

FCD UPDATE

FCD Educational Services, Inc.

A Nonprofit Organization

Alcohol, Tobacco, and Other Drug Education

Winter 2001

The Agony of Ecstasy

TEEENAGE USE OF MDMA IS RISING DRAMATICALLY. While many adolescents believe “ecstasy” to be a harmless, dance-inducing euphoric that makes you like everyone, recent research reveals a darker side to the drug: depression and potential long-term brain damage. To get the lowdown on this high, FCD spoke with Dr. Karen Bolla, a neuropsychologist and researcher at Johns Hopkins Medical Institutes who is an expert in the field.

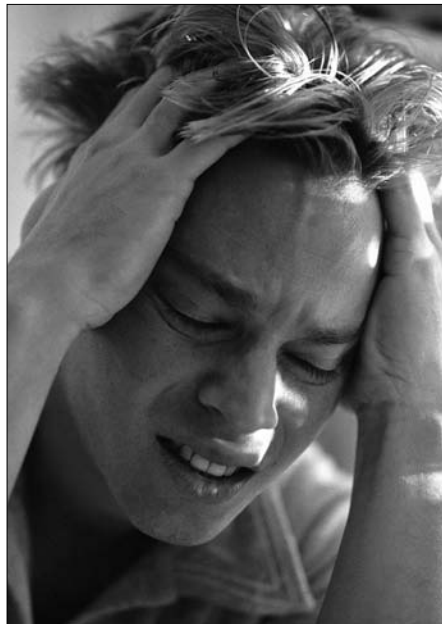
Drug use among teens seems to be holding steady or declining. What accounts for the recent surge in teenage use of ecstasy over the past several years?

Availability and the belief that it’s not a hard drug. A lot of ecstasy is coming into the country. There’s a huge profit margin. It costs about eight cents to manufacture a tablet, and the street value is \$25.00-\$40.00.

Kids today think ecstasy is safe because it’s not cocaine or heroin, both of which have scary connotations. It seems less dangerous than other drugs because “everybody does it.” It doesn’t whack you out completely; you can be out in public; you’re able to function, go to dances or raves. It gives teens energy. They’re not hallucinating like they would with a straight hallucinogen. It’s just not considered a hard drug by teenage standards. The attitude is that it’s more like having a drink or two.

Is there a reason why raves and ecstasy are so closely associated?

Ecstasy is a mix of a mild hallucinogen and an amphetamine derivative. It gives you energy so you can dance all night, and it makes you feel good about being around other people. Raves are crowded spots with tons of people dancing all night.



Can you describe what it feels like to take the drug?

Well, I haven’t taken it myself, but from what people have told me, they experience a general feeling of well being. But it depends on whom you talk to. Younger people tend to take ecstasy in groups, in high-energy arenas, and seem to experience a more intense high.

Older, more educated people, like doctors, teachers and lawyers (the primary focus of our research), report a different subjective experience than younger people. They say it’s a mild high. Everything looks nice, you feel really good toward other people. Originally, ecstasy was going to be marketed as a drug for psy-

chotherapy, just like LSD in the early sixties. People who have taken it with a significant other or spouse talk about how wonderful it was; that they opened up to each other like never before; that it even patched up their relationship. I’ve had people tell me they were headed for divorce and started taking ecstasy on the weekends, and it saved their marriage. It can make you get into the person you’re with.

I guess that’s okay if you really know the other person. But one of the criticisms of the drug is that if you go to a party and you take this stuff or someone gives it to you, it clouds your judgment. It gives you

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Some of What’s Inside...

The Agony of Ecstasy

More teens than ever are using MDMA. Benign party drug or wolf in chic’s clothing? Our feature article examines the darker side of ecstasy with neuropsychologist Karen Bolla.

The New York High Times

A recent cover story in *The New York Times Magazine* gives kids across America all the reasons they need to try MDMA. FCD president Alex Packer is less than ecstatic about it.

Rave Review or Stark Raving Mad?

FCD takes an informal survey to discover what teens think about free ecstasy testing at raves. Good idea or bad? You decide.

Did You Know...

