescents across levels or stages of chemical involvement. Adolescents may differ not only in terms of the severity and consequences of their chemical use, but in the pattern of that use and in the configuration of factors that may play a role in leading to, or maintaining chemical misuse. One central question is whether one can validly differentiate short-term users or experimenters vs. those abusers whose problems will endure. Extant data do not allow such discriminations of these two groups based on initial involvement with drugs.

Another key issue is whether it is possible to differentiate adolescents in terms of the configuration of their chemical involvement. This configural perspective is similar to the multiple-syndrome notion of adult alcoholism (Wanberg and Horn 1983) and may prove to be a more appropriate framework from which to view adolescent chemical involvement than simply distinguishing abusers along the severity dimension.

Third, there exists a need to identify and differentiate problems accompanying chemical abuse. The ability to assess not only the severity of the chemical use problem itself, but also the extent of other problems that may complicate or be disguised by chemical abuse, is a high priority.

Finally, there must be differential assignment of client to appropriate treatment level and modality. As the diversity of treatment services increases, the basis for choosing among them for each available client becomes more complicated. There may be some clients for whom no appropriate treatment currently exists, while for others, decisions of formal treatment vs. education, residential vs. outpatient treatment, or extended care vs. support group, are the relevant questions.

Clearly the issues surrounding the assessment of adolescent chemical involvement are complex and controversial. In 1982, the Chemical Dependency Adolescent Assessment Project was begun to address some of these issues. The 5-year project is unique in that it is being completed collaboratively by a consortium of 16 established chemical dependency organizations in Minnesota. Funding for the project comes from the Northwest Area Foundation. The Saint Paul Foundation and the Amherst H. Wilder Foundation are administering the grant on behalf of the consortium. The remainder of this report provides a brief summary of the relevant assessment literature on adolescent chemical involvement and discusses the current status of research activities by the Adolescent Assessment Project.

BRIEF OVERVIEW OF PERTINENT LITERATURE

With the exception of two brief screening instruments, the Adolescent Alcohol Involvement Scale (AAIS) (Mayer and Filstead 1979) and the Youth Diagnostic Screening Test (YDST) (Alibrandi 1978), no psychometrically developed or validated paper-and-pencil instruments for use with adolescent chemical dependency populations have been reported in the professional literature. The AAIS has been validated, to some degree, against independent clinical diagnosis and, in general, has undergone more research scrutiny than the YDST (Moberg 1983; Riley and Klockars 1984). Nevertheless, the apparent value of the AAIS and YDST is limited to initial screening applications. While they may permit general evaluation of the extent or severity of the adolescent's problem, they do not provide for discrimination between different problem types or configurations.

Related to the "problem severity" instruments is the group of adolescent survey instruments. The Youth Experience Questionnaire (Dunnette et al. 1980), the Research Triangle Institute's Study of Adolescent Drinking Behavior and Attitudes (Rachal et al. 1980), and the Institute of Social Research's Annual High School Senior Survey Questionnaire (Johnston et al. 1981) are three important examples of surveys of nonclinical adolescent populations. These survey questionnaires typically evaluate use prevalence, extent of consumption, reasons for use, use patterns, and effects and consequences of use.

Development of instruments for adult chemical-abusing populations has received, by far, greater attention. These instruments can offer models from which to work in developing similar instruments

for adolescents. The Michigan Alcoholism Screening Test (MAST) (Selzer 1971), the MacAndrew Scale from the Minnesota Multiphasic Personality Inventory (MMPI) (MacAndrew 1965), the Alcohol Dependence Scale (Skinner and Allen 1982), the CAGE Questionnaire (Mayfield et al. 1974), and the Drug Abuse Screening Test (Skinner 1982) represent popular screening instruments for adults with substance use problems. Their value is limited, as in the AAIS, because of their focus on a single, general problem severity dimension. These questionnaires may be contrasted with the Alcohol Use Inventory (AUI) (Wanberg et al. 1977), a sophisticated and well-researched instrument that assesses multiple dimensions of alcohol involvement. Skinner's (1981) factor analysis of the AUI suggests four factors or alcoholism "syndromes" tapped by the AUI: alcohol dependence, perceived benefits from drinking, marital discord, and polydrug use. These findings support a multiple syndrome conception of alcohol abuse in adults.

In the domain of diagnostic structured interviews, there now exist several interview protocols for adolescents (or children) that address DSM-III criteria for mental disorders, including those for substance use disorder diagnoses. Four prominent interview schedules include the Diagnostic Interview Schedule for Children and Adolescents (Reich et al. 1982), the Kiddie Schedule for Affective Disorders and Schizophrenia (Chambers et al., in press), the National Institute of Mental Health Diagnostic Interview Schedule for Children (Costello et al. 1984), and the Child Assessment Schedule (Hodges et al. 1982). While these interviews have undergone evaluations for interrater agreement and have been validated against external criteria, there are no published reports of the validity of their substance use disorder diagnosis sections against independent clinical diagnoses.

In addition to the focus on problem severity and diagnostic classifications, existing personality inventories and research instruments have been used to explore the role of psychosocial variables in adolescent chemical use. These studies have included measures of deviance, sensation seeking, aggression, alienation, impulsivity, self-esteem, locus of control, family cohesion, religiosity, and peer attitudes (to list only a few). While many of these variables have consistently discriminated samples of adolescent chemical abusers from samples of nonabusers, the strength of the observed relationships has generally been modest. Since it appears that none of these variables constitutes a necessary or sufficient basis for the development of adolescent chemical abuse or dependence, it may be more appropriate to consider them as risk factors that may play a role in predisposing adolescent experimentation with chemicals or perpetuating chemical use once it is initiated.

It is also important to note that the aforementioned psychosocial variables are often associated with a broad range of problem behaviors, including delinquency and sexual promiscuity (Jessor and Jessor 1977; Rathus et al. 1980). Given the nonspecificity of psychosocial risk factors for adolescent chemical abuse, there is

little validity in targeting high-risk individuals on the basis of these variables alone. Psychosocial measures may, however, have value in identifying subgroups of chemical abusers who have different treatment needs or prognoses. There is an increasing body of research concerned with the identification of personality subtypes among adult alcoholics, and some common threads have emerged across those studies (Costello 1981).

DEVELOPMENT OF A NEW ASSESSMENT BATTERY

In view of the limitations of existing tools to assess adolescent chemical involvement, the Chemical Dependency Adolescent Assessment Project began the process of developing a new standardized assessment battery.

The first year of the project was spent reviewing pertinent literature, consulting experts, and talking with direct service providers. A dominant theme that emerged was the complexity of the problem configurations that characterize this clinical population. Adolescents were viewed as differing in multiple (perhaps configural) ways, not only in terms of chemical use problem severity. The convergence of anecdotal clinical reports and the emerging viewpoint in the adult literature of multiple alcoholism syndromes or types (Jellinek 1960; Morey et al. 1984) led the project to base its model for instrument construction on a multidimensional footing.

A three-ring model has guided the project's efforts in instrument development (figure 1). The first ring, which occupies the center of the model, is the problem severity domain. It involves the signs, symptoms, consequences, patterns, etc., of chemical abuse and dependency. The project instrument developed to assess this domain is the paper-and-pencil questionnaire entitled "Personal Experience With Chemicals Scales" (PECS).

The cluster of variables forming the second ring in the model refers to the so-called risk factors of substance use. These predisposing and perpetuating factors include genetic, sociodemographic, intra- and interpersonal, and environmental variables. The second paper-and-pencil questionnaire that was developed, the Personal Experience Scales (PES), addresses a subset of these variables.

The third ring of the model includes variables associated with the diagnostic classification of psychoactive substance use disorders and attends primarily to factors associated with DSM-III-R criteria. We have developed a highly structured interview schedule, the Adolescent Diagnostic Interview-Revised (ADI-R), to address the third ring.[1] Although the applicability of DSM-III-R substance use disorder diagnostic criteria to adolescents has been questioned, it may be expected that DSM-III-R interview schedules will be used to a greater degree as programs are forced to justify and document their diagnostic decisions.

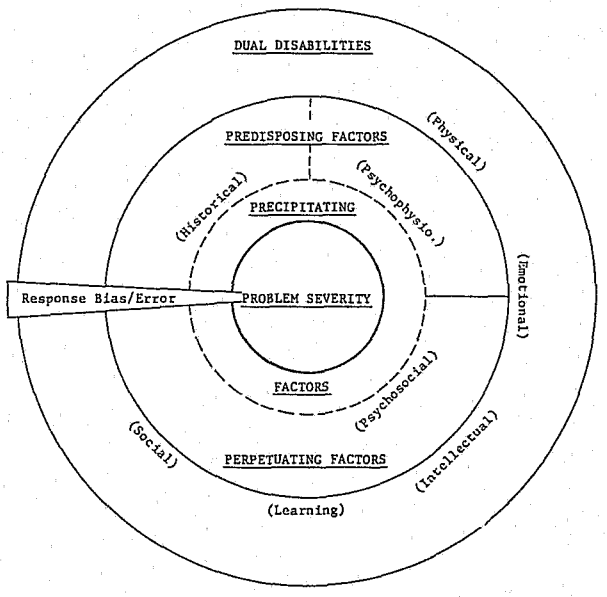

FIGURE 1. *A model to guide initial instrument construction*

Since the PECS and PES have received the most attention to date, the remaining discussion will focus on these two questionnaires. Due to limitations of space, only a brief overview of the development of these instruments will be presented. A more detailed report on the development of the battery can be obtained by contacting the authors.

Preliminary Instrument Construction

Three steps were involved in constructing the item pools for the PECS and PES: (1) items were culled from existing measures and organized into content categories; (2) ratings of the clinical importance of each content area were obtained from service providers; (3) new items were written to represent each content area that was rated important. Additional items were added to assess defensiveness (items adapted from the Marlowe-Crowne Social Desirability Scale) (Crowne and Marlowe 1960) and invalid responding. The resulting preliminary versions of the two instruments were each about 250 items in length. In order to facilitate administration during the research phase, each instrument was divided into two subsets having similar item content and style, so that the instruments could be conveniently completed in two separate sittings.

Administration Procedures

In order to remain within project timelines, the PECS and PES were administered to independent samples at different times. Consenting adolescent clients at participating Minnesota chemical dependency evaluation and treatment programs were administered the PECS or PES questionnaires during their first week of program contact. The order of administration of the instrument subtests was randomized, so that the effects of item order and respondent fatigue might be counterbalanced. The majority of clients completed both subtests for an instrument in a single sitting. The instruments were administered by staff members at the participating programs.

Subjects

Participants were consenting adolescents, ages 12 to 18, receiving chemical dependency evaluation or treatment at 16 Minnesota sites between March 1984 and May 1985. The participating programs included both hospital and free-standing units that provided either evaluation or treatment services on either a residential or outpatient basis. Twelve of the sixteen sites are located in the Minneapolis-St. Paul metropolitan area; the remaining sites are in rural locations. Approximately 1,100 of the 1,600 clients identified as eligible to participate in the study completed either the PECS or PES questionnaire. Comparisons of participants and nonparticipants during the PECS and PES administration phase failed to detect statistically significant differences on either demographic (sex, age, race, prior treatment history) or psychological (MMPI scale scores) variables. Sample characteristics are summarized in table 1. The majority of the sample is male, white, and between the ages of 15 and 17.

Scale Analyses

Rational and empirical strategies were employed in the development of the revised PECS. First, items were assigned a priori to scales and then reassigned or deleted based on their own-scale and other-scale correlations, so that scale reliability and independence could be maximized using the rational approach. Second, a variety of factor and cluster-analytic procedures were employed to define empirically the PECS. Scales that emerged consistently across these procedures were then evaluated for clinical utility and interpretability. Most of the empirical scales were conceptually similar to the rational scales; hence, the empirical scales formed the basis for the selection of the final set of PECS. A small number of rational scales were retained because their clinical utility was judged to be important. Rational scale construction procedures formed the primary basis for the development of the revised PES. In the analyses for both instruments, scale characteristics were derived and optimized on a development sample and then tested on a separate, replication sample.[2]

TABLE 1. *Sample characteristics*

Demographic Variables	PECS (n=646*) n	PECS (n=646*) Percent	PES (n=458*) n	PES (n=458*) Percent
Sex				
Male	377	60.4	265	61.6
Female	247	39.6	165	38.4
Age				
12	5	0.8	2	0.4
13	32	5.1	22	5.3
14	78	12.5	52	12.5
15	140	22.5	107	25.7
16	164	26.4	115	27.6
17	151	24.3	93	22.4
18	49	7.9	22	5.3
19+	3	0.5	3	0.7
Race				
White	578	92.3	378	88.5
Black	10	1.6	28	6.6
American Indian	26	4.2	9	2.1
Other	12	1.9	12	2.8
Prior Primary Treatment				
No	463	75.3	335	78.5
Yes	152	24.7	92	21.5

*Totals do not add to indicated n due to unavailable or missing data. N's refer to development and replication samples.

Results

Titles and definitions of the resulting scales of the PECS and PES are presented in table 2. Scale reliabilities, based on the replication samples, are reported in table 3. The revised PECS have 113 items that permit the scoring of five Basic Scales, five Clinical Scales, and three Validity Indices. The Basic Scales account for the majority of reliable instrument variance. The Clinical Scales, whose items are largely redundant with the Personal Involvement Scale, restructure the information from that single scale in a way that may be interesting to clinicians. Estimates of internal consistency reliability for the revised PECS range from .80 to .97. The 147 items of the revised PES are organized into eight Personal Adjustment Scales, four Family and Peer Environment Scales, and two Validity Indices. In addition, four brief problem screens are scored. Internal consistency reliability estimates for the 12 substantive scales range from .74 to .90.

TABLE 2. *The revised scales of the Personal Experience With Chemicals Scales (PECS) and the Personal Experience Scales (PES)*

PERSONAL EXPERIENCE WITH CHEMICALS SCALES

Clinical Scales

1. **Personal Involvement** (29 items) - High scores on this scale suggest frequent use at times and in settings that are inappropriate for drug use; use for psychological benefit or self-medication; and restructuring activities to better allow use (preoccupation). Low scores on this scale suggest relatively infrequent use associated with social settings. This set of items forms the key scale to assess general problem severity.

2. **Effects From Use** (10 items) - The items of this set concern the immediate psychological, physiological, and behavioral consequences of chemical use.

3. **Social Benefits Use** (8 items) - This scale reflects use associated with increased social confidence and social acceptance.

4. **Personal Consequences** (11 items) - Items in this set focus on difficulties with friends, parents, school, and various other social institutions that are a result of the use of chemicals.

5. **Social-Recreational Use** (8 items) - Items from this scale are associated with the use of chemicals for fun in social situations.

Basic Scales

6. **Transsituational Use** (9 items) - This set represents use in a variety of settings, particularly ones that are inappropriate for drug use (e.g., school).

7. **Psychological Benefits Use** (7 items) - Items in this set suggest the use of chemicals to reduce negative emotional states and to enhance pleasure.

8. **Preoccupation** (8 items) - This scale represents overinvolvement with chemical use, for example, by preplanning future use, restructuring activities to better allow private or social use, and rumination about use.

9. **Loss of Control** (9 items) - This set of items is associated with both the inability to abstain from chemical use and the inability to moderate use on occasions when chemicals are available.

10. **Polydrug Use** (8 items) - The items defining this scale are all indicators of use of drugs other than alcohol.

Validity Indices

11. **Infrequent Responses** (7 items) - These items, having very low rates of endorsement, may be associated with "faking bad," inattention, or random responding.

12. **Defensiveness** (15 items) - The basis for this set of items was the 33-item Marlowe-Crowne Social Desirability Scale, a frequently used measure of defensiveness. The items were modified slightly to make them appropriate for an adolescent population.

13. **Pattern Misfit** - Respondents with unusual pattern response on the Personal Involvement Scale can be statistically identified; an unusual pattern can be indicative of inattentive or random responding, or may represent actual, but atypical, chemical use patterns.

TABLE 2. (Continued)

PERSONAL EXPERIENCE SCALES

Personal Adjustment Scales

1. **Personal Adequacy** (10 items) - This scale reflects general self-esteem and self-regard, personal satisfaction, and feelings of competence.

2. **Psychological Disturbance** (10 items) - Items from this scale are associated with psychological problems and distress, such as difficulties with mood, thinking, and physical concerns.

3. **Social Integration** (8 items) - This scale represents social competence, feelings of belonging to a social group, and degree of mistrust in one's social life.

4. **Self-Control** (12 items) - These items focus on tendency to act out, to display anger and aggressiveness, and to defy authority.

5. **Conventional Values** (11 items) - The items in this set concern acceptance of traditional beliefs about right and wrong.

6. **Deviant Behavior** (10 items) - High scores on this scale suggest involvement in unlawful or delinquent behavior.

7. **Future Goal Orientation** (11 items) - This scale represents planning for and thinking about one's future plans, goals, and expectations.

8. **Spirituality** (7 items) - High scores on this scale suggest belief in spiritual life and use of prayer.

Family and Peer Environment Scales

9. **Peer Chemical Environment** (8 items) - The items defining this scale indicate involvement with chemicals by one's peers.

10. **Sibling Chemical Use** (4 items) - This set represents chemical use by brothers or sisters.

11. **Family Pathology** (14 items) - Items from this scale are associated with family problems of chemical dependency, physical or sexual abuse, and severe family dysfunction.

12. **Family Estrangement** (13 items) - This scale reflects lack of family solidarity and closeness and the presence of a parent-child conflict.

Screens for Other Problems

These scales provide brief screens for the following problem areas:

13. **Parent/Sibling Chemical Dependency**

14. **Physical Abuse**

15. **Sexual Abuse**

16. **Eating Disorder**

Validity Indices

17. **Infrequent Responses** (11 items) - These items have very low rates of endorsement and may reflect "faking bad," inattention, or random responding.

18. **Defensiveness** (12 items) - This set of items is based on the Marlowe-Crowne Social Desirability Scale and adapted for use with an adolescent population.

TABLE 3. *Coefficient alpha reliability estimates for the PECS and PES*

Scale	Coefficient Alpha
PECS	
Personal Involvement	.96
Effects From Use	.87
Social Benefits Use	.89
Personal Consequences	.84
Social-Recreational Use	.88
Transsituational Use	.91
Psychological Benefits Use	.93
Preoccupation	.92
Loss of Control	.87
Polydrug Use	.79
PES	
Personal Adequacy	.86
Psychological Disturbance	.80
Social Integration	.74
Self-Control	.84
Conventional Values	.81
Deviant Behavior	.80
Future Goal Orientation	.81
Spirituality	.90
Peer Chemical Environment	.85
Sibling Chemical Use	.87
Family Pathology	.76
Family Estrangement	.88

Future Work

A series of more complete standardization and validation studies were initiated in November 1985 to permit development of representative norms (both for treatment and nonclinical populations) and to further evaluate the battery's validity.[3] Validity evaluations will include examining relationships of instrument scales to concurrent measures and indicators (e.g., well-established personality measures, diagnoses, family history variables, and parental report) and to subsequent events (e.g., evaluation and treatment outcome). Time will not permit us to conduct an extensive outcome study to evaluate the instruments' ability to predict long-term treatment outcome; however, initial validation efforts will examine other important treatment variables, such as referral decisions, treatment compliance, and treatment aftercare recommendations.

This assessment battery is expected to be ready for distribution by June 1987. The package is expected to include a single

paper-and-pencil inventory that represents the combined items from the PECS and PES, a brief screening test derived from the general problem severity dimension found in the PECS, a structured diagnostic interview that addresses DSM-III-R criteria for psychoactive substance use disorders, and a user's manual.

CONCLUSIONS

The assessment package is intended to serve as an adjunct to clinical assessment. No assessment tool can address all the factors that need to be considered in making clinical decisions. Rather, the intent is to assist the clinician by providing information that is of known reliability and validity and that can be referenced with regard to the larger population of adolescents having problems related to chemical use. Sound assessment tools can also provide a more solid foundation for future research. As professionals find that adult models of chemical dependency are unworkable when applied to an adolescent population, the search for new models will intensify. The implementation of a standardized assessment package can lead to the establishment of a data base from which to launch that search.

FOOTNOTES

1. The ADI-R contains the following sections: sociodemographic information, alcohol use, cannabis use, other drug use, psychosocial stressors, level of functioning, and a screen for mental disorders. Currently, the interview is being evaluated for interrater agreement and content validity.

2. Conservative decision rules were established for the rejection of questionnaires whose responses were of doubtful validity, due to high scores on the invalidity or defensiveness scale.

3. The revised versions of the PECS and PES were evaluated preliminarily against some available external criteria. High vs. low PECS scores were differentiated on the MMPI (number of elevated scales), on clinical diagnoses (abuse vs. dependence), and on the basis of inpatient vs. outpatient treatment setting. A similar contrasted group analysis of the PES indicated a strong relationship between deviant PES scores and scale elevations on the MMPI.

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Substance Abuse in Adolescents: Diagnostic Issues Derived From Studies of Attention Deficit Disorder With Hyperactivity

Jan Loney

INTRODUCTION

The accumulated literature on the treatment of substance abuse in adolescents with a history of DSM-III diagnosed Attention Deficit Disorder with Hyperactivity or an associated Oppositional Disorder or Conduct Disorder is extremely limited. In part, this is due to complicated diagnostic questions which continue to command the attention of many investigators, and controversies surrounding the treatment of hyperactivity and attention deficit disorders. This is especially true for children prescribed central nervous system (CNS) stimulant medication.

The absence of an empirically based literature does not mean, however, that existing studies of these childhood psychiatric disorders have no value for clinicians concerned with the treatment of substance abuse among troubled adolescents. On the contrary, over the past decade, a great deal of information about the diagnosis, prognosis, and treatment of attentional, oppositional, and conduct disorders has been gathered. Certainly this knowledge will benefit clinicians in making assessment and intervention decisions for drug-abusing adolescents.

The earliest research to be carried out focused on prognosis (e.g., Weiss et al. 1971) and treatment (e.g., Werry and Aman 1975) and will be presented first. A discussion of the implications of several recent studies of diagnosis (e.g., Milich et al. 1982) will follow. A more detailed analysis of these and other studies concerning substance abuse and childhood hyperactivity is offered in Kramer and Loney (1982).

Although distinctions have been made between the terms "childhood hyperactivity" and "attention deficit disorder," they will be used as synonyms in this discussion, referring to a population of hyperactive children who have been studied under these and related terminologies (e.g., minimal brain dysfunction, hyperkinetic syndrome). Similarly, the terms "childhood aggression,"

"oppositional disorder," and "conduct disorder" will be treated as if they were essentially synonymous.

INFORMATION ABOUT PROGNOSIS

Early investigators tended to believe that childhood hyperactivity was a form of "maturational delay," and, therefore, the associated symptoms could be expected to disappear around the time of adolescence. However, carefully designed prospective studies found in many hyperactive children a "continual display" of problems with inattention and motor restlessness extending into the adolescent and young adulthood years, and in several systematic followup studies, a substantial minority of hyperactive children showed what could be called "eventual decay," in that after 18 years of age they were assigned adult psychiatric diagnoses, the most common being Antisocial Personality Disorder. Results from a recent comprehensive outcome study of 100 children diagnosed as hyperactive (Gittelman et al. 1985) could be interpreted in terms of "maturational delay" (52 percent of previously diagnosed hyperactive boys showed no psychiatric disorder at 16 to 23 years), "continual display" (40 percent still displaying signs of an attentional disorder), and "eventual decay" (27 percent having an antisocial or conduct disorder at followup).

Hyperactive Children and Risk of Adolescent Substance Abuse

In theory, there are numerous grounds for expecting that hyperactive children might be predisposed to experimentation with illegal substances such as marijuana. Studies of the distinguishing features of hyperactive children emphasize a host of behavioral and emotional characteristics which are known or thought to be related to illegal drug use: impulsivity, low self-esteem, noncompliance with authority, poor school performance, and susceptibility to peer pressure. Conversely, studies of the precursors of substance abuse among normal children have identified a set of predisposing factors which are known to describe the typical hyperactive child.

Attempts to examine adolescent substance use among hyperactive children have produced numerous methodological problems. Many of the followup studies had been nonblind, had relatively few subjects, included no control groups, and sustained considerable subject attrition. Most of these investigations involved samples of hyperactive subjects averaging 14 years of age and ranging from as young as 9 to as old as 23 years of age. It is difficult to generalize from these samples, as they represent children at disparate developmental stages with respect to exposure to illegal drugs. Few of the subjects in these studies are old enough to have developed a pattern of serious abuse, and many of the youngest had not yet been exposed to the full range of drugs with abuse potential. For these reasons, most research into substance use among hyperactive children and adolescents had been limited to subjects' use of marijuana and/or alcohol.

Few studies have investigated hyperactive children's attitudes or intentions toward drug use. Fewer still have attempted to delineate the steps leading from the use of one type of drug to another. The relative paucity of this kind of information makes a comprehensive theory associating adolescent substance abuse with hyperactivity and attention deficit disorders difficult to articulate. An exception has been the work of Hechtman et al. (1984), who presented a series of pioneering studies which described substance use among groups of Canadian hyperactive children. The developmental focus permitted Hechtman et al. to contrast early substance use with more recent use. Hyperactive youngsters were not reported to differ from controls in their recent use of most illegal substances. However, control subjects were reported to use hallucinogens more frequently.

Developmental data can also help bring basic information about initiation of substance use into clearer focus. For example, in one of Loney's studies (unpublished), 33 of 95 adolescent hyperactive boys said that they had tried marijuana. However, only 70 of the boys knew someone who used marijuana, and only 50 of the 95 reported actually having the opportunity to smoke it. Thus, the 36 percent of the total sample who had tried the substance represented two-thirds of those having the opportunity. Sixty percent of the 33 hyperactive boys who had "ever tried" marijuana had used it some time during the month of the followup interview. Of the 20 boys who continued to use it, 8 escalated to "frequent" use (defined as use of the drug on at least 15 days during the current month). Only at the point of escalation did the hyperactive boys tend to differ from their classmate controls; fewer controls used marijuana frequently during the month of the followup interview.

Differential Risk for Hyperactive Subgroups

It has long been known that hyperactive children are a heterogeneous population, both at the time of initial psychiatric referral and in terms of response to treatment. Thus, a recurring question concerns identifying those characteristics or antecedent activities that will predict which hyperactive child will develop drug-related problems. Fortunately, studies that have asked these prediction questions represent the more controlled and least ambiguous research. This is true in part because the questions of proper diagnosis and appropriate control groups were not of central importance.

