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# Impact of Adolescent Drug Use and Social Support on Problems of Young Adults: A Longitudinal Study

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Despite widespread concern regarding the effects of teenage drug use, there has been little effort to establish specifically what long-term consequences arise from such use and whether these adverse outcomes may be mitigated by a supportive social network. We obtained data from 654 teenagers when they were in early and late adolescence and used it to evaluate resultant problems reported by this same group of youngsters when they were young adults. General, or polydrug, use increased drug and alcohol, health, and family problems. The unique or independent effects of cigarettes and hard drug use (while controlling for General Drug Use) had a wide range of negative effects on health, psychosomatic symptoms, emotional distress, and interpersonal relationships. Specific use of cannabis increased health and family problems. Alcohol use, which was not reflected in General Drug Use, had no specific negative effects, but it reduced loneliness in romantic relationships, self-derogation, and family problems. General social support during adolescence provided a significant amelioration of all seven young-adult problem areas. In contrast to the effects of specific drugs, specific areas of social support had minimal impact on young-adult functioning. Results are discussed in regard to theory development and prevention strategies.



Drug use among adolescents and young adults has become widespread during the past 25 years (Robins, 1984). In a recent national survey of high school seniors, 92% reported using alcohol sometime in their lives, whereas 54% reported marijuana use, and 40% reported using some other illicit drug (Johnston, O'Malley, & Bachman, 1986). Although it is not surprising that teenagers experiment with various drugs, problems can arise if this experimental use becomes regular use or abuse. In this same survey, 37% reported at least one instance of heavy drinking (five or more drinks) during the past 2-week period, 268 reported at least monthly marijuana use, and 58 reported daily marijuana use. Thus, for many teenagers drug use is more than experimental or occasional or simply the result of curiosity. For many adolescents, ingestion of various drugs is a component of their lifestyle (e.g., Castro, Newcomb, & Cadish, 1987). In this study, we examine how teenage drug involvement affects social and psychological development beyond the years of adolescence.

It is generally believed that drug use can have catastrophic consequences for individuals, their families, and society. Such common knowledge is, however, hard to verify scientifically. It is difficult to prove, in a causal sense, that teenage drug use created specific problems for the young adult. Dramatic case histories on negative effects (see, e.g., Can Cocaine Conquer America?, 1987, on cocaine), although suggestive, cannot support a causal interpretation because of the absence of information on individuals who may have used a drug but had minimal or no negative consequences. Similarly, it is believed that good relationships with one's social network can provide a foundation for subsequent improved psychological, social, and health functioning, but scientific evidence for such a proposition is slim.

Short-term consequences of acute substance use can be readily demonstrated in experimental designs that use conditions of varying types and dosage levels of drugs with pre- and posttest of tasks of interest, such as driving skill or problem solving. It does not take sophisticated technologies nor longitudinal studies to establish that if a teenager is too stoned to take an algebra final, the drug use may have caused the failing grade. However, the study of longer term drug use consequences cannot ethically manipulate drug use levels and experimental conditions. For such questions one must rely on quasiexperimental designs with longitudinal data, specific tests for causal inference, and statistical controls (e.g., Gollob & Reichardt, 1987).

There has been little theory development regarding the impact of adolescent drug use on later life (see Newcomb, 1987). Common to most theories is the assumption that use of various substances interferes with or impairs physical, psychological, or emotional functioning. This can result from the psychoactive effects of the drug on cognitive, affective, and behavioral processes. It can also arise from the deleterious effects arising from the mode of ingestion or the metabolizing of the substance on a physical level.

Others have suggested that teenage drug use interferes with normative tasks of adolescent development (e.g., Baumrind & Moselle, 1985). Adolescence is a critical period for the formation of competencies and behaviors necessary for the successful acquisition of adult roles, such as spouse, parent, and provider (e.g., Havighurst, 1972). Baumrind and Moselle (1985) hypoth-

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esized that substance use during this developmental period may impede psychosocial maturation, motivate regression, and create a "hiatus in identity formation" (p. 53). Thus teenage substance use may interfere with the stage-sequential processes of development. As a result, drug-using adolescents may, as adults, "remain in limbo, suffering from symptoms of diffuse identity, marked by prolonged aimlessness and lack of clarity about goals" (Baumrind & Moselle, 1985, p. 52). Because these hypotheses have never been tested empirically, the theory has no data-based support.

Another viewpoint suggests that drug use is associated with accelerated rather than delayed development (Newcomb, 1987; Newcomb & Bentler, 1988). From this perspective, teenage drug users bypass or circumvent the typical maturational sequence of school, work, and family formation and make the transition prematurely into adult roles of jobs and family, without the necessary growth and development for success in these tasks. Thus teenage drug users may develop a pseudomaturity that ill-prepares them for the real difficulties of adult life. As a consequence, they should evidence greater difficulty, if not failure, in these roles over time.

Social support provides major benefits to the individual and has been defined as "the existence or availability of people on whom we can rely, people who let us know that they care about, value, and love us" (Sarason, Levine, Basham, & Sarason, 1983, p. 127). Social support has a variety of positive influences both as a direct effect on healthy adjustment and growth, and as a buffer against the disorienting effects of stressful life events (e.g., Cohen & Wills, 1985; Sarason et al., 1983). The presence of supportive people should enhance both psychological and physical well-being and reduce the adverse consequences of drug use. We do not test the buffering effect of social support but rather focus on the beneficial, main effect of social support.

One can also argue that positive relations with individuals from several generations during adolescence, represented in a general factor of Social Support, would be associated with acceptance of traditional values and behaviors and rejection of negatively sanctioned substance use. Thus, these variables should be controlled in evaluating the long-term consequences of drug use. In addition, socially supportive relationships may ameliorate or attenuate the negative outcomes of drug use. Drug use has also been frequently associated with deviance, problem behavior, or nontraditionalism (e.g., Donovan & Jessor, 1985; Newcomb, Maddahian, & Bentler, 1986). Deviant attitudes often precede drug involvement, are highly correlated with drug use, and thus may represent a spurious factor in tests for drug use consequences. For instance, if a relation is found between early drug use and later employment problems, it is quite possible that both events are the result of general deviance, not that drug use somehow caused the employment difficulties. A factor of Social Conformity (or lack of deviance) is paired with the General Drug Use and Social Support factors during adolescence statistically to hold constant the influence of deviant attitudes.

We also control for adolescent levels of the young adult outcome measures. Such control is necessary to conclude that an impact of social support or drug use discovered over time actually represents a change in the criterion variable or construct and is not simply an association over time.

With these safeguards and controls for spuriousness, temporal sequence, reliable associations, and baseline measures, we are able to draw causal inferences regarding the impact of teenage drug use and social support (see Clayton & Tuchfeld, 1982; Hirschi & Selvin, 1973; Newcomb & Bentler, 1988). On the basis of prior empirical and theoretical leads, we evaluate the impact of these adolescent constructs on several outcomes: Problems With Drugs, Psychosomatic Complaints, Relationship Problems, Emotional Distress, Work Problems, Health Problems, and Family Problems. Of course, it is never possible to prove unequivocally that drug use caused certain problems or that social support ameliorated other problems. However, our controls go a long way toward providing a high degree of trust that if a direct and significant relation is found between teenage drug use and social support, and later life problems or circumstances, these adolescent constructs may have contributed directly to such outcomes.