...that drinking too much water to quench an ecstasy thirst can be dangerous or fatal? Learn more about this and other recent research findings.

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From the President

On January 21, 2001, the cover story in *The New York Times Magazine* gave kids across America all the reasons they need to try ecstasy. The author describes the first time he took the drug:

"...A feeling came over me somewhere between the looseness that follows a good workout and the euphoria of winning the Publishers Clearing House Sweepstakes.... 'I am so happy,' I thought....

And: all afternoon, all night, I didn't hate myself.

"...Ecstasy creates not just a rush but a singular kind of emotional elevation – you are launched on a hot-air balloon that floats over the pitfalls of typical humanity. The what ifs, the self-doubts, are knocked flat, and instead a hunger for human connection and a desire to empathize firmly take hold.... I had a tingling awareness that something important was happening inside me: a bubbling birth of new wonder....

"...You feel restored, energized.... Just breathing is really good on this stuff.... I experienced a kind of wordless glory. This was the best I'd ever felt in my life."

Sounds good to me. I could use a little wordless glory and bubbling new wonder in my life. And, if I were an adolescent struggling with identity and relationships, I wouldn't mind an afternoon of euphoria in which I didn't hate myself.

To be fair, the article does pay passing attention to ecstasy's downsides. It mentions the 18-year-old in England who died from drinking too much water to quench the insatiable thirst created by the drug. It features a lead character, Kyle, who has lost the ability to "just say no." A nod is given to the *possibility* of damage to the serotonin neurons in the brain. But the author concludes that "no serious science has been done on the kind of periodic dosages of Ecstasy I took, a little more than once a month." He continues, "You can wreck your liver and die on a bottle of Tylenol. Too much aspirin causes gastrointestinal bleeding. Too much lithium damages your thyroid and kidney. The point is that it matters how much you take of a drug." So, kids, as long as you don't take too much ecstasy or drink too much water, what's to worry?

I take consolation in the fact that not many teenagers devour the Sunday *New York Times Magazine*. But this *is* the word on the street: Ecstasy is a benign drug that makes you feel better than you've ever felt in your life. How could any teen who hungers for intimacy and communion; who craves peak experiences; who is socially uncomfortable; who aches from adolescence and lusts for life; how could this teen *not* be attracted to ecstasy?

A recent article on children and drugs in *The Boston Globe* ("Blowing Smoke"; October 15, 2000), asked why, given the millions of dollars poured into prevention, so many youngsters are still drinking and taking drugs. Well, why *wouldn't* they be? Our commitment to prevention is paltry compared to the annual advertising budgets of the tobacco and alcoholic beverage industries; *The New York Times* lauds ecstasy; teen movies portray irresponsible drinking and pot smoking as the norm for cool kids; and, truth be told, many adults don't think there's anything wrong with teenage drinking and drug use:

"Hey, kids are going to experiment."

"So what if the football team blows off a little steam?"

"I inhaled a few times when I was a teenager and it didn't do me any harm."



Alex J. Packer

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overwhelming feelings of love and trust. Some people have gotten themselves into some pretty precarious situations while on ecstasy.

You hear, particularly among teens, that sex on ecstasy is “better.” Is there any basis for this claim?

I’m not sure. It’s funny because the older people that you talk to say that the last thing you think about is sex. You want to hold and love, but you’re not particularly sexually aroused. It’s not a drug that enhances sexuality; it just seems to generate a warm and fuzzy feeling. It’s more of an increased sensuality than sexuality. We haven’t heard reports of, “We had sex on ecstasy and it was really great.” We’ve heard that about cocaine, but not about ecstasy. I think teenagers use ecstasy in a group when they go out. I don’t think they use it to enhance sexual feelings.

How does ecstasy affect the body physically?

Initially, the drug triggers a rush of serotonin in the brain, which is why you feel “good.” After the initial rush, re-uptake of serotonin is blocked, leading to a low feeling. Reduced levels of serotonin impair sleep, so you stay up for long periods of time. Serotonin also affects memory. In our research we found that if you do a lot of ecstasy it can cause memory impairment, even weeks later.

