Tilda, ecstasy, and the loss of a life

Teacher’s manual
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The pictures in this manual are taken from the movie "Tilda, ecstasy, and the loss of a life"
Tilda was a perfectly normal, curious 19-year-old with dreams for her future. She aspired to be a pharmacist. But before studying in Uppsala, she wanted to go to London, brush up her English and have fun. Go to some discos, dance, be with her friends and have a drink or two. And maybe try ecstasy. She was in fact abroad, aren’t you supposed to try new things? Other people did, why shouldn’t she? A lark – something cool.

So she experimented took a few “e” plus some cocaine. Then she died. Just like that. Finding her lifeless in her bed – literally foaming at the mouth – her friend must have really been traumatised the next morning. Not to mention how all her other friends and acquaintances reacted later on. How could she? Why? She was always so upbeat and loved; she had her whole life in front of her. Gone: bye-bye forever… Just for trying a “recreational” drug?

This teacher’s manual presents factual information about drugs that affect the central nervous system as a follow up to the film: “Tilda, ecstasy, and the loss of a Life”. We attempt to delve into the “teenage brain” to see if we can find some answers as to why a young person is willing to risk testing drugs - street drugs that may contain who-knows-what. We know that in most cases it’s a question of curiosity plus a search for an “incredible high”, “life altering experience” – to name just two. But we wonder: If Tilda had had more facts – Would she have taken the risk? We explain what effects the consumption of various drugs has on the brain. We discuss the latest findings about the brain’s reward system and teenager’s search for kicks. At the end of the manual we provide suggested discussion questions and advice on possible follow up.

We hope that all young people, after having seen the movie and participated in this manual’s lessons, will stop and think twice if it’s worth the risk. The risk that taking ecstasy, amphetamine and cocaine poses. A risk that even after trying it only once, if you’re really unlucky, things go right down the tubes. Or parts of what we used to call our lives are broken apart if we become addicts.

Knowledge is a prerequisite for engaging in drug prevention activities. Knowledge can with any luck lead to consideration and self-reflection just at that moment drugs are offered.
1. For you – the teacher

The purpose of this manual is to increase our knowledge about ecstasy and drugs that stimulate the central nervous system, explain what happens in and to the brain and to talk about the risks associated with using drugs. Upper teens are the primary target group.

The question that both the film and this manual ask is why Tilda and other teenagers are willing to expose themselves to the risks inherent in using drugs. There are of course many answers. We’ll try to discuss a few of them here.

It’s obviously important to get the students involved in the questions posed by the film through discussion and conversations. One idea is to initiate a “four corner” discussion group – in favour, against, undecided plus one other alternative.

Recommended number of class hours devoted to viewing the film, discussions and group activities: 3-5 hours

A few sample questions to discuss:
- Why did Tilda take the drugs she did? Would she have acted differently had she known more about ecstasy?
- Why would you consider taking drugs?
- Why do you refuse to do drugs?
- Can anybody become a drug addict? What are risk and prevention factors?
- Why do young people take such risks?
- Just how risk-prone are you?
- What could replace this need to chase “drug highs”?
- What can parents possibly do to help their children avoid becoming drug abusers/addicts?
- Five reasons not to try drugs, anyone?
- What do you do when you see someone taking drugs? What do you say? How should your school react? How does your school react?
- What are the consequences when our natural neural reward system has been damaged? How are we affected? What areas of the brain and our personality are affected?
2. Drugs that stimulate your central nervous system

These drugs affect the central nervous system to such an extent that sensations and aspects of consciousness seem amplified – you become full of energy and raring to go. What happens to your brain is that the drug allows an increase of signal substances such as dopamine, noradrenaline and serotonin to the brain’s “reward system” centre. Thereby, ensuing feelings of pleasure and euphoria arise.

The most common of these drugs is amphetamine. Cocaine and ecstasy also belong to this category, although ecstasy has certain hallucinogenic properties.

Ecstasy
Tilda took ecstasy and some cocaine the night before she died. Ecstasy is a chemically produced drug. Most often in tablet form, but occasionally as a white powder in capsules. Normal doses vary from 50 to 160 mg. The tablets (or pills) come in a variety of colours, often stamped with a symbol such as a smiley. This gives the drug the appearance of being “harmless” and “cool” – the in-drug at parties and discos – the drug to induce “awesome experiences”.

Questionable contents
Tilda took two ecstasy tablets. It’s somewhat unusual that someone dies from 1-2 tablets – but it has happened before. There can be many reasons. One possibility is that you never know just what a tablet contains or how powerful or poisonous it is. The concentration of the active substance MDMA may vary. Ecstasy may also contain related substances such as MDEA, MDA or other drugs – amphetamine, methamphetamine, psychosis-inducing PCP, caffeine as well as binding agents etc. Even rat poison has been found as an ingredient. If you’re not a chemist, you have no way of knowing what a tablet actually contains. Ecstasy was criminalized in England 1977 – likewise in the USA 1985 when it was shown that ecstasy could induce severe physiological complications including cardiac disorders and convulsions. When tested on animals, ecstasy was shown capable of causing permanent damage to the brain’s serotonin network. Ecstasy was banned in Sweden in 1987.