## Method

### *Subjects*

This study uses data from 654 individuals who provided complete data at three testings over a period of 8 years, from early adolescence to young adulthood (see Newcomb & Bentler, 1988). The study began in 1975 with a group of 1,634 students in the seventh, eighth, and ninth grades (Year 1 of the study) at 11 Los Angeles County schools. The schools were chosen from a larger, randomly selected group of schools representative of Los Angeles County. The schools were initially contacted through their district offices and solicited for voluntary participation in a longitudinal study of teenage substance use. Participants were cooperative students whose parents had signed informed consent forms. The 11 schools were roughly representative of schools in the county in terms of socioeconomic status and ethnicity. Unfortunately, we do not have detailed data to determine if and how our sample differed from the larger sampling frame. All parents and participants were informed that their responses were protected legally by a grant of confidentiality from the U.S. Department of Justice.

Data for this project were also collected 4 years later (in 1980) when the subjects were late adolescents and, again, 4 years later when the participants were young adults (in 1984). At the young-adult follow-up, data were collected from 739 subjects from our original sample (654 provided data at all three assessments). This represents a 45% retention rate over the entire 8-year period of the study. This rate of subject loss is not unusual among real-world studies of this type. An extensive series of attrition analyses, reported elsewhere (Newcomb, 1986; Newcomb & Bentler, 1988), revealed that patterns of dropping out of the study were only slightly systematic because of drug use, personality, or sex of the respondent. For example, in a comparison of 1976 data on subjects who either completed or did not complete the 1984 assessment, not one of 38 drug use and personality variables was able to differentiate significantly the lost from the continuing subjects. Thus, although the retention rate after 8 years was 45%, not surprising considering the nature and length of the research, results should not be gravely biased because of subject loss.

Table 1 presents a description of the sample as young adults. To determine the representativeness of our remaining subjects, we compared our sample with other national samples and individuals in studies similar to ours. When characteristics (e.g., income and living arrangements) of our participants were compared with national surveys of young adults (Glick & Lin, 1986; Johnston et al., 1986; Miller et al., 1983) and other samples of young adults (Donovan, Jessor, & Jessor, 1983; Kandel, 1984), very similar patterns were noted. Our group of young adults did

Table 1
*Description of Sample*

| Variable | Male ($N$ = 192) | Female ($N$ = 462) | Total ($N$ = 654) |
|---|---|---|---|
| Age (years) | | | |
| *M* | 21.86 | 21.90 | 21.90 |
| Range | 19–24 | 20–24 | 19–24 |
| Ethnicity (%) | | | |
| Black | 12 | 16 | 15 |
| Hispanic | 8 | 11 | 10 |
| White | 70 | 64 | 66 |
| Asian | 10 | 9 | 9 |
| High school graduate (%) | | | |
| Yes | 94 | 93 | 93 |
| No | 6 | 7 | 7 |
| No. of children (%) | | | |
| None | 96 | 80 | 85 |
| One | 3 | 18 | 14 |
| Two | 1 | 1 | 1 |
| Three | 0 | 1 | 0 |
| Income for past year (%) | | | |
| None | | | |
| Under $5,000 | 3 | 12 | 9 |
| $5,001 to | 31 | 34 | 34 |
| $15,000 | 51 | 44 | 45 |
| Over $15,001 | 15 | 10 | 12 |
| Living situation (%) | | | |
| Alone | 3 | 4 | 4 |
| Parents | 52 | 46 | 48 |
| Spouse | 7 | 21 | 17 |
| Cohabitation | 9 | 9 | 9 |
| Dormitory | 8 | 5 | 6 |
| Roommates | 16 | 11 | 12 |
| Other | 5 | 4 | 4 |
| Current life activity (%) | | | |
| Military | 7 | 1 | 3 |
| Junior college | 9 | 13 | 12 |
| Four-year college | 24 | 20 | 21 |
| Part-time job | 14 | 14 | 14 |
| Full-time job | 46 | 47 | 47 |
| None or other | 0 | 5 | 3 |

not appear to differ markedly from other young adults. For instance, the U.S. Bureau of the Census reported that in 1984, 45% of 20-to-24-year-olds lived with their parents (Glick & Lin, 1986). This prevalence rate is quite similar to the 48% we found in our sample of the same age.

The main difference was that our sample had a greater percentage of women than men, which it has had since the beginning and represents an initial self-selection bias. This imbalance could influence our results if there were large sex differences on the variables. To mitigate this possibility, we partialed the effects of sex (and ethnicity) from our covariance matrix.

One would expect drug users to drop out of a long-term study, leaving the resulting sample unrepresentative of the population. To evaluate such an effect, we compared reported drug use between our sample and a national representative sample of young adults (Miller et al., 1983). Lifetime prevalence levels were equal on hallucinogens, heroin, sedatives, analgesics, and cigarettes, whereas our sample reported significantly higher prevalence for use of cannabis, cocaine, stimulants, tranquilizers, and alcohol. Prevalence rates of our sample were also compared with those provided for the Western U.S. region in the national survey and were found not to differ significantly. Clearly, we did not lose substantial numbers of drug users as a result of attrition (see Newcomb & Bentler, 1988, for further details).

## *Adolescent Drug Use Measures*

All measures are summarized in Table 2, including univariate statistics, number of items, tests for sex differences, and rating scale formats.

*General Drug Use.* This latent construct was reflected in five measured scales: Cigarette, Alcohol, Cannabis, Cocaine, and Hard Drug Frequencies. Each of these measures are combined, multi-item scales from Years 1 and 5. In Year 1, subjects indicated their lifetime frequency of use, whereas in Year 5, subjects provided frequency of use during the past 6 months. The items were summed into five separate scales: Cigarettes (one item from each time), alcohol (beer, wine, and liquor from each time), cannabis (marijuana and hashish from each time), cocaine (one item from each time), and hard drugs (the sum of 5 items from Year 1 and 14 items from Year 5 [e.g., stimulants, sedatives, hallucinogens, inhalants, and narcotics]). Any specific hard drug substance was used relatively infrequently, so it was necessary to combine the different hard drugs into a summary scale to maximize the available variance. By doing so, we sacrificed the differentiability of the individual hard drugs. However, the improved psychometric qualities of the scale outweigh this lack of specificity. Thus, these drug-use-frequency measures provide combined information about the use of drugs at early adolescence and late adolescence, which should yield a fairly reliable measure of drug use involvement during the teenage years.

These drug use measures form one central core of our analyses, because they represent the causal or antecedent condition against which changes in life functioning between adolescence and young adulthood are gauged. The separate measures of cigarette, alcohol, cannabis, cocaine, and hard drug frequencies are assumed to reflect a tendency toward General Drug Use or polydrug use, identified as a latent construct. We tested for the impact of this latent factor of General Drug Use on life functioning. Controlling for General Drug Use we also assessed the specific impact of cigarettes, alcohol, cannabis, cocaine, and hard drug use. Thus we were able to determine the influence of a general propensity to use drugs (the General Drug Use factor) in addition to the influence of the five specific types of drug use.