Loney et al. (1981a; Loney et al. 1981b) have systematically followed approximately 300 hyperactive boys and controls into adolescence (ages 12 to 18) and young adulthood (ages 21 to 23), using an extensive battery of tests and interviews to obtain information from the boys and their parents and teachers. All the hyperactive boys were originally referred to a major medical center for outpatient psychiatric evaluation, and all were treated with either psychostimulant medication or with behaviorally oriented parent and teacher counseling. The results of these studies indicate that among so-called hyperactive children, those who were

more aggressive, oppositional, and conduct disordered eventually had problems with illegal drug use. In contrast, hyperactive children who did not show signs of aggressivity at referral appeared more at risk for academic problems.

INFORMATION ABOUT TREATMENT

This discussion will be confined to studies of treatment with stimulant medications because of their presumed association with later substance use.

There is no question that the majority of hyperactive children respond with behavioral improvement after treatment with stimulant medication such as methylphenidate. Numerous well-controlled within- and between-group studies have established their short-term efficacy. Unfortunately the studies that focus on the long-term consequences of the medication are rife with problems and, therefore, difficult to interpret. Many compare medicated hyperactive children with unmedicated nonhyperactive children, such as brothers and classmates, making it impossible to differentiate the signs of a hyperactive disorder from the short-term effects of the stimulant medication. However, it is impossible to assign hyperactive children randomly to either long-term medication or non-treatment conditions.

Results from the earliest studies of the long-term stimulant effects were discouraging because investigators expected the drug-induced behavioral improvements, in evidence during childhood, to affect performance through adolescence even if a child was no longer on the medication. Instead, there appeared to be no long-term drug effects on adolescent behavior (Weiss et al. 1975). However, later studies suggested that the effects, while minimal, were positive. For example, Loney, Kramer, and Kosier (Loney et al. 1981a) found that, at 5-year followup, hyperactive boys who had been medicated for an average of 2 years were rated by their mothers as having fewer problems with motor coordination and self-esteem than the unmedicated boys. However, when teachers rated both medicated and unmedicated hyperactives, no difference was found between groups in these or any other behaviors. In addition, stimulant medication was unrelated to adolescent performance on intelligence and achievement tests.

Childhood Drug Treatment and Risk of Substance Abuse in Adolescence

Early concern about the long-term effects of treating hyperactive children with a stimulant drug stemmed from the fear that such treatment would lead to later use of illegal drugs. This fear resulted from several coexisting factors: (1) Public sensitivity to the increasing use of illegal drugs among youth, and (2) an expectation that at maturity hyperactive children might become dependent on stimulant medication in the same way as nonhyperactive adolescents. In the absence of data, public concern about

stimulant medication acting to precipitate later drug abuse was hard to allay.

Clinical reports verify that many hyperactive children dislike taking their stimulant medication because of its side effects, because their peers tease them about being on "speed," or because they dislike taking any kind of pills. Many adolescents refuse to take their prescribed medication. Therefore, clinicians often have difficulty maintaining their patients on a stimulant regimen, and many consider it improbable that drug abuse will emerge.

In an adolescent followup study of medicated and unmedicated hyperactive boys, Loney et al. (1981a) found no differences between groups in self-reported delinquencies such as stealing, property damage, and car accidents, although the unmedicated boys reported significantly more instances of drunk driving. Similarly, the medicated and unmedicated boys did not differ in the seriousness of their overall involvement with legal authorities, although the unmedicated boys reported significantly more serious police involvement for substance-related offenses. In a further study of the same sample, Kramer et al. (1981) found few differences between medicated and unmedicated hyperactive boys in attitudes toward and experimentation with various illegal substances, but the trend was toward a higher use among the unmedicated hyperactive boys. Results from these studies suggest that if early treatment with stimulants can decrease the irritability and impulsivity of hyperactive children and raise their frustration tolerance and self-esteem, those effects might even decrease the probability of ultimate drug abuse. This is a hypothesis that needs to be tested.

INFORMATION ABOUT DIAGNOSIS

Over the decades that childhood hyperactivity has been studied, questions regarding proper assessment and diagnosis have been frequent and frustrating. While early investigators focused their attention on whether drug treatment was safe and effective, the underlying disorder was little understood. It was acknowledged that any given group of children selected for study was heterogeneous in that the subjects varied from one another, and each behaved differently across different situations and from one time to the next. Thus, the diagnostic issues surrounding attention deficit disorders with hyperactivity were increasingly addressed.

Initial diagnostic studies directed attention to aggressive behaviors that had been identified as important predictors of treatment success. It became clear that many hyperactive children were also aggressive. For example, in a group of clinic-referred boys who met criteria for hyperactivity on the widely used Conners teacher rating scale, 65 percent were classified as both hyperactive and aggressive, whereas only 17 percent were exclusively hyperactive (Loney and Milich 1982).

In contrast, unpublished data from a large metropolitan clinic yielded very different findings. Only 25 percent of the referred hyperactive boys received a mixed diagnosis. In addition, only 17 percent of the hyperactive students from an elementary school sample could be described as mixed hyperactive-aggressive children (Loney and Milich 1982). These findings have major diagnostic and prognostic implications.

Despite controversy concerning the interdependence of hyperactivity and aggression, there is evidence that each of these characteristics should be measured as independent dimensions. Each may have different childhood antecedents and different adolescent and adult consequences (Loney et al. 1981b). For clinicians interested in the treatment of illegal and norm-violating behaviors such as substance abuse, it is important to note that these behaviors appear to be more closely related to childhood aggression, conduct problems, and oppositional behavior than they are to childhood overactivity, short attention span, and cognitive impulsivity.

As clinical investigators become more sensitive to the diagnostic issues, fewer include aggression in their definition of hyperactivity. However, the lack of discriminant validity of the measures of hyperactivity and aggression suggests that hyperactivity and aggression may be two separate problems (Loney et al. 1978), two intertwined problems (Prinz et al. 1981), or indistinguishable facets of the same problem--a Conduct Disorder (Quay 1979). Most scales used to measure these two constructs have been moderately to highly intercorrelated. However, when the behavioral observation data were substituted for teacher rating-scale data, correlations between hyperactivity and aggression were markedly reduced (Loney and Milich 1982).

Meanwhile, what appears to be a relationship between childhood hyperactivity and adolescent substance abuse may actually be the previously well-documented relationship between childhood aggression and substance abuse. Most of the rating scales and structured interviews used to assign scores on hyperactivity factors or to diagnose children with attentional disorders contain items which tap factors related to aggressive behavior as well as motor activity and ability to concentrate. Therefore, the selected samples of hyperactive children often include aggressive/oppositional as well as exclusively hyperactive children. Obviously, data on the drug use of these samples cannot be interpreted with clarity and confidence.

Attempts have been made to obtain more homogenous samples by excluding children with DSM-III diagnosed conduct disorders. This method is likely to remove the oldest and most antisocial children, but an unknown number of oppositional and/or aggressive children will remain in the group. Since these children are known to be at risk for drug abuse, their presence will confound the results. Other frequently used methods to identify hyperactive adolescents may actually increase the heterogeneity. When parent

input is added to the results from teacher questionnaires which gather data on children in structured, attention-demanding situations, diagnostic heterogeneity is often increased.

Diagnostic procedures that use several methods of assessment or high cut-off scores to select the most severely dysfunctional children will probably increase the proportion of mixed hyperactive-aggressive children in their samples. Results from those studies might have less generalizability to populations of pure hyperactive children. But these limitations will persist until valid measures of attentional, conduct, and oppositional disorders are available.

At present an empirical foundation is in the process of being built. Meanwhile, critically important questions will remain in understanding the relationship between attentional deficit and adolescent substance abuse disorders.

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Empirical Guidelines for Optimal Client-Treatment Matching

Reid K. Hester and William R. Miller

INTRODUCTION

In the last 10 years, interest in treating adolescent substance abuse appears to have increased dramatically. A great deal more treatment is now being provided to this population, frequently utilizing intervention strategies which have been extrapolated from those used to treat adults. Unfortunately, our understanding of which interventions are most beneficial for which adult clients is in its infancy. The purpose of this paper is to develop guidelines for matching adolescent clients to treatments, based on the current substance abuse treatment literature. An underlying assumption in developing such guidelines is the following hypothesis: Adolescents who are appropriately matched to treatment will show outcomes superior to those who are unmatched or mismatched. This hypothesis predicts an interaction between client variables and treatment outcome even in the absence of main treatment effects. Figure 1 shows how client characteristics could interact with treatment outcome to produce a potentially confusing picture of the effects of treatment.

Education, which significantly interacts with treatments A and B, has been labelled the predictive variable. In study 1, for clients with low educational levels treatment B has a better outcome than A. In study 3 the opposite is true, while in study 2 there is no significant difference. Averaging all educational levels results in no main effect of treatment, thereby leading to the erroneous conclusion that the treatments are equivalent. In fact, however, there is a significant interaction between education levels and treatments, and for certain clients there is a substantial difference in effectiveness between the alternative interventions.

Matching a client's needs to specific treatments has validity and is routinely done in medicine. Although widely discussed, this notion has seldom been applied in the area of alcohol and drug abuse treatment. It is a notion which is just beginning to develop in the area of adolescent substance abuse treatment, and there

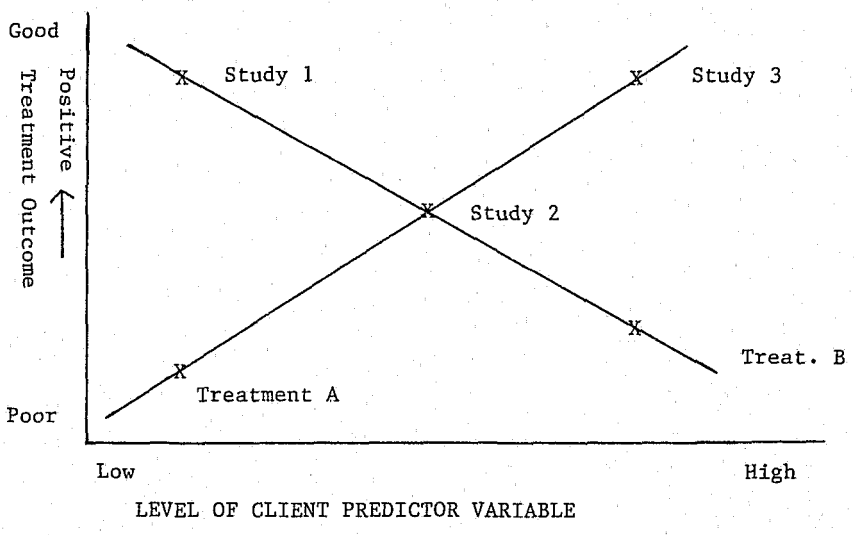

FIGURE 1. *A hypothetical client-by-treatment interaction*

are few data which can be used to develop guidelines. The reasons for this are several. First is the common and, we believe, mistaken assumption of uniformity of drug or alcohol abuse. Alcoholism, in particular, has been thought to have a common etiology and therefore one method of treatment. A second factor discouraging individualization of intervention has been the historic tendency for treatment professionals and programs to adhere to a single, often dogmatic view of etiology and proper remediation. To be sure, there are rival and alternative approaches to intervention, but each particular program has tended to embrace and manifest a specific strategy, be it education, group confrontation, drug substitution, therapeutic community, Alcoholics Anonymous or Narcotics Anonymous, or training in alternatives to drug use. As a consequence of these factors, assumption of uniformity and adherence to a particular philosophy of intervention, treatment, and prevention programs have often offered a very narrow range of alternative strategies necessarily constraining the potential for individualizing intervention.

We will review the adolescent data first, then the adult literature, to determine potentially fruitful areas of investigation. Next, we will present recommendations for the development of potentially promising approaches and procedures to evaluate client treatment interactions. Of necessity, much of what will be presented is extrapolated from the adult alcohol and drug abuse treatment literature. Although there may be significant differences in treatment interventions which are appropriate for adolescents, how to match a client with optimal treatment is still an empirical question. The adult treatment literature has valuable

information which can be used efficiently and effectively to develop and evaluate adolescent client treatment interactions.

PREDICTOR DATA

Adolescent Literature

National studies (e.g., the Drug Abuse Reporting Program (DARP) and the Treatment Outcome Prospective Study (TOPS)) to date appear to have been designed to gather data on the overall outcome of clients receiving treatment in the various settings. Only the DARP included an "intake only" comparison group of clients (Simpson and Sells 1982). Unfortunately, Simpson and Sells did not find any data which might indicate an optimal client-treatment setting match. They did note, however, that the best predictors of specific posttreatment outcomes were pretreatment measures of functioning (e.g., pretreatment alcohol problems predicted heavier consumption after treatment). Simpson and Sells also noted that continued time in treatment, completion of treatment, and favorable behavior during treatment were positive prognostic indicators of outcome.

The TOPS specifically evaluated treatment outcome for adolescents (Hubbard et al. 1985). Unfortunately, this study does not appear to have included any untreated control groups. Consequently, it is impossible to determine how much of the improvement in outcome measures after treatment may have been affected by confounding factors.

Two studies of young drug abusers in Scandinavia have specified client characteristics which influence outcome after treatment. Holsten (1980) found that 26 percent of the variance in outcome at 1 to 6 years after treatment was associated with: (a) the youth not being registered for criminality for the 12 months prior to the first contact, (b) no alcohol problems at the time of the first contact, (c) being female, (d) being raised in a broken home, and (e) having a father who had no alcohol problems during the youth's childhood. Benson (1985) found that continued users after treatment tended to: (a) deviate more from school careers, (b) be more truant if they were male, and (c) have one or more alcoholic parents if they were female. Low intensity of drug and solvent abuse were positive prognostic factors.

Vaglum and Fossheim (1980) reported that adolescents' primary drug of abuse was associated with how favorably they responded to various forms of treatment. For users of psychedelic drugs the amount of family therapy, followed by individual psychotherapy, was most strongly correlated with outcome, whereas confrontive milieu therapy was slightly negatively correlated with outcome. Conversely, for opiate and central nervous system (CNS) stimulant users, the degree of confrontive milieu therapy was strongly correlated with outcome, followed by family therapy and individual psychotherapy.

Unfortunately, for the purposes of developing matching criteria, these studies, with the exception of that of Vaglum and Fossheim, were primarily concerned with the overall impact of substance abuse treatment. Comparisons were between treatment settings, and it is impossible to determine what sort of specific interventions were conducted within those settings. This lack of specificity severely limits the utility of these data in developing matching criteria.

Adult Literature

If there are very few relevant data in the adolescent treatment literature, perhaps useful implications can be derived from the literature describing adult treatment strategies. While there may be substantial differences in the specific problems which adolescents and adults present, perhaps by examining the adult literature we may at least avoid reinventing the wheel (or the Edsel) and avoid some of the mistakes reported in the adult literature. We will examine the adult literature by client variables rather than by treatment interventions because the search for potential matching criteria is of foremost concern here.

Psychopathology. A recent National Institute on Drug Abuse (NIDA) report (1983) presented the results of two studies of client treatment interactions where the treatment populations were opiate addicts. Both studies evaluated the effects of structured psychotherapies in addition to the usual drug counseling of the clinic programs. In one study, conducted in Philadelphia at the VA Medical Center, clients with low levels of psychiatric symptoms had a better outcome than those with higher levels of such symptoms. They also reported that the "high-severity clients assigned to additional therapy groups showed more significant improvements, while those high-severity clients who received counseling alone showed progress only in reducing their drug use" (NIDA 1983, p. iv). In addition, depressed clients received substantial benefits from the additional therapy, while those with antisocial personality showed little improvement except in drug use. In contrast with these results, the New Haven study in the NIDA report did not find significant client treatment interactions. The discrepancies between the two studies were attributed to the differences in treatment populations and problems with the implementation of the second study.

McLellan and his associates (McLellan et al. 1983), who conducted the 1983 NIDA study in Philadelphia, also conducted a retrospective and prospective study to develop a multivariate equation which optimally matched clients with treatments. In their initial study they found that measures of psychiatric symptomatology and social stability interacted with outcome in complex ways. The investigators used this information, attempting to match clients prospectively to various treatments. They found that clients appropriately matched to treatment had a significantly better outcome than those who were unmatched or mismatched. Clients were not randomly assigned to matched or unmatched conditions, however,

and some of their statistical analyses may have overestimated the effects of matching. Nevertheless, these two studies represent a significant advance in client-treatment matching research.

Cognitive style. Cognitive style can be defined as "enduring patterns of perception and information processing that the client evidences in a broad range of situations" (Miller and Hester, in press). McLachlan (1972; McLachlan 1974) found a strong interaction between a client's conceptual level (CL) and the structured nature or directiveness of treatment. People with low CL tend to depend on authority and prefer simpler rules and constructs. In contrast, high-CL individuals are more independent and more complex in their thought processes. McLachlan hypothesized that high-CL alcoholics would benefit more from a less structured and nondirective approach, while low-CL clients would show greater benefit from a more structured and directive approach. At 12- to 16-month followup (McLachlan 1974), clients matched during treatment and aftercare had a 71-percent recovery rate, whereas those who were mismatched in treatment and aftercare had a 38-percent recovery rate. Recovery rates for clients only matched to treatment or to aftercare showed intermediate rates of recovery. Finally, although no main effects for treatment were found, there was a strong interaction effect. McLachlan would have concluded erroneously that directiveness of treatment has no effect on outcome had he not investigated the effects of CL.

In a retrospective prediction of outcome, Thornton et al. (1977; Thornton et al. 1981) found an interaction between developmental level (DL) and outcome. DL is a construct similar to CL. At followup they found that high-DL clients were more likely to drink moderately when they did drink, whereas low-DL clients drank more frequently and more heavily.

Finally, Karp et al. (1970) studied the relationship between field dependence, a measure of cognitive style, and outcome. For alcoholics, field independence predicted initiation of and continuation in psychotherapy. In contrast, dropouts from psychotherapy for drug abuse were slightly more field independent. When they combined interventions in analyses, field dependence failed to predict compliance in treatment.

Neuropsychological functioning. O'Leary et al. (1979) found neuropsychological impairment to be negatively associated with outcome for alcoholics. They did not find, however, that providing cognitively impaired alcoholics with more or longer treatment significantly improved outcome (Walker et al. 1983). This does not preclude the interesting possibility that clients with cognitive impairments might differentially benefit from different types of interventions.

Self-esteem. Annis and Chan (1983) found a significant interaction between self-esteem and a confrontational group therapy intervention. Alcoholic clients with high self-esteem benefited

from the additional intervention; for those with low self-esteem, it was detrimental, and they fared better without it.

Social stability. Both Levinson (1977) and Smart (1978) found married and employed alcohol abusers to be more likely to develop moderate drinking outcomes, compared to less socially stable clients. Azrin et al. (1982) found that unmarried clients benefited differentially from a broad-spectrum community approach. Married clients, on the other hand, had comparable outcomes when they received either the comprehensive community program or disulfiram with a behavioral compliance program. Thus, clients with less social stability may need a more broadly based system of interventions.

Client choice. Satisfaction with treatment (Vannicelli 1978), compliance in treatment (Sanchez-Craig 1980), and outcome from alcoholism treatment (Thornton et al. 1977) have been positively associated with the amount of client choice in determining the goal and nature of treatment. Kissin et al. (1971) randomly assigned clients to receive up to three treatment choices. Abstinence rates at followup increased with the number of choices offered to the client.

Summary of Client Variables

The brief review provided above of interaction between adult client variables and treatment suggests that there may be a number of similar or identical variables which influence treatment outcome among adolescents. It would be grossly premature to recommend specific criteria for matching adolescents to treatment at this time. However, a number of general principles can be extrapolated from the data on adult matching. In a recent review of the adult literature in this area (Miller and Hester, in press), we came to the following tentative conclusions:

- The degree of differential benefit from a broad-spectrum intervention (such as the "alternatives" approach common in drug abuse intervention with adolescents) depends upon the degree to which the individual manifests the life problem or deficit for which the additional intervention is an effective treatment.

- Clients show greater improvement when matched with a treatment that is congruent with their cognitive style relative to clients who are unmatched or mismatched.

- Clients who choose their treatment approach from among alternatives show greater acceptance of, compliance in, and improvement following treatment relative to clients offered only a single program or approach.

- Clients with more severe alcohol-related problems benefit differentially from more intense (though not necessarily inpatient) treatment, whereas clients with less severe problems

benefit at least as much, if not more, from a minimal intervention.

RECOMMENDATIONS FOR FUTURE RESEARCH

At this point it is clear that the field would benefit from well-designed studies to determine which adolescents benefit most from which specific interventions. Jaffe (1984) has already recommended that this be a focus of future research and has expanded the notion. He further cites data suggesting that different dimensions of drug abuse and life adjustment are modestly intercorrelated at best. This notion has been supported in the adult alcoholism literature by Horn (1978). Specifically, he notes that:

> If this relative independence (of outcome measures) is true for all programs, then the old question of which programs are best suited to which patients becomes more complex. It may be necessary to pay more attention to the components of individual programs to learn which program elements influence which outcome dimensions for which patients. (Horn 1978, p. 20)

Again extrapolating from the adult literature, we offer a number of recommendations about how such studies could be designed to provide the most useful information. The aspects that need to be considered include research strategy and design, treatment interventions, and assessment approaches.

Research Strategy

Two appropriate strategies are the differential research strategy and a modelling approach. The differential approach compares two or more treatment interventions within the same population and study. Ideally, clients are randomly assigned to treatment. A priori blocking with a selected predictor variable (e.g., clients high vs. low on severity) ensures equal distribution of the variable in each treatment. A second option involves no a priori blocking but multiple regression on client variables within each treatment. Although random assignment is preferred, some quasi-experimental designs allow for nonrandomized assignment to treatment. An example is the regression discontinuity design (Campbell and Stanley 1963; Lettieri, unpublished manuscript; Trochim 1984). This design establishes a cutoff score on a predictor variable. Clients are then assigned to treatment or control groups solely on the basis of the cutoff score. If done retrospectively, cases are selected which meet the established cutoff scores. The differential effect of the programs is measured by examining the regression lines. Profiles of successful clients for each treatment can be developed with differential strategies.

An intriguing alternative to the development of elaborate actuarial schemes for client-intervention matching is to offer individuals a range of well-specified options and allow the clients to

choose for themselves. As indicated above, current data suggest that this procedure diminishes dropout rates and enhances both compliance and outcome, relative to procedures which assign treatment. In the absence of valid empirical criteria for matching, self-selection from several options may offer an optimal approach. In reality, self-selection occurs even when limited alternatives are offered, operating through mechanisms such as differential dropout and compliance. An interesting question for future studies is whether empirical-actuarial schemes for optimizing matching can improve outcome over client self-selection from the same menu of options, or therapist intuitive matching using the same menu.

Should it be found that either the clients themselves or certain therapists are superior in selecting optional approaches, a mathematical modelling strategy can be used to develop empirical representations of the strategies employed. The actuarial application of derived decision rules may either equal or exceed the efficiency of the human judgment processes from which they were derived (Goldberg 1972).

This modelling approach investigates how clinicians or clients select treatment; in other words, how and what criteria are used in assigning clients to alternative approaches. This perspective was developed by Goldberg (1968; Goldberg 1971) to study the decision making of clinicians. Quantitative client characteristics are the independent variables, and the chosen treatment is the criterion variable. Using a discriminant function analysis, one can generate a multivariate equation which models the decision-making process. After compliance in treatment and outcome are measured, it is possible to determine which judgments about treatment result in the best outcomes for which clients. This approach can be applied to clinicians' judgments or clients' judgments about treatment.

Treatment Interventions

Selecting a research strategy and experimental design will be a futile exercise unless the interventions themselves are operationally defined. With the exception of some family therapies (Szapocznik et al. 1983), there is little specificity in the adolescent literature about what is actually done in treatment. It is insufficient to describe treatment in terms like "individual counseling" or "group psychotherapy." To enable replication of treatment, matching research must specify the amount (length of session, number of sessions over what period) and content of interventions. With regard to content, the development and publication of research treatment procedures manuals would be helpful in specifying interactions of interventions.

Assessment Approaches

A solid research design with specified interactions will still fail to yield adequate matching criteria if client characteristics

and outcomes are poorly assessed. The selection of intake and outcome data should take into consideration the frequent independence of various client characteristics and problems. Potentially predictive variables which have been investigated in the adult literature and show some promise are: (a) problem severity which can be defined as problem duration, severity or cumulative signs of dependence, level and pattern of alcohol/drug consumption, or severity of current or cumulative consequences; (b) concomitant psychopathology; (c) social stability which could also include measures of family functioning and dynamics; (d) neuropsychological functioning; (e) personality characteristics, with emphasis on personality subtypes; (f) cognitive style; (g) locus of control; (h) perceived choice; (i) family history; and (j) stage of change (Prochaska and DiClemente, in press).

Although there are many options for predictors, each study should specify a small number of focal predictor variables chosen on theoretical or empirical grounds. Otherwise, small samples will limit the utility and power of multivariate analyses (Harris 1985). Measurement should be conducted in such a way as to allow for replication in other clinical and research settings.

Measures of outcome also need to assess posttreatment experiences. Moos and his colleagues (Finney et al. 1980) have repeatedly demonstrated that non-treatment-related experiences have a substantial impact on posttreatment functioning. In addition, these experiences may interact with specific client characteristics and treatment in ways which are, as yet, not understood.

CONCLUSIONS

The use of matching procedures shows promise of improving the overall effectiveness of treatment. Significant differences in effectiveness may be unmasked where interventions were previously found to be equivalent. In this area the adult literature is in its infancy, while the adolescent literature is in the prenatal stage. Nevertheless we offer the following recommendations about current clinical practice and future research:

- First, intervention systems should offer a range of approaches varying in content, setting, and intensity. Variety is a prerequisite for matching research.
- When single programs fail to manifest alternatives, priorities should be given to higher order brokering systems capable of matching clients with interventions.
- High priority funding should be given to quality research on matching.

- Matching studies should clearly specify in replicable, operational terms the interventions under study and should include an adequate range of assessment tools for specifying client characteristics and outcome.

- Random assignment designs are highly desirable, although quasi-experimental alternatives (e.g., regression discontinuity) are appropriate for studying matching processes.

- Client self-selection among alternatives should be considered and studied as a procedure for optimizing client-intervention matching, thereby diminishing dropout, increasing compliance, and improving outcome.

- Finally, the utility of actuarial systems should be contrasted with that of client self-selection and therapist assignment among the same alternative interventions.

