
CHAPTER 12

Multivariate Model Predicting Teen Substance Use

The ecological model of youth development suggests that there are important factors at each level of the model that influence teen behaviors. In previous chapters we have presented individual factors alone, such as teen perception of substance use risk, time spent in various activities, parenting style and parental monitoring, neighborhood support, etc. This chapter will present a model in which the factors are considered together and the relative strength of each factor in predicting substance use will be identified. However, the caveat is that this model does not contain all critical factors. One factor of particular importance, peer influence, was not included in the survey questions. Thus, like all models, our model is limited by the type of data that was collected.

Why do we want to do this? We want to test the notion that every level of the ecological model makes a contribution to youth development. For example, do parent behaviors make a difference in predicting teen behavior? In particular, we want to examine those factors that are amenable to change and influence. Some factors such as temperament or age cannot be changed. Other factors such as perceived neighborhood support, perceived school attachment, or levels of parental monitoring can be altered. The goal is to identify those factors that have influence and can be enhanced as protective factors in the development of youth. We hope this will allow the communities to more effectively use the information from the Teen Assessment Project in developing appropriate programs and interventions.

Multivariate Model

Data from the surveys of the last two years allow us to create a multivariate model of teen development that includes the levels of youth, family, school, and community. The chart below depicts each level and the specific factors at each level.

Ecological Level	Factors
Youth	Social responsibility Perceived risk of alcohol, drugs, tobacco Time spent at home alone with no adults present Time spent working
Family	Parenting style Parental values and attitudes Parent-teen communication Parental monitoring
School	School attachment
Community	Neighborhood support Neighborhood monitoring

Creation of the Factors

Listed below is each factor of the model and the questions that make up that factor. In addition to those factors, we have to identify the effect of demographic variables such as gender and grade. Research suggests that substance use increases with age and can vary by gender (Johnston, O'Malley & Bachman, 2002). Thus our complete model includes demographic variables and the factors below. We used this model to examine the links between these factors and teen substance use.

Community

Neighborhood Support

My town is a good place to live.

In my town there are a lot of fun things for kids my age to do.

If I had a problem, there are neighbors whom I could count on for help.

Neighborhood Monitoring

If I were to do something wrong, adults in my town would probably tell my parent(s)/ guardian(s).

Adults in my neighborhood or community keep an eye on what teens are up to.

If an adult in my town saw me drinking alcohol, they would probably tell my parent(s)/ guardian(s).

Family

Parental Monitoring

If I am going to be home late, I'm expected to call my parent(s) to let them know.

I tell my parent(s) who I'm going to be with before I go out.

When I go out at night, my parent(s) know where I am.

My parent(s) know who my friends are.

I talk to my parent(s) about the plans I have with my friends.

When I go out, my parent(s) usually ask me where I'm going.

My parent(s) usually know what I am doing after school.

My parent(s) know how I spend my money.

Mother support

My mother is there when I need her.

My mother cares about me.

My mother is fair when it comes to enforcing family rules.

Father support

My father is there when I need him.

My father cares about me.

My father is fair when it comes to enforcing family rules.

Mother communication

How often in the past year have you had a good talk with your mother or other adult female about each of the following: risks of drinking or taking other drugs; whether or not it's okay for teenagers to have sex; birth control; AIDS or sexually transmitted diseases; your job or educational plans after high school; your personal problems

Father communication

How often in the past year have you had a good talk with your father or other adult male about each of the following: risks of drinking or taking other drugs; whether or not it's okay for teenagers to have sex; birth control; AIDS or sexually transmitted diseases; your job or educational plans after high school; your personal problems

Parental attitudes

My parent(s) think it is wrong for teens my age to smoke cigarettes.

My parent(s) think it is wrong for teens my age to drink alcohol.

My parent(s) think it is wrong for teens my age to have sexual intercourse.

Parental consequences

If your parent(s) knew you were smoking cigarettes, do you think you would get in trouble at home?

If your parent(s) knew you were drinking beer, wine, or liquor, do you think you would get in trouble at home?

If your parent(s) knew you were having sex, do you think you would get in trouble at home?

Youth

Attachment to school

I enjoy going to school.

The rules in my school are enforced fairly.

I will probably drop out before I complete high school.

I believe I am getting a good, high quality education at my school.

Social responsibility

I often think about doing things so people can have things better in the future.

It is important to me to contribute to my community and society.

If I had to choose between helping to raise money for a neighborhood project or enjoying my own free time, I'd keep my own free time.

Youth (cont.)

Risk perception

How much do you think people risk harming themselves (*physically or in other ways*) if they:

Smoke one or more packs of cigarettes a day?