Although teenage drug use tends to be acquired in a sequence of increasing involvement from one substance to another (i.e., alcohol precedes cannabis use, which in turn precedes hard drug use), a common factor can represent general drug involvement equally as well (e.g., Bentler & Newcomb, 1986; Hays, Widaman, DiMatteo, & Stacy, 1987; Kandel & Faust, 1975). Our General Drug Use factor reflects increasing polydrug involvement by tapping a continuous latent tendency of drug use, ranging from no use of any substance to high levels of use of all types of drugs. This reflects a common finding in the teenage substance use literature, which suggests that specific substances are rarely used exclusively but that polydrug use is quite common (e.g., Clayton & Ritter, 1985). Those students who used only one substance are not captured in the General Drug Use latent factor but are reflected in the residual (R) of the specific substance.

*Social Support.* The second core of our analyses is social support. A latent construct of Social Support was reflected in four multi-item scales assessed during late adolescence (Newcomb & Bentler, 1986). These scales included good relationship with parents ($\alpha$ = .82), family ($\alpha$ = .84), adults ($\alpha$ = .54), and peers ($\alpha$ = .74). The items assess the amount of respect, support, and inclusion experienced with the four categories of relationships. Previous use of the Social Support latent factor has revealed that the variable *good relationships with peers* has the lowest factor loading (Newcomb & Bentler, 1986). Peer relationships are extremely important when studying adolescent behavior (e.g., Newcomb, Maddahian, & Bentler, 1986). Even though this factor may be weighted toward family and adult support, the influence of peer support can be

Table 2
*Summary of Variable Characteristics*

| Latent construct/measured variable | *M* | No. of items in scale | Range | *SD* | Skew | Kurtosis | *M* sex difference[a] ($r_{pb}$) |
|---|---|---|---|---|---|---|---|
| | | | Adolescence | | | | |
| General Drug Use[b] | | | | | | | |
| Cigarette frequency | 4.64 | 2 | 2–12 | 2.90 | 1.13 | 0.14 | .08* |
| Alcohol frequency | 14.47 | 6 | 6–30 | 5.36 | 0.21 | −0.89 | −.05 |
| Cannabis frequency | 6.63 | 4 | 4–19 | 3.52 | 1.39 | 1.12 | −.04 |
| Cocaine frequency | 2.41 | 2 | 2–7 | 0.94 | 2.47 | 5.71 | .04 |
| Hard Drug frequency | 20.61 | 19 | 19–69 | 4.06 | 5.48 | 44.37 | .04 |
| Social Conformity | | | | | | | |
| Law abidance[c] | 13.15 | 4 | 4–20 | 4.03 | −0.23 | −0.75 | .15*** |
| Liberalism[c] | 9.96 | 4 | 4–19 | 2.63 | 0.23 | −0.05 | .02 |
| Religious commitment[c] | 15.57 | 4 | 4–20 | 3.90 | −0.75 | −0.18 | .12** |
| Social Support | | | | | | | |
| Good relationship with parents[c] | 15.87 | 4 | 5–20 | 3.45 | −0.76 | −0.17 | .03 |
| Good relationship with family[c] | 14.27 | 4 | 4–20 | 4.20 | −0.47 | −0.61 | −.01 |
| Good relationship with adults[c] | 17.10 | 4 | 7–20 | 2.30 | −0.84 | 0.88 | .06 |
| Good relationship with peers[c] | 16.72 | 4 | 6–20 | 2.80 | −1.08 | 1.02 | .05 |
| Control Variables | | | | | | | |
| Headache prone[e] | | | | | | | |
| Insomnia[e] | 8.78 | 4 | 4–20 | 4.42 | 0.75 | −0.38 | .20*** |
| Depression[c] | 8.93 | 4 | 4–19 | 3.44 | 0.73 | −0.11 | .05 |
| Self-derogation | 7.69 | 4 | 4–18 | 3.26 | 0.84 | 0.00 | .03 |
| Objective symptom index | 2.46 | 7 | 0–7 | 2.76 | 0.81 | −0.53 | .05 |
| Illness sensitivity[c] | 4.05 | 25 | 0–16 | 3.10 | 0.98 | 0.80 | .13** |
| Times felt really ill | 9.63 | 4 | 4–20 | 3.91 | 0.56 | −0.37 | .16*** |
| Dissatisfaction with relations with parents[d] | 1.55 | 1 | 0–6 | 1.51 | 1.30 | 1.40 | .15*** |
| Dissatisfaction with relations with opposite-sex friends[d] | 1.95 | 1 | 1–5 | 1.00 | 1.12 | 0.80 | .08* |
| Dissatisfaction with work or school[d] | 2.33 | 1 | 1–5 | 1.01 | 0.71 | −0.19 | .02 |
| No. of car accidents while drunk or stoned | 2.18 | 1 | 1–5 | 1.10 | 0.91 | 0.07 | −.06 |
| | 0.09 | 6 | 0–5 | 0.50 | 7.09 | 56.17 | −.04 |
| | | | Young adulthood | | | | |
| Problems With Drugs | | | | | | | |
| Trouble with drugs[e] | 0.10 | 4 | 0–4 | 0.47 | 5.95 | 39.38 | −.02 |
| Trouble with alcohol[e] | 0.09 | 4 | 0–4 | 0.42 | 5.43 | 33.22 | −.10* |
| Trouble with drugs or alcohol[f] | 1.21 | 1 | 1–5 | 0.65 | 3.58 | 13.88 | .00 |
| Psychosomatic Complaints | | | | | | | |
| Headache prone[c] | 8.69 | 4 | 4–20 | 4.45 | 0.77 | −0.37 | .22*** |
| Insomnia[c] | 8.83 | 4 | 4–20 | 3.76 | 0.80 | 0.04 | .07 |
| Psychosomatic symptoms | 3.75 | 11 | 0–15 | 2.83 | 0.95 | 0.82 | .21*** |
| Relationship Problems | | | | | | | |
| Trouble in relationship[f] | 2.15 | 1 | 1–5 | 1.18 | 0.83 | −0.18 | .05 |
| Unhappy in relationship[g] | 2.78 | 1 | 1–7 | 1.58 | 0.75 | −0.09 | −.02 |
| Lonely in relationship | 2.39 | 5 | 0–5 | 1.64 | 0.88 | −0.56 | −.07 |
| Emotional Distress | | | | | | | |
| Trouble with feelings[f] | 1.63 | 1 | 1–5 | 0.22 | 1.55 | 1.88 | .09* |
| Unhappy handling emotions[g] | 2.90 | 1 | 1–7 | 0.22 | 0.89 | 1.21 | .07 |
| Self-derogation | 1.50 | 7 | 0–7 | 1.84 | 1.32 | 1.00 | .07 |
| Work Problems | | | | | | | |
| Trouble with work[f] | 1.91 | 1 | 1–5 | 0.97 | 0.92 | 0.34 | −.01 |
| Unhappy with work[g] | 2.81 | 1 | 1–7 | 1.21 | 0.71 | 0.43 | .02 |
| Health Problems | | | | | | | |
| Trouble with health[f] | 1.56 | 1 | 1–3 | 0.86 | 1.83 | 3.56 | .17*** |
| Unhappy with health[g] | 2.38 | 1 | 1–7 | 1.18 | 1.23 | 2.00 | .07 |
| Health problems past 4 years[e] | 0.13 | 4 | 0–4 | 0.50 | 4.75 | 25.72 | .03 |
| Family Problems | | | | | | | |
| Unhappy with family[g] | | | | | | | |
| Good relationship with family[c] | 2.31 | 1 | 1–7 | 1.24 | 1.05 | 0.98 | −.02 |
| Poor relationship with family past 4 years[e] | 14.87 | 4 | 4–20 | 3.78 | 0.65 | −0.11 | .07 |
| | 1.67 | 4 | 0–4 | 1.20 | 1.70 | 1.70 | .00 |