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Family-Based Approaches to Reducing Adolescent Substance Use: Theories, Techniques, and Findings

Brenna H. Bry

INTRODUCTION

Knowledge regarding the effects of family-based interventions upon adolescent substance use is currently being pursued simultaneously from two significantly different theoretical viewpoints. These two conceptual frameworks, family systems theory and behavioral theory, generate differing explanatory hypotheses and focus on differing sets of variables. Mature scientific disciplines thrive on disparate viewpoints, in that competing orientations challenge researchers to clarify, extend, and expand their own frameworks to account for increasingly more phenomena. Consequently, I expect the presence of the two paradigms to enhance knowledge about family-based interventions. Accordingly, the purpose of this paper is to highlight the accomplishments of scientists in both paradigms by (a) presenting the premises and current concepts of both competing theories, (b) describing the interventions each framework has spawned, and (c) reviewing the findings each has generated.

FAMILY SYSTEMS THEORY

Assumptions and Concepts

General systems theorists propose that since human behavior is inextricably embedded in systems of reciprocally interdependent interactions, behavior problems can best be understood by studying the structures and processes of systems within which behavior occurs (Bertalanffy 1981; Miller 1978). More specifically, family systems theorists believe that adolescent problems can best be understood by studying the characteristics of one of the systems within which they occur, the family system.

Some of those family systems characteristics are: (a) clarity and permeability of boundaries, (b) flexibility of interactions, (c) proximity of the interrelated parts (family members), (d) autonomy of the interrelated parts, (e) degree of interdependence between the family and surrounding systems, and (f) repetitive behavioral

sequences that maintain the family homeostasis or status quo (Foote et al. 1985; Kaufman 1984; Stanton et al. 1982).

Descriptive studies lend support to systems theory assumptions that family systems characteristics will covary with members' problems. In a multiyear, multimethod study, Lewis et al. (1976) found that, compared to families without a symptomatic adolescent, families with an adolescent problem had less involvement with and more suspicion of other families, used distancing communication mechanisms, and had reduced spontaneity and lower levels of personal autonomy. Steier et al. (1982) also found that families with drug addicts were more rigid in their communication patterns and alliances than matched families without an addict.

To reduce adolescent problems, family systems therapists attempt to change some of the above family characteristics through: (a) gaining access and influence in the system, (b) interrupting the reciprocal relationships between the dysfunctional family characteristics and the adolescent problems, and (c) establishing new family characteristics to interact with new adolescent behaviors (Szapocznik et al. 1984). My categorization of techniques that are commonly employed in family systems research to test the above concepts follows, along with recent findings regarding their effects.

TECHNIQUES

Gaining Access and Influence in the Family System

Introduction to treatment. Typically, one family member seeks help, motivated by a combination of (a) personal dissatisfaction with one member's behavior, (b) a sense of powerlessness regarding changing this behavior, and (c) fear of negative consequences if it does not change. For Stanton et al. (1982), adult male methadone maintenance patients were their initial contacts, and the challenge was persuading them to allow a therapist to contact their parents. Adolescents typically enter treatment after a mother makes the initial telephone call in search of a therapist to whom the family can transfer full responsibility for helping their adolescent. That there is still a need for techniques to gain access to family systems is demonstrated by the Foote et al. (1985) report that only 15 percent of the family members who called their clinic about adolescent problems actually entered family therapy.

Stanton et al. (1982) were able to recruit 70 percent of the adult addicts' families for family therapy through applying 21 basic principles outlined in their book, including: (a) the therapist contacts the family within 3 days of obtaining permission and delivers a nonblaming message to each individual; (b) the rationale for family treatment is presented in such a way that a family member's refusal would be tantamount to stating that he or she wants the addict to remain symptomatic; (c) the therapist is given strong incentives for recruiting the family. In one-fourth of

Stanton et al.'s cases, home visits were made to recruit families. In one particularly difficult case, the recruitment efforts took 30 days and included 4 contacts with the adult addict, 24 contacts with other family members, and 15 talks with the addict's drug counselor.

In an ongoing study, Joanning et al. (unpublished) are testing the use of a broader system, the whole community, in recruiting families. Rather than having just one therapist conduct all the recruitment efforts, they are training teachers, judges, and police officers to support the therapist in persuading families to enter treatment.

Joining the family. Since the family is viewed as a system with boundaries, simply sharing a therapy room is not presumed to be sufficient to provide enough access to analyze and influence a family system. Thus the family system therapist joins the family (a) physically, by arranging him- or herself in its midst, (b) empathetically, by demonstrating and accepting each family member's goals and values, and (c) contractually, by promising that if the family will engage in therapy for a specified, limited period of time, the therapist will help it reach those goals (Kaufman 1984). In addition, Joanning et al. (unpublished) are testing the effects of having the therapist in regular telephone contact with the family between sessions, attempting to obtain more information and change dysfunctional patterns that interfere with treatment.

Enactment. Since the unit of analysis in systems theory is the whole system, the predominant family assessment technique is for the therapist to direct the family to interact during the session in diagnostic ways (Szapocznik et al. 1983). The therapist observes, and at times interacts, to discover recurring behavioral sequences, alliances, unspoken family rules, etc., that are maintaining the status quo and may, at the same time, be maintaining the adolescent's problem.

Interrupting Dysfunctional Family System/Behavior Relationships

Focusing on concrete behavior. Stanton et al. (1982) report that when families initially appear to agree about family rules, attempts to elicit a consensus on specific details often reveal hidden disagreements and dispel the myth of family harmony. They found, for instance, that weekly urine analysis results upset the family status quo, preventing the family from denying or sidestepping drug use.

Reversals. Family systems therapists can direct family members to react, during a session or between sessions, contrary to their usual way. This direction, coupled with whatever new behavioral sequences occur in the family as a result, may be sufficient to break recurring dysfunctional patterns (Szapocznik et al. 1984).

Reframing. The therapist can explain a behavioral sequence or family characteristic in a new, more positive way that is, nevertheless, compatible with the family's value system (Kaufman 1984). This new interpretation theoretically prevents the family from continuing to interact in their usual way without awareness.

Intensifying. The therapist can choose an issue that evokes some minor emotions that everyone in the family acknowledges, such as irritation over shoes being left in the family room, and focus on the issue until it becomes so important that the family chooses to deal with it (Szapocznik et al. 1984).

Paradoxical instruction. When the family is continuing a dysfunctional interaction despite direct attempts by the therapist to change it, the therapist can try the indirect approach, instructing the family to continue to engage in the dysfunctional interaction and to slow their change process. The symptoms then theoretically become controllable instead of uncontrollable, and the family becomes able to change them if they want to (Kaufman 1984).

Home Detoxification, Probation, and the Community Network Approach

If the above techniques have not reduced the adolescent drug use, Quinn et al. (submitted for publication) report using larger societal systems to interrupt the family's interactions. The therapist arranges for teachers, school officials, police and probation officers to support the family's goals in their interactions with the adolescent. This could include placing the adolescent on probation if the drug use continues, and home detoxification where the adolescent is watched 24 hours a day to assure that no drugs are taken. The involvement of outsiders theoretically changes the system within which the family interacts and, thus, supports new family behaviors.

Establishing New Family System/Behavior Relationships

Restructuring techniques. After the family system has been destabilized, several techniques are used to direct the system to reform in specific, health-producing ways. Boundaries within the system are clarified by establishing rules such as (a) allowing family members to finish talking before someone interrupts them, (b) prohibiting members to speak for each other, (c) establishing some rights to privacy for the adolescent, and (d) separating the parents from their children for discussions about limit setting and marital problems (Kaufman 1984). Boundaries around the system are changed to keep family crises within the family for resolution and to connect the family with natural support systems outside (Stanton et al. 1982).

Family members are directed to change not only their distance from one another but also their interdependencies, so that the enmeshed relationships become more differentiated and the disengaged, more involved (Szapocznik et al. 1984). Therapists endeavor to change

behavioral sequences through enactment during sessions and through assigned homework tasks in the "real world." Resistance to these directions may be dealt with through paradoxical instruction (Stanton et al. 1982). Finally, the therapist disengages him- or herself from the family system by scheduling the final sessions increasingly farther apart.

Standards for the new structure. Family systems theorists use normal developmental stages as guidelines for restructuring dysfunctional systems, so that they can be more health producing. For instance, for adult male methadone maintenance patients, Stanton et al. (1982) set independent living as a goal and helped their parents move the identified patients out of their homes. Conversely, Kaufman (1984) reports that parents of young adolescents are encouraged to set limits on their children's freedom.

Findings

Research guided by family systems theory investigates the effect of family therapy interventions primarily on family system characteristics and, secondarily, individual members' problems. Although empirical testing of family systems assumptions is relatively recent, findings have been obtained about the effect of both global interventions and specific components of those interventions.

Effects of Family Recruitment Efforts

The results indicate that a great deal of outreach effort must be expended to gain access to the family system of a client with substance use problems. Evidence for this conclusion comes from a comparison of the percentage of families, with a problem user who made inquiries, that came into treatment with Foote et al. (1985) (20 percent) or Stanton et al. (1982) (70 percent). Reports about the techniques that produced such relatively high engagement rates are more anecdotal than systematic at this point; thus, more research into the components that heighten engagement must be done. Factors to be investigated include: (a) delivery system variables, such as speed with which the family is contacted after the initial inquiry and the incentive system for therapists regarding the number of families recruited, and (b) therapy variables, such as the amount of family commitment required and attitudes communicated regarding the family's blame for the problem.

Effects of Global Interventions Guided by Family Systems Theory

Research from the family systems perspective has produced evidence that such interventions can be more effective than traditional individual approaches, both in changing family function and in changing dysfunctional behavior of an individual member. Stanton (1979) reports, for instance, that Hagglund and Pylkkanen found that adding family therapy to individual and group therapy, for adolescents just released from residential treatment, resulted in the direction of family aggression moving away from the identified

patient toward other objects. In addition, 56 percent of the adolescents in family therapy reported having better relationships with their environments. Sixty percent reported cessation of drug use, and 12 percent reported reduced use. Sixty-four percent of the youths whose families were in family therapy also became gainfully employed.

Szapocznik et al. (1983) observed healthier family structure, less blaming of the adolescent, better conflict resolution capacity, flexibility, more appropriate distances, and more advanced developmental stages in families who had had from 4 to 12 sessions of Conjoint Brief Strategic Family Therapy for adolescent substance abuse. Families continued to improve on all these dimensions through followup. The families and the identified patients (IPs) also reported increased family expressiveness and moral-religious orientation by termination. In addition, the IPs reported overall reductions in delinquent behavior and, specifically, drug use at termination. Although at 6- to 12-month followup, drug use and other delinquent behaviors were beginning to return, the levels were still significantly below pretreatment.

While neither the Hagglund and Pylkkanen (Stanton 1979) nor the Szapocznik et al. (1983) research had nonfamily treatment controls, Stanton et al. (1982) did have appropriate controls. They found that three different intensities of family intervention, including a relatively weak weekly family trip to the movies, all produced less drug use, more autonomous living, and fewer deaths for adult IPs and a higher percentage of days employed or in school than the traditional treatment.

Effects of Paying the Family for Clean Urines and Attendance

With their three intensities of family treatment, Stanton et al. (1982) began to investigate the differential impact of different components of treatment. Paying a family for increasing the number of drug-free days of their adolescent enhanced significantly the treatment's impact on drug use but did not affect the number of days at work or school relative to other family treatments. A separate analysis, however, showed that family attendance at sessions was positively affected (Stanton et al. 1982). In the absence of the incentive pay, seeing the family for systems-oriented therapy had a greater effect than showing educational movies.

These results are tantilizing and lead to more questions. Urine testing, for instance, is a component of all interventions used by Stanton et al. (1982) and Joanning et al. (unpublished). What role does this treatment component play? In addition, of the techniques used in systems-oriented family therapy, which ones are necessary and/or sufficient?

Effects of One-Person Family Therapy

Szapocznik et al. (1983; Szapocznik et al. 1986) carefully studied how necessary it is to involve the whole family in systems-oriented therapy and obtained some challenging results. Not only could systems-oriented therapists working solely with one family member (usually the adolescent) obtain results as positive as a therapist working with the whole family, but some indicators at 6- to 12-month followup suggested that the family and adolescent might do even better if seen alone most of the time. While adolescents seen with the family were beginning to engage in some delinquent behavior and drug use again at followup, adolescents seen in One-Person Family Therapy were continuing to reduce their drug use at followup and saw their families as more cohesive and less controlling after followup than before. More research into these interesting effects needs to be done. A therapist manual is available to facilitate replication (Szapocznik et al. 1985).

Effects of Reframing and Paradoxical Instruction

Other than paying for attendance, clean urines, and the number of family members involved in treatment, the relative efficacy of most of the myriad other components of family systems therapy have not been investigated experimentally. Interestingly, the combined efficacy of two of the components have been demonstrated scientifically in work apparently guided by the other predominant family paradigm--behavioral theory. Kolko and Milan (1983) found that the addition of reframing and paradoxical instruction to a modified token economy intervention reduced previously intractable drug use, school failure, and absenteeism problems, suggesting that the techniques can be effective even when used by therapists without family systems orientation.

CONCLUSIONS

Substantial knowledge has been developed recently in investigations of family systems assumptions about adolescent substance abuse. Some types of family interactions which occur with substance use have been discovered, and certain service delivery system variables which increase family participation in treatment have been found. Various effects of family system therapy and its components upon family interactions and adolescent behavior have been demonstrated.

As Kaufman (1985) points out, however, many theory-based questions remain. It is not known, for instance, whether the observed differences between families with and without substance abusers precede or follow the substance abuse. Many of the effects that family systems therapy is assumed to have upon family characteristics are yet to be demonstrated, and finally, many of the postulated interconnections between family characteristics and adolescent substance use have yet to be validated.

BEHAVIOR THEORY

Behavior theorists view all behavior as a function of: (a) the consequences the behavior produces, (b) competing behavior/consequences relationships, (c) the individual's learning history, (d) current state, and (e) genetic endowment (Skinner 1953). Thus all adolescent behavior, including drug use, is also seen as a function of past and present environmental and genetic variables. A particular behavior is considered to be understood in the behavioral paradigm when enough of its antecedents and consequences are known to permit modification of behavior through manipulation of controlling factors. Consequently, since observable environmental events are eminently more manipulable than an individual's genetics, history, or current state, behavior researchers choose to explain as much behavioral variance as possible through its relation with environmental variables.

The basic units of analysis for understanding how family variables affect adolescent problems are the functional relationships, or contingencies, among (a) discrete adolescent behaviors, (b) family-related consequences of the behaviors, and (c) antecedents that signal what consequences are in effect. Some concepts which behavioral theorists use to describe salient relationships are: (a) positive reinforcement, (b) negative reinforcement (including escape), (c) schedules of reinforcement, (d) punishment, (e) discriminative stimuli, (f) establishing operations or setting events, (g) avoidance, (h) extinction, and (i) rule-governed behavior (Kantor 1959; Michael 1982; Skinner 1953; Skinner 1969).

Correlational support for the behavioristic notion that adolescent problems can be a function of antecedents and consequences in the family environment comes from Reid et al. (1982). In families with children exhibiting behavioral problems, they observed both excessive aversive parent-initiated behavior toward the child (antecedents) and weak or ineffective consequences. Alexander (1973) found parents of adolescents with problems doing more blaming, evaluating, and preaching (vs. discussing) than non-distressed parents. Another type of antecedent--vague or interrupted commands with which a child cannot comply--was found to covary with child behavior problems by Forehand et al. (1986). Furthermore, in response to family disagreements such as arguments about curfew, families with drug-abusing adolescents tend to change the topic and discuss areas of agreement significantly more often than do other families, thus precluding constructive problem solving (Mead and Campbell 1972).

That environmental variables can affect drug use directly is clear from research with adults by Bigelow et al. (1976), Hall et al. (1979), McCaul et al. (1984), and Stitzer et al. (1982). Each research group decreased drug use by modifying specific antecedents and/or consequences of discrete instances of drug use. Drug use was punished, nonuse was reinforced, or the amount of effort required to obtain drugs was increased.

Thus, to reduce adolescent problems, behavior family therapists: (a) analyze what functional relationships each problem behavior appears to have with antecedents and consequences, (b) select one target problem behavior which is measurable and appears to be contingent upon modifiable family antecedents and/or consequences, (c) record the base rate of that behavior per unit of time, (d) change the therapist-controlled environment such that the parents will change the hypothesized family-related antecedents and/or consequences of the targeted adolescent behavior, (e) record the impact of environmental changes on the targeted behavior, (f) select another adolescent problem and repeat steps c through e, (g) change the therapist-controlled environment such that parents will generalize and maintain their new behavioral antecedents and/or consequences and generate their own ideas about how to change other contingencies after they no longer see the therapist regularly. In other words, behavior family therapists help parents change their own behavior in order to change their adolescents' behavior. My categorization of the methods and content which behavior family therapists use to change parent and adolescent behaviors follows, along with findings regarding their effects.

TECHNIQUES

Behavioral Assessment

Functional analyses. Gordon and Davidson (1981) describe thoroughly what techniques behavior therapists use to analyze adolescent problems. Briefly, by combining interviews with both the parents and adolescents, behavioral and reinforcement checklists, and analogous and naturalistic observations during the therapy session both at home and at the adolescent's school, potential target behaviors along with potential controlling antecedents and consequences are specified. Parents and adolescents typically begin by discussing only global nonbehavioral problems and blaming each other. The therapist not only respectfully prompts and reinforces nonblaming responses about observable stimulus/response/reinforcement relationships, but also observes salient correlated parent and child behaviors such as self-deprecatory comments, inaccurate problem reporting, and expressions of dissatisfaction with therapy (Wahler and Fox 1982). Griest et al. (1979), for instance, found that mothers' depressive behavior tends to be more correlated with their reports of child behavior than is the actual child behavior.

Unseen problem behaviors, such as stealing and drug taking, can be defined so that they are observable (Chamberlain and Patterson 1984). Stealing can become "taking or being in possession of something that does not belong to you." Drug use can become "money disappearing unaccountably," "sleeping at unusual times," "smelling pungent," "not making focused eye contact," "possessing paraphernalia," or "being in the company of known drug users."

Another approach to analyzing unseen problem behaviors is to substitute similar or functionally dependent behaviors that are observable (Reid et al. 1982). Since drug use, for example, often occurs on school days and lowers school performance (Pandina and White 1981; Pandina et al. 1981), measurements of school performance can be useful substitutes for unseen heavy drug use.

Gordon and Davidson (1981) also describe criteria behavior therapists use to select target behaviors. Since adolescent behavior change usually depends on parent behavior change, one of the initial criteria for target behavior selection is that the parents are concerned about the behavior. The greater the concern, the greater should be the parents' participation in treatment. Other criteria are: (a) the behavior can be directly observed by the parents; (b) the behavior has a high frequency, or parents desire a high frequency; and (c) the behavior has educational or social significance.

Parent Training Methods

After selecting target behaviors, therapists select methods and content to influence parent behaviors. Behavior family therapists work more directly on parental than adolescent behaviors--not because they assume that parents cause adolescent problems, but because parents have access to many family-related antecedents and consequences of the adolescents' behavior (O'Dell 1985). Thus, through judicious application of these events, the parents can modify the child's behavior.

Common behavioral methods which are used both singly and in combination to influence parent behaviors include:

Providing reading material. Giving parents pretested books and brochures and monitoring subsequent behaviors has proven effective in reducing children's antisocial behavior (Green et al. 1976), inappropriate mealtime behavior (McMahon and Forehand 1978), and disruptive shopping behavior (Clark et al. 1977). Several empirically based parent manuals have been produced by behavior therapists to be used alone or in combination with other behavior change techniques (Becker 1969; Blechman 1985; Miller 1975; Patterson 1971; Patterson and Forgatch, in press).

Instruction. In combination with other methods, informal oral instruction is probably the most commonly used behavior change method in behavior therapy (O'Dell 1985). There is evidence that individualized, interactive instruction is more effective in changing parent and child behaviors and producing parent satisfaction than group didactic instruction (Eyberg and Matarazzo 1980). Microanalyses suggest, however, that discrete episodes of informal instruction during therapy sessions can produce contingent momentary noncompliant responses on the part of parents (Patterson and Forgatch 1985). These findings will be discussed subsequently in the context of the effects of other therapist behaviors.

Modelling. Modelling--teaching new parent behaviors by demonstrating their desirable effects--is a particularly effective behavior change methodology (Nay 1975). Perhaps modelling is superior to written and oral presentations because it communicates nonspecific components of the new behavior, such as affective components (Alexander and Parsons 1973). Videotaped modelling appears to be as effective as live modelling in teaching basic skills (O'Dell 1985).

Prompting, shaping, and behavioral rehearsal. While parents are interacting with their adolescents in the therapist's presence, the therapist can prompt and shape the parents' behavior by coaching and praising successive approximations of the new antecedents and consequent relationships (Gordon and Davidson 1981). Wahler (1969), for instance, went into homes and prompted and shaped mothers' differential reinforcement and punishment skills. If used to change parents' verbal and attending behavior during therapy sessions, prompting, shaping, and behavioral rehearsal can produce rapid parent behavior change (Guerney, unpublished).

Providing reinforcement. The therapist can provide positive and negative consequences to increase or decrease specific parent and adolescent behaviors. Family attendance at therapy sessions is extremely important for effectiveness, and, thus, behavior family therapists provide positive reinforcement. Contingent upon only attendance, most behavior therapists provide praise, a congenial setting, and respect by asking the family members for advice, involving them in decision making, and treating them like cotherapists. Patterson et al. (1975) also provide telephone inquiries three times a week. Besides phone calls, Szykula et al. (1982) provide home visits which are gradually attenuated after attendance is established.

Rinn et al. (1975) provide small fee reimbursements for attendance; Peine and Munro (unpublished) do so for punctuality. Gordon et al. (1979) refund a fee deposit for attendance and completion of homework. Other incentives reported are prizes (Muir and Milan 1982), therapist time (Eyberg and Johnson 1974) and self-disclosure, and prompt feedback about improvement in target behaviors (Gordon and Davidson 1981). Recall that this procedure was incorporated by Stanton and Todd in traditional family therapies in the form of explicit payment.

Not only has positive reinforcement improved session attendance (Szykula et al. 1982) and homework completion, but also parent satisfaction with the whole intervention (Gordon et al. 1979). Only one study found a negative effect along with the positive ones: Blechman and Taylor (unpublished) report that payment for attendance and homework completion decreased performance maintenance and generalization as compared to mere social reinforcement.

Assigning homework. Asking family members to practice between sessions the skills they have learned and to report their results at the next session is a common behavior therapy practice to

increase the probability that changes will occur outside the therapy sessions. Few families, however, comply automatically. Therefore, Guerney (unpublished) has developed a technology utilizing both rehearsal and reinforcement to teach families to do homework. It is generally assumed that homework is effective, but Foster et al. (1983) report that in at least one parent training study it decreased generalization and maintenance. They speculate that assigning homework can put home behavior change under so much therapist control that the new behavior disappears when the therapist does.

Parent Training Content

Through the above methods, behavior change principles and skills are taught to parents and family members, both singly and in combination. To help therapists choose which principles and skills to teach, Blechman (1981) has developed an algorithm for matching content to the situations which families present.

Parent contingency management skills. Because most parents initially assume that the adolescent is the sole cause of his or her own problems, the first concept taught is that most behavior is learned through interaction with the social environment, which leads to a reinterpretation of the cause (Nichols 1984). Once it is clear that the behavior family therapist is not going to "fix the child" but help the parents instead to "fix the environment," parents ask what they can do. Skills taught include: (a) pinpointing behavior, or describing exactly when, where, and what the adolescent does that concerns the parent, (b) discriminating and reporting accurately when (and when not) the defined behavior occurs, (c) analyzing the behavior's antecedents and consequences, and (d) changing the behavior's consequences. To change the consequences, parents are taught to: (e) state the new rules to the adolescent in a calm, matter-of-fact manner, (f) reduce the frequency of their demands, commands, and nagging, (g) consistently praise or provide a tangible reward for desirable behavior, and (h) consistently punish or withdraw attention or rewards for undesirable behavior (Gordon and Davidson 1981).

Each of the above skills is difficult and may need to be taught separately. For instance, in their training manual, Patterson et al. (1975) warn therapists that many parents do not know how to make eye contact, label the target behavior, and state, just once, what the consequence is with appropriate expressions on their faces. Equally complex are the skills involved in changing the antecedents of target behaviors, reducing commands, demands, and other aversive controlling stimuli.

Communication skills. Parents and adolescents often nag and shout at each other when they have no other means of influencing each other. Through communication training, they can learn more desirable ways to influence each other. Specifically, Klein et al. (1977) taught family members to: (a) state clearly what they want and (b) state their understanding of what other family members

want. Guerney (1983) views communication training, which he calls Relationship Enhancement, as "teaching people to gain...control over what had previously been...reflexive interpersonal behaviors." He sees the skill as so important in problem resolution that his training manual calls for 4 hours of basic communication skills practice before even minor family disagreements are discussed (Guerney, unpublished).

Problem-solving skills. Once parents and adolescents have communicated what they want from each other, contingency management approaches are not always appropriate or effective. At that stage in their child's development, parents often want the child to develop good independent decision-making skills instead of merely complying with their wishes. Further, even if the parents are still seeking compliance, they often cannot use contingency management techniques because most of the adolescents' contingencies and consequences are out of their direct control. Another typical barrier is disagreement between the parents regarding what and how to discipline. Consequently, the therapist teaches the whole family problem-solving skills. Then both the parents and the therapist can model them for the adolescent.

Robin and Foster (1984) describe problem solving in detail. Foster's (unpublished) training manual spells out the logical progression of communication components that families are taught to reach an agreement about a specific problem: (a) defining the problem (as a dissatisfaction) concisely without accusations, (b) "brainstorming" a variety of alternative solutions, (c) evaluating the costs and benefits of the most popular solutions and negotiating a solution that maximizes benefits and minimizes costs for everyone involved, (d) specifying the details of the implementation agreement, including what will happen if difficulties arise.

Contingency contracting skills. A contingency contract is a written document detailing specific behaviors to be changed and their reinforcement arrangements that have been agreed upon by members of the family (Stuart 1971). It should be accompanied by a system to record at appropriate intervals whether or not behaviors occurred. Preparing a contingency contract requires all the above listed skills, contingency management, communication, and problem-solving skills. Contracts are particularly well-suited for adolescent problems because they specify that every member in the family, including the adolescent, will get something they want through compromise (Nichols 1984).

