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## Chapter 12

# Multivariate Model Predicting Teen Substance Use

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The ecological model of youth development suggests that there are important factors at each level of the model that influence teen behaviors. Often individual factors are presented alone, such as teen perception of substance use risk, time spent in various activities, parenting style and parental monitoring, neighborhood support, etc. This supplement 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 11/02 Pemi-Baker School District TAP survey allows 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.

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

### **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.

#### *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*

### **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?

## **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).

## **Prediction of Increasing Substance Use**

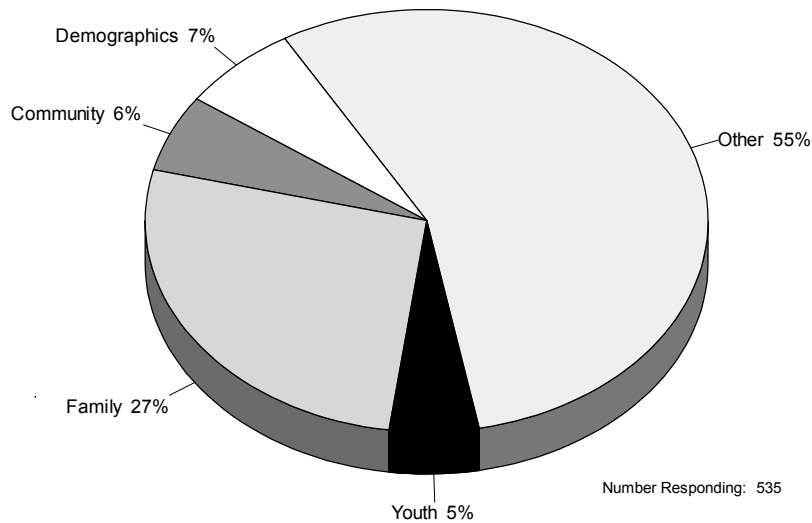
Rather than look at how our model predicts increasing use of individual substances (e.g. alcohol, smoking tobacco, marijuana, cocaine, inhalants, etc.), we wanted to examine substance use across the three substances with the highest prevalence: smoking tobacco, alcohol, and marijuana. The outcome we 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 students in Pemi-Baker School District, the model with the factors of Youth, Family, and Community explained 45% of the variance.

Forty-five percent (45%) of the variance in drug use was explained by these factors for teens in the Pemi-Baker School District. As Figure 12-1 shows, the strongest predictive factor was **Family** (27%), followed by **Community** (6%), and **Youth** (5%).

**Figure 12-1: Multivariate Model Predicting Substance Use (Alcohol, Smoking, Marijuana)**



The **Youth** factor accounted for 5% of the variance. The strongest link within the **Youth** factor was attachment to school followed by the perception of risk of substance use. Students with higher levels of school attachment had lower levels of substance use. Also, students with higher risk perceptions of substances had lower substance use.

Of all the factors, the **Family** factor was strongest predictor of substance use for teens. It accounted for 27% 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 6% of the prediction of substance use for teens.

The **Demographics** variables explained 7% of the prediction of substance use for 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 this dataset as in the TAP 2000-2001 Multi-Community dataset, the factors of *Youth, Family, and Community* were significantly related to teen substance use.

For Pemi-Baker School District teens the strongest factor related to substance use was Family. Within that factor 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. Students with greater attachment to school showed less substance use. As student perception of risk of substance use 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 also other community and youth variables that would be helpful in examining the question of substance use. 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.

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