[a] A positive correlation indicates that the women had the larger value, whereas a negative correlation indicates that the men had the larger value.
[b] Each drug use frequency measure includes assessments for early and late adolescence.
[c] Each variable includes four items rated on 5-point bipolar scales.
[d] These items were rated on 5-point scales ranging from *very happy* to *very unhappy.*
[e] These items reflect the number of years in the past 4 that the subject reported this problem.
[f] Each of these items was rated on 5-point scales that ranged from *no difficulty* to *great difficulty.*
[g] Each of these items were rated on 7-point scales that ranged from *delighted* to *terrible.*
* $p < .05$. ** $p < .01$. *** $p < .001$.

captured as a nonstandard effect (i.e., an impact of the good relationship with peers variable on young-adult outcomes separate from general Social Support), so that its influence is not lost.

*Social Conformity.* The Social Conformity latent construct was assessed with three scales during Year 5 of the study, when subjects were in late adolescence: for law abidance, period-free reliability was .83; for liberalism, .55; and for religious commitment, .77 (Stein, Newcomb, & Bentler, 1986).

*Control variables.* The adolescent influence of 11 other variables, as well as sex and ethnicity, were controlled in a statistical manner by partialing their effects from the data. It is critical to control for adolescent levels of the young adult outcome variables, so that when across-time effects are noted for drug use or social support, these will reflect increases or decreases in the outcome variables (Gollob & Reichardt, 1987). It was necessary to partial these influences rather than include them directly in the model because of the extremely large size of the model.

The differences between men and women and across ethnic groups may distort associations in the models. To reduce these potential confounds, sex (as one dichotomous variable) and ethnicity (as three dummy variables representing the four ethnic groups) were partialed from the data. As a result, the findings we obtained were not biased because of the linear effects of sex or ethnic differences among the variables. This does not suggest that differential associations may not exist between variables for men and women or by ethnicity. However, to test this, separate models would need to be created for each sex and ethnicity, which could not be done reliably with the given sample size. Partialing out sex and ethnicity assures that the results are not distorted by the linear effects of these demographic differences.

We used two scales to control for baseline levels of psychosomatic complaints: Headache prone ($\alpha = .87$) and insomnia ($\alpha = .74$) (from the Bentler Medical–Psychological Inventory [BMPI]; Newcomb, Huba, & Bentler, 1981, 1986). Two scales were used to control for baseline levels of emotional distress: depression (from the BMPI: $\alpha = .74$) and self-derogation (Kaplan, 1975). Three scales were used to control for baseline levels of physical health status: illness sensitivity (from the BMPI: $\alpha = .79$), times felt really ill (during the past 6 months), and objective symptom index (Newcomb & Bentler, 1987). We used three items to control for baseline levels of trouble or problems in various life areas: dissatisfaction with relations with parents, dissatisfaction with relationships with opposite-sex friends, and dissatisfaction with work or school (Newcomb, Bentler, & Collins, 1986). One multi-item scale was used to control for baseline levels of drug problems: number of car accidents while drunk or stoned (a sum of six items assessed for the past 6 months).

### *Young Adulthood Outcome Measures*

Seven latent factors were assessed with young adult measures. We used two multi-item scales and one single-item scale to reflect a latent construct of Problems With Drugs: trouble with drugs, trouble with alcohol, and trouble with drugs or alcohol (Stein, Newcomb, & Bentler, 1987). Three multi-item scales were used to reflect a Psychosomatic Complaints latent factor: headache prone, insomnia (from the BMPI), and psychosomatic symptoms (Newcomb & Bentler, in press). Two single-item variables and one multi-item scale were used to reflect a Relationship Problems latent construct: unhappy with relationship, trouble with relationship (Newcomb & Bentler, 1988), and lonely in romantic relationship (Schmidt & Sermat, 1983). We used two single-item scales and one multi-item scale to reflect a latent construct of Emotional Distress: trouble with feelings, unhappy handling emotions, and self-derogation (Kaplan, 1975). Two single-item scales were used to reflect a latent construct of Work Problems: trouble with work and unhappy with work (Newcomb & Bentler, 1988). Two single-item scales and one multi-item scale were used to represent a Health Problems latent construct: trouble with health, unhappy with health, and health problems past 4 years (Newcomb & Bentler, in press). Two multi-item scales and one single-item scale were used to reflect a latent construct of Family Problems: unhappy with family, good relationship with family, and poor relationship with family past 4 years.

### *Analyses*

We used point-biserial correlations to test for mean sex differences on each of the 43 observed variables. This test was chosen because it is mathematically identical to the $t$ statistic, yet unlike the $t$ test it can indicate the amount of accountable variance between groups when squared (e.g., Guilford, 1965, pp. 322–325).

An inspection of the skew and kurtosis estimates for the 43 observed measures indicates that several are nonnormally distributed. Although it would be ideal to use a structural model estimator that does not require multivariate normal data (e.g., Browne, 1984), such procedures are impossible to use with models of this size. As a result we used the maximum likelihood structural-model estimator, which, although historically it has been assumed to require multivariately normal data, has been shown to be quite robust over normality violations (e.g., Harlow, 1985; Mooijaart & Bentler, 1986, Satorra & Bentler, 1986). The control variables from adolescence were statistically partialed from the data to remove their influence from the entire system of variables.

Confirmatory factor analysis was used to evaluate the adequacy of our hypothesized factor structure (Bentler & Newcomb, 1986). If the initial hypothesized model did not adequately reflect the data (which is common in models with many variables and many subjects), we added correlated residuals until an acceptable fit was achieved. These modifications were made in a manner that does not disturb the critical features of the model (i.e., latent-factor intercorrelations).

Finally, we generated a structural model that predicts young adult constructs and variables from the adolescent factors and variables. This structural model was overfit using across-time empirical modification suggestions (Bentler & Chou, 1986), and nonsignificant paths were deleted (as recommended by MacCallum, 1986). All structural model analyses were performed using the EQS computer program (Bentler, 1986).

## Results

### *Sex Differences*

Mean sex differences on the 43 observed variables were tested using point-biserial correlations. These correlations are presented in the right-hand column of Table 2. Significant mean differences were found on 13 variables. All of these differences were small, with the largest accounting for less than 5% of the variance between groups. On the basis of these results, as well as those of other studies that have found few differential associations between drug use and other variables by sex (e.g., Newcomb, Maddahian, & Bentler, 1986), and because the social support variables showed no sex differences, we combined the men and women in the analyses that follow. Of course, partialing sex from the data reduced the distortion that may have resulted from any of these even small sex differences.