Can you tell us about the research?

We recruited 28 people who had used MDMA (methylenedioxymethamphetamine) on at least 25 occasions, although some had used it up to 300 times. Twenty-eight people who had never used ecstasy served as controls. They ranged from 19 to 49 years old, with an average age of 27. The average level of education was 17 years. We kept them here for a week, and they were asked to abstain from use for at least two weeks prior to the study. We gave them spinal taps, looking for a chemical called 5-HIAA, which is an indication of the amount of serotonin in the brain.

We also performed a battery of tests that looked primarily at memory, because it has been thought that low levels of serotonin correspond with memory loss.

When we analyzed the data, we found that the people with the highest levels of use had the worst memory performance. People with a lower IQ had more negative effects than those with a higher IQ. We also found that men showed more negative effects than women.

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Ecstasy kills brain cells. Heroin doesn’t; no one has shown that marijuana kills cells, but MDMA and methamphetamine both do. These are probably the worst two drugs because they actually knock out cells that produce chemicals that you need for everyday functioning. Ecstasy is a known neurotoxin, so taking it is like saying, “Here, kid, eat some lead, eat some strychnine, eat some Drano.”

Are there any particular dangers in teenage use of ecstasy as opposed to adult use?

It’s probably worse. A teenager’s brain is still developing, especially the frontal por-

ECSTASY: QUICK FACTS

What is it?

Ecstasy (XTC), is a street name for MDMA (methylenedioxymethamphetamine), a synthetic, mind-altering drug, similar in chemical structure to the stimulant methamphetamine and the hallucinogen mescaline. Other street names include “X” and “E.” If you’re “rollin’” it means you’re on ecstasy.

How is it used?

MDMA is generally ingested orally in tablet or pill form. It can be snorted or smoked as a powder, but this is less common.

How extensive is the use of MDMA?

Use of ecstasy by young people is increasing at an alarmingly fast rate. According to the University of Michigan’s Monitoring the Future Study, the number of 12th-graders reporting ever having used ecstasy increased from 5.8 percent in 1998 to 8.0 percent in 1999. Reported use within the past month by 12th-graders increased from 1.5 percent to 2.5 percent during the same period, representing a 66 percent jump. Use in New England and on the west coast is higher than in other parts of the United States.

tion, which is responsible for judgment, the ability to formulate actions and plans, and to decide what’s appropriate or inappropriate behavior. This area of the brain is not fully developed until a person hits twenty or twenty-one years of age. Developing brains are more sensitive to outside chemicals. For example, the negative effects of exposure to lead are far greater and longer-lasting for children than for adults. Putting chemicals into your body that change neurotransmitters and serotonin levels is dangerous.

What about the long-term side effects?

Our research only looked at people after a couple of weeks. But there have been animal studies and in those we’ve seen

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Rave Review or Stark Raving Mad?

If you want a good example of the mixed messages we send kids about drug use, check out the Web site: www.dancesafe.org. The self-stated mission of DanceSafe is to promote “health and safety within the rave and dance club community.” According to their Web site, they follow a “harm reduction” model that provides information to reduce the risk for those individuals who choose to use drugs. One of the most controversial aspects of DanceSafe’s work is the free drug-testing service they offer. You can send a pill anonymously to the laboratory they use (results are posted on their Web site); you can buy your own Ecstasy Testing Kit (for a donation of \$25 or more they’ll send you a complimentary kit); and you can get your pills tested onsite at raves by an ever-expanding network of DanceSafe volunteers. For the onsite testing, a scraping is taken from the pill, which is returned to the user. Results indicate whether the pill contains MDMA. They do *not* indicate the presence of other substances.