Therapist manuals by Alexander and Parsons (1982) and Barton and Alexander (unpublished) spell out family contingency contracting training procedures in detail. To guide families through their initial contract formation and to assist them in maintaining and generalizing the skills, Blechman (1977) has developed a board game that therapists can teach them to play and then give families to take home.

Self-management skills. Often parents and adolescents demonstrate the above skills consistently when they are prompted by the therapist but fail to do so without prompting. One approach to this situation is to teach parents and motivated adolescents how to anticipate on their own when opportunities for performing their new behaviors will arise and monitor their own new behaviors.

To increase mothers' attention to appropriate child behaviors, Herbert and Baer (1972) taught mothers to use a golfer's wrist counter to monitor the number of episodes of appropriate attention they gave for their child's behavior. Csapo (1979) and Wells et al. (1980) added self-reward to the behavioral sequence, teaching parents to give themselves rewards such as a coffee break when they provided appropriate consequences for their children's behavior. McCrady and Abrams (unpublished) have written a therapist's manual for training spouses in self-management, and Marlatt and Gordon (1985) have developed procedures for single adults.

Generalization and Maintenance

Even though a major reason for training parents to change their children is to enhance generalization of those changes across time, settings, behaviors, and siblings, empirical evidence indicates that transfer of treatment effects seldom occurs without specific programming. Consequently, behavior family therapists must attend to controlling variables outside the session, too (Gordon and Davidson 1981; O'Dell 1985).

Family-based reinforcement. Kelley et al. (1979) specifically taught spouses to reinforce each other's new child management behaviors in the same way that they were taught to reinforce their child's positive behaviors. Rabin et al. (1984) added explicit training in positive affective behavior to problem-solving training to maintain the latter. Generally, training parents to support each other comes after training them to manage their children, since their first concerns are about the children (Gordon and Davidson 1981).

Often, however, parents with adolescent problems do not increase their supportive behaviors for each other, even when they are modelled, prompted, and shaped. In his comprehensive therapists' manual, Miller (1975) lists the possible variables that may be operative in such training failures and, thus, need behavior family therapists' attention. There may be interpersonal demands, aversive stimuli, and distractions of which the parents may not be aware that interfere with the parents' using their new skills. Parents may have unreasonable, absolutistic thoughts about how teens act or how parents cooperate that lead to unrealistic goals, attributions of malicious intent on the part of their spouse or child, and/or self-blame. Parents may also be uncertain about whether or not their spouse will stay in the marriage.

To train mothers to be more aware of aversive interpersonal stimuli to which they respond aside from their children's behavior,

Wahler and Graves (1983) and Griest et al. (1982) discuss actual coercive exchanges that mothers have had with relatives and other adults. Wahler (unpublished) also uses "redirects" in conversations with mothers who are not aware of the impact upon them of these non-child-related aversive "setting events." He continually asks, "What else was going on (beside your child's being 'rude')?" and "Tell me more." Wahler is currently testing whether or not such treatment will result in fewer child-directed aversive responses on the part of the mothers.

Identification and challenging of unfounded thoughts, such as "Disapproval means our relationship will end," that lead to ineffective, rule-governed parent behavior were undertaken by Robin and Foster (1984), Alexander and Parsons (1982), and Barton and Alexander (1981) through examination of actual interpersonal contingencies. Patterson et al. (1975) and McCrady and Abrams (unpublished) describe marital contingency contracting to enable therapists to help spouses elicit more desirable responses from each other.

School-based reinforcement. Another extrasession source of controlling variables is the school. Positive changes in an adolescent at home do not necessarily correlate positively with changes at school (Forehand et al. 1981). To both assess the school variables and arrange for more reinforcement of new parent and adolescent behaviors, therapists can hold school conferences as Patterson et al. (1975) describe in their manual. The outcome could be weekly report cards (Bailey et al. 1970) or Progress Reports, as most schools call them, where teachers send parents regular reports about targeted school behaviors that are consequated at home. Alternatively, school personnel can be trained to provide consequences for targeted behaviors in school with the knowledge and support of parents (Bry 1978; Bry 1982; Bry and George 1979; Bry and George 1980). Stanley et al. (unpublished) have written a manual to train school personnel in the latter methodology.

Community-based reinforcement. Behavior family therapists also mobilize non-school-based community reinforcements for new parent and adolescent behaviors. For instance, when Wahler (unpublished) found that some parents did not maintain new behaviors outside the clinic, he proposed training friends to provide the same "redirects" outside therapy that therapists provide in therapy.

Csapo (1979) provided community-based reinforcement for parents by training them in a group and prompting parents to reinforce each other weekly in group meetings and call one another daily to ask how new contingencies were working. Szykula et al. (1982) also arranged for parents to receive babysitting, housing, legal, and medical attention if needed.

For adolescents, family-based interventions have included coordinated job training placement and social reinforcement for good performance (Barton et al., submitted for publication). At least

two technologies have been developed to help recovering substance abusers obtain community-based reinforcement in employment settings (Azrin and Basalel 1982; Hall et al. 1981).

Booster sessions. The demonstrated effects of intermittent reinforcement on resistance to extinction (Ferster and Skinner 1957) have lead behavior therapists to use gradual reductions in the number of booster sessions over time to enhance temporal generalization of positive behavior changes instead of offering time-limited therapy that ends abruptly (Gordon and Davidson 1981). In fact, because of previous findings that the positive effects of contingency management training do not last for young people who steal, Patterson (1982) does not terminate treatment for such families but merely lengthens time between contacts. Another type of booster procedure is to maintain telephone contact with families, providing retraining when necessary (Patterson et al. 1973).

FINDINGS

As stated above, behavioral researchers seek to understand adolescent behavior problems through their control. The goal of programmatic research, then, is to reduce problem behaviors progressively through the introduction of increasingly more effective behavior change technologies. Below are findings regarding techniques that have been shown to reduce adolescent behavior problems to date.

Effects of Combinations of Techniques

Through family contingency contracting, communication training, and homework assignments, Alexander and Parsons (1973) reduced adolescent problem behavior, first over an 18-month period, and then for up to 3 years (Klein et al. 1977). Robin et al. (1977) combined communication and problem-solving training to reduce lying and interrupting by the adolescent and the number and intensity of arguments reported by the parent (Robin 1981). Foster et al. (1983) also reduced number and intensity of parent-child disputes using similar techniques and maintained the changes through a 6- to 8-week followup.

Two behavioral family researchers have demonstrated some control over adolescent substance use. Fredericksen et al. (1976) combined problem solving, contingency contracting, and booster telephone calls to reduce both parent and adolescent complaints about the family and reduce drug use throughout a 1-year followup. Bry et al. (1986) combined problem solving, communication training, and school conferences to reduce drug use and school failure by the end of a 15-month followup (figure 1).

None of the above studies, of course, demonstrated perfect control. Types of inter- and intrasubject variabilities include subjects' not responding to treatment at all, varying degrees of

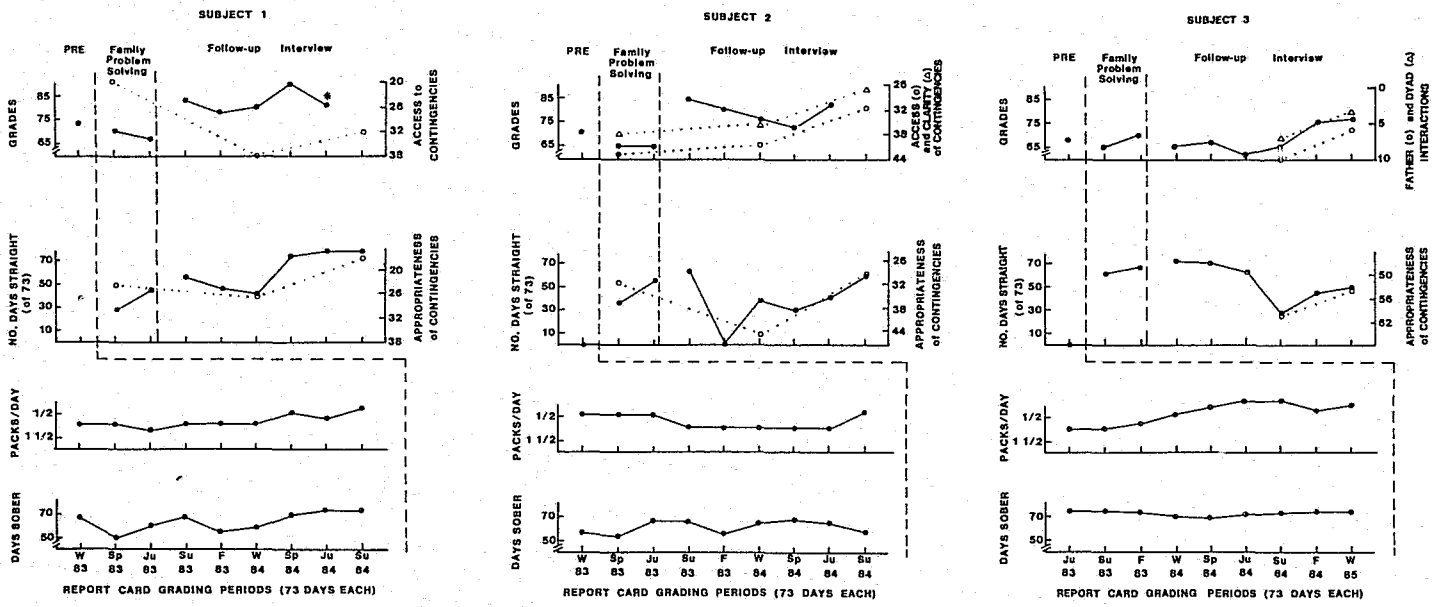

FIGURE 1. *Long-term effects of family communication and problem-solving training on adolescent grades, drug use, and their correlates*

NOTE: Solid lines connect grade point averages, number of days without drug use, mean daily packs of cigarettes smoked, and number of days without alcohol use for three 15- to 16-year-olds during each report card grading period (73 days) before, during, and 1 1/4 years after their families received targeted communication and problem-solving training. Dotted lines connect correlated indices of subjects' questionnaire responses about their school and home environments.

SOURCE: Bry et al. 1986, Copyright 1986, Haworth Press, Inc.

response, varying amounts of delay before response, varying durations of response, and problem behavior recurrences during followup.

Potential Additional Controlling Variables: Correlates of Problem Behavior Change

When behavior control is less than perfect, behavioral researchers examine correlates of behavioral variability for additional potential controlling variables (Sidman 1960). Findings suggest that less than optimal outcomes are due to less than optimal (a) family communication, consequating, and problem-solving behaviors, (b) community and school variables, and (c) therapist behaviors.

Family behaviors. When Alexander and Parsons (1973) examined which family communication variables correlated with juvenile delinquent recidivism, regardless of type of treatment, they found that (a) equality of speaking time among family members, (b) proportion of talk time to silence, and (c) frequency and length of interruptions all correlated negatively with amount of arrests. In another study, Alexander et al. (1976) found that families with better treatment outcomes had higher ratios of supportive to defensive (e.g., sarcasm, blaming) communications.

Robin et al. (1977) found that as the use of three of the components of problem-solving behavior on the part of both adolescents and parents increased, the reports of adolescent behavior problems decreased. During other effective interventions, Robin (1981) found more improvement in parents' problem-solving skills than in the adolescents'; Foster et al. (1983) found that the adolescents reported more improvement in their mothers' than their fathers' behaviors. Bry et al. (1986) found that decreases in an adolescent boy's drug use and school failure were accompanied by increases in his reports of positive interactions with his father.

Patterson and Fleischman (1979) actually observed more positive child-parent exchanges as behavior problems reduced. More specifically, Taplin and Reid (1977) report that (a) maternal aversive consequences following deviant behavior, (b) maternal aversive consequences following prosocial behavior, and (c) maternal positive consequences following deviant behavior decreased as behavior problems decreased. Taken together, correlational findings suggest that greater control over the adolescent's behavior may be gained by training the parents more specifically to (a) reduce sarcasm and blaming, (b) provide nonaversive appropriate consequences, (c) discriminate prosocial from deviant behavior, (d) use all the problem-solving components, (e) increase positive child-parent exchanges, (f) increase interruptions for clarification and feedback, and (g) acknowledge behavioral improvements.

Community and school variables. Wahler and Graves (1983) discovered that aversive exchanges that isolated mothers have with adults outside the family (e.g., welfare workers, relatives) early in the day appear to function as setting events (Kantor 1959) for

aversive parent-child exchanges later in the day. Assuming that they could not control the setting events, Wahler and Graves (1983) investigated the relationship by training isolated mothers to identify the setting events that were increasing their aversive interactions with their children. They found that as mothers reported more details about aversive exchanges outside the parent-child relationship, their aversive communications (e.g., blaming) about their child decreased.

Bry et al. (1986) measured some promising school-based correlates of problem behavior change. As adolescents' drug use and school failure returned during followup, so did their reports of inappropriate, inaccessible, and unclear contingencies at school. As their drug use and school failure decreased again, their reports about school improved (figure 1). Thus, other potential sources of variables controlling parent and adolescent behaviors are in the community and the school.

Therapist behaviors. Therapist behaviors have also been found to correlate with changes in client problem behavior. Stuart and Lott (1972) first observed that therapist variables affected outcome more than any other characteristic of therapy. This observation lead Alexander et al. (1976) to find that therapist behaviors such as self-disclosures, jokes, integrations of affect and behavior (called Relationship behaviors), and directives and clear expressions of confidence (called Structuring behaviors) accounted for 60 percent of the outcome variance, including whether or not clients stayed in treatment.

After Chamberlain et al. (1984) discovered that high initial levels of parent resistance behavior (interruptions, negative attitudes, challenges, following their own agenda) predict early treatment dropout, Patterson and Forgatch (1985) examined temporal relationships between all therapist behaviors and client resistance to see whether any therapist behaviors increased or decreased client resistance. Indeed, when therapists supported (encouraged, joked with the client) or facilitated ("um-humm," "sure"), resistance became less likely; when therapists taught (provided information about parenting or family life) or confronted a client (challenged a client with disagreement or disapproval), resistance became more likely.

That therapist behaviors are actually controlling variables was subsequently demonstrated through an ABAB single-subject design in which client resistance behaviors increased and decreased as the therapist systematically presented and withdrew teaching and confronting behaviors. These findings are significant contributions to knowledge, since client resistance behaviors typically occur from 6.4 to 14 times per therapy session. Practical applications are not immediately apparent, however, for other research suggests that supportive and facilitative communications alone change adolescent behavior significantly less than when combined with teaching and confronting (Alexander and Parsons 1973; Patterson et al. 1982).

Effects of Single Components of Behavior Family Therapy

As systematic research continues, the following findings regarding the effects of separate behavior family therapy techniques and contents could suggest methods to gain greater control over adolescent problem behaviors:

Written materials. O'Dell et al. (1980) found that adding a take-home manual to parent training eliminated previous variability in generalization. The authors speculate that parents used the manuals at home after termination to remember behavioral principles and solve new problems.

Interactive shaping, prompting, and rehearsal. These were found to be more effective and attractive to parents than didactic training (Eyberg and Matarazzo 1980).

Modelling. Alone, modelling has produced parent behavior changes that lasted for at least 1 year (Webster-Stratton 1982) and produces such behavior changes more rapidly than other techniques (Green et al. 1976).

Positive reinforcement. Blechman et al. (1981) found that giving parents just 1 hour of individual attention and then calling them to support their reinforcement of "home notes" from school produced greater consistency in their children's improved school performance and greater generalization to situations with no tangible reinforcement than did a similar intervention without parent reinforcement.

Instruction in behavioral management principles. For McMahon et al. (1981), instruction in behavioral management principles proved to increase generalization at followup.

Communication training. Relationship Enhancement, when applied intensively (20 to 30 hours of systematic training), significantly increases expressive and listening behavior, overall communication behavior, reported satisfaction in the family, and changes in the topography of both adolescent and parent communication behavior at termination (Guerney et al. 1981) and at 6-month followup (Guerney et al. 1983), compared with equal time spent in a discussion group. When parent communication training is added to other parent training techniques, previously ungeneralized behavior change can become generalized (Kelley et al. 1979). When specific training in positive affective communication is added to straight problem-solving training, affective elements of couple communication increase, and couples report better moods (Rabin et al. 1984).

Problem-solving training. Shown to increase negotiation behavior, parent-adolescent agreement, and the number of agreements kept (Kifer et al. 1974), problem-solving training is rated higher in social acceptability than are behavioral contracting, paradoxical

family therapy, and medication (Finfrock and Robin, submitted for publication).

Self-management training. When added to didactic training, self-management training reduced child behavior problems significantly more than did didactic training alone or combined with social reinforcement from the community (Csapo 1979). There is evidence that self-management training also improves generalization. Whereas no differences were apparent at termination, the children of parents who received self-control training in addition to regular parent training were less deviant at 2-month followup than were children of parents who received only regular parent training (Wells et al. 1980).

Family-based reinforcement. Techniques in family-based reinforcement have produced more positive child behaviors at 2-month followup than has parent training without them (Griest et al. 1982). Wahler and Graves (1983) did not directly manipulate relatives' behavior, but, by reviewing videotapes and shaping and prompting isolated mothers to report their aversive interactions with relatives in a more complex fashion, they reduced the frequency of behavior problems in isolated mothers' children on days when these aversive interactions with relatives occurred. McCrady et al. (submitted for publication) found that, as compared with minimal or no spouse involvement, active involvement of spouses in an outpatient alcohol treatment program decreased the amount of drinking by patients after relapses and increased life satisfaction, marital relationship, and consumer satisfaction ratings.

School-based reinforcement. When added to family-based interventions, school-based reinforcement can have powerful and long-term effects. Patterson (1974) added contingencies in school to contingencies at home and found that school performance improved for those young people. As mentioned above, when parents reinforced "home notes" from school personnel, school behavior changed for the whole school year (Blechman et al. 1981). Conversely, Bien and Bry (1980) and Bry and George (1979) found that providing reinforcement in school for "high risk" adolescents brought positive behavior changes only if parents were also systematically involved in the program.

Community-based reinforcement. When community-based reinforcements such as babysitting, housing, and legal and medical help were added to behavior family therapy, the dropout rate for parents decreased from 46 percent to 26 percent (Szykula et al. 1982). When daily calls to parents from other parents who were also implementing a child behavior change program were added to parent training, Csapo (1979) found significantly greater reductions in some target child behaviors than occurred without the community reinforcement. When job-search training, advice on non-alcohol-related social and recreational activities, and instruction in how to establish non-alcohol-related social relationships and how to adopt a pet were added to family-encouraged disulfiram treatment for young adult alcoholics, four different

indices of substance use problems were positively affected over a 6-month followup (Azrin et al. 1982). For serious adolescent offenders, the addition of family therapy coordinated job training and placement reduced recidivism from 93 percent to 60 percent (Barton et al., submitted for publication).

Booster sessions. There is clear evidence that the addition of even two 1-hour booster sessions can increase maintenance of behavior changes (McDonald and Budd 1983). In a very systematic look at booster effects, Guerney et al. (1983) found that the communication behavior of a randomly assigned group that received four booster sessions in communication training at 6-week intervals continued to increase over followup, while communication behavior in the non-booster-sessions group deteriorated.

CONCLUSIONS

Over the past 20 years, knowledge has grown about behavior therapy techniques that affect parenting behaviors and parenting behaviors that, in turn, affect child behavior problems. Clear training manuals that render the techniques replicable have been tested. Although much of the research reviewed here has focused on either non-substance-use problems in younger children or substance use in adults, a sufficient number of combinations and components of behavior family therapy have affected adolescent behaviors, including substance use, to establish its relevance for that age group and problem. A great deal of variability exists, however, in treatment effects among treatment settings, therapists, families, and problem behaviors. The systematic process of accounting for this variability and controlling it, particularly for adolescent substance use, is just beginning.

To guide that process, O'Dell (1985) argues that the most likely source of differential outcomes is variable performance of new behaviors by parents. According to O'Dell, parent variability could be due to, in order of importance, (1) variable levels of participation by parents in treatment, (2) concurrent personal, family, and community problems of the parents, and (3) parents' failure to discriminate problem from nonproblem behaviors in their children. Technologies exist that can affect each of these hypothesized sources of variance, but each requires considerable effort, consistency, and planning by the therapist. Consequently, agency conditions that establish and maintain the most effective therapist behaviors must be investigated.

Finally, theory-based questions still face behavior family researchers. Few studies have experimentally investigated the assumed functional relationships between discrete changes in parent-initiated antecedents and consequences and adolescent problem behavior. Likewise, there have been few experimental demonstrations of the assumed functional relationships between therapist behavior and parenting behavior.

SUMMARY

There has been much discussion over the last two decades concerning the theoretical and philosophical, as well as practical merits of the two perspectives discussed in this chapter. Both theories recently have developed knowledge that benefits all researchers and practitioners and are in the process of developing more. Adherents to both orientations agree that the family and greater social context play important roles in determining adolescent substance use. They also concur that successful interventions to change adolescent behaviors include: (a) targeting behaviors appropriate for the adolescents' developmental status, (b) recognizing that adolescents are seldom self-referred, and (c) utilizing the fact that parents still potentially control much in their lives. Theoretical differences lie in choices of salient family and adolescent variables, units of measurement, levels of scientific analysis, and notions about cause and effect. Both theories, however, currently are generating knowledge that reduces adolescent substance use, and this bodes well for the future.

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Parent and Peer Factors Associated With Drug Sampling in Early Adolescence: Implications for Treatment

Thomas J. Dishion, Gerald R. Patterson, and John R. Reid

INTRODUCTION

There are two directions which can be taken when addressing the problem of adolescent substance abuse. The first (and most common) is to develop a reasonable treatment strategy which helps youngsters whose early lives are disrupted by excessive use of one or many drugs. Although much has been done in this direction, both in terms of inpatient and outpatient treatment, the theoretical model guiding such treatment often lags far behind (Hubbard et al. 1985).

A complementary direction is to conduct careful longitudinal research to identify antecedents and covariates of substance use patterns, from early initiation to the actual abuse of one or more substances. Toward this goal, the writers are involved in a research agenda which focuses on the influence of families and peers on the development of antisocial child behavior and substance (ab)use (Patterson et al., in press). The assumption underlying this approach is that such developmental research will yield findings that might, in turn, be applied in the design of effective interventions.

The theoretical framework underlying this research has been termed "social interactional" (Cairns and Green 1979; Patterson and Reid 1984). It is based on the fundamental assumption that progress in the behavioral sciences can best be achieved by examining moment-by-moment social interactions in terms of the individual differences. Specifically, in the study of child development up to and through the adolescent years, it is assumed that interactions with both family and peers are necessary points of focus with applied implications. Such an interactional perspective provides a rationale within which to study the changing etiological variables as they relate to prevention and treatment effects (Dishion and Loeber 1985; Patterson and Reid 1984; Patterson et al., in press).

This applied perspective is the direct result of over two decades of programmatic work at the Oregon Social Learning Center (OSLC),

involving the development and evaluation of clinical procedures designed for families whose children have conduct problems (Patterson 1978; Patterson and Reid 1984). The Center provides parent training, based largely on social learning principles, which has been shown to affect considerable improvement in children's behavior (Patterson et al. 1982). These effects extend at least 1 year after treatment termination (Patterson and Fleischman 1979). Recent studies demonstrate that parent training for families of adolescents who have committed at least three offenses can reduce the rate of police contact with these youths over a period of 2 to 3 years (Marlowe et al., in preparation). In addition, current research efforts are directed at elucidation of the client-therapist interaction process contributing to the family's change during therapy (Chamberlain et al. 1984; Patterson and Forgatch 1985).

This clinical experience of working with the families of conduct-problem children and adolescents led to an emphasis on the role of specific parenting practices in the etiology of adolescent conduct problems, later chronic antisocial behavior, and substance use. In turn, efforts were focused on implementation of a longitudinal study on the contribution of family management practices to characteristics of normal and pathological development. Concurrent relationships were demonstrated (across settings) among inept parental discipline, negative microsocial exchanges within the family, and the child's tendency to be physically aggressive (Patterson et al. 1984). Similar relations between child-rearing practices and a generalized index of the child's antisocial behavior were later found (Patterson and Bank 1985; Patterson et al., in press). It is hypothesized that maladaptive family management practices have a persistent adverse impact in terms of antisocial behavior, eventual drug abuse, and developmental lag in academic skills, peer relations, and self-esteem. A systematic review of the literature corroborates this hypothesis by showing that disrupted family management practices were the best predictors of later male delinquency (Loeber and Dishion 1983).

In studying the etiology of substance (ab)use, it is important to clarify the criteria to be addressed. Baumrind (1985) has raised the crucial point that the varying definition of substance abuse across studies is a serious detriment to the utility of the findings of those studies. In this research, three criteria of drug use are defined: drug use exploration (number of drugs sampled), patterned drug use, and drug abuse. In part, the distinction among these three criteria is logical: youngsters must proceed through these steps to arrive at a stage where they are using a substance at a level that is immediately dangerous or that is detrimental to future development. In this vein, Baumrind's contention that drug abuse should be defined empirically--based, in part, on research showing the immediate and long-term effects of drug dosages on youngsters of the same age--is correct. The results described here relate to factors influencing the pre-adolescents' sampling of diverse substances. Future study of the longitudinal cohort will permit definition of factors associated

with patterned drug use and patterned use of specific substances as well as polydrug use. Finally, during late adolescence, study of the progression from patterned use to abuse can be undertaken. This sequential strategy for studying adolescent drug use is also supported empirically. Several studies document the continuity between early problem behavior and maladjustment in adolescence and adulthood (Loeber and Dishion 1983; Robins 1966), as well as substance abuse (Kellam et al. 1983). More to the point, early drug use in adolescence (before age 15) is predictive of abusive use of alcohol and other drugs in adulthood (Robins and Przybeck 1985).

Thus, we assume that a model explaining early drug exploration may not be equivalent to the model explaining patterned drug use in adolescence. Moreover, these models may not explain well the movement into drug use habits more appropriately labelled as abusive. However, the predictive validity of each stage of analysis will most likely be enhanced (Robins et al. 1977) and, therefore, the applied utility of the findings.