### *Confirmatory Factor Analysis Model*

The first step in our structural-modeling analyses was to assess the adequacy of our hypothesized measurement model. We needed to demonstrate that the variables we had chosen to re-

Table 3
*Summary of the Model-Fit Statistics*

| Model | $\chi^2$ | *df* | *p* value | Normed fit index |
|---|---|---|---|---|
| Initial CFA | 1297.39 | 419 | < .001 | .80 |
| Final CFA[a] | 361.47 | 341 | .21 | .95 |
| Final structural | 375.19 | 355 | .22 | .94 |

*Note.* CFA = confirmatory factor analysis.
[a] Includes one additional factor loading and 77 added correlations between pairs of residual variables.



flect the latent factors actually reflected these constructs in a statistically reliable manner. This was accomplished via a confirmatory factor analysis (CFA). In addition, the CFA model provides correlations among the latent factors that are disattenuated for measurement error. These factor intercorrelations permit the first opportunity to examine how the latent constructs are related, and they provide the basis upon which the path, or structural, model among the latent factors is built.

In the initial CFA model, the 10 latent constructs were hypothesized to "cause" or generate the variation in the 32 observed variables. The factor structure of this first model was "pure" in that each observed variable was allowed to load on only one latent construct. For instance, self-derogation was assumed to be only an indicator of Emotional Distress. There may be many small associations between variables that are not captured in the overall hypothesized measurement model (the a priori factor structure). These typically must be added to the model on an empirical basis (e.g., Sorbom, 1975) to account for all of the covariation of the data.

An initial CFA model was run that (a) fixed all factor variances at unity, (b) allowed all latent constructs to correlate freely, and (c) freed all hypothesized factor loadings and constrained all others at zero. Because there was one repeatedly measured variable included in the model (good relationship with family), a cross-time correlated residual between these variables was included a priori. This initial model did not adequately reflect the data ($p < .001$; see Table 3 for a summary of other fit indexes), although the normed fit index (NFI; Bentler & Bonett, 1980) was sufficiently large (.80) to suggest that modifications to the model should yield an acceptable fit. Factor intercorrelations for this initial CFA model are presented in the upper triangle of Table 4.

By examining selected Lagrange multiplier modification indexes (Bentler & Chou, 1986), correlations among 77 pairs of measured-variable residuals were added to the model along with one extra factor loading (relating headache prone to Problems With Drugs). Many of these correlated residuals reflect method or response effects between variables measured in similar formats. These modifications resulted in a model that adequately reflected the data ($p = .21$; NFI = .95) or one that at least could not be rejected as a plausible explanation of the data. This final CFA model was a significant improvement over the initial CFA model, difference $\chi^2(78, N = 654) = 935.92$, $p < .001$. Factor intercorrelations for this final CFA model are presented in the lower triangle of Table 4. All hypothesized factor loadings were highly significant ($p < .001$), confirming the major features of our hypothesized factor structure. Standardized factor loadings and residual variables (variances) of the observed variables in this final CFA model are graphically depicted in Figure 1. (We present standardized results only, on the recommendation of Bielby, 1986.)

To test whether adding the correlated residuals and additional factor loading disturbed the fundamental associations among the latent constructs, the factor intercorrelations between the initial and final CFA models were correlated. The resultant correlation was higher than .98, indicating that the model modifications did not alter the basic pattern of factor intercorrelations and thus did not disturb this fundamental feature of the model.

The CFA provides correlations among the 10 latent constructs that are disattenuated for measurement error. As such, these correlations represent the true, or error-free, associations among the constructs. In the final CFA model, the adolescent General Drug Use factor was significantly related to lowered Social Conformity, lowered Social Support, higher Problems With Drugs, high Psychosomatic Complaints, more Emotional Distress, and greater Health Problems (see Table 4). Adolescent Social Conformity was significantly associated with higher Social Support, decreased Problems With Drugs, decreased Psychosomatic Symptoms, less Emotional Distress, decreased Work Problems, and fewer Family Problems. Adolescent Social Support was significantly negatively correlated with all young-adult constructs. All 7 young-adult latent constructs were significantly positively correlated among themselves.

### *Structural Model Analyses*

The final stage in our analyses was the creation of a structural, or path, model, which was built upon the measurement portion of the CFA model presented earlier but included regression effects representing unidirectional influences of one variable or factor upon another across time. As a rule, we did not include regression paths within time, because the causal interpretation of these may be ambiguous. Within-time associations were captured as correlations among constructs, factor loadings, or correlated residuals. The regression effects we are most interested in are those across time that may have a plausible causal inference.

Because many of the correlated residuals added in the model modifications to create the final CFA may be across-time regression effects, these empirically determined across-time correlated residuals were deleted in the initial structural model. We did this in hopes of capturing these associations as across-time causal paths. All constructs in adolescence were allowed to correlate freely, as were all factor residuals during young adulthood. All young-adult constructs were initially predicted from all adolescent constructs.

This beginning model was modified by adding across-time regression paths (based on carefully selected modification indexes that made theoretical sense) and deleting nonsignificant parameters. These additions to the model were empirically determined and not hypothesized (Bentler & Chou, 1986). This structural model was overfit by adding these parameters, and then nonsignificant paths were deleted. This procedure was suggested by MacCallum (1986) and affords the best results for

Table 4
*Factor Intercorrelations for the Initial (Upper Triangle) and Final (Lower Triangle) Confirmatory Factor Analysis Models*

| Factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Adolescence | | | | | |
| 1. General Drug Use | — | −.74*** | −.24*** | .40*** | .16** | −.04 | .10* | .02 | .12** | .05 |
| 2. Social Conformity | −.75*** | — | .48*** | −.40*** | −.21*** | −.05 | −.14** | −.15* | −.08 | −.24*** |
| 3. Social Support | −.25*** | .54*** | — | −.25*** | −.33*** | −.14** | −.37*** | −.25*** | −.27*** | −.52*** |
| | | | | | Young adulthood | | | | | |
| 4. Problems With Drugs | .43*** | −.43*** | −.26*** | — | .35*** | .16** | .48*** | .27*** | .15** | .21*** |
| 5. Psychomatic Complaints | .19*** | −.23*** | −.35*** | .37*** | — | .19*** | .67*** | .38*** | .56*** | .34*** |
| 6. Relationship Problems | −.04 | −.08 | −.17** | .18** | .22*** | — | .61*** | .27*** | .22*** | .22*** |
| 7. Emotional Distress | .12** | −.17** | −.38*** | .45*** | .66*** | .66*** | — | .64*** | .55*** | .50*** |
| 8. Work Problems | .06 | −.16* | −.26*** | .24** | .38*** | .21** | .61*** | — | .32*** | .34*** |
| 9. Health Problems | .14** | −.07 | −.27*** | .15** | .53*** | .16** | .52*** | .33*** | — | .30*** |
| 10. Family Problems | .07* | −.26*** | −.50*** | .26*** | .37*** | .24*** | .49*** | .30*** | .28*** | — |

* $p < .05$. ** $p < .01$. *** $p < .001$.

cross-validation. The final model includes only significant paths. The final structural model fit the data quite well ($p = .22$; NFI = .94). Associations among the latent factors are displayed graphically in Figure 2, whereas the across-time paths that include at least one observed variable are listed in Table 5 with their standardized regression weight. In this table, those predictor variables designated by an (*R*) are from the residual of the particular variable. These nonstandard effects yield a much more detailed representation of the path structure not readily available in LISREL-type models (Newcomb & Bentler, 1988). Finally, Table 6 presents the correlations among the latent factor residuals during young adulthood. Thus Figure 2 and Tables 5 and 6 each represent a distinct aspect of the same final structural model and are presented separately only for reasons of clarity.