While DanceSafe informs users that no drug is safe, FCD would argue that such testing promotes and enables drug use. DanceSafe responds: *Every person who has come to our booth to have a pill tested was going to swallow it anyway. We have never enabled anyone to obtain or ingest a pill they weren’t already going to take. But we have successfully prevented thousands of people from ingesting pills they thought contained ecstasy, but actually contained different drugs entirely, many of which are far more dangerous than MDMA (real ecstasy).*

We would not disagree that DanceSafe alerts people to the fact that pills they think are ecstasy are, in fact, not. But picture the following conversation between two teens as they head for a party:

“You want to take some ecstasy with me?”
“No, thanks.”
“Why not?”
“How do you know it’s ecstasy? It could be anything.”
“We’ll get it tested at the club for free. If it isn’t MDMA, they’ll tell us.”
“I don’t know.”
“Come on. We won’t take it unless they say it’s safe.”

To the extent that some teens look for reasons to abstain from drugs, other teens look for reasons to “experiment” with drugs. Our experience tells us that free drug testing provides the rationalization many kids are looking for, and that young people who might not otherwise try ecstasy would – if they believed it to be “safe.”

DanceSafe addresses this issue by stating: *We follow strict, harm reduction protocols around pill testing that were carefully designed not to give false safety reassurances to the user. No drug use is entirely safe, including and especially ecstasy, which has many inherent risks. The language we use to communicate a positive test result carefully explains this. We also require them to read a sign which further reinforces the message that a positive test result does not mean their pill is “safe” or “good.”*

Anyone who lives or works with kids knows that what adults think they’re saying, and what kids actually hear, can be two very different things. FCD believes that many teens, if told that their ecstasy does, in fact, contain MDMA, will *hear* “pure,” and thus “safe.” So we decided to find out what kids think about free drug testing at raves. We took an informal survey of 84 teenagers. Thirty-nine percent said that it’s a “good idea.” Thirty-four percent called it a “bad idea.” And 11 percent thought it was “good and bad.”

Here are some comments from students who see it both ways:

“I don’t think it is that important to test XTC to see if it is pure or not. Either way it has risk, and it is illegal. On the other hand, it would be better to test so it would be less harmful to the user.”

“XTC, no matter if it is tested, will still cause holes in your brain. But I guess if you’re gonna do it, you might as well take the ‘safest’ drug possible.”

“I think this is a good idea. If you are going to use the drug, you might as well be sure there is nothing ‘wrong’ with it. But I also think it is a bad precedent to set. It’s kind of saying that XTC is safe as long as it is tested, when in actuality it is not.”

Here’s what the teens who think it’s a good idea have to say:

“By doing this they are making people aware of what they are actually buying/getting.”

“People are going to take ecstasy whether or not the drug gets checked. So it is good to be safe and try to save lives.”

“It’s a good idea, but there shouldn’t be secret cameras placed to take pictures. It should be kept strictly confidential. This is because addicts should be encouraged to recover on their own. Having police appear at their door might finish them off and give them too much stress.”

“It makes drug users aware of the risks.”

“I feel that this is an excellent idea as I myself am an ecstasy user at raves and I want to know what I take. I’m not a constant ecstasy taker. However I do it every once in a long while, and only at raves and when I’ve enough money.”

“It’s good because it creates awareness that there are more chemicals in the pill than MDMA that are all very bad and add to the negative effect, and that it can mess you up even more.”

“I think it is a good idea to check it. But they shouldn’t be buying that crap anyway.”

“If we can’t stop people from using ecstasy or other drugs, then at least we can try to minimize the damage they do to themselves. Also, the cost of testing is less than treating those who get hospitalized because of overdose or heat exhaustion.”

“Although it sends a bad message I think it’s a good idea.”

“Good idea. It’s better for you to take XTC to slowly kill yourself than take a pill with rat poison in it and die that day.”

“This is definitely a good idea. If people are going to take ecstasy anyway, they should at least have some way to find out whether or not there are even more harmful drugs/stimulants in it. No matter what ‘message’ this sends out, it is probably not gonna matter to people who take it already.”

“I wish they could test weed like that.”

Here’s why teens think it’s a bad idea to offer free ecstasy testing at raves:

“It sends the message that it is ok to try it because it is ‘safe’ – it has been tested.”

“If people hear they can get their drugs tested, it makes it seem legal. Someone who wouldn’t normally risk getting an impure sample might now do a dangerous drug.”

“It provokes drug use. It is more fun to save your body than to get high and be depressed and what not.”