ANTISOCIAL BEHAVIOR AND DRUG USE

There has been debate about the causal relation between drug use and the commitment of delinquent acts (Clayton and Tuchfeld 1982). The major impetus for positing that drug use causes criminal activity comes from clinical outcome studies in which, for example, methadone treatment for heroin addiction was accompanied by decrements in criminal activity (Chambers 1974). However, it appears that delinquent behavior usually preceded drug use, and epidemiological studies on substance use in adolescence definitely corroborate this finding. For example, research by Johnston et al. (1978) reveals that the adolescents who began using drugs the earliest were those also engaging in behaviors such as interpersonal aggression, theft, and vandalism. Furthermore, as time progressed and new groups of youngsters began using drugs, the relative positions of those youngsters on a general delinquency composite did not change. In fact, all groups decreased their involvement in delinquent behavior as time progressed. In addition, Kellam et al. (1983) reported that, in their longitudinal analyses, aggressive behavior in the first grade correlated with substance use in adolescence. The best predictor of substance use was a combination of aggressiveness and shyness in the first grade. This supports the hypothesis of greater risk of problems in adolescence for children with combined skill deficits and antisocial behavior (Dishion et al. 1983; Patterson 1982). These data give rise to the hypothesis that both drug use and delinquency in adolescence are mutual outcomes of similar circumstances. Research on predicting the onset of marijuana use (Jessor and Jessor 1975) and alcohol use (Jessor 1976), and research on the development of problem drinking (Donovan et al. 1983) consistently indicated that self-reported delinquent behavior was among the strongest predictors of each. Similar results on the concomitant development of drug use were reported in the followup phase of the Cambridge-Sommerville study (McCord 1981).

Evidence of overlap between the development of antisocial behavior and drug use exists, but the overlap is not perfect. This supports the view that there are probably multiple pathways leading to drug use in adolescence (Bry et al. 1982; Elliott et al. 1985). The alternative pathways to drug use in adolescence can be delineated by dividing a sample and examining profiles on relevant factors. Pulkkinen (1983) followed this strategy in a longitudinal study conducted in Finland. Similarly, Dishion and Loeber (1985) reported that youngsters who used drugs regularly (at least once per month over a 1-year period) showed a profile almost identical to that of the nondelinquent abstainer group on the measures of peer deviancy and parent monitoring, while those who used drugs and had an official record of police contact for nondrug offenses were the most pathogenic on these variables (figure 1).

DETERMINANTS OF ADOLESCENT DRUG USE

A number of factors have been suggested as causally related to substance use in adolescence. Major factors include the child's attitudes, such as low law abidance (Huba and Bentler 1983), and exposure to drug use among peers and significant adults (Dishion and Loeber 1985; Elliott and Huizinga 1983; Huba and Bentler 1983; Noll and Zucker, unpublished; Zucker 1976). Research by Bry and associates indicates that, as the number of risk factors increases, the likelihood of adolescent substance use greatly increases (Bry et al. 1982). Generally neglected in the study of etiology has been the relation of specific parenting practices to the child's acquisition of addictive behaviors (Dishion and Loeber 1985). A model under development is directed at evaluating the hypothesis that child-rearing practices underlie the child's initial exploration of drug use and evolution of a pattern of regular use.

The major problem in interpreting previous research on the role of child-rearing factors in initiation of drug use has been dependence on the child's self-report. Dishion and Loeber (1985) (table 1) found a moderate covariation between such a generalized composite of the monitoring practice and the adolescent's use of alcohol ($r=-.36$) and marijuana ($r=-.43$). Similarly, a measure of parent discipline practices, based on home observer impressions across three home observation sessions, correlated with the adolescent's report of alcohol use ($r=.29$). Consistent with other studies on adolescent drug use, a composite measure of deviant peers covaried highly with adolescent alcohol ($r=.35$) and marijuana use ($r=.44$).

In the context of a multiple regression analysis (table 2), parent monitoring practices did not add to the variance accounted for by deviant peers in alcohol use, but did so for marijuana use. These findings were consistent with the hypothesis that parent monitoring practices exert an indirect and direct influence on adolescent drug use. The indirect effect is mediated through the child's association with a deviant peer group. Poor monitoring of the child is likely to increase his/her availability for deviant peers. A similar model has been tested and confirmed with

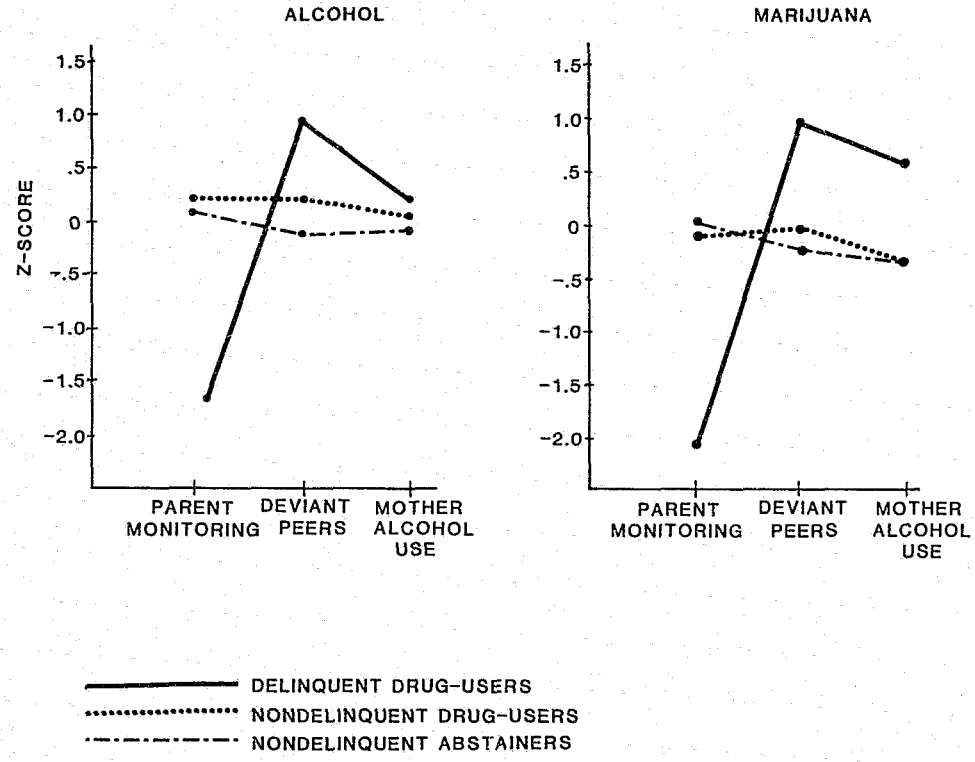


FIGURE 1. *Profiles of adolescent delinquent drug users compared to nondelinquent drug users and abstainers on family management, deviant peers, and mother's alcohol use*

SOURCE: Dishion and Loeber (1985). Copyright 1985, Marcel Dekker, Inc.

TABLE 1. *Bivariate correlations between self-reported substance use and parent and peer variables for 7th- and 10th-grade adolescent males*

Variables	Frequency of Use			
	Alcohol	n	Marijuana	n
Alcohol use:				
Mother	-.05	130	.17*	129
Father	-.07	96	.13[a]	96
Both parents	-.07	88	.05	88
Parent monitoring	-.36***	103	-.43***	103
Parent discipline	-.29**	61	-.12	61
Deviant peers	.35***	117	.44***	116

[a]p<.10

*p<.05

**p<.01

***p<.001

SOURCE: Dishion and Loeber (1985). Copyright 1985, Marcel Dekker, Inc.

TABLE 2. *Multiple regressions of self-reported drug use on parent monitoring, deviant peers, and mother's alcohol use for Cohort I (n=91)*

Dependent Variable	Independent Variable	Stand. Beta Coef.	(R)	[a]Adjusted R^2	R^2	F
Self-reported alcohol use	Parent monitoring	-.19	(.41)			
	Mother's alcohol use	-.01		.17	5.98**	
	Deviant peers	.28*				.14
Self-reported marijuana use	Parent monitoring	-.26*	(.52)			
	Mother's alcohol use	.10		.27	11.01**	
	Deviant peers	.31*				.25

[a]Adjusted for estimated shrinkage under cross-validation

*p<.05

**p<.001

SOURCE: Dishion and Loeber (1985). Copyright 1985, Marcel Dekker, Inc.

correlational data on adolescent delinquency (Patterson and Dishion 1985).

Other researchers have reported covariation between child-rearing practices and substance use. Pulkkinen (1983) found through

interviews that a measure of child-centered guidance, when the child was 14 years old, was related to the child's smoking and drinking habits at that age and later in adolescence. However, in the Jessors' studies, the child's report of parental control was not found to be related to the onset of alcohol use (Jessor and Jessor 1975) and was only marginally related to marijuana use (Jessor 1976). Clearly, as noted by Baumrind (1985), the problem of measuring processes must be surmounted to prevent premature conclusions from being drawn (e.g., the contribution of child-rearing practices). However, it is hypothesized that parent monitoring practices are important, and that it is partly the exposure to drug use among friends and parents that determines the child's initial exploration of drugs.

In the current research, attention has focused on five family management practices: Parent Monitoring, Discipline, Positive Reinforcement, Parent Involvement, and Problem Solving. The focus is on forming constructs incorporating the unique vantage point of all social participants, including that of professional observers. These more generalizable constructs should be more robust under the scrutiny of both cross-validation and longitudinal analysis. This follows from the principle of aggregation (Buss and Craik 1983) in personality theory and is primarily a measurement issue.

The relationship between the five management practices and disrupters is important. There are events that both the child and his or her parents experience that disrupt the exercise of normal family management (Patterson 1982; Patterson 1983). For example, heavy alcohol or drug use by a parent could be a family disrupter and is, thus, included in the model as an important factor for two reasons. First, it may directly affect the child's initial exploration of drugs as the child models parent behavior and by making the drugs more readily available. Second, heavy parent substance use is likely to disrupt monitoring practices, as well as other family management variables. This effect may be particularly relevant in preadolescence, when the influence of parents on social development may be more important than peers' influence. Consistent with research by Krosnick and Judd (1982) and Kandel (1973), peer substance use may be more influential in adolescence. However, it may be premature to draw conclusions about the relative influence of parents and peers, since models incorporating both direct and indirect influences of each have not been adequately evaluated.

AIMS OF THE PRESENT RESEARCH

The study reported here focused on a model to explain the child's initial sampling of various drugs. Drug exploration, as a criterion variable, has been examined in relation to the composite indices of family management practices, family interactional processes, peer influence, and parent drug use.

Subject Recruitment

These data represent the first collection wave in a longitudinal study of two cohorts. Schools located in neighborhoods with higher risk for delinquency were selected based on police arrest data. The 15 highest-risk schools were approached to join the study for Cohort I, and 14 agreed to be in the study. The 10 highest-risk schools were randomly ordered, and the first 6 schools were recruited. Schools were recruited until a sample of 103 families was obtained. This process was repeated for Cohort II, except that the remaining 10 highest-risk schools were randomly reordered. In Cohort II, 7 schools were recruited to acquire 104 families.

Adjusting for the families not solicited, the rate of recruitment and completion for Cohort I was 76.7 percent, and, for Cohort II, 72.2 percent. Thus, 30 of 153 families and 40 of 155 families declined participation in Cohorts I and II, respectively.

Sample Characteristics

Table 3 contains the basic demographic characteristics of the two longitudinal cohorts. Whenever possible, further data are supplied from more representative samples to provide an anchor for comparative purposes. For socioeconomic status, the National Youth Survey (Elliott et al. 1985) data were provided, since these data reflect the distribution of families within three categories, according to Hollingshead's index (Hollingshead, unpublished manuscript): lower class represents categories 1 and 2; working class represents category 3; and middle class, categories 4 and 5. The unemployment rate of 9 to 10 percent for the longitudinal cohorts is noteworthy, even though it is not directly comparable to the National Youth Survey sample and does not include "discouraged workers" (individuals who are no longer collecting unemployment benefits and have abandoned seeking new employment). Inspection of table 3 reveals that the middle class in the longitudinal cohorts was underrepresented, and families with lower incomes were overrepresented.

Data Collection Procedures

Data collection proceeded in three phases: the school phase, the interview phase, and the home phase (Patterson et al., in press).

The school phase involved collection of school information such as teacher ratings, peer nominations, and school records and achievement test scores. The only contact we had with the study children in the school setting was in collecting peer nominations, which involved groups of 4 to 12 children and required about 15 to 20 minutes of class time to administer.

TABLE 3. *Demographic characteristics of longitudinal study samples*

Demographic Characteristic	Cohort I	Cohort II	Comparative Statistics
			National Youth Survey, U.S., 1978
Family SES*			
Lower (1 & 2)	34%	28%	42%
Working (3)	23%	26%	29%
Middle (4 & 5)	22%	26%	23%
Unemployed	22%	20%	-
			U.S. Census, Western U.S., 1979
Family Income			
$0-4,999	11%	16%	12%
$5,000-9,999	21%	20%	15%
$10,000-14,999	16%	17%	15%
$15,000-19,999	14%	14%	14%
$20,000-24,999	17%	14%	13%
$25,000-29,999	8%	10%	-
$30,000-39,999	13%	6%	-
$40,000+	3%	3%	-
($25,000+ total)	(24%)	(19%)	(32%)
Family Structure			
Single parent	31%	40%	-
1-2 children	52%	58%	-
3-4 children	37%	32%	-
5-6 children	12%	11%	-
Mean age:			
Mother	34	36	-
Father	36	37	-
Child Achievement			
WRAT reading**	106.0	108.7	-
(SD)	(13.8)	(17.0)	-

*Hollingshead Index of Socioeconomic Status, 1975

**Wide Range Achievement Test, mean standard score

The interview phase of data collection consisted of a visit to OSLC. During the interview session, the parents and child were interviewed and completed questionnaires separately, but participated together in a videotaped problem-solving task.

The home phase involved the collection of data in a series of six telephone calls to the child and parent(s) separately, and three home observations lasting 60 minutes each. The telephone reports were structured interviews that lasted from 10 to 15 minutes per respondent. The home observation sessions were structured to facilitate the coding of all family members' behavior and to prevent interruptions in interaction sequences.

The format was consistent with that described by Reid (1978) for home observations in assessing behavior change in parent training. Observation was based on the Family Process Code (Dishion et al. 1983) which includes ongoing behavior and emotional valence with every behavior recorded.

Obviously, the study of the longitudinal cohorts included a plethora of measures tapping many facets of family functioning. The approach that was used to build constructs with the longitudinal cohorts has been described as "bootstrapping" (Patterson and Bank 1985; Patterson and Bank, in press; Cronbach and Meehl 1955).

Whenever feasible, multiple agents, settings, and methods were used to assess every construct. The resulting score is usually referred to as the "construct score." A 3-year pilot study (the Planning Study) provided the opportunity to test the initial measurement hypotheses about family management.

The following is a brief description of the composite scores used in this study. Details of the items for each of the composites and their specific data sources are provided in Patterson et al. (in press).

Child Behavior Composites

Child's drug exploration. This composite was based on parents' and children's reports of drug use. The child scale consisted of six items asking the child if he had ever tried cigarettes, beer, wine, hard liquor, marijuana, or other drugs. The parents also reported on whether the child had tried cigarettes, alcohol, marijuana, or other drugs.

Antisocial behavior. For boys 9 to 10 years old, it was assumed that a general score combining information concerning both overt and clandestine noncompliance to rules would be prototypic of behaviors describing the antisocial child. This score sampled global ratings from peer nominations, teacher and parent Child Behavior Checklists (CBCs), and the daily telephone interview with the parent and the child. The behaviors included in this score ranged from fighting and arguing with siblings to more extreme behaviors, such as stealing and vandalism.

Friends' drug use. Information on the subject child's friends was obtained in the child interview. The child was asked if any of his friends used alcohol, tobacco, marijuana, or other illicit drugs, or sold illicit drugs.

Academic skills. An average score was computed for each child from parent and teacher CBC ratings of academic competence, as well as the Wide Range Achievement Test (WRAT) and Standardized Achievement Tests (SATs) administered in schools. The WRAT was administered during the structured interview. SATs and WRAT ratings were on math as well as various language arts.

Normal peer relations. School data are integral to this construct. The Unpopular Scale from teacher CBCs and Peer Nominations on friendliness and popularity were used along with the child's self-report on making friends.

Antisocial peers. This score reflects the degree to which the child associates with peers who commit antisocial acts. The composite consists of the child's report on peer antisocial activity, peer nominations of children who associate with "tough kids," and the parents' global rating.

Coercive child. Three variables were taken directly from the home observation data that defined the child's coercive reactions to family members. The variables were (1) mean duration of the coercive interactions initiated by the target child with his mother, father, and siblings; (2) the likelihood of the child's initiating a conflict (startup) given that the parents were either neutral or positive in their immediately prior reaction to the child; and (3) the likelihood of the child's startup with siblings. Startup refers to the likelihood of the child's initiating a coercive response when his sibling was previously neutral or positive.

Self-esteem. Three measures based on the child's self-report are used as indicators for this construct. Self-ratings on academic and social competence from the Skills Checklist (Patterson et al. 1984) are used in conjunction with global ratings of self-worth (Kaplan 1975).

Antisocial attitudes. This score represents a composite of the child's report of a negative attitude about teachers, parents, police, and school; the child's perceptions of how permissible deviant behaviors are; and the interviewer's impression of the child's having an antisocial attitude.

Child depression. This represents teacher and parent reports of depressive symptomatology on the Child Behavior Checklist and the home observer's impression of the child's depression aggregated over three observation sessions.

Parenting Composites

Discipline. There are four indicators used to define parent discipline practices: Two are based on observation data, one on the observers' global ratings after the home observations, and one on parent reports in the interview on discipline strategies.

Two scores derived from the home observations describe the likelihood of an aversive parental reaction given that the parent was interacting with the child. One of the scores, explosive discipline, describes the likelihood that the parental reaction was extreme (e.g., threats, hitting). The other score, nattering, defines the likelihood of the parent's reacting in a scolding or nagging fashion given that he/she was interacting with the child.

There is, in addition, a composite based on the observers' global ratings of punishment, consistency, and followthrough. These scores are internally consistent and were shown to be a useful indicator for the definition of discipline (Patterson et al. 1984). The fourth indicator consists of ratings obtained from the mothers during an interview, sampling their perceptions of the discipline confrontations as being harsh and inconsistent.

Monitoring. The parent's composite score on monitoring has three indicators. It is measured by two different assessment methods and by reports from three different agents. The first indicator is from the parent and child interviewers' global ratings on how well the child is monitored. The second is a composite score based on child interview items that describe house rules for monitoring the child's return home from school, his whereabouts in the evening, and his activities when away from home. The third indicator is based on daily telephone reports of the number of hours the parent and child spend together. This is a single score averaged across 6 days of reporting.

Parent involvement. Four indicators of parent involvement were developed from three data types and two agents. Three of these are child reports of activities with parents, collected from questionnaires, telephone interviews, and the structured interview. Parent reports on similar activities from questionnaire data are also used.

Parent rejection. Parents report in the face-to-face interview on how pleasant their son has been to raise, how difficult it is to be patient with him, and how well they get along with him. Observers were asked to comment on whether relations between parents and son were friendly, and interviewers were asked if parents seemed accepting of the subject child.

Posi..ive reinforcement. This score reflects parent use of positive reinforcement to encourage prosocial behavior. One indicator for this construct represents the likelihood of the parent's being positive given the child is positive or neutral in the home. Additionally, staff observers' and interviewers' impressions of the parent's reinforcing behavior are used in conjunction with the parent's daily telephone report of using rewards (verbal, physical, or monetary) and the parent's interview responses concerning general reinforcing practices.

Problem solving. This measure assesses parent competence in handling family problems (Forgatch 1984). The score is based

primarily on the videotaped family problem-solving task at the Center, where coders and parents provide global impressions of the family's problem-solving performance. In addition, home observers made global ratings of parent competence in solving family problems as observed in the home, combined across three home observation sessions.

Parent drug use. This is a composite score combining the parent's use of alcohol, marijuana, and illicit drugs (e.g., LSD, cocaine) with minor drug use, such as use of caffeine or sleeping pills. The questions regarding substance use were acquired by two questionnaires: one developed here at the Center, and the Michigan Alcoholism Screening Test (MAST) developed by Selzer et al. (1975).

RESULTS

Percentages of the child's Yes responses to queries on use of each drug are presented in table 4. Note that the two cohorts are relatively comparable on all drugs, although a slightly higher percentage of Cohort II had experimented with marijuana. Alcohol was the most commonly sampled drug in the 9- to 10-years age group. The number and percentages of boys sampling multiple substances is presented in table 5. Relatively few boys (21 in Cohort I and 19 in Cohort II) in the sample had not sampled any drug, whereas 7 youngsters in Cohort I and 15 in Cohort II had experimented with four or more drugs.

A composite score reflecting the child's drug sampling was formed by combining the parent and child reports. The correlation between the parent and child reports was .84 in Cohort I and .88 in Cohort II. Table 6 shows the intercorrelation of the child's drug use and that of his friends to antisocial behavior and attitudes, peer relations, self-esteem, child depression, observed child coerciveness, and academic skills. Note that for Cohort I the highest correlations are observed between the child's use of drugs

TABLE 4. *Frequency of drug use exploration in two cohorts of 9- to 10-year-old boys*

	Percent Yes	
	Cohort I	Cohort II
Have you ever tried...?		
Cigarettes	24	29
Beer, even a sip	71	76
Wine, even a sip	47	48
Hard liquor, even a sip	16	28
Marijuana	5	15
Anything else to get high	3	4

TABLE 5. *Percent of preadolescent boys' polydrug use*

Number of Substances Sampled	Cohort I (Percent)	(n)	Cohort II (Percent)	(n)
0	21	(21)	18	(19)
1	29	(29)	21	(21)
2	25	(25)	33	(31)
3	18	(18)	13	(13)
4	6	(6)	8	(8)
5	0	(0)	5	(3)
6	1	(1)	2	(4)

TABLE 6. *Correlation of child's drug use and friends' drug use to other measures of child behavior and adjustment*

	Child's Drug Use		Friends' Drug Use	
Child Measures	Cohort I	Cohort II	Cohort I	Cohort II
General antisocial	.37***	.15[a]	.28**	.07
Observed child coercion	.25**	.15[a]	.09	.20*
Antisocial peers	.27**	.47***	.39***	.51***
Normal peer relations	-.09	-.15[a]	-.03	-.19*
Self-esteem	-.24*	-.20*	-.15[a]	-.14[a]
Depression	.23*	-.05	.03	-.02
Academic skills	-.09	-.03	-.04	.10

[a] $p<.10$

*$p<.05$

**$p<.01$

***$p<.001$

and his antisocial behavior. This correlation was found to replicate only partially in Cohort II. In the second cohort, deviant peer influences covaried quite strongly with the composite measure of child drug exploration, which was consistent across the two cohorts. The child's sense of self-esteem correlated with early drug sampling at a low level in both cohorts.

The next step in the analysis was to examine the covariation between five measures of family management, as well as one measure of the parent-child relationship, with the child's and his friends' drug use. Parent Monitoring practices were significantly correlated with Child's and Friends' Drug Use in both cohorts (table 7). Parent Discipline practices were found to covary with

TABLE 7. *Correlation of child's drug use and friends' drug use to six family management constructs*

Family Management Constructs	Child's Drug Use		Friends' Drug Use	
	Cohort I	Cohort II	Cohort I	Cohort II
Parent monitoring	-.39***	-.19*	-.22**	-.18*
Positive reinforcement	-.16[a]	-.10	-.13[a]	-.08
Parent involvement	-.28**	-.05	-.01	-.23**
Discipline practices	-.27**	-.18*	-.13[a]	-.02
Parent rejection	-.31***	-.02	-.21*	-.05
Parent problem solving	-.26**	-.10	-.09	-.05

[a] $p<.10$

*$p<.05$

**$p<.01$

***$p<.001$

Child's Drug Use in both cohorts and Friends' Drug Use, marginally, in Cohort II. Parent Involvement was associated with Child's Drug Use in Cohort I and Friends' Drug Use in Cohort II. Also notable was the correlation between a composite measure of parent rejection and both the child's and friends' drug exploration in Cohort I. However, this finding did not replicate in Cohort II. It is hypothesized that the major causal influence on family management relates parent monitoring to the child's exposure to peers who use drugs. It is also hypothesized that the longer the child's foray into drug use goes undetected by significant adults, the more likely it will be that the child will develop a pattern of drug use. While at this early age there are no patterned drug users in either cohort, the moderate degree of consistency between the two cohorts in the patterns of correlations should be considered. It is also important to consider the possible indirect influence of monitoring on the child's drug sampling. For example, parent monitoring correlated with antisocial peers: -.36 ($p<.001$) in Cohort I and -.40 ($p<.001$) in Cohort II.

Parent drug use was assumed to serve two functions, as described earlier. Table 8 provides correlations between the different indices of parent drug use and the child's and friends' drug use. Note that the mother is primarily implicated, since four of five measures of her reported drug use correlate with the child's drug use. The father's heavy drinking score correlates with the criterion variable. The level of the child's exposure to parent substance use could not be determined. Further analysis of the relation between the pattern of parent drug use (e.g., at home vs.

TABLE 8. *Correlations between parent drug use and child's and friends' drug use*

	Child's Drug Use		Friends' Drug Use	
Parent Drug Use	Cohort I	Cohort II	Cohort I	Cohort II
Mother:				
Heavy drinking score	.24**	.35***	-.07	.26**
MAST score	.18*	.07	.08	.11
Marijuana use	.36***	.24*	-.04	.05
Minor drug use	.00	.07	-.01	.05
Hard drug use	.32***	.27**	.06	.20*
Father:				
Heavy drinking score	.32***	.24*	-.07	.09
MAST score	.03	.15	.03	-.05
Marijuana use	.15[a]	.09	.13	-.09
Minor drug use	.06	.17[a]	-.01	-.01
Hard drug use	.08	.18[a]	.05	.25*
Parent composite	.35***	.34***	-.04	.19*

[a] $p < .10$

*$p < .05$

**$p < .01$

***$p < .001$

in a bar) and the beginning of substance use by the child is needed, as is further clarification of the extent to which children of drug-using parents find substances more readily available.

It is also hypothesized that parents' immoderate use of substances may interfere with their parenting practices, in general, and their monitoring, in particular. The data presented in table 9 provide only marginal support for this hypothesis. In Cohort I, the composite measure of parent drug use correlated significantly with monitoring practices and parent involvement with the child. These correlations, however, were not replicated in Cohort II. The hypothesis that parent monitoring of and involvement with the child has a predictive relation to later patterned use of drugs remains untested. Further, longitudinal data will address the question of whether sustained or increased substance use by parents is followed in time by decrements in their family management practices.