The effects of ecstasy
What effect ecstasy will have depends mainly on the amount taken and in what manner.
One's frame of mind, current health status and previous experience are additional factors which influence the drug's effect.

From a general point of view, Ecstasy induces a "high" experience not found in other drugs. One symptom is a powerful urge to be close to other people. This has been described as an "artificial love affair". A positive feeling towards everything and everybody permeates one's being: you feel all "cuddly" and susceptible. This feeling of euphoria occurs about 30 minutes after ingestion and culminates after one hour. The effect subsides after about three hours.

The negative effects are both psychological and physiological. The user can become over-stimulated mentally and act recklessly and aggressively. Difficulty sleeping, depression, anxiety and temporary psychoses may ensue.

Ecstasy regularly raises body temperature which can cause heatstroke. Such a sharp increase in body temperature may cause a lowering of consciousness, muscle atrophy, blood clots, bleeding as well as cessation of kidney function.

Women may suffer from hyponatremia - an electrolyte disturbance of the salts in the blood. The kidneys cannot dispose of excess water, causing the blood to become diluted. This results in confusion, a lowering of consciousness and epileptic spasms. This condition is aggravated by fluid intake. A person so affected should be hindered from drinking even if she feels thirsty.

Higher doses may cause hallucinogenic effects with severely altered sight and hearing sensations. A user may also experience so-called "flashbacks" - reliving the "trip" long after the drug was taken. This is due to drug remnants detaching themselves from fat tissue and getting into the system again.

Current research has shown that a significant number (probably 20-25%) of those who use ecstasy regularly suffer damage to the brain's nerve cells which remains for years after they have stopped taking the drug. Ecstasy users' short-term memory becomes impaired similar to premature aging. Since the serotonin network is damaged, it's difficult to treat depressions which are quite common among ecstasy abusers. Antidepressant medicines don't work, pure and simple.

**How addictive is ecstasy?**

Clinical experience does not suggest a compulsive addiction. However, since the "high" sensation can be quite intense the first few times one uses the drug, there is of course the risk that you'll want to try it a few more times and develop a psychological addiction. Those who use the drug frequently need to increase the dosage by degrees in order to achieve the desired effect.

A weakening of the effect occurs relatively quickly. The "high" becomes less pronounced and even generates negative emotions. This is most likely due to the fact that serotonin is released in large quantities during the initial stages – only to diminish substantially later on due to the "burn out" of the serotonin network. Consequently, one either stops using drugs - or switches to another narcotic.

More on how ecstasy and drugs that stimulate the central nervous system affect the brain at: "The teenage brain– chasing "highs" or rewards?"

**Amphetamine and cocaine**

Amphetamine is produced chemically, usually in the form of yellowish crystals often diluted with non-narcotic substances. Amphetamine can be taken in either pill or capsule form, by sniffing or by injection into a vein.

Cocaine is made from coca bush leaves. It is often found as a fine, white crystalline powder. Cocaine is often diluted with inactive matter of similar appearance, with active drugs such as the local anaesthetics procaine and benzocaine or other drugs that stimulate the central nervous system. Cocaine is often inhaled or sniffed
up (“snorted”) through the nose. Cocaine can also be injected under the skin (subcutaneously) or in a vein. It can also be applied directly to mucous membranes in the mouth, rectum or vagina.

Crack is a special variety of cocaine that comes in the shape of greyish yellow chunks or flakes. Crack is introduced into the body by smoking it in a hookah (water pipe), for example.

**Short-term effects**
The way in which a drug is taken plus the amount influences its effect, as do previous experiences and the atmosphere/frame of mind a person’s in when taking the drug. Effects which “kick in” very quickly (within a few seconds to a minute) after taking the drug usually wear off within a few hours or less.

Amphetamine and cocaine induce a “high” which includes a sense of increased energy, intensified alertness, a feeling of well-being and a heightened awareness of the senses. A cocaine “high” lasts up to 40 minutes, whereas an amphetamine “high” can last several hours. Both drugs, even in small doses, result in loss of appetite, increased respiratory (breathing) and cardiac (heart) activity, increased blood pressure and dilation of the pupils.

Higher doses of amphetamine and cocaine can cause fever, sweating, headaches, blurred vision and dizziness. Extremely high doses of amphetamine and cocaine can cause flushing, paleness, rapid and irregular cardiac activity, shivering, lack of coordination and collapse. Local brain haemorrhages may occur. Even deaths have been reported.

**Long-term effects**
After a few days or weeks of drug abuse, feelings of well-being are replaced by burnout and withdrawal. Since amphetamine and cocaine suppress hunger, chronic addicts usually do not eat enough and therefore develop diseases associated with vitamin deficiency and malnutrition. Balance and body movements (swaying, twisting) are often affected. Repetitive, stereotype fidgeting is quite common. Chronic amphetamine and cocaine addicts experience that the “high” gradually gives way to restlessness, extreme irritability, insomnia, hallucinations and delusions such as insects and worms crawling under the skin. This condition is called a cocaine or amphetamine psychosis.