“XTC and safe are two words that probably don’t belong in the same sentence.”

“It gives a false sense of security.”

“Bad idea. No one really knows what is in X. One of my friends got really sick from rollin’ and trippin’ too often.”

“This ‘Dance Safe’ thing is really stupid. I don’t think they are sending the right message out to kids. I would not be that stupid to listen to a group saying that my XTC is okay to use. People need to use their brains more often.”

“I think drugs are just plain stupid and anyone that uses has got some major issues with themselves.”

YOU CAN SEE FROM THE ABOVE COMMENTS THE MIXED MESSAGE FREE DRUG TESTING SENDS TO YOUNG PEOPLE. Some students see ecstasy as “bad” whether it’s tested or not. Other students buy into the false security drug testing offers. Clearly this is a complicated and provocative issue that raises many of the same questions as other controversial risk reduction strategies (e.g., providing needles to drug addicts; handing out condoms in high schools). We don’t doubt the motives or sincerity of DanceSafe or other organizations that believe such testing to be a critical component of risk reduction. But we do wonder: Are more lives put at risk by the false sense of security drug testing creates, than are saved by the adulterated pills it finds? What do you think?

What is an ecstasy “high” like?

The effects can vary depending upon the individual taking it, the surroundings, the dose, and any additional substances compromising its purity. A typical high lasts from three to six hours. By stimulating the release of serotonin, the drug can produce a heightened sense of pleasure, peacefulness, and self-confidence. Its amphetamine-like properties can boost energy levels. Users report enhanced feelings of empathy, acceptance, sensuality, and closeness to others. These latter effects lead some clinicians to see ecstasy as a potentially valuable psychotherapeutic tool. In public settings, however, drug-induced feelings of trust and affection may jeopardize users’ judgment and vigilance, and lead them into dangerous situations.

What are the risks of use?

In addition to the risks created by a false sense of trust, use of ecstasy can lead to memory impairment, confusion, anxiety, and paranoia — both during, and sometimes weeks after, taking the drug. Sleep problems may occur. Physical effects include involuntary teeth-clenching, nausea, faintness, blurred vision, and chills or sweating. Significant increases in heart rate and blood pressure pose a special threat to those with circulatory or heart problems. Extended dancing at raves in hot, crowded spaces can lead to dehydration and hyperthermia. High doses, especially in combination with alcohol or other drugs, can trigger seizures, strokes, and kidney or cardiovascular failure. Recent brain imaging studies on humans show that ecstasy produces long-lasting and possibly permanent damage to the neurons that release serotonin. A positive correlation exists between amount of use and amount of damage. Researchers believe that this harm to serotonin transporters may account for the depression and impaired memory found among chronic users of the drug.

permanent brain damage in animals, in primates, over and over, for as long as seven years afterward.

Ecstasy kills brain cells. Heroin doesn’t; no one has shown that marijuana kills cells, but MDMA and methamphetamine both do. These are probably the worst two drugs because they actually knock out cells that produce chemicals that you need for everyday functioning. Ecstasy is a known neurotoxin, so taking it is like saying, “Here, kid, eat some lead, eat some strychnine, eat some Drano.”

In our studies with humans, we found that memory loss and other neurological side effects were directly related to the amount of use. The greater the use, the greater the damage.

Older people tell us that you can’t take ecstasy that often, that it takes a long time to recover. Since it depletes serotonin,

you tend to feel tired and depressed the next day, and sometimes longer.

Is ecstasy considered addictive?

We don’t really know. I don’t think it’s physically addictive. I don’t think the body craves it if it doesn’t get it, as with heroin, for instance, but it probably can be psychologically addictive. Some people who use it say they can’t help themselves, they can’t stop. It makes them feel good, so they want to do more. They show patterns of use that might look like addiction, but they probably aren’t physically addicted.

What are the risks to the teen who says, “I just want to use it one time to see what it’s like”?