There is a need for a model providing a unified explanation of early drug sampling. As a preliminary step toward building such a model, the four primary constructs discussed above (Monitoring, Parent Drug Use, Peer Drug Use, and Child Drug Sampling) were

TABLE 9. *Parent drug use as a disrupter of family management practices*

Parent Drug Use	Monitoring	Discipline	Positive Reinforcement	Involvement	Problem Solving
Cohort I					
Parent composite	-.24**	-.06	-.15[a]	-.31***	-.12
Cohort II					
Parent composite	-.10	-.16[a]	-.09	-.10	-.14[a]

[a] $p < .10$

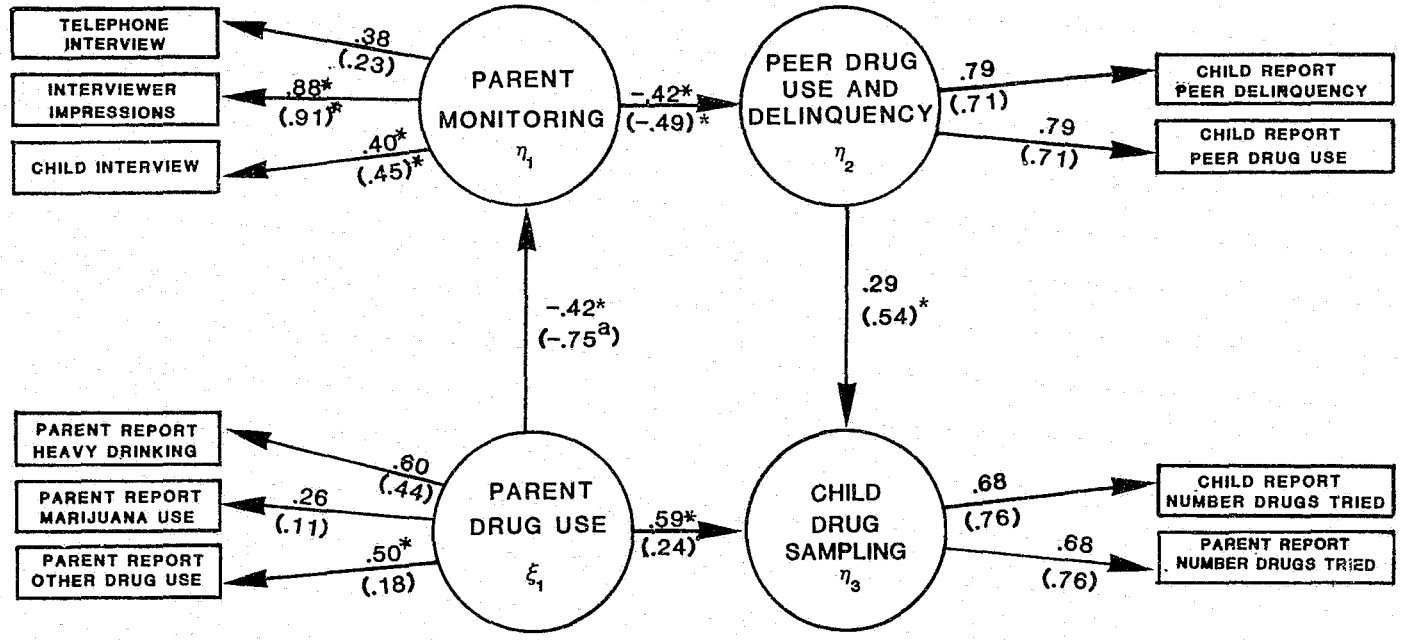
*$p < .05$

**$p < .01$

***$p < .001$

tested in a correlational structural equation model. The model (shown in figure 2) was developed and tested with Cohort I and subsequently replicated with Cohort II. Note the hypothesized pattern of relations: Parent drug use is expected to have both direct and indirect effects on the child's early initiation into drug use. The first effect is direct, and the mechanism is thought to be an increased availability of substances for children whose parents use substances regularly, as well as possible modelling effects. The second effect is indirect, disrupting the parent's supervision practices and placing the child in a peer context where he/she is exposed to drug use by near-age mates. Exposure to drug use by parents and peers was hypothesized to be a proximal effect on the child's early drug use, and parent monitoring, a more distal effect (although of considerable importance to the applied issue of prevention). Parent monitoring was further tested for having both a direct and indirect impact on the child's exploration with drugs. In Cohort I, the direct path coefficient joining Parent Monitoring with Child's Drug Sampling was observed to be nonsignificant. Dropping the effect coefficient did not result in a statistically significant change in the chi-square goodness-of-fit test. Therefore, the most parsimonious version, as shown in figure 3, was replicated on Cohort II.

The replication of the model in figure 2 is not altogether perfect. In Cohort II, the effect coefficients emanating from Parent Drug Use are not statistically significant, as is consistent with the bivariate correlations reported above. It is also important that the standardized factor loadings for the latent variable, Parent Drug Use, are statistically nonsignificant. It may be that the relatively skewed distributions in those two indicators (parent marijuana use and other drug use) are responsible for the change in correlational structure across the two cohorts. The importance of replicating structural models is underscored by this example. Nevertheless, progress has been made towards supporting



$p = .05$

[a] $p = .10$

Cohort	N	Goodness of fit
I	87	$\chi^2(31) = 31.6$ $p = .44$
II	85	$\chi^2(30) = 41.5$ $p = .08$

FIGURE 2. *Correlational model of drug sampling in middle childhood: Construction and replication coefficients*

a model including both parent drug use and parenting practices as determinants of drug sampling in middle childhood. The model accounted for 51 percent of the variance in drug use in Cohort I and 44 percent of the variance in Cohort II.

A reasonable next step to take in analyzing the appropriateness of the concurrent model for the observed data is to determine its adequacy when the two samples are combined. Increasing the sample size should theoretically increase the viability of the effect coefficients relative to population values. The original model developed in Cohort I was tested again, without the Cohort II revisions, with the combined sample.

Increasing the sample size to 168 resulted in the model's showing an adequate fit to the combined cohort data (chi-square=36.7, df=32, p=.26). As can be seen in figure 3, all the effect coefficients are statistically significant, as well as the construct indicators. For the two cohorts combined, the model accounts for 51 percent of the variance in the child's sampling of different drugs.

DISCUSSION

A concerted effort was made to develop a model showing the interrelations between variables often studied in epidemiological studies of child drug use. These data are an improvement on such studies in that they represent a number of measurement approaches to both parenting practices and indices of drug exposure and the child's antisocial behavior. These analyses revealed significant correlations between the child's early drug use and several composite scores reflecting his maladjustment, including antisocial behavior, coercive behavior with family members as observed in the home, self-esteem, and depression. The patterns of correlations were not entirely consistent across the two cohorts; however, the child's association with deviant peers was found to be significantly related to early drug exploration and poor parent monitoring practices, which is consistent with the findings reported by Dishion and Loeber (1985) on a sample of older adolescents.

Parent monitoring practices were significantly correlated, but of a relatively low magnitude, with drug sampling across the two cohorts. Related to this issue of monitoring is the extremely high correlation noted between the child's and parent's report of his drug sampling in both cohorts (r=.84 and .88 in Cohorts I and II, respectively). Obviously, early drug sampling is not exclusively a clandestine activity but a process that seems to be initiated with at least the partial awareness of parents. Thus, the effect of poor monitoring practices may be instrumental in the child's progression from exploration to patterned use. We assume that the deviant peer group is the social context in which maladaptive patterns of drug use are practiced. Parent monitoring is hypothesized to restrict the child's involvement in deviant social contexts. It is also likely that a high degree of parent involvement

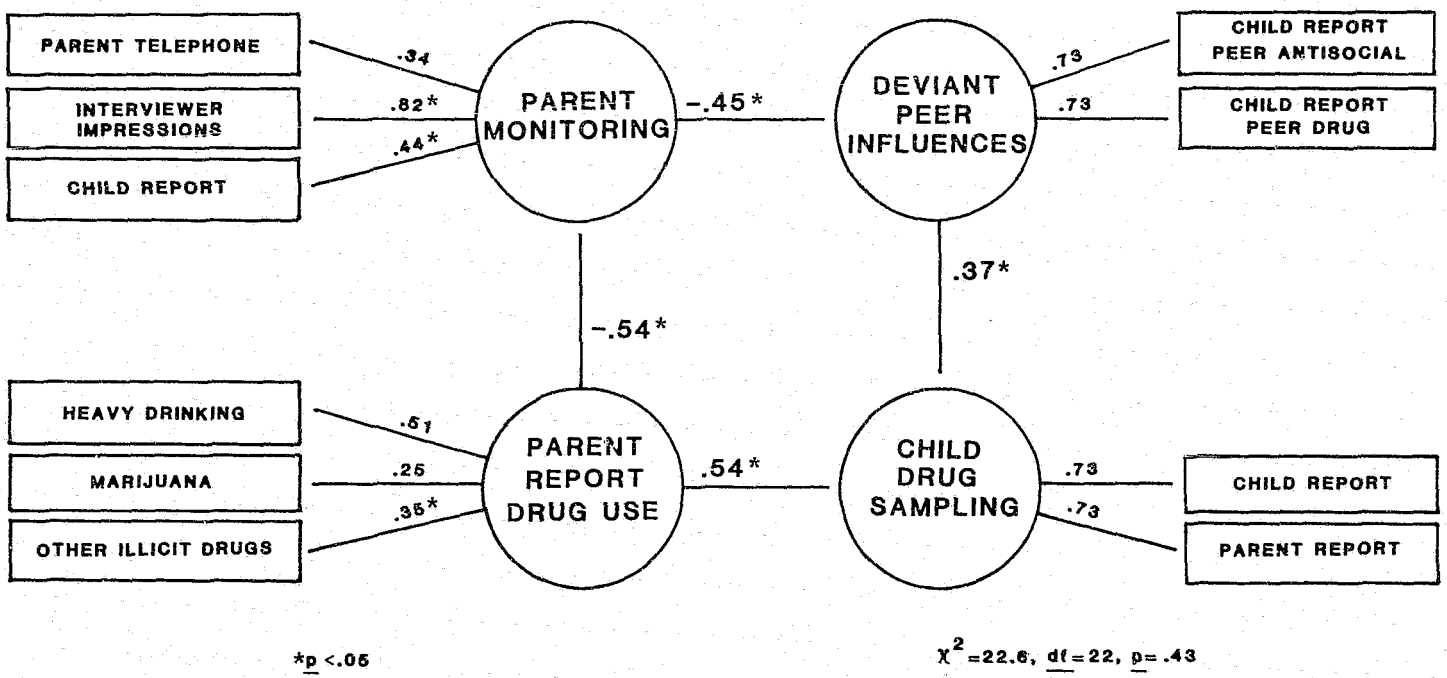


FIGURE 3. *Correlational model of drug sampling in middle childhood: Cohorts I and II combined*

with the child has a positive effect in promoting prosocial activities and increases the parent's sensitivity to the child's whereabouts and needs.

The correlational data and the modelling analysis support the hypothesis that parent drug use is related to the child's early sampling of drugs. This finding is in some contrast to earlier research with older adolescents (Dishion and Loeber 1985), where the correlation between parent use of alcohol and the child's use of marijuana and alcohol was low and generally nonsignificant (table 1).

The implications of these results for both treatment and prevention of drug use in adolescence are of special importance here. The correlation between the child's drug use and his generalized score on antisocial behavior is supportive of a perspective that ties these two outcomes together and poses similar, although not exact, causal circumstances underlying both. That is, parenting skills that are either omitted or disrupted set the child up in two ways: (1) he or she is likely to be antisocial and engage in behavior that elicits negative reactions by adults and peers alike; and (2) through the lack of monitoring and by virtue of being antisocial, the child is allowed to associate with a peer group in which drug use is common. Given research reported by Bry et al. (1982), it is clear that there is no single path toward substance use. However, parental monitoring practices may be a key variable underlying the child's early foray into sampling substances.

It has been proposed that drug use represents the beginning point on a developmental continuum. This assumption is supported in part by longitudinal studies of delinquency (Loeber and Dishion 1983). It is also expected that parent training procedures would be most useful as an intervention tool. This generates the emphasis on studying the very beginnings of substance use prior to adolescence.

The next step in this line of research is completion of longitudinal research, and this is currently under way at OSLC. The following steps relate well to the task of early intervention in substance abuse among the group of adolescents who are most at risk.

IMPLICATIONS FOR TREATMENT

It is important to underscore the fact that longitudinal data alone do not provide an adequate basis for attributing causality to any identified determinant. The more rigorous approach to determining the actual applied utility of an explanatory model is to use the principles implied by the model in a randomized longitudinal experiment, in other words, a planned intervention. The use of randomization is especially important in this context to fully examine the effect of manipulating the hypothesized determinants. The family (mis)management processes are viewed as setting

the child at risk for developing maladaptive habits such as drug use. The question remains: How would such a trial be carried out practically?

Simply providing the child with information about substance abuse would primarily alter the behavior of well-socialized children from cohesive families, rather than those most at risk. Children at high risk for heavy substance use would probably not give up cigarette smoking when given health information. Similarly, simply giving information and training the child in self-control techniques would probably not be effective for the subset of children most at risk for later substance abuse. Even at age 10, this subset of most-at-risk children are already difficult to change, whether by family, teachers, or therapist. A review of controlled field trial studies by Kazdin (1985) showed that efforts to teach self-control techniques to such samples did not produce consistent generalization to natural settings. But still, both information and teaching self-control techniques should be explored more intensively.

Although it is likely that parents will still prove to be the most effective agents for changing the behavior of their preadolescent or adolescent children, there are recognized disadvantages to using parents as agents of change. First, it is difficult to obtain parent cooperation in any kind of intervention. Second, even if the parent agrees to participate, careful observation of their interactions with parent trainers has demonstrated that much of their efforts are resistive and noncompliant (Chamberlain et al. 1984). But in summary, the optimal strategy may still prove to be to train parents before the child develops a major drug abuse problem.

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Pharmacotherapy of Concomitant Psychiatric Disorders in Adolescent Substance Abusers

Barbara Geller

INTRODUCTION

At the time of this writing there are no studies of the pharmacological treatment of adolescent substance abusers who also have major affective or schizophrenic disorders. Therefore, the following is a review and discussion of drug treatment of these disorders in nonabusing adolescents.

DIAGNOSTIC ISSUES OF AFFECTIVE DISORDER IN ADOLESCENTS

There has been a consensus among various investigators in the past decade that major depressive disorder exists during the adolescent years, evidenced by the increasing utilization of diagnostic criteria and assessment instruments that are similar to those used by investigators of adult populations and, therefore, yield comparable data (Carlson and Cantwell 1980; Strober et al. 1981; Robbins et al. 1982; Friedman et al. 1982; Geller et al. 1985a). The current Diagnostic and Statistical Manual (DSM-III) for psychiatric disorders includes exactly the same criteria for affective disorder from age 6 through adulthood.

However, there has been less systematic investigation of the diagnosis of mania during the pediatric years, despite over 300 reports of its existence (Youngerman and Canino 1978; Steinberg 1980; Jefferson 1982). Several authors have reported the misdiagnosis of an adolescent manic episode as schizophrenia (Campbell 1952; Horowitz 1977; Carlson and Strober 1978; Joyce 1984). The latter may be due in part to the presence of other psychotic phenomenology (e.g., delusions, thought disorder) during adolescent mania, and here the usefulness of a family history of a lithium-responding parent has been noted as a diagnostic aid (Carlson and Strober 1978; Strober and Carlson 1982).

An important issue is whether or not to assess affective disorder in adolescents by administering the Kiddie-Schizophrenia and Affective Disorders Schedule (KSADS), or other diagnostic instruments (Chambers et al. 1985; Geller et al. 1985a), to the mother

and the adolescent and arriving at a consensus diagnosis (similar to assessments of children), or to administer the Schizophrenia and Affective Disorders Schedule (SADS) to the adolescent only (similar to adult assessments) (Friedman et al. 1982; Strober and Carlson 1982). Studies of mother-child ratings of depression among the 12-and-under age group report significant differences (Weissman et al. 1980; Kazdin et al. 1983; Moretti et al. 1985). Comparable studies of depression in teenagers are not available. However, a recent study of mother-adolescent ratings of attention deficit disorder with hyperactivity by Gittelman (1985) is relevant. In that study, a significantly higher percentage of attention deficit disordered adolescents was identified using combined mother and adolescent ratings. Further studies of adolescent affective disorder will be important, especially in cases in which it is the patient's first episode, and prior course of illness and previous response to treatment are not available as diagnostic aids.

Although retrospectively 20 to 35 percent of adults report that their first episode of affective disorder occurred during the adolescent years (Loranger and Levine 1978; Strober and Carlson 1982), there are no large-scale studies of the course of affective disorder during adolescence. However, there are retrospective data that suggest that the course of illness of major depressive disorder in adolescents may be chronic (of years' duration) (Geller et al. 1985a; Beardslee et al. 1985), unlike the cyclic acute (of months' duration) episodes in adults (Hamilton 1979). One systematic study reported that the first manic episode during adolescence is usually preceded by a depressive episode, and a bipolar course is predicted by a history of rapid onset, the presence of marked psychomotor retardation, and a switch to hypomania with tricyclic antidepressant treatment (Strober and Carlson 1982). These studies of the course of adolescent affective disorder are crucial in evaluating outcomes in drug studies.

The incidence of delusional depression in adolescents has been reported as 13 percent and 8 percent by investigators of inpatient groups (Strober et al. 1981; Friedman et al. 1983). It was also lower in the Inamdar et al. (1979) study, but it is doubtful that their subjects fit the criteria for major depressive disorder, since they were described as "transiently sad only in relation to particular environmental events." The above reported incidences are lower than the 9 to 60 percent observed in adults (Pope and Lipinski 1978); however, this may be largely due to the misdiagnosis of psychotic depressed adolescents as schizophrenic (Carlson and Strober 1978). The question of whether delusions need be mood congruent remains controversial (Kantor and Glassman 1977).

In summary, the current hypothesis is that manic-depressive illness is the same disorder at all ages, and, therefore, studies to examine external validating criteria (family history of affective disorders, biological markers, course of illness, and response to antidepressant medication) would be appropriate (Akiskal 1980).

PHARMACOLOGICAL ISSUES OF PSYCHOTROPIC DRUGS IN ADOLESCENTS

Pharmacological properties of psychotropic drugs commonly used in adults have been little studied in adolescents. There are only two reports on neuroleptics. Meyers et al. (1980) reported a plasma level/response relationship of haloperidol in a 13-year-old schizophrenic boy. That patient's therapeutic level was higher than that reported in some adult studies (Mavroidis et al. 1985; Davis et al. 1985). Geller et al. (1985b) reported a chlorpromazine-nortriptyline drug interaction similar to that reported for adults on combined neuroleptic-tricyclic antidepressant therapy (Loga et al. 1981). Two investigators have reported on the pharmacology of tricyclic antidepressants in adolescents. Puig-Antich (1984) found no plasma level/response relationship for imipramine in adolescents. This was an unexpected finding, because Puig-Antich et al. (1979) had previously reported such a relationship in prepubertal children, and this relationship is also reported in adults (Risch et al. 1981). Recently, similarities between the pharmacology of nortriptyline in adolescents and adults have been reported with respect to the following: pharmacokinetic parameters (Geller et al. 1984); single dose kinetics predicting steady state and dose (Geller et al. 1985c); and serial monitoring and the time to achieve steady state (Geller et al. 1985d). The latter studies provide the basis for expecting that a well-designed study would prove nortriptyline to be effective in adolescents also.

There are as yet no studies during the teenage years of the administration of psychotropic drugs to substance-abusing adolescents, and, therefore, little is known of substance interaction in drug abuse during the teenage years. However, since these may be similar to interactions found in adults, mention of the adult findings may be useful here. Acute ethanol ingestion may elevate tricyclic antidepressant plasma levels, while chronic ethanol ingestion and chronic ingestion of certain abused drugs can induce the hepatic degradative enzymes and thereby decrease tricyclic antidepressant plasma levels (Seixas 1975; Kalant et al. 1976; Sellers and Holloway 1978; Sellman et al. 1975; Stevenson et al. 1972; Ciraulo et al. 1982; Sandoz et al. 1983; Iber 1977; Khanna et al. 1976; Linnoila et al. 1979; Linnoila et al. 1981; Moldeus et al. 1980). Thus, plasma level monitoring would be crucial to avoid toxicity in acute substance abusers and to avoid subtherapeutic plasma levels in chronic substance abusers.

PHARMACOTHERAPY OF MAJOR DEPRESSIVE DISORDER IN ADOLESCENTS

Since the introduction of antidepressant medications in the 1950's, there have been numerous well-designed double-blind placebo-controlled studies among adult samples (Klein et al. 1980). More recently, with advanced technology, many studies have monitored the plasma levels of the tricyclic antidepressants (Risch et al. 1981) or monoamine oxidase inhibition (Robinson et al. 1978) to insure therapeutic dose during trials. Recognizing the need to utilize power statistics to insure an appropriate

sample size and recognizing the high placebo response rate to medications of all types, well-designed studies in adults have begun with a placebo washout period of 1 to 2 weeks. Diagnostic instruments and severity measures have been tested for interrater reliability and clinical validity (Klein et al. 1980).

Despite these important advances in the design of studies of tricyclic antidepressants and monoamine oxidase inhibition in adult populations, the adolescent age group has been relatively neglected. There are no adequately designed double-blind placebo-controlled studies of tricyclic antidepressants or monoamine oxidase inhibitors for major depressive disorder during the adolescent years. There are four double-blind placebo-controlled studies of the drug treatment of depression during adolescence. The first of these studies was performed by Lucas et al. (1965). Fourteen subjects, 10 to 17 years of age, were studied, making adolescent-specific issues difficult to identify. Diagnosis was made by clinical interview, and the diagnostic categories included childhood depression, schizophrenia, personality disorder, and psychoneurosis. Diagnostic criteria were not mentioned. Severity measures were developed by the authors, but data on interrater reliability or validity were not given. The subjects received amitriptyline 30 to 75 mg daily. The reasons for the choice of amitriptyline and for the dosage range were not presented. The study was done prior to the availability of plasma levels. The percent of responders and nonresponders was not stated. The second of these studies was performed by Frommer (1967). Forty-one subjects, 9 to 15 years of age, were studied. Diagnosis by clinical interview divided the sample into a phobic group and a mood-disorder group. No criteria for diagnosis were given, and response was not measured by severity scales but by clinical interview. The two treatment regimes were either phenelzine 30 mg daily plus chlordiazepoxide 20 mg daily, or phenobarbitone 60 mg daily and an inert placebo. The phenelzine-chlordiazepoxide group had a 56-percent improvement; the phenobarbitone group had a 19-percent improvement.

These two studies were both performed prior to the advent of Research Diagnostic Criteria (RDC) and DSM-III criteria, and from the article it remains unknown whether the subjects mentioned would have met current criteria for major depressive disorder. Further, the group included subjects who were 9 to 12 years old; therefore, this study was not adolescent specific. Also, using phenelzine without monitoring monoamine oxidase inhibition does not permit determining whether the amount of medication the children were receiving was adequate to expect response.

More recently there have been two other studies. Kramer and Feiguine (1981) reported a study of 20 subjects, 13 to 17 years of age, who were diagnosed with adolescent depression. The criteria for the diagnosis are not stated. The children were rated for severity on a psychiatric rating scale that the authors developed; data on interrater reliability or validity were not given. The subjects had the Minnesota Multiphasic Personality Inventory

(MMPI) and the Depression Adjective Checklist administered at baseline and after 6 weeks of either active or placebo drug. All these subjects were inpatients who, by clinical interview prior to admission, were felt to be significantly depressed. They were kept drug free for approximately 5 days on a unit where various forms of milieu therapy were routinely used. Each subject received amitriptyline 200 mg per day for a period of 6 weeks if they were on active drug. The results of this study show that on all measures, except the Depression Adjective Checklist, there were no significant differences between active and placebo groups. On the Depression Adjective Checklist, the active group was significantly more improved. Both groups, however, showed significant improvement and, apparently, were no longer in need of psychiatric care at the end of the trial. Even if we assume that all children on active medication were receiving an adequate amount of medication, the results of this study have several problems. An n=20 is, by power statistics, inadequate to test the difference between an active and a placebo medication. Further, three subjects were later identified as not being depressed. The drug-free period lasted only 5 days. Without an adequate placebo washout phase, the distribution of placebo responders between the two groups cannot be known. Here again, the reason for the choice of amitriptyline and the rationale for the dosage were not stated. Ryan et al. (in press) reported an abstract of a study of 38 subjects. These subjects were diagnosed with major depressive disorder, utilizing research diagnostic criteria assessed by the KSADS. The KSADS was also used as the severity measure. The children received a fixed dose of imipramine, 5 mg/kg per day, unless their EKG did not permit the full dosage. It was noted at the end of the study that only 44 percent had improved; further, there was no plasma level/response relationship in this group. As noted above, these were unexpected findings, since the same group of investigators had found from retrospective data analysis a significant plasma level/response relationship of imipramine in prepubertal children similar to that in adult groups. Puig-Antich (1984) speculated that, possibly due to pubertal hormones, these subjects may not have responded. However, hormonal imbalance at other times of life, such as post partum, is not associated with a lower response to antidepressant medication. Further, Puig-Antich had speculated that maybe adolescents have atypical depressions such as those reported by Quitkin et al. (1982) and, therefore, would do better on monoamine oxidase inhibitors. However, if the subjects met the RDC criteria for major depressive disorder and were atypical, they may have been more similar to the group reported by Akiskal (1981) who had a good response to tricyclic antidepressants.

In summary, subjects were not identified using current criteria for major depressive disorder in three studies (Lucas et al. 1965; Frommer 1967; Kramer and Feiguine 1981), and delusional subtypes could not be identified from material given in the reports. This is important, because delusional subtypes in prepubertal subjects (Chambers et al. 1982) and in adults are significantly less likely to respond to conventional doses of tricyclic antidepressants, as

discussed elsewhere in this review. It is of note that in two of these four studies, the authors reported less than 50-percent improvement (Frommer 1967; Puig-Antich 1984), and in the Kramer and Feiguine (1981) study, both active and placebo patients responded.