Try marijuana once or twice?

Smoke marijuana regularly?

Try inhalants once or twice?

Worries

How much do you worry about the following issues: getting good grades; getting along with parents at home; not fitting in with the other kids at school; how I look, that my parent(s) drink too much or use drugs.

Time spent home alone

Time spent working for pay

Prediction of Increasing Substance Use

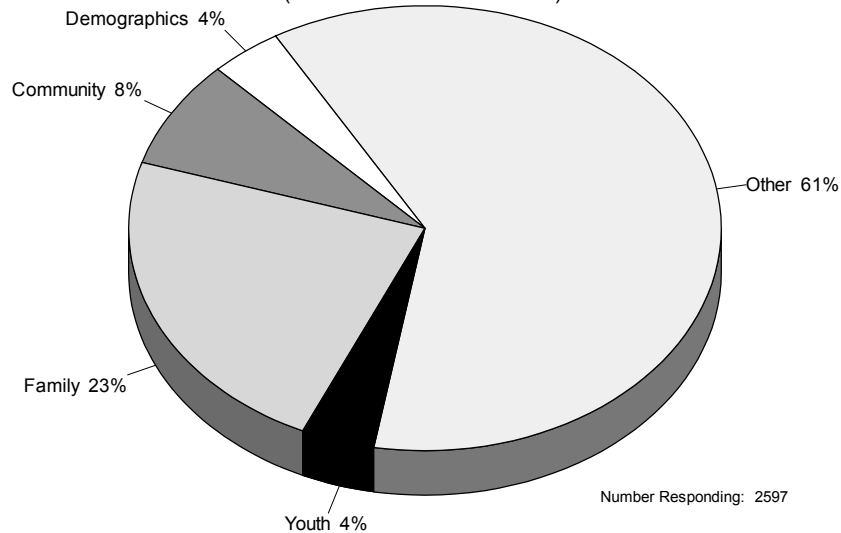
Rather than look at how our model predicts increasing use of individual substances (e.g. alcohol, smoking tobacco, marijuana, cocaine, inhalants, etc.), we wanted to know if there was a particular pattern of substance use. Were there groups of students who just used narcotics or only used inhalants, for example. To answer this question we used a statistical technique called a factor analysis which identified a pattern of substance use that included alcohol, marijuana, tobacco, and binge drinking together. The outcome we want to predict from *Youth, Family, and Community* factors is the use of these substances.

Individual students vary in the level of substance use; some individuals use more often than others. When a group of variables, or a factor, is used to predict substance use, its predictive usefulness can be assessed by looking at the percent of variance in substance use that it accounts for. A predictor variable that is completely unrelated to substance use would explain 0% of the variance. The higher the percent of variance that is accounted for by a predictor, the stronger its predictive relationship to the substance use.

For both the middle school students and the high school students, our model with the factors of Youth, Family, and Community explained 39% of the variance. One might think that 39% is too small an amount to be of any importance. To put this into perspective, one can review the findings from the National Longitudinal Study on Adolescent Health, a random study of more than 15,000 adolescents (Resnick et al, 1997). The model for this study included demographic factors, family context, school context, and individual characteristics. The full model explained 12.5 % of the variance for high school alcohol use and 13.7 % of the variance for middle school alcohol use.

Figure 12-1 shows the overall model for middle school students. The notion that each level of the ecological model has influence is upheld. Overall, our model explains 39% of the relationship between these factors and increasing substance use. The strongest predictor in the model is **Family** (23%), followed by **Community** (8%) and **Youth** (4%).

Figure 12-1: Multivariate Model Predicting Substance Use (Alcohol, Binge Drinking, Smoking, Marijuana) (For Middle School Students)