With ecstasy you never know what you’re getting. You hear lots of horror stories about people who have gotten very sick, who have suffered long-term brain damage, who have gone into seizures, and who have died from overheating of the body. It’s probably not from ecstasy, from pure MDMA, but from what they’re mixing it with. We’ve found ecstasy cut with things like ketamine, which is a cat tranquilizer. A woman I went to junior high school with told me that her son, who was nineteen, had been doing ecstasy, and had a seizure and cardiac arrest. They found other drugs in his system as well, so who knows what he mixed it with. Kids will take other drugs while they’re on ecstasy, and we don’t know how those drugs interact. I would never say it’s safe to do it once. People are trying to make a buck, and they’ll put anything in it.

A lot of teens take the drug dealer’s word that what they’re buying is the real thing, that

PERCENT OF STUDENTS REPORTING USE OF ECSTASY*			
	8th-Graders	10th-Graders	12th-Graders
Ever Used	2.7	6.0	8.0
Used in Past Year	1.7	4.4	5.6
Used in Past Month	0.8	1.8	2.5

* Monitoring the Future Study, 1999

it's "pure" ecstasy. Is there such a thing as safe ecstasy?

It's hard to say if anything has a safe level. A person may have an underlying brain abnormality or arterial vein malformation. They do a drug once and it blows them out. It's like kids who drop dead on the basketball court after snorting a little cocaine. They didn't realize that they had a brain abnormality or heart problem. You mix that with unsafe drugs, it's just not a good combination.

We've heard that ecstasy can lead to depression in teenage users. Is this true?

Well, back to our study: We found that there is a direct correlation between level of use and serotonin depletion. Serotonin is responsible for regulating mood. Depleting your serotonin levels with ecstasy actually kills the cells that produce serotonin. Since most anti-depressants focus on increasing serotonin levels, it makes sense that ecstasy users will eventually have depression. We've had reports of long-standing depression in people who have used MDMA who didn't have depression before.

Any other side effects?

We found that ecstasy users did experience some learning impairment. For instance, they weren't able to learn word lists as well as those who had never used it.

If you could say one thing to teens about ecstasy, what would it be?

This stuff actually kills brain cells. In the primate studies, even years later the cells haven't grown back. Don't think it's harmless. Ecstasy can affect you for the rest of your life through impaired learning and memory, and depression. It sounds like such a fun drug when you hear people talk about it. Sure, you may get away with it, but I'd be afraid to take that chance. You take a risk. So don't think it's safe.

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From the President

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As we struggle with the problem of adolescent drinking and drug taking, we often neglect to consider the impact of our own values, attitudes, and beliefs on teenagers' decisions and behaviors. Put a group of adults in a room and ask them whether they favor random drug testing in schools, or if it's all right for a five-year-old to have a sip of wine, and the debate will rage for hours. When we're conflicted as educators and parents, we give children mixed messages (e.g., designated driver programs tell kids that it's okay if the rest of them get drunk as long as one of them stays sober.)

Young people sense our ambivalence and take it as permission to drink and "experiment" with drugs.

Those of us raising kids, running schools, setting priorities, and making laws are the same people arguing over the legalization of marijuana, denying our own or someone else's substance abuse, and even using drugs recreationally. Young people sense our ambivalence and take it as permission to drink and "experiment" with drugs.

There's no quick fix to the problem of substance abuse in our culture. If we put as much energy into prevention as we do pep rallies, and devote as much time to strengthening protective factors as we do to strengthening math skills, we can transform teenage culture and create schools where non-use is the norm. But until we're willing to confront our own mixed messages and lukewarm commitment, let's not be surprised that so many kids are still drinking and using drugs.



Alex J. Packer, Ph.D.

Did you know?

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tained levels of NNAL and NNAL-Gluc five to six times higher than those found in the urine of women living with nonsmokers. These compounds are metabolized products of NNK, a proven cancer-causing chemical found in tobacco smoke. Thus, mere exposure to secondhand smoke can cause the body to absorb carcinogens as if one were actually smoking.⁵

This is Ecstasy?