In the final structural model, relating adolescent latent factors to young-adult latent factors (Figure 2), we found that teenage General Drug Use directly increased young adult Problems With Drugs, Health Problems, and Family Problems. General Drug Use also had a specific influence on increasing a poor relationship with family during the past 4 years (this is shown in Table 5). Adolescent Social Conformity decreased Psychosomatic Complaints and Health Problems. Finally, teenage Social Support decreased problems in all seven areas of life as a young adult.

A variety of effects were also noted for specific types of drug substances. A summary of these results is given in Table 5. In most instances, these effects were significant but not always substantial in magnitude. They may be less reliable in cross-validation than the latent-variable effects. However, they do represent significant and predictive influences over a relatively lengthy period (up to 8 years) and were found over and above stability, or baseline, controls. Cigarette use increased Psychosomatic Complaints, Emotional Distress, trouble with drugs/alcohol, trouble with relationship, and health problems during the past 4 years. Alcohol use reduced Family Problems, feeling lonely in relationships, and self-derogation. Cannabis use increased Family Problems and health problems during the past 4 years. Cocaine use reduced trouble with feelings and increased unhappiness with work. Hard drug use increased Psychosomatic Complaints, Relationship Problems, Emotional Distress, trouble with drugs/alcohol, and unhappiness in relationships.

Finally, several non-drug-related effects were found over time. From the control variables, law abidance reduced Problems With Drugs and increased Emotional Distress. From the substantive social support variables, general Social Support reduced unhappiness with family. Specific social support effects included good relationship with parents increasing Psychosomatic Complaints, good relationship with family reducing Family Problems (the major specific effect in terms of magnitude), and good relationship with peers reducing Emotional Distress. This last effect corroborates Kaplan's (1984, 1985) hypothesis that good associations with a peer network in adolescence will enhance feelings of self-worth and emotional well-being.

## Discussion

Various types of teenage drug use, with the exception of alcohol use, but in particular cigarettes and hard drug use, had a range of negative consequences for this group of young adults. These effects represent increments of trouble in these problem areas that are not spurious because of a general proneness toward deviance nor totally mitigated by social support. These negative effects of teenage drug use included problems with health, psychosomatic symptoms, dysphoric emotional functioning, impaired romantic attachments, and trouble with parents and family. Thus the impact of teenage drug use does not have a single targeted area of influence or dysfunction, but rather impedes a range of important domains. Work problems were related only to teenage cocaine use. In other analyses, teenage general drug use increased job instability in young adults (Newcomb & Bentler, 1988). Thus, cocaine use predicts general unhappiness with work situations, whereas general drug use (one component of which is cocaine use) reduces job stability.

These effects were evident over a 4-year span from late adolescence to young adulthood, although the drug use measures also

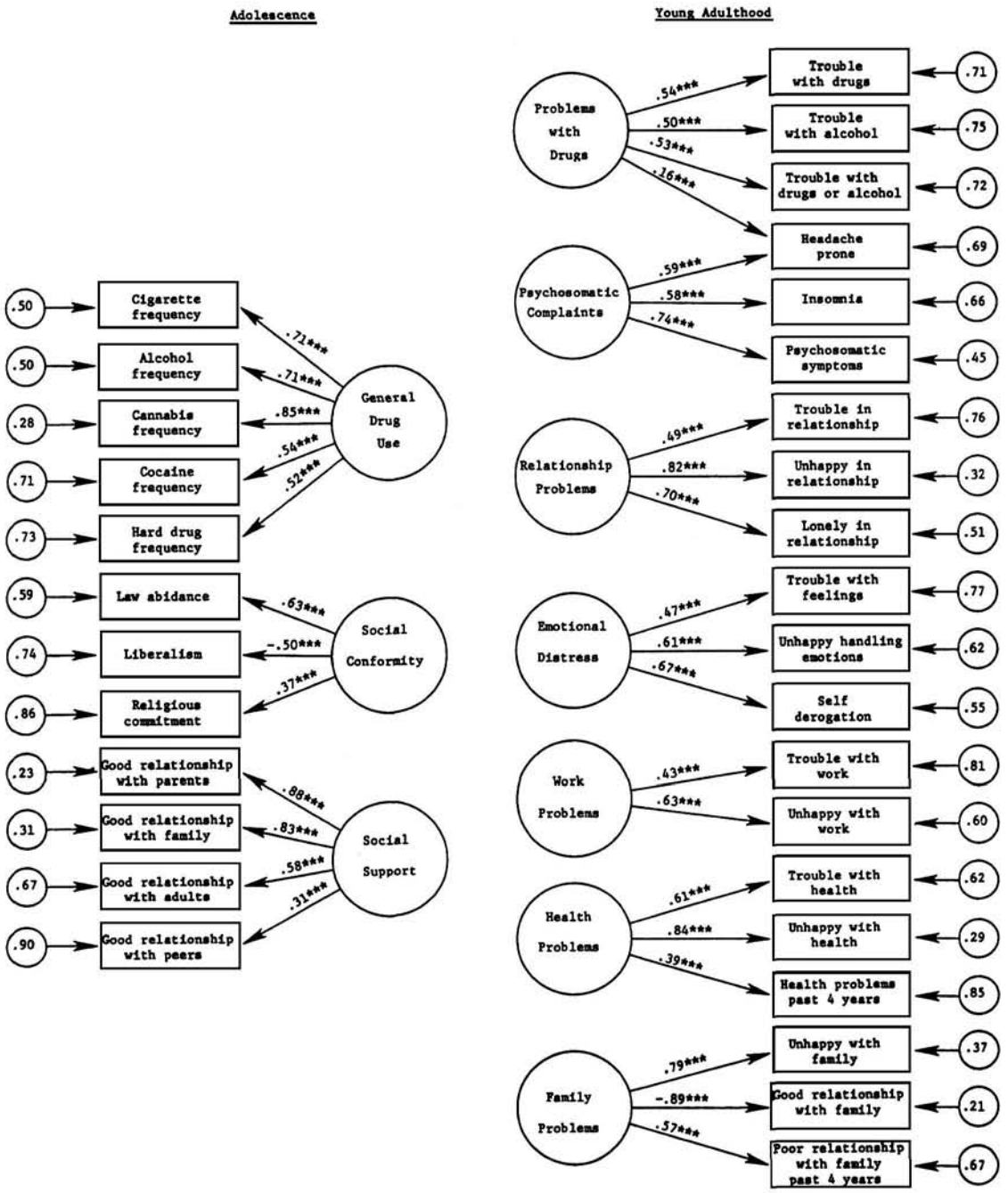


*Figure 1.* Final confirmatory factor analysis model. (Large circles represent latent constructs, rectangles are measured variables, and small circles with numbers are residual variances. Factor loadings are standardized and significance levels were determined by critical ratios on unstandardized coefficients [$***p < .001$]. Not depicted in the figure are two-headed arrows—correlations—joining each possible pair of factors. Estimates for these correlations are given in Table 4.)

included information from early adolescence. It is likely that certain effects of adolescent substance use may appear only after a longer time. Nonetheless, the effects we have located influence several critical life areas, were found over a relatively short period of time, and may reflect a life trajectory of increasing problems partly the result of teenage involvement with drugs.