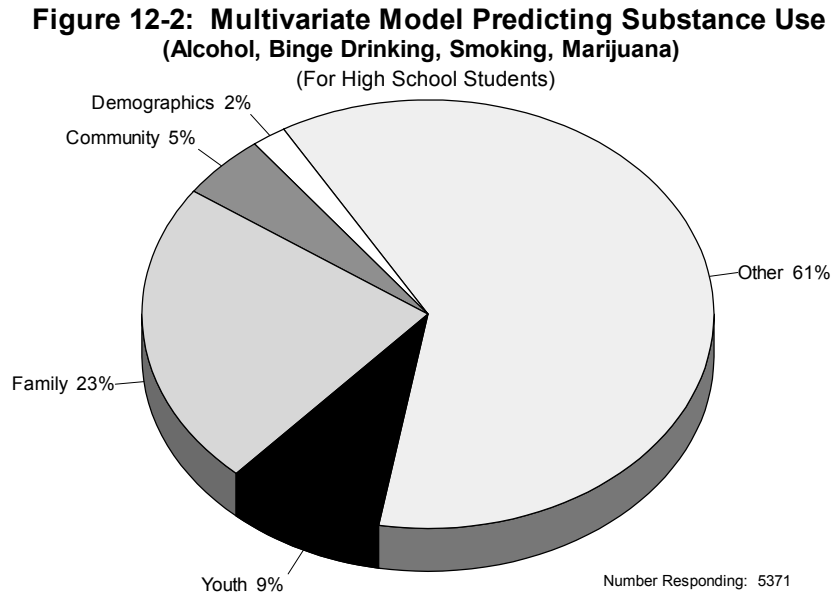
The **Youth** factor accounted for 4% of the variance for middle school youth. Due to statistical technique limitations, we could not examine school attachment as a single factor, but as one of many within the **Youth** factor. For middle school students, within the **Youth** factor reported attachment to school was the strongest link to lower substance use. Students with higher levels of school attachment had lower levels of substance use.

Of all the factors examined, the **Family** factor was most strongly predictive of substance use for middle school students as the factor accounted for 23% of the variance. Within the **Family** factor, the two strongest predictors to lower substance use were parental monitoring and parental consequences. Higher levels of parental monitoring were related to lower levels of substance use. Knowing that there were consequences (e.g. getting in trouble at home) to specific behaviors such as drinking, smoking, and having sexual intercourse also was related to lower levels of substance use.

The **Community** factor explained 8% of the prediction of substance use for middle school youth. Higher levels of perceived neighborhood support predicted lower levels of substance use.

The **Demographics** variables explained 4% of the prediction of substance use for middle school youth. As youth age, levels of substance use increase.

A result similar to the middle school student model can be seen here for high school students. Thirty-nine percent (39%) of the variance in drug use was explained by these factors for high school teens. As Figure 12-2 shows, the strongest predictive factor was **Family** (23%), followed by **Youth** (9%), and then **Community** (5%).



The **Youth** factor accounted for 9% of the variance. For high school students the strongest link within the **Youth** factor was the risk perception of substance use followed by school attachment. Students with higher perceptions of substance risk had lower substance use. Also, students with higher levels of school attachment had lower levels of substance use.

As with middle school students of all the factors examined, the **Family** factor was most strongly predictive of substance use for high school teens. It accounted for 23% of the variance for high school students. Within the **Family** factor, the two strongest predictors to lower substance use for high school teens were parental monitoring and parental consequences. Higher levels of parental monitoring were related to lower levels of substance use. Knowing that there were consequences (e.g. getting in trouble at home) to specific behaviors such as drinking, smoking, and having sexual intercourse also was related to lower levels of substance use.

The **Community** factor explained 5% of the prediction of substance use for high school teens. Higher levels of perceived neighborhood support predicted lower levels of substance use.

The **Demographics** variables explained 2% of the prediction of substance use for high school teens. As youth age, levels of substance use increase.

Conclusions

Since the work of Urie Bronfenbrenner (1977) researchers have focused on the development of behaviors within context, within an ecological model. All levels of the model have a role in shaping the outcome. This research showed that in the multi-community dataset the factors of **Youth, Family, and Community** were significantly related to teen substance use for both middle school and high school students.

For middle school and high school students the strongest factor related to substance use was **Family**. Within that factor for both groups of students the strongest predictors were perceived parental monitoring and parental consequences. As parental monitoring increased and as certainty of parental consequences for behaviors increased, substance use decreased. Perceived attachment to school was also a strong predictor of substance use for both groups. Students with greater attachment to school showed less substance use. One important difference between middle and high school students, however, was that high school students' perception of risk of substance use was much more strongly related to substance use than it was for middle school students. As student perception of risk increased, substance use decreased.

It is critical to emphasize again that our analyses are limited by the information collected. We are missing information about peer influences and how they operate with parental influences to effect behavior. We are missing other important family variables such as smoking status of parents, drinking status of parents, etc. There are community and youth variables that would be helpful in examining the question of substance use. However limited, this model does give us confirmation that the factors we looked at do make a difference. Parental monitoring and knowledge of parental consequences can be strengthened as protective factors. Perceived school attachment can be enhanced as a protective factor. Information about the risks of substance use would be particularly useful for high school students.

These analyses affirm the importance of all levels of the ecological model and identifies specific protective factors. Communities can use this information in their efforts to foster positive youth development.