Ecstasy is similar in chemical structure to the stimulant methamphetamine. And scientists are now seeing brain damage and lost brain function in methamphetamine abusers nearly a year after they last used the drug. According to a study financed in part by the National Institute on Drug Abuse, imaging techniques that measure dopamine levels uncovered damage to the "reward and pleasure" system in the brains of methamphetamine addicts. Additional tests revealed hyperactivity and scarring in the area of the brain responsible for spatial perception, memory, and attention. Compared with people who do not use drugs, methamphetamine abusers showed significant deficits in learning and memory. In fact, some of their brains were similar to those of people with early Parkinson's disease. It is unclear whether lost brain function can return with continued abstinence.⁶

1. *New Scientist*, November 25, 2000.
2. *Neuron*, August 2000.
3. *The Boston Globe*, December 20, 2000, p.A14.
4. *Journal of the American Medical Association*, 2000; 284: 1527-1533
5. *Journal of the National Cancer Institute*, March 2001.
6. *The American Journal of Psychiatry*, March 2001.

FCD welcomes your comments, questions, and ideas. To learn more about anything in the newsletter, to send letters to the editor, or to submit a manuscript or proposal for an article, please contact:

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Did you know?

Less than Ecstatic

Ecstasy raises your body temperature and causes dehydration. If you're feeling on top of the world and dancing for six straight hours in a warm, poorly ventilated club, you're not going to notice that you're overheating and drinking quarts of water to quench your thirst. This can be dangerous or fatal. When ecstasy breaks down in the body, it triggers the release of a hormone called vasopressin, causing water retention and diminished levels of salt in the body. Combine this with copious consumption of liquids and you can create a condition in the brain known as "water intoxication." In essence, the combination of ecstasy and too much water can lead to death by "drowning."¹

This Is Your Brain on Nicotine

Even one "experimental" cigarette can cause permanent changes in the brain and lead to a smoking habit, according to a study conducted by Daniel McGehee and Hubert Mansvelder of the University of Chicago. They found that nicotine in the brains of rats attaches to receptors that

trigger the release of the pleasure-inducing chemical dopamine. Due to an effect called long-term potentiation, each successive dose of nicotine creates a stronger and stronger craving for the next. In effect, the brain learns to *want* to smoke.²

Coffee and Pregnancy

A rigorous study conducted by Dr. Sven Cnattingius of the Karolinska Institute in Stockholm provides the strongest support yet for a link between caffeine and miscarriage. The study, which controlled for such factors as smoking and genetic defects in fetuses, involved 562 women who miscarried between their sixth and twelfth week of pregnancy. Researchers found that those who drank one-to-three cups of American-strength coffee a day had a 30 percent increased risk of miscarriage. At three-to-five cups, the risk rose to 40 percent. And drinking in excess of five cups daily more than doubled the risk. The study also suggests that consuming an equivalent amount of caffeine from tea, sodas, cocoa, and/or medication could have a similar effect.³

Accident Prone

Studies have clearly shown that the earlier one starts to drink, the greater one's chances of becoming a problem drinker or alcoholic. Since accidents are the leading cause of death for persons between the ages of 1 and 34, researchers at Boston University examined data from 42,862

randomly selected adults to see if there was also a relationship between age of drinking onset and rate of unintentional injury. The age of drinking onset was categorized as under 14, each age from 14-20, or 21 years or older. To isolate the age variable, researchers controlled for such factors as family history of alcoholism, frequency of heavy drinking, and subsequent alcohol dependence. The study concluded that the earlier one starts to drink, the more likely one is to be involved in an alcohol-related accident. Young people who start to drink at age 14 or younger are three times more likely to be injured while under the influence than are those who wait until age 21 to drink. And, the odds of injury remain significantly greater for every age level between 14 and 21.⁴

Where There's Smoke There's Cancer

Studies have already demonstrated a link between environmental tobacco smoke and lung cancer. A new study, conducted at the University of Minnesota and reported in the *Journal of the National Cancer Institute*, is the first to provide biochemical evidence that people who live with smokers actually absorb carcinogens through their lungs. Researchers compared the urine of 22 women who lived with nonsmokers with that of 23 women who lived with men who smoked at home. Analysis showed that the urine of women living with smokers con-

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