Developmental tasks have been defined as those that occur "at or about a certain period in the life of an individual, successful achievement of which leads to happiness and success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society and difficulty with later tasks" (Havighurst, 1952, p. 2). Such tasks for an adolescent typically in-

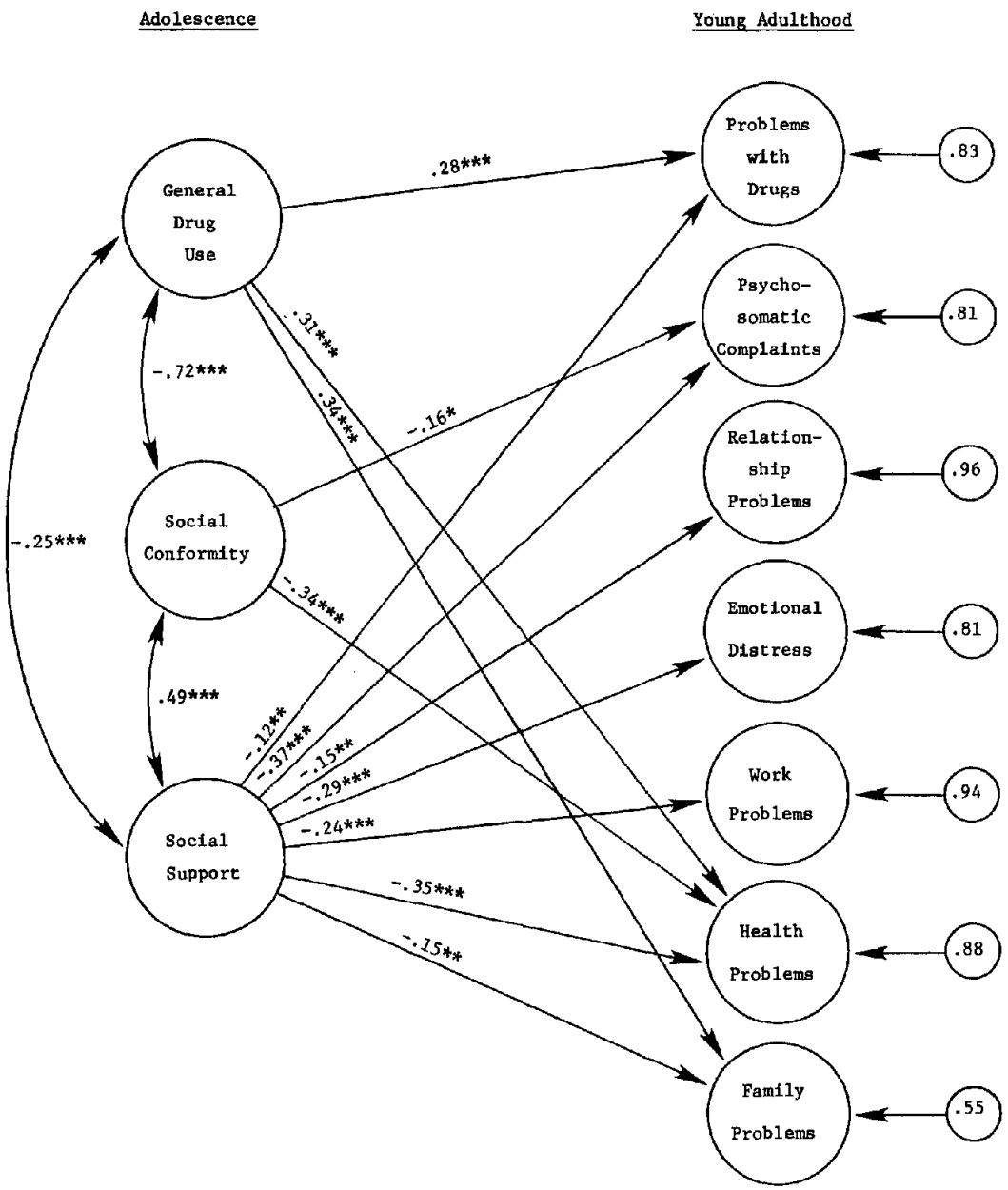


*Figure 2.* Final structural model of the across-time effects between latent constructs. (Large circles represent latent factors and small circles with numbers reflect residual variances. Path coefficients are standardized and significance levels were determined by critical ratios on unstandardized coefficients [$*p < .05$; $**p < .01$; $***p < .001$]. Other regression effects from this same final model that do not relate latent constructs to one another are given in Table 5. Within-time correlations between factors residual are given in Table 6.)

clude achieving mature relations with peers, individuating from parents, learning of socially responsible behavior, establishing personal values, acquiring appropriate social roles, pursuing formal education, and preparing for marriage and parenthood (Havighurst, 1972). Our results indicate that the successful achievement of many of these critical developmental tasks of adolescence may be jeopardized by drug use and can be seen in the types of problems faced as young adults, such as relationship problems, emotional distress, family problems, and problems with drugs and alcohol.

Physical health was also affected by teenage drug use. Both cigarettes and cannabis use increased health problems, whereas cigarettes and hard drug use increased psychosomatic complaints. Thus we must conclude that some health compromises result from use of cigarettes, cannabis, and hard drugs as a teenager. Similar effects were noted in a larger system of health status and health service use variables (Newcomb & Bentler, 1987).