The first of the five open-design studies was performed by Frommer (1968). Clinically diagnosed as phobic depressed, 190 subjects, 4 to 16 years of age, were studied. Criteria were not given, and assessment instruments were not used. Amitriptyline, in unreported dosage, was administered, and a 73-percent response rate was stated. Again, the wide age range does not permit specific knowledge of how the adolescents responded. In the second study, reported by Stack (1971), 289 subjects, 5 to 14 years of age, were studied. They were divided into four groups, one of which was "organic depressed" and will not be discussed here. The other three were simple, phobic, and mixed depressions. Diagnosis was made clinically, no criteria were given, and no assessment or severity instruments were used. Subjects received either amitriptyline, nortriptyline, or imipramine up to 75 mg per day, or phenelzine up to 45 mg per day. The response rate reported was 67 to 94 percent. Again, the basis for the choice of drugs and the rationale for the doses are not stated. Without monitoring the plasma levels for the tricyclic antidepressants or monoamine oxidase inhibition for phenelzine, it cannot be known if the difference between responders and nonresponders was an issue of adequate dose. The third study, reported by Abe (1979), included 24 subjects 9 to 17 years of age. They were diagnosed as paranoid phobic depressives by clinical interview without criteria being specified, and no assessment or severity measures were used. These subjects received sulpiride in a dose of 50 to 100 mg/day (no rationale for the choice of drug or dose was reported), and 66-percent improvement was noted.

Minuti and Gallo (1982) reported a study of 20 subjects, 4 to 15 years of age, who were diagnosed by clinical interview as depressed or as having a behavior disorder. A severity measure used to rate them during the time they were on medication was a four-item target symptom scale that the authors developed and for which reliability and validity are not reported. The subjects received a mean maprotiline dose of 24 to 32 mg per day (rationale for drug choice or dose was not given), and it was noted that subjects "improved." In the Abe (1979) and Minuti and Gallo (1982) studies, it is not clear why drugs newer to the market were being studied prior to better-known medications, especially for pediatric subjects. Also, the age range of the subjects mixed teenagers with prepubertal subjects; therefore, the results for the teenagers themselves cannot be known.

Geller et al. (1985b) reported an open pilot study of nortriptyline in eight adolescents 13 to 16 years of age. These subjects were diagnosed with major depressive disorder, nondelusional type, by RDC and DSM-III criteria and were assessed by the KSADS. The severity measure used during the study was the Children's

Depression Rating Scale (CDRS). These subjects received nortriptyline in a dose kinetically determined to obtain plasma levels between 60 and 100 ng/ml, similar to the adult therapeutic range (Asberg et al. 1971). In this study, six of the eight subjects had a full response on the CDRS. Plasma-level monitoring was performed weekly during the 8-week study and indicated good compliance. The rationale for the choice of nortriptyline was its safety in the geriatric population and its kinetic properties, which permit determining at baseline what dose to administer to obtain a plasma level optimal for safety and efficacy. Weekly Asberg Side Effects monitoring showed only minimal and transient side effects.

In summary, there is a need for adequately designed double-blind placebo-controlled studies of tricyclic antidepressants and monoamine oxidase inhibitors for major depressive disorder in the adolescent age group.

Pharmacotherapy of adult delusional depression is considerably less well studied than the nondelusional type. This is in part due to the lack of recognition that delusional depressives might be a subtype with a poor response to conventional doses of tricyclic antidepressants prior to the critical literature review of Kantor and Glassman (1977). A number of open studies (Glassman et al. 1977; Davison et al. 1977; Friedman et al. 1961; Hordern et al. 1963; Avery and Lubrano 1979; Minter and Mandel 1979; Kaskey et al. 1980; Charney and Nelson 1981; Moradi et al. 1979; Frances et al. 1981; Nelson and Bowers 1978; Fink et al. 1965) and one double-blind placebo-controlled study (Spiker et al. 1985) support the need for combined therapy of delusional depression; other open studies do not (Simpson et al. 1976; Stewart et al. 1980; Quitkin et al. 1978).

The only study of adolescent delusional depression was an open design reported by Geller et al. (1985b) of six postpubertal subjects, 12 to 16 years of age, who were diagnosed and assessed utilizing the KSADS and CDRS and who fit DSM-III and RDC criteria for major depressive disorder, delusional type. In this report, chlorpromazine (50 to 100 mg daily) alone was ineffective after 2 weeks. Nortriptyline was then added pharmacokinetically to produce plasma levels between 60 and 100 ng/ml, in the adult optimal therapeutic range (Asberg et al. 1971), for an 8-week combined therapy phase. Plasma levels were monitored weekly. Combined therapy produced a full response in five of the six subjects. Side effects were monitored by the Asberg Side Effects Scale and the Abnormal Involuntary Movements Scale (AIMS) and were minimal and transient.

PHARMACOTHERAPY OF MANIA IN ADOLESCENTS

Since the introduction of lithium in the 1950's, its usefulness in the treatment of acute manic episodes and the prevention of recurrences has been well established (American Journal of Psychiatry 1985). The relationship of lithium plasma levels to response is

also well studied (Cooper and Simpson 1978). Since the 1950's, there have been more than 300 reports of the use of lithium in children and adolescents, many of whom were diagnosed manic-depressive (Schou 1971; Youngerman and Canino 1978; Jefferson 1982; Steinberg 1980). However, there are no studies of plasma level/response and no well-designed double-blind placebo-controlled studies of adolescents.

The following is a review of the five more systematic studies of the use of lithium for adolescent mania. The first of these studies was by Annell (1969). Twelve subjects, 9 to 18 years of age, were studied. They were diagnosed as two manic, five catatonic, two delinquent, one suicidal, and two hyperactive using clinical interview; no criteria were stated. No diagnostic or severity measures were used. They were administered lithium to achieve a plasma level of 0.6 to 1.2 mEq/L per day, and 11 of the 12 responded; the one nonresponder was one of the hyperactive children. A second report was by Horowitz (1977) of eight teenagers, 15 to 18 years of age, who were diagnosed with primary affective psychosis by clinical interview. All eight responded when lithium was administered to achieve a plasma level of 0.5 to 1.2 mEq/L. Brumback and Weinberg (1977) studied six children 4 to 13 years of age. Although there were few adolescents in the sample, this study is important, because criteria were used. This is the first report of criteria for juvenile mania used by investigators performing a drug study. The Weinberg criteria for childhood mania were used as a severity measure to assess the children. The children received lithium to achieve a plasma level of 0.6 to 1.5 mEq/L. While receiving lithium, five of the six children sustained a worsening of the depression to a point of clinical significance. Two of the five children whose depression worsened while they were on lithium had a good and sustained response when a tricyclic antidepressant was added to the lithium. Another two of these five children who received a tricyclic antidepressant in addition to the lithium had a worsening of their mania. Therefore, only two of the six children had a good and sustained response, and those two only after a tricyclic antidepressant was added to their regime.

DeLong reported (1978) on 12 subjects 4 to 14 years of age. Again, although there were few adolescents in this sample, four of these subjects were on a double-blind placebo-controlled trial for a 3-week period. Their diagnosis was manic-depressivelike illness based on clinical interview, and their behavior was assessed by a modified Connors Parent Questionnaire. They received lithium to achieve plasma levels of 0.5 to 1.2 mEq/L. The subjects were all reported to have had a good response in terms of stabilization of their mood. Two of the 12 were noted to have decreased motivation to achieve in usual areas of activity and 1 of the 12, to have a decreased interest in learning. Hassanyeh and Davison (1980) reported on seven teenagers, 13 to 15 years of age, three of whom were diagnosed manic and four of whom were diagnosed depressed as assessed by the Weinberg criteria. Six of these subjects were reported to respond to lithium at a plasma level of 0.5 to 1.0

mEq/L; however, three of the six also received electroconvulsive therapy (ECT).

The problems with all the above studies are similar to the problems with the studies of major depressive disorder in this age group. The age range of the subjects in three of these studies also included prepubertal children, which makes it difficult to define adolescent-specific issues. Only two of these studies, Brumback and Weinberg (1977) and Hassanyeh and Davison (1980), used criteria to establish the diagnosis of mania. In two of the studies, additional treatment with either a tricyclic antidepressant or ECT was administered, making it difficult to assess the effect of lithium. It is of note here that plasma levels were monitored as is necessary to avoid serious toxicity with lithium, and the range at which response occurred is similar to that reported for adult subjects.

There are as yet no studies of whether or not lithium will be useful on a maintenance basis during adolescence. The need for these studies is evidenced by reports, such as those by Strober and Carlson (1982), that an adolescent presenting with bipolar illness will have a "malignant" course. It is not known whether maintenance lithium or lithium plus other modalities would provide a more favorable prognosis for these children. It is also not known whether a more favorable prognosis would be available if plasma levels were held between 1 and 1.5 mEq/L. This is mentioned because children and adolescents have a higher renal clearance than adults and, therefore, might need not only higher mg/kg doses to achieve similar plasma levels, but might, because of the rapid clearance, need to be maintained at higher plasma levels in order to achieve consistent response.

DIAGNOSTIC ISSUES OF SCHIZOPHRENIC DISORDERS IN ADOLESCENTS

Many reports of "childhood schizophrenia" or "childhood psychosis" are equivalent to DSM-III childhood autism or DSM-III childhood onset pervasive developmental disorder (Green et al. 1984). It is yet unclear what subset, if any, of children with childhood autism or childhood onset pervasive developmental disorder are manifesting an illness similar to adult onset schizophrenia. Therefore, it is not possible to evaluate treatments of "childhood schizophrenia" and know whether or not we are talking about the same illness as adult onset schizophrenia. Multiple studies of neuroleptics in the childhood autism or childhood onset pervasive developmental disorder group suggest that there is no medication that has been found effective in well-designed double-blind placebo-controlled studies (Coleman and Gillberg 1985). The phenomenology of schizophrenia defined by DSM-III criteria has not been studied during the adolescent years. We do not know whether adolescents having their first episode of schizophrenia would be different from adults in their phenomenology, the way manic episodes occurring during adolescence have been reported to be worse in terms of psychotic features and thought disorder (Carlson and

Strober 1978), or whether the phenomenology would be similar to that of adults (e.g., focal delusions).

PHARMACOTHERAPY OF SCHIZOPHRENIC DISORDERS IN ADOLESCENTS

The introduction of neuroleptics in the 1950's was followed by numerous double-blind placebo-controlled studies of their usefulness for acute schizophrenic episodes and for maintenance to prevent acute episodes in adults (Baldessarini 1977). Plasma level/response studies have been inconclusive (Sakalis et al. 1972; Van Putten et al. 1981; Mavroidis et al. 1985; Davis et al. 1985). Many chronic schizophrenics continue to require custodial care despite these advances. In part due to the diagnostic issues of schizophrenia during the pediatric years discussed above, there are few studies of schizophrenia during adolescence.

There are four reported studies of adolescent schizophrenia in which the children are not reported to be presenting autistic or pervasive developmental disordered features. However, this issue was not specifically addressed in these papers. The first of these was reported by Shaw et al. (1963). Ninety-one subjects, 7 to 15 years of age, were studied in a double-blind crossover design. However, it was stated that the time they spent on each medication was variable. These children were diagnosed using clinical interview without assessment criteria and were called "disturbed children." No severity criteria or scales were mentioned. Eight different drugs were used. The authors concluded that the drugs were useful if careful selection was noted. Lewis and James (1973) reported on 22 subjects, 4 to 14 years of age, who were diagnosed by clinical interview. Ten were reported to be neurotic, four, psychotic, and eight, behaviorally disordered. The severity measure used was a 10-point scale developed by the authors for which reliability and validity were not reported. Subjects received either chlorpromazine 2.5 mg/kg or haloperidol .05 mg/kg. Eight of the 22 were reported to have responded; however, none of the four psychotic children responded. Pool et al. (1976) reported on 75 subjects, 13 to 18 years of age, who were studied in a double-blind placebo-controlled design that lasted for 4 weeks, after a 5-day drug-free period. Their diagnosis, made by clinical interview, was adolescent schizophrenia. Outcome measures of severity were the Brief Psychiatric Rating Scale (BPRS), the Clinical Global Ratings of Improvement (CGI), and the Nurses' Observation Scale for Inpatient Evaluation (NOSIE). Subjects received either loxapine 87 mg daily (average) or haloperidol 10 mg daily (average) and also received milieu treatments. Of the subjects on loxapine, 87.5 percent responded; 70 percent of the subjects on haloperidol responded; and 36.4 percent of the subjects on placebo responded. Over half of the subjects on active medication had significant sedation and extrapyramidal side effects. Realmuto et al. (1984) reported on 21 subjects, 11 to 18 years old, who were studied in a single-blind design. Their diagnosis, based on clinical interview, was schizophrenia. Severity measures were the BPRS and CGI; diagnosis was made by DSM-III criteria. On the average, the subjects received

either thiothixene 0.22 mg/kg or thioridazine 0.26 mg/kg. It was reported that none of the subjects had a good response, and 50 to 75 percent were sedated. The authors stated that they felt that their subjects were similar to "process" schizophrenia in adult patients with unremitting courses.

Issues that need to be addressed are: (1) to differentiate adult-type schizophrenia in teenagers from the autism spectrum; (2) to differentiate schizophrenia during the teenage years from affective disorder (especially mania and delusional depression); (3) to perform dose/plasma level/response studies and see if it is possible to obtain optimal therapeutic response without sedation; and (4) to perform adequately designed double-blind placebo-controlled studies.

ADOLESCENT AGE-RELATED SIDE EFFECT ISSUES

There are several issues specific to teenagers that need attention in prescribing psychotropic drugs. One of these is the additive effects of marijuana and tricyclic antidepressants on heart rate. Although there is only one report of the combination of marijuana and nortriptyline (Hillard and Vieweg 1983) in which the marijuana possibly contributed to a serious tachycardia, all tricyclic antidepressants may elevate the heart rate (Glassman 1984), and marijuana is known to do the same (Meyer 1978). This, therefore, is an important issue to address. There has been some concern about the effect of lithium on bone growth during the formative years (Birch 1980). In adults, it is known that lithium deposits in bone; however, radiographic studies of the hands of adults who had been on lithium for years, compared to age- and sex-matched controls, showed no difference in bone density (Birch 1980). It is not known whether this would also be found in teenagers before bone growth is complete. There is a question of neuroleptic impairment of cognition due to sedation (Erickson et al. 1984), since over half of the adolescents in the two studies in which this was mentioned were excessively sedated (Realmuto et al. 1984; Pool et al. 1976). There is a recent report that chlorpromazine administered for over 6 months reduces plasma testosterone and luteinizing hormone response to luteinizing releasing hormone in adolescents (Apter et al. 1983). Although this effect is also observed in adults, its significance and reversibility in adolescents would need further study. Finally, there is the question of the long-term effects of lithium on renal functioning. There is one report of four children who were maintained on lithium at therapeutic plasma levels who were not noted to have changes in renal function during the 3- to 4-year period (Khandelwal et al. 1984). However, this was a study of a small number of subjects, and further studies in this area are needed.

ISSUES OF DRUG STUDIES IN ADOLESCENT SUBSTANCE ABUSERS

One of the main issues is that all adolescents with a history of substance abuse (whether or not it was substantiated by blood or

urine studies at the time of admission) would need a detoxification period, specified in the protocol so that comparable data with other studies could be obtained. There is, at present, insufficient information on how long after detoxification a psychiatric diagnosis could reliably be made. In this regard, it would be useful to identify which substances have been abused, so that the detoxification period would be based on their known withdrawal effects and withdrawal syndromes. The episodic nature of manic-depressive illness dictates that it may be difficult to distinguish a first episode of manic-depressive illness precipitated by drugs from drug-induced behaviors (Horowitz 1975). It will be useful through the initial detoxification stage, and in order to stabilize medication in adolescents who are known to be substance abusers, to hospitalize them in locked units with care in monitoring what may be obtained on the ward in the way of illicit drugs. A greater problem for these patients would be outpatient compliance during the maintenance medication phase. Since both lithium and tricyclic antidepressants are commonly given for a period of 6 months to a year after the person has recovered from the initial episode (the optimal length of time for teenagers with various subtypes of affective disorders has never been studied) (American Journal of Psychiatry 1985), this will be a crucial period if adolescents are similar to adults, who are likely to relapse if the maintenance period is too short.

CONCLUSIONS

There are no studies of depressed, affectively disordered, or schizophrenic teenagers who are also substance abusers and few adequately designed studies in adults (Kline et al. 1974; Ciraulo and Jaffe 1981; Viamontes 1972; Ditman 1966). To make matters more complicated, there are no adequately designed double-blind placebo-controlled studies of tricyclic antidepressants or other antidepressants in adolescents with major depressive disorder, or of lithium in adolescents with mania or bipolar disorder, and only one reasonably well-designed study of adolescent schizophrenia (Pool et al. 1976). However, in the latter study, the drugs were felt to be too sedating in 50 to 75 percent of the subjects to be clinically useful. Further, it is not possible, at present, to tell a drug-induced behavior disorder that will be self-limiting from a drug-induced precipitation of an early or first episode of manic-depressive illness or schizophrenia.

Although there is currently a consensus among various investigators on the existence of major depressive disorder in adolescents and agreement that it can be diagnosed using instruments and criteria similar to those used in studies of adults, there are no data on whether or not tricyclic antidepressants will be effective treatment for depressed teenagers.

For the manic phase of affective disorder or for adolescents who switch between mania and depression, there are few diagnostic studies. There are no well-designed, double-blind placebo-controlled studies, and only two drug studies in which criteria

for mania are given. Lithium's effectiveness at the same blood levels as those in adults is unclear, since several studies combined lithium therapy with tricyclic antidepressants or ECT to obtain response.

There are too few reports to say whether or not there is a consensus on the existence of schizophrenia during adolescence, which differs from the childhood autism spectrum, and, if there is adult-type schizophrenia in adolescents, whether it will respond to neuroleptics without producing unacceptable side effects.

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Treatment Validity: An Approach to Evaluating the Quality of Assessment

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INTRODUCTION

The purpose of treatment research is to identify specific interventions with a beneficial impact for specific types of clients with specific types of problems (Beutler 1979; Paul 1969). Ideally, a client coming to see a clinician will be more likely to receive effective therapy because of treatment research.

When treatment research does have such an impact on others it has a degree of external validity (Campbell and Stanley 1963). In the context of treatment research, external validity refers to the degree to which the results of a study can be applied elsewhere, to other clients treated by other therapists. The promise of external validity forms the primary practical basis for conducting treatment research and, indeed, justifies its Federal funding.

Methodologists have written volumes on the methods available for achieving internally valid research. External validity is often virtually ignored, even though an internally valid piece of treatment research without external validity has no applied importance. This chapter examines research methodology from the viewpoint of what we want treatment research to do. It asks the question, "If external validity were the primary guide, would currently popular research practices need to be modified?"

EXTERNAL VALIDITY AS A MATTER OF MATHEMATICAL NECESSITY

The dominant model of external validity has prevented a proper concern for the relevance of external validity to the design of treatment research. According to this model, a correctly designed study possesses external validity as a matter of mathematical necessity. Every beginning researcher learns the model--typically as a theory of proper research method; some students even confuse it with the scientific method itself. The model is fundamentally flawed as a guide to the external validity of treatment research and is never truly followed by treatment researchers, despite mighty efforts to do so. Furthermore, even if the model could be

followed in the real world it still could not deliver the kind of external validity needed from treatment research.

The dominant model of external validity draws from sampling theory and probability theory and is closely related to theories of internal validity in group comparison designs. According to the model, we must randomly select from a known population and randomly assign to groups or conditions. If variability between subjects is low enough (relative to variability between groups), we conclude that we have an effect. This effect then should also apply to other random samples from the same population, at some level of probability. As a matter of mathematical necessity, the resulting study possesses a degree of external validity.

The mathematical necessity model of external validity has a long history and powerful intellectual support. At least since the time of R.A. Fisher, researchers have designed experiments with one eye on random selection and random assignment. Because both internal and external validity seemingly flow from the same probabilistic source, few special considerations need apply to external validity. A properly crafted design necessarily yields both types of validity.

Unfortunately, no one can implement this model in the world of treatment research. The problem of drug abuse presents an especially difficult environment for its implementation.

Problems With the Mathematical Necessity Model

We can break down the preliminary issues into four areas: known populations, random selection, random assignment, and application to additional samples. Each presents major obstacles to treatment research. Since the model requires all its elements to maintain its mathematical integrity, a weakness in even one area seriously undermines its precision. If the mathematical necessity model is unrealistic, alternative methods for ensuring external validity must be found.

Known populations. Treatment researchers can easily name the populations they seek to study: agoraphobics, alcoholics, depressives, and so on. These populations definitely exist, and we can describe their defining characteristics in detail (e.g., all people with a given degree of addiction to a given drug). A "known population" in a statistical sense is not, of course, simply these conceptually known populations. Theoretically, a known population can be defined as the population for whom the initial probability of being sampled is above zero. If individuals meeting the conceptual category are totally unknown to the researcher, their probability of being sampled is initially zero. In the perfect case, all members of the conceptual population are known and equally likely to be selected. In this case, the known population is the same as the conceptual population.

In treatment research, conceptual populations are virtually never known populations. Some individuals may have a problem, but it may not be detected either by others or by themselves. Others may know they have a problem but fail to seek treatment. Still others may seek treatment in a manner prohibiting their identification. In the real world populations are detected by their contact with certain cooperative individuals or institutions. The events producing either the contact or the cooperativeness of the institution can distinguish this population from the conceptual population in important ways. For example, we may have access to poor people entering a county hospital, but not to middle class people treated by a private practitioner.

The area of drug abuse shows this problem clearly. The very nature of drug abuse leads individuals to avoid contact with authorities. Most drug abuse will never be detected. It is possible, of course, to redefine the conceptual population to reflect these realities. We could study drug abusers who are in treatment, for example, with the rationale that even if this population is unrepresentative of drug abusers, the consumers of treatment research could only apply its results to individuals in treatment anyway.

This strategy still does not yield a known population matching the conceptual population. For example, drug abuse has recently become much more common in middle and upper socioeconomic groups. Professionals may frequently contact these individuals and may seek guidance from the research literature. Unfortunately, these populations are obviously underrepresented in the populations available for research. Should a private practitioner seeing an upper middle class, suburban professional who abuses cocaine rely on data collected from studies of unemployed, undereducated, inner-city cocaine abusers? Perhaps, but this reliance cannot be justified by the mathematical necessity model of external validity, since one of its major precepts has now been violated. Generalization to the suburbanite does not derive from mathematical necessity.

Random selection. Even if it were possible to specify a known population matching a conceptual population, we still would have the problem of random selection. Random selection occurs when the probability of a single selection is 1/n for each member of the population, where n equals the total known population. If the probability of selection is higher or lower than 1/n for given subjects, the sample will be biased. In a sense, you can think of this as altering the known population. Subjects can be more or less known--more or less visible in the population. When a given subject is more likely to be selected, everyone else is slightly less likely to be selected and vice versa.

In the real world, subjects are selected for practical reasons in treatment research. A given hospital may allow access to a researcher, while another may not. Any characteristic leading people to use that particular hospital now also distorts the sample.

For example, the hospital may draw its clients from a particular region, may enjoy a good reputation among particular religious or ethnic groups, or may be known to use treatment modalities that are attractive to certain kinds of people. Members of the conceptual population who are without these characteristics are thus less well-known. Once again, it is possible to redefine the known population. We might, for example, define the population as all persons in a given hospital. Rarely would anyone want to generalize the results of their research to such a population, however. Thus, this maneuver seemingly meets the letter of the mathematical necessity model but does not increase its usefulness.

Even with the population of people in a given hospital, random selection is rarely possible. Agreeing to participate in research is a significant behavioral act. Clients willing to be subjects surely differ from clients unwilling to be subjects. Researchers sometimes make mighty efforts to show that the demographic characteristics of the two groups are similar. However, drawing the implication that the two groups are thus functionally similar is not justified by sampling theory. We do not know whether other unmeasured characteristics (e.g., attitudes, cognitive style, personality) distinguish the groups, and we do not know if these characteristics alter the applicability of treatment research from one to the other. Demographic characteristics are far too crude for this purpose. We do know the groups are different, but we do not know if the difference is important. Based on mathematical necessity, we can only generalize to the population of persons with a particular disorder in this institution who are willing to participate in research of exactly this kind. No one is interested in generalizing to such an odd population.

Random assignment. When a sample has been selected, subjects are randomly assigned to groups. This part of the model is more feasible than other parts, but even here trouble arises. Subjects decline assignment to particular conditions. Subjects may drop out of the study more in one condition than in another. These problems are well-known, of course, and attempted solutions are common. For instance, researchers will often conduct a statistical test to see if dropout rates differed. For this purpose, however, statistical inference is not a great aid. Even without a difference in dropout rates, dropouts can bias a sample. Suppose we are comparing two treatments. One treatment works differently with cooperative and uncooperative people. Cooperative people respond to the treatment, but the treatment is absolutely iatrogenic for uncooperative persons. The second treatment is moderately effective for both cooperative and uncooperative people. Imagine all uncooperative people drop out of the study, thus the dropout rates are likely to be equal in both groups. The first treatment may now look more effective with this sample but not with the original sample.

Applicability to nonrandom samples. When you put together these three problems--known populations, random selection, and random assignment--it becomes clear that the mathematical necessity model

of external validity does not exist in the world of treatment research. I am not attacking sampling theory or probability theory. If the model could be implemented, studies would indeed possess a kind of external validity. Ironically, even then the kind of external validity such studies would possess would not be of use to practitioners and most consumers of treatment research.

If the model were followed, research results would necessarily apply only to other random samples from the same population. The model can promise no more. The model does not promise that every subgroup in the sample will respond in the same manner as the entire group. A given treatment can work well with the population overall and be iatrogenic with a subpopulation. The effects of the treatment on nonrandom samples are unknown. Clinicians, however, never randomly sample from treatment populations. How an individual client ends up being treated by a given clinician is definitely nonrandom. Clients seek out particular clinicians for all kinds of nonrandom reasons: reputation, location, sex, race, fees, availability, hours, and so on. How are we to know whether the nonrandom characteristics causing an individual to be treated by someone do not also cause them to be in a subgroup for whom the overall results will not apply? We cannot know beforehand.

In summary, the mathematical necessity model collapses completely when examined as a means to ensure the external validity of research. We do not have a clear known population. Even if we did, we cannot randomly select. Even if we could, we often cannot randomly assign. Finally, even if all of this were not true, we cannot apply the results to nonrandom samples even though these are the only kinds of samples clinicians ever treat.

ALTERNATIVES TO THE MATHEMATICAL NECESSITY MODEL

The mathematical necessity model is the only one to promise external validity as an inherent possession of a well-designed study. Every other approach to external validity relies on logical generalization (Hersen and Barlow 1976). The principle of logical generalization says that: if a given treatment is shown to be successful with a given client, it is more likely to be successful with another to the extent that the two clients are similar. This principle makes no mathematical claims. It is not based on sampling theory or probability theory but is simply logical, based on our experience with the world.

Logical generalization can be found both in group comparison strategies and in single-case designs. It is most obvious in the latter, because group comparison strategies often are rationalized in terms of sampling and probability theory, and it is easy to miss that the mathematical necessity model of external validity is not being used.

Homogeneous Groups

One alternative strategy is the homogeneous group strategy. Subjects are selected according to a particular set of well-defined characteristics. If a given treatment works with this homogeneous group, then it seems more likely to work with others with the same set of characteristics. Note that the principle involved here is logical generalization. It is not necessary to pretend that the homogeneous group is a random sample from a known population.

The homogeneous group strategy is reasonable and deserves greater use, although it is difficult to implement and has certain inherent limitations. Difficulty in implementation arises because even simple group comparison research can require large numbers of subjects. A small set of carefully defined subject characteristics can quickly make a large group impossible to collect; therefore, the typical compromise is to limit the subject selection criteria to a few gross characteristics. Unfortunately, this undermines the principle of logical generalization supporting the strategy in the first place. If the group is not very homogeneous, how can I have confidence that my clients are like those in the group?

There are other difficulties. Some of the most important populations are difficult to reach. While it may be very important, for example, to do some research on upper middle class professionals who abuse cocaine, these are the very people we may not be able to find in large numbers.. The problems of random assignment also remain in this type of research.

Even when we can generate large homogeneous groups, we know that there are surely subgroups within the groups. Some subjects may improve and others may not. How are we to know whether our clients are like the successes or the failures? I will return to this critical issue shortly.

Homogeneous group research shows that logical generalization can be used to construct alternative research strategies. Most often, however, the group nature of the research disguises this principle. Researchers often act as if the mathematical necessity model of external validity applies to homogeneous group research simply because subjects were randomly assigned to groups, as far as that was possible. This confusion of issues has unfortunate side effects since failure to see the principle of logical generalization restricts its use in other ways.

Correlational Analyses of Factors Related to Outcome

Another group comparison strategy often recommended is also based on logical generalization. It is possible in very large group studies to correlate various subject characteristics post hoc with improvement. Even if the original sample is not a random sample from a known population, it is logical to believe that if improvement is correlated with certain subject characteristics then clients who share those characteristics are likely to respond

similarly. Correlational strategies occur in two forms. In one, particular characteristics are used to block subjects into various groups, arranged along a continuum. For example, high and low socioeconomic status subjects might be compared. In a second type of strategy, no groups are formed, but the various characteristics are examined for linear or other relationships with outcome.

Post hoc correlational strategies are well-known and have a long tradition in clinical science. For example, a review of research in depression by Bielski and Friedel (1976) suggested tricyclic medication is most helpful given higher social class, insidious onset, anorexia, weight loss, middle and late insomnia, and psychomotor disturbance. It is likely to be least helpful given neurotic, hypochondriacal, and hysterical traits, multiple prior episodes, and delusions (Paykel et al. 1973).

The difficulty with correlational strategies is that if we include more than a few subject characteristics we quickly require either absolutely enormous groups or often will be basing our correlations on very small numbers of similar subjects. Correlations based on small sets are notoriously unreliable, and indeed correlational research of this sort is known for the variability in the results obtained across studies.

In addition, we must decide beforehand exactly what subject characteristics will be measured for all subjects. This is troublesome, because some of the most important variables are probably not the obvious demographic variables or universal measures usually examined in research of this kind. Post hoc correlational research tends to rely on measures such as the Minnesota Multiphasic Personality Inventory (MMPI) (Shealy et al. 1980; Strassberg et al. 1981), locus of control (Poole et al. 1981; Woodward and Jones 1980), self-efficacy measures (DiClemente 1981; Williams et al. 1984), or demographic characteristics (Dumas and Wahler 1983; Elsworth et al. 1979) to predict patient outcome. It is easy to see why. These are the types of measures commonly collected at the beginning of treatment and can easily be examined for post hoc correlations with outcome.

Unfortunately, research of this sort has often failed to find consistent or strong correlations between these measures and outcome. It is not uncommon to see studies reporting correlations that account for 5 to 10 percent of the variance in outcome (Luborsky et al. 1979). The larger correlations sometimes seen are rarely cross-validated in subsequent research. Despite the large number of studies being reported of this type, there is little evidence that they are leading to greater external validity for the output of treatment research. Why are they not leading to increasingly sophisticated rules of generalization?

Probably the most difficult problem is the weakness of the correlational strategy in determining individual successes and failures. There are three kinds of variability in any treatment research study. Some variability is due to inconsistent

measurement. This is false variability because it exists only in the data, not in the phenomenon being measured. Other variability is caused by extraneous factors. Extraneous factors are those that are not manipulated systematically and are allowed to vary. Variability due to extraneous factors, such as maturation or coincidental experiences, is actual variability in the phenomena. Finally, there are various kinds of treatment-related variability. Treatment effects can be produced by nonspecific or specific components of treatment. The effects produced by specific components may be due to the theoretical variables the researcher meant to manipulate or to other specific variables unintentionally manipulated.

All treatment research seeks to distinguish variability due to treatment from the other kinds. Some types of treatment research also seek to distinguish particular subcomponents of treatment-related variability from each other. In group comparison research, these distinctions are made at the level of the group. Consider a typical group comparison study in which an experimental and a control group are measured pre and post. We can distinguish treatment-related variability from other kinds by using the variability between subjects in the two groups as a kind of rubber ruler against which treatment differences can be measured. We assume that inconsistent measurement and extraneous factors are operating but are influencing both groups equally. If variability between subjects within the groups is large, these nontreatment sources of variability are also large; thus, only large mean difference between the groups are thought to be statistically significant. If the variability within the groups is very small, even small differences between the groups is probably due to treatment-related variability.

This is an eminently logical model with which I have no quarrel. Note, however, that the correlational studies correlate improvement of individuals with characteristics of these same individuals. This is troublesome because in the great majority of group comparison studies all three sources of variability are confounded at the level of the individual. If a given person improves from pre to post we cannot say, for that individual, that improvement is due to inconsistent measurement, extraneous factors, or treatment-related variability of various kinds. It is only at the level of the group that the three types of variability are distinguished. Thus, correlational strategies of this kind correlate subject characteristics with improvement due to all three sources of variability. It is no wonder that correlational strategies so seldom lead to large or replicable correlations.

One improvement is to identify treatment responsiveness and differential treatment effects at the level of the individual--that is, to use "single-case" experimental designs (Barlow and Hersen 1985; Barlow et al. 1984). "Single-case" is a bit of a misnomer. The issue is one of level of analysis and not one of number. A single-case approach will often require just as many subjects as the previous approach, but since individual assessment results

will now be correlated with individual treatment effects, stronger external validity for these correlations seems likely. Seeing the important role of sensible analyses at the level of the individual also opens up the possibility of contributions to the research literature by a large series of smaller n designs, not just through a smaller series of large n designs.

Single-case analyses can be built into most group comparison designs. Consider a typical two group design with an experimental and control group. Adding the needed dimension of intensive analysis can be accomplished with a minimum of three steps: repeated measurement, establishment of intrasubject variability, and within-subject comparisons. For example, at a minimum subjects in the experimental group could be exposed to a baseline phase, while measures were repeatedly taken. If the data were relatively stable (Hayes 1981), this could be followed by a treatment phase in which repeated measurement continued. The resulting "A/B" design is probably the lowest level single-case design, but it does begin to increase the precision of the identification of individual successes and failures. Repeated measurement gives some indication within subject of the degree of variability due to measurement inconsistency and extraneous factors. If change is noticeable after the implementation of treatment, improvement is probably either due to treatment or to a coincidental extraneous factor. The strength of the analysis can be increased by adding intrasubject replication of the apparent treatment effects (e.g., through an A/B/A/B design in this example). By using single-case designs for individual subjects in addition to the usual pre/post/followup measurement, the researcher can: (a) still analyze in a pre-post fashion, if desired; (b) identify at the level of the individual the successes and failures that seem probably due to treatment in each group; and (c) begin to correlate subject characteristics with success and failure of individuals due to treatment. Some subjects, for example, may have improved or deteriorated significantly but in such a way that it cannot be said with confidence that treatment was the cause. Others may have shown ambiguous results. By considering these subjects separately from subjects showing clear effects due to treatment, the relationship between individual subject characteristics and individual treatment responsivity can better be determined. Thus, single-case analyses can be incorporated within group comparison designs to increase the analytic power of the research.

Other Uses of Single-Case Designs

Single-case designs can also be used by themselves and gradually collected into series of studies encompassing many subjects. The details of conducting single-case experimental research are well known (Barlow and Hersen 1985; Barlow et al. 1984). I will not review them here. There are several aspects to the proper use of single-case designs that seem worth mentioning.

First, as emphasized earlier, the issue of number must be distinguished from the issue of level of analysis. We cannot know how

clients will respond to treatments until the treatments are used with many clients. This raises the unsolved question of how to collapse studies using single-case analyses into a series of studies. We may need a kind of meta-analysis for single-case data, though hopefully these techniques will be more practical and straightforward than the procedures available for group studies. This also implies that we should fund research programs using this approach, not just specific studies.

Second, single-case research is best done in an analytical fashion. Client and treatments should be described carefully. When we identify successes and failures due to treatment, we should then attempt to determine why these persons succeeded or failed. The best way to do this is to treat the failures and attempt to find a successful intervention based on hypotheses about the source of the failure. We should seek to identify (in a conceptually consistent manner) dimensions relating to success and failure. In a sense, the purpose of this research would be to identify functionally homogeneous groups, rather than to rely on the structural characteristics of client variables to determine homogeneity.

Third, the research strategy encouraged by single-case research is fundamentally different from that supported by the group comparison model. Single-case researchers must constantly interact with their data and allow it to modify the design as additional information arises. Federal grant agencies must take care not to tie single-case research into a straightjacket. For example, it is foolish to insist that the length of phases be specified a priori (e.g., based on number of assessment sessions), since only stable data will allow the observation of subsequent effects, and the actual achievement of stability cannot be specified beforehand. Again, funding research programs rather than specific studies seems advisable. Methodological modifications, however, should not be arbitrary. It will be necessary to develop separate standards for the specification of research strategy in single-case research.

Finally, single-case research quickly confronts the researcher with how little we know about behavior and its measurement. Often the results of single-case research will be ambiguous. We must be prepared to deal with that eventuality. In many cases, it will not be clear how to analyze single-case data, although usual statistical procedures now appear often to be appropriate (Huitema 1985). If a researcher can produce a series of organized single-case studies, hopefully it will lead to clear and powerful demonstrations of experimental control as the components of the analysis come together. In this case, ambiguity is not a difficulty. Once again, emphasis on research programs seems warranted.

OTHER DIMENSIONS OF EXTERNAL VALIDITY

I occasionally ask students why they would ever replicate a study. The usual answer is "to see if you do the same thing if you get

the same results," but of course that cannot be correct. In a determined world, if you do the same thing you have to get the same results. The purpose of replication is to see if the description of the study is enough to lead you to do the same thing. If so, then you will get the same results.

In the same way, external validity tests the validity of our formulations, not our results. What we give away in a piece of research is a verbal description of what is important to produce particular ends. How can we make that more likely? One way, already mentioned, is to include an intensive analysis of the individual in the study so that successes and failures due to treatment can be identified at the level of the individual. There are other considerations as well.

Treatment Integrity

Often we describe our treatments post hoc and may fail to determine whether we actually followed our own advice. This is an example of how internal and external validity can become seriously disconnected. We can do a study and be absolutely certain that our treatment produced an effect. Its internal validity can be unquestionable. If we cannot describe our treatment with precision, however, the study cannot have external validity because we have no verbal formulations to give away.

There are several aspects to a solution to this problem. First, we must measure the behavior of treatment providers and determine whether they are actually following a given protocol. Careful assessment of the independent variable is just as important as assessment of the dependent variables. (Peterson et al. 1982; Yeaton and Sechrest 1981). If we did not do what we said we did, then how can others expect the same results? Second, we can test the degree to which our protocol is effective in generating the appropriate clinical behavior. For example, if we have a therapist manual developed before intervention, we can test to see if the results of reading the manual are behavior consistent with the protocol. If not, our manual is inadequate, because when we give it to other researchers it will also fail to produce consistent treatment. If additional training is required, this should be specified and tested to see if others can produce the same therapist behavior based on the training procedure specified. Third, we must specify the conditions under which treatment was applied and check to see if the descriptions are, in fact, accurate. Finally, we must measure client compliance with treatment and the presence of possible extraneous factors. Essentially we must measure the variables influencing clients much more. Client failure to follow a treatment is a very different issue than treatment failure when followed. The same advice applies to control conditions. If a control subject seeks out other treatment resources, formally or informally, this is a very different subject than a control subject continuing the usual routine. Monitoring of this sort should continue throughout the study. For example, extended followups are of little intellectual use if we do not know what is

happening during the followups. Presumably failures and successes in maintenance are caused by particular events. If we are not measuring the events impinging on our clients during this time we will not have a clue about why some succeed and others do not.

Principles of Treatment

Imagine the task you would have if you attempted to describe every event that has happened over the last hour around you. If every detail had to be specified, it could take you many months just to describe most of the major events in exact detail: every sound, every sight, every smell, every taste, every feeling, every behavior, and so on. Clearly, it is also impossible in a research project to specify every treatment event in precise detail. In verbal psychotherapy, for example, a therapist varies in tone of voice, posture, gestures, expressions, motions, dress, a thousand other variables. How can we "give away" treatment knowledge if we cannot be encyclopedic?

One major solution is to develop principles of intervention that underlie successful techniques. Rather than describe techniques one at a time, we need at least some research that will sift out their essential components and describe them in theoretically meaningful ways. Principles are much easier to give away than idiosyncratic details. Many researchers have complained that applied psychology is becoming more and more technically oriented in its research (Deitz 1978; Hayes et al. 1980). The problem with technical research is that we develop knowledge with less and less of an interest in external validity. Even if a technique can be described in full detail, if we do not know the principles involved, how can we generalize to other problems or populations. Must we have a separate effort for every kind of client, and every specific problem?

The kinds of principles that relate specific client, therapist, situational, and treatment characteristics will most readily emerge from careful experimental analysis of these interactions. Single-case research often promotes this kind of work since failures are followed by an attempt to determine and correct the source of the failure for that client. Again, it is important that we follow the leads our data gives us. Too many limits should not be placed on design modifications. The inductive, technique-building approach used when single-case designs are being applied to small numbers of subjects to analyze a phenomenon, dictates that the data guide the researcher as it comes in.

Treatment Utility

I have been emphasizing that for research to be generalizable to the clinical situation we will need to know more about how client, therapist, and situational variables interact with treatment. Most of this work will be done post hoc, as a matter of careful specification of these variables. Some of it can also be done a priori. In these studies, factors thought to interact with

treatment are systematically manipulated in the study. If a relationship is predicted a priori and is successfully demonstrated, then some degree of robustness (external validity) in our conceptualization has already been shown. This has been termed "treatment utility" (Hayes et al. 1986).

There are a number of examples of treatment validity research addressing the question of the value of client classification, although they are perhaps surprisingly rare in the psychotherapy literature given their obvious importance (Hayes et al. 1986). An example of a treatment validity study is provided by McKnight et al. (1984). Three subjects each were obtained who were depressed and had: (a) poor social skills but few irrational cognitions; (b) irrational beliefs but adequate social skills; or (c) problems in both areas. After a baseline phase, all subjects received both social skills training and cognitive therapy in randomly alternating sessions (what is known as an Alternating Treatments Design) (Barlow and Hayes 1979). Subjects with only social skills problems improved most following social skills training, while the reverse was true for subjects with problems only in the cognitive area. Subjects with problems in both areas improved as rapidly in either situation. Thus, the suspected relationship between these patient and therapy types was confirmed.

CONCLUSION

Essentially, the treatment validity approach tests our view of functionally homogeneous groups. Since it does this a priori, is experimental and not just correlational, and concentrates on a single dimension or small number of dimensions, it does not fall prey to the same problems of the homogeneous group and correlational approaches. It is also well suited for either group comparison or single-case designs.

In summary, consideration of the issue of external validity shows that both the kinds of questions we are asking in treatment research and the various methods we use to answer these questions seem out of line with the needs of treatment research consumers. This chapter provides several alternatives that might bring treatment research into better coordination with the needs of clinicians.

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Adolescent Drug Use: Suggestions for Future Research

Norman A. Krasnegor

INTRODUCTION

The purpose of this paper is to provide suggestions for research initiatives in the field of adolescent drug abuse treatment. The recommendations given are predicated upon a biobehavioral perspective that focuses upon developmental psychobiology and child development. These disciplines are viewed as a relevant framework for asking questions that can lead to the knowledge base necessary for establishing effective intervention strategies for the prevention and treatment of this public health problem.

ADOLESCENCE: A TIME OF CHANGE

Human development is one of the most complex processes in nature. From birth, babies present themselves to the world as being at once precocial regarding their cognitive and sensory faculties (Gottlieb and Krasnegor 1985) and altricial regarding almost all their others. This latter state of affairs makes children almost totally dependent for their well-being upon the largess of their caregivers. Traditionally, parents in our society in their role as caregivers provide the means to sustain their offspring until they attain independence. Along this developmental trajectory, all children and parents (caregivers) who survive encounter that enigmatic aspect of ontogeny termed "adolescence."

This period is one of the least understood phases of development. It is a time of enormous change biologically and psychologically for the individual. Beginning usually anywhere from the 10th to 12th postnatal year of life, the period spans the teenage years and concludes by the start of the third decade of life. Adolescence is marked by a spurt of bodily growth that dramatically alters the individual's appearance. It is a time when endocrine surges trigger the onset of puberty (menarche and breast development in girls and spermatogenesis, facial hair, and voice changes in boys). Further, it is an epoch during which children experience and exhibit mood swings that operationally affect how they

behave toward others and vice versa. It is a time, too, when cognitive and perceptual shifts often lead to confusion for the adolescent and his/her parents about issues of responsibility, conformity, and independence. As if these factors were by themselves not complex enough, one must add to the picture the variance associated with the timing of development. Thus some children are early and others are late "bloomers," a factor which can have multiplicative effects in its deleterious impact upon the behavioral development of children. In short, adolescence is synonymous with upheaval and biobehavioral modifications which, if successfully completed, transform the child into an adult.

RISK-TAKING BEHAVIOR

From the behavioral perspective, adolescence is associated with experimentation by boys and girls in the realms of social relationships, diet, rest/activity cycles, ideas, dating, and roles. All such activities, except possibly at the extremes of each dimension listed, are both expected and normal. Institutions become interested when adolescents exhibit behavior which exceeds normative expectations and causes harm to themselves and others. That interest becomes galvanized into action when the behavior in aggregate entails costs, either economic or societal, that are unacceptable. It is in this domain that teenage drug use resides.

Even though for many, if not most teenagers, drug use is just another form of experimentation that, in the natural history sense (Vaillant 1966), has no measurable consequence for the individual, society still has a legitimate interest. The reason is that the residual number of children who do not spontaneously stop but go on to have drug-using lifestyles is measurable and growing (O'Malley, this volume). More important, there is extant a growing trend in our teenage population of risk-taking behavior which deserves further examination. This rubric subsumes a class of consummatory behaviors whose incidence and prevalence are increasing and, therefore, are associated with unacceptable costs both economically and socially. The list is familiar to most who have examined the epidemiological characteristics of what pediatricians have termed the "new morbidity" in children (Haggerty et al. 1975; Haggerty 1986). Specifically, the domain includes teenage smoking, drinking, drug use, pregnancy, eating disorders (anorexia and bulimia), and accidental injury. Viewed from this broader perspective, drug use can be seen as being only one of a number of risks to which teenagers subject themselves.

Some behavioral biologists have suggested that many of the behaviors involved in the risks teenagers take may have a common neurobiological basis. Weisz and Thompson (1983), for example, have argued that substances (e.g., drugs, alcohol, food, etc.) which act to reduce the effects of stress or the aversiveness of stimuli may have a common linkage to the endogenous opioids. The opioid system itself has a hypothetical function of being involved in adaptive behaviors such as learning, responsiveness to stress, conditioned fear, and defensive behavior (Krasnegor 1979).

Parallel with these issues, one must comment upon the upheavals that are occurring in American families, the milieu in which child rearing traditionally takes place.

FAMILY TRENDS AND CHILD DEVELOPMENT

In the past 15 years, the rate of divorce has dramatically increased in the United States to the point where the probability of that outcome is nearly one in two. Thus the number of children who have and are experiencing the concomitant emotional and physical stresses associated with the breakup of families and altered living arrangements is also increasing. Coupled with that observation is the trend for children to be raised by a single-parent head of household (Hofferth 1985). Demographers have estimated that, if current trends continue, the proportion of children raised in one-parent families will increase, as will the number of childhood years spent in such families (Radish et al. 1984). Further, these same researchers indicate, based on projected data, that one-third of the childhood years of whites and three-fifths of the childhood years of blacks born in 1980 may be spent with only one parent.

In addition, with the advent of the shift in women's roles from primarily being housewives to entering the world of work, many children are being cared for by people other than their parents (Presser 1982). Many younger children are looked after in day care centers or, in the case of teenagers, left on their own recognizance (latch-key children). A recent conference sponsored by the National Institute of Child Health and Human Development (NICHD) on the impact of divorce, single parenting, and step-parenting on children attests to the importance that public health officials and researchers attach to this topic for development of our children (Hetherington and Arasteh, in preparation). This topic will undoubtedly be a fruitful area of research for developmentalists for the rest of this century and is pertinent to the specific issue of initiation of drug use dependence.

THE DEVELOPMENT OF CONTROL

Given these factors and the potential for turbulence on any or all of the multiple dimensions that comprise the biopsychosocial framework for adolescent development, it is not surprising that today's teenagers are confronted by very different stressors than were their parents. In general, the milieu for child rearing is giving two different messages to our children. On the one hand, parents by their own choices in lifestyle are saying that children have to be more independent and thereby take more personal responsibility for "growing up." On the other hand, children are being told that they do not have the authority to engage in behaviors (smoking, drinking, intercourse, etc.) which adults reserve for themselves. At issue in this dilemma is the concept of control. Useful questions on this issue relate to: (1) Who is in control of whom? (2) Where does control reside (internally or externally)? and (3) How does one attain control?

In the often confusing time of adolescence, children are confronted by the problem of dealing with the demands made by caregivers about routines such as going to school, studying, chores, and interpersonal relationships, requirements which often conflict with their own perceived agenda of important activities. In this context, control is associated with learning discipline (i.e., the ability to deal effectively with conflicts).

The locus of control is another dimension on which this concept requires clarification, as it affects the behavioral development of adolescents. Particularly around the time of puberty, the concept of self at the emotional, perceptual, and cognitive levels undergoes change. This process entails a redefinition of where the sources of control reside. The teenager is experienced with the external controls impinging from the larger social environment that can be superficially compressed along the dimension YES----MAYBE----NO. What they begin to experience in psychological and emotional terms is the struggle at the cognitive level between their own goals and desires that originate from "within" and the conflicting demands for adherence to the expectations of significant others who can enforce compliance through the application of sanctions.

Successful mastery of such control issues in part helps to define the transition from adolescence to adulthood. Failure to attain mastery is frequently signaled by the extremes associated with risk-taking behaviors. That is to say, children may engage in escape or avoidance behavior to keep from having to resolve conflicts, particularly those having to do with control. The use of drugs is one high-probability behavior that is likely to be used by teenagers as a coping mechanism to reduce stress. Alternatively, such behavior may be a way for adolescents to say, "I'm a grown-up."

RESEARCH PRIORITIES

Based on the observations made above, priorities for treatment research emerge that fall within the bounds of developmental psychobiology and behavioral pediatrics.

Psychobiology of Risk-Taking Behavior

Regarding developmental psychobiology, it would seem prudent to investigate at the basic level the role of endorphins in the onset of risk-taking behavior. Specifically, it is recommended that research be undertaken to study the development of the endorphin system early in life. In particular, it would be useful to study the effects of stress on the endorphin system in organisms at the onset of puberty to determine whether environmental stressors at this "critical period" lead to increased probability of drug use during that and subsequent periods of the life cycle. The research initiative should employ a primate model in the context of a behavioral pharmacological approach. Major independent variables could include chronic stress tasks that have high demand

characteristics (e.g., vigilance, avoidance/escape, etc.). Dependent measures could include rate and amount of self-administration of drugs with concomitant assessment (before, during, and after) of the endogenous peptides system. Some work in progress that would be useful to guide researchers is that of Dr. Seymour Levine (in press), of Stanford University, who is studying the effects of separation stress on the endorphin system in juvenile squirrel monkeys.

Locus of Control

A second area of importance is work to gain an understanding of "locus of control." In particular, studies directed at gaining basic knowledge of how this behavioral domain develops normally in children are necessary. Along these same lines, studies of at-risk adolescents who fail to develop locus of control could help in determining parameters of such learning that are impaired. Knowledge gained could aid in the design of behavioral treatment strategies to shape effective learning of control and thereby reduce the chances of risk-taking behavior.

Screening

A third recommended initiative could be launched in the domain of behavioral pediatrics (Krasnegor et al. 1986) regarding primary prevention of drug abuse. This would entail developing psychometric and biochemical indices to predict those children who are at risk (Kellam et al. 1979). If such screening procedures could be successfully developed, they could be used by pediatricians and family practitioners to provide anticipatory guidance to parents. These specialists are the professionals most likely to see such children prior to the onset of drug use. Early detection and intervention might well prevent those at risk from initiating use.

Family Therapy

Research should be continued and broadened into family therapy. Since the statistics cited above indicate that the family is changing, more information is needed about whether such changes are affecting development in those dimensions which would influence deviance from expected behavioral norms. Also, the work described by Patterson and his colleagues (this volume) provides an excellent example of the type of empirical work that should be expanded so that effective therapeutic modalities can become available to deal with the scope of the problem presented by adolescent drug abuse.

Skills Training

Finally, research on how to teach children basic decision-making skills and an understanding of the relationship between behavior and consequences needs to be expanded (Botvin and Wills 1985). This domain includes developing educational packages on assertiveness to be taught to at-risk children. Also needed are effective

training packages to teach children how to differentiate between the immediate and long-range consequences of their behavior, particularly as such consequences affect their health. Research should be targeted on developing materials that can be used by health educators and health care providers.

CONCLUSION

In summary, these recommendations focus upon a series of basic and applied areas of research deemed necessary for the development of primary and secondary prevention of drug use among our nation's children. The knowledge gained from such initiatives should provide public health officials, physicians, educators, and parents with the basic tools to effectively help treat this growing public health problem.

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