Interestingly, there were no negative consequences to the specific use of alcohol among this group of adolescents. In fact,

Table 5
*Direct Across-Time Causal Paths Not Depicted in Figure 2*

| Adolescent predictor variable | | Young-adult consequent variable | | Standardized parameter estimate[a] |
|---|---|---|---|---|
| Observed | Latent | Observed | Latent | |
| | General Drug Use | Poor relationship with family past 4 years | | .11** |
| Cigarette frequency | | | Psychosomatic Complaints | .18*** |
| Cigarette frequency | | | Emotional Distress | .12** |
| Cigarette frequency | | Trouble with drugs/alcohol | | .13** |
| Cigarette frequency | | Trouble with relationship | | .09** |
| Cigarette frequency | | Health problems past 4 years | | .13*** |
| Cigarette frequency (R) | | Health problems past 4 years | | .11** |
| Alcohol frequency (R) | | | Family Problems | −.09** |
| Alcohol frequency | | Lonely in relationship | | −.10** |
| Alcohol frequency (R) | | Self derogation | | −.09** |
| Cannabis frequency | | | Family Problems | .17** |
| Cannabis frequency | | Health problems past 4 years | | .08** |
| Cocaine (R) | | Trouble with feelings | | −.07* |
| Cocaine | | Unhappy with work | | .10** |
| Hard drug frequency | | | Psychosomatic Complaints | .09** |
| Hard drug frequency (R) | | | Relationship Problems | .11** |
| Hard drug frequency | | | Emotional Distress | .09* |
| Hard drug frequency (R) | | Trouble with drugs/alcohol | | .08** |
| Hard drug frequency (R) | | Unhappy in relationship | | .12*** |
| Law abidance | | | Problems with Drugs | −.12** |
| Law abidance | | | Emotional Distress | .07* |
| Good relationship with parents | | | Psychosomatic Complaints | .17** |
| Good relationship with family | | | Family Problems | −.51*** |
| Good relationship with peers | | | Emotional Distress | −.17*** |
| | Social Support | Unhappy with family | | −.15*** |

*Note.* (R) denotes variable residual.
[a] Significance level determined by a critical ratio of the unstandardized parameter estimate divided by its standard error.
* $p < .05$. ** $p < .01$. *** $p < .001$.

there were three positive effects of teenage alcohol consumption: enhanced positive self-feelings and improved social relationships with family and romantic attachments. One must keep several facts in mind when interpreting these effects. First, alcohol is not an illicit substance, and although its use by these teenagers was illegal, its use may not have been considered as deviant as use of illicit drugs. The social sanctions against alcohol may not have been as great as for other drugs and, in fact, may have actually been condoned (particularly when the illicit alternatives of cannabis and hard drugs are considered). Thus, family relations may improve if the teenager uses alcohol only (as indicated by the prediction from the alcohol residual in our analyses), to the exclusion of illicit drugs. On the other hand, alcohol is well noted for its ability to reduce social inhibitions and may have allowed certain awkward adolescents the opportunity to develop adequate social skills, thus improving their functioning in relationships and resulting in decreased self-derogation. Remember, however, that alcohol use is one indicator of our General Drug Use factor, which has some definite negative outcomes. Thus, we cannot conclude that alcohol use is always positive, because when it is used in conjunction with other drugs it becomes a negative influence toward health, family, and developing drug and alcohol problems.

Our results also have important theoretical implications. It is

Table 6
*Correlations Among the Young-Adult Factor Residuals*

| Factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Problems With Drugs | — | | | | | | |
| 2. Psychosomatic Complaints | .29*** | — | | | | | |
| 3. Relationship Problems | .18** | .17** | — | | | | |
| 4. Emotional Distress | .41*** | .62*** | .67*** | — | | | |
| 5. Work Problems | .37*** | .32*** | .19* | .60*** | — | | |
| 6. Health Problems | .10* | .50*** | .14** | .49*** | .28*** | — | |
| 7. Family Problems | .17** | .24*** | .20*** | .39*** | .23*** | .18** | — |

* $p < .05$. ** $p < .01$. *** $p < .001$.

quite apparent that with the exception of alcohol, teenage drug use produced at least some impairment in physical, social, and emotional functioning among these young adults. In addition to the effects of General Drug Use, the most destructive drugs appear to be cigarettes and hard drugs. Use of these substances apparently interferes with normal physical and emotional development, resulting in problems in several important areas of life. The exact nature of how this interference occurs cannot be directly addressed by our data. However, other analyses and literature reviews have indicated that drug use can be associated with both precocious development (Newcomb, 1987; Newcomb & Bentler, 1988) and psychosocial dysfunction (e.g., Baumrind & Moselle, 1985), which then could have generated the problems noted in the present analyses (Newcomb & Bentler, 1988). For instance, if teenage drug use is associated with precocious (or premature) maturation as an adolescent, a wide range of developmental tasks will not have been adequately achieved. As a result, one would expect to find difficulties in areas requiring mature coping skills, such as in romantic relationships, individuation from family, responsible social behavior, and emotional integrity. Similarly, teenage drug use may have created a developmental dysfunction by impairing or interfering with the normal processes of developing adolescent peer relationships, which are necessary for acquiring the social skills and competence to succeed in adult relationships. Such dysfunction could also account for the family and relationship problems we have noted in our study that resulted from drug use.

The present results particularly emphasize the destructive effects of cigarette use. In the quantities used by these adolescents, cigarettes predicted as much, if not more, impairment and dysfunction than cannabis and hard drugs. Although there is a national fervor toward preventing drug use among the nation's youth, tobacco use is rarely considered in such efforts. Clearly, cigarette use must receive greater attention in these programs.

The effects we have noted are not the result of experimental or infrequent drug use, but reflect a pattern of relatively heavy use during early and late adolescence. Thus, it is those teenagers who have developed a life-style of drug use who must be the focal point of prevention and treatment efforts. Heavy use, abuse, or misuse of drug substances by these teenagers, and not the occasional social use at a party or among friends, led to the problems noted. Other research has found that problematic drug use is not generated in peer settings, but results from internal needs to reduce stress, combat negative feelings, and self-medicate various dysfunctional states (e.g., Carman, 1979; Margulies, Kessler, & Kandel, 1977). It is logical then to focus on improving poor social and emotional coping skills and preventing drug use that is used to relieve these inadequacies. In contrast, the occasional use of beer or marijuana at a party cannot be considered abuse or problematic use and may be a natural consequence of teenage curiosity and experimentation. As such, it should not be overly pathologized because this is not the type of drug use that will create problems as the teenager matures into adulthood.

The consequences of social support during adolescence were, if anything, even more dramatic than the consequences of adolescent drug use. Even after appropriate control for potential confounding effects, every young adult problem area was reduced by the presence of earlier social support. Thus, difficulties in interpersonal relations seem to provide a surprisingly powerful indicator of psychosocial dysfunction over time. These findings confirm a main effect notion of social support, but could not test the buffering hypothesis as currently designed. Our design permitted the effects of specific types of social support to show themselves, as had many specific drug effects. In particular, it would have been possible to find that the negative effects of inadequate social support were largely the result of adolescents' poor relationships with peers, as might be predicted from socialization theories that emphasize the powerful role of peers during adolescence (e.g., Kandel, 1985). However, this was not found. Virtually all of the effects in this domain were general effects of the Social Support factor, for which good relationships with peers was clearly the least adequate indicator. Although there were four specific effects (see Table 5), only one involved peer relations, with good peer relations leading to decreased emotional distress in young adulthood. The powerful effects of adolescent social support on young adult functioning imply that interpersonal relations during adolescence should represent an important target domain for intervention and prevention programs.

We have been able to separate the general and specific young-adult consequences of teenage drug use and social support from the general tendency toward deviance. The effects of drugs were both general and specific, but the effects of social support on young adult functioning were largely general. Future research should be directed toward refining these preliminary results and establishing more clearly the nature of the process leading from teenage drug use and interpersonal relations to later problems in life. Studies over longer periods of time will be crucial once these data become available.

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