**Addiction**
Using amphetamine regularly increases one’s tolerance. The user must increase the dose to
achieve the desired effect. The user develops first and foremost a mental dependency. In other words, the drug becomes the focal point in that person’s thoughts and emotions. A cocaine addict can be afflicted with a strong, compulsive, psychological need. Laboratory tests in the US have shown that cocaine is one of the few narcotic substances which animals will self-ingest unto death. This demonstrates just how addictive it can be. As with ecstasy, cocaine and amphetamine destroy the brain’s neurotransmitter network in the long run. See “How the teenage brain develops”

**Drug abuse damages the brain**

After prolonged drug abuse, changes in the brain’s structure occur which resemble those caused by a minor brain injury. Studies of cocaine addicts, primarily in the US, have shown that brain activity patterns change radically and remain so for a long time – even after drug abuse has ceased.
Sture Liljequist, Professor in experimental alcohol and drug dependence research, maintains that it is primarily the structures in the frontal cortex which are damaged. This part of the brain is most essential for decision-making as well as coordinating nerve impulses from other sectors of the brain.

It has also been shown that dopamine receptors in the brain regress after amphetamine and cocaine abuse. These drugs cause nerve cells (neurons) to release up to a hundred times more dopamine than normal. The receptors are so to speak forced to protect themselves by regressing.

Swedish law
Ecstasy, amphetamine and cocaine are classified as narcotics. It is illegal to use, buy or possess narcotics at all. It is also illegal to sell, exchange, lend or give narcotics as a gift. In addition, it is illegal to grow or produce narcotics by any method. Narcotics may not be packaged, transported or stored. One may not arrange contacts between buyer and seller nor assist in transferring payment between buyer and seller. The penalties for narcotics crimes vary depending on how serious the offence is. Minor narcotics offences are usually punished by fines or up to six months in jail. More serious narcotics crimes always involve prison time, normally a maximum of three years. If the crime is judged extremely serious, the sentence can be at least two and maximum ten years in prison.

3. The teenage brain – chasing “highs” or rewards?

How the brain functions
The body’s tissue and organs all are comprised of cells. The brain and spine consist of more than 100 billion nerve cells (neurons). These send the information which steers the body and determines how you feel. Neurons are tightly placed close to one another. They send signals to each other. They manage to do this with the help of signal substances, so-called neurotransmitters. Diverse neurotransmitters have differing characteristics and perform distinct functions. Here are a few of the most common:

**Noradrenaline**
This signal substance affects neurons so that they acquire better means to receive information from other parts of the brain. It intensifies perceptual sensitivity and influences wakefulness and attentiveness.

**Dopamine**
Dopamine stimulates the brain’s reward centre. This gives rise to feelings of pleasure, happiness and satisfaction. Dopamine is also present in those parts of the brain controlling thought processes and memory functions. Dopamine affects the body’s movement patterns.

**Serotonin**
Serotonin affects mood, learning ability and memory. Serotonin deficiency can cause depression. Serotonin also affects sleep rhythm, appetite as well as regulating body temperature.

**GABA (gamma-aminobutyric acid)**
Has a soothing and analgesic (painkilling) effect by inhibiting certain processes which activate other neurotransmitters.

**Endorphins**
Stimulate the brain’s reward centre as well as alleviating pain.

The brain’s reward centre
The brain’s reward system plays a crucial role when you take drugs. The brain reward system’s primary function is to convey a feeling of well-being when engaged in natural behaviour which is important for the survival of the individual and the species: eating, drinking, exercising and/or making love. Addictive drugs, just like food or sex, activate the brain reward system though in a much more powerful way. Amphetamine can increase the release rate of the signal substance dopamine, which influences the reward system, by as much as 1000 percent.
Researchers believe that the brain’s reward system also profoundly affects memory and learning. Taking drugs causes a pathological “overkill” learning/yearning for drug-induced “highs”. As a result, the desire to seek pleasure from natural behaviour (exercising, learning new things, developing loving relationships, sex) diminishes.

How the teenage brain develops
The brain had long been thought to be fully developed at age 12-13. Brain researchers, using magnetic resonance imaging (MRI), now know that changes in the brain occur even during the teen years. Nerve cells connect anew and brain signals take different paths. Certain synapses (connections between two nerve cells, neurons) become more stable while others disappear completely. What you do as a teenager stays imprinted in your brain. There’s a struggle for survival among brain cells to keep connected. Researchers call it: “use it or lose it” – use your nerve cells, otherwise they’ll disappear. Not all of them can survive.

Nature has given us an overproduction. If you go in for music hardcore, certain parts of the brain strengthen. If you dance intensely, other parts strengthen instead. If you study or play computer games day in day out – these activities determine what’s imprinted in your brain.

One of the most important discoveries was how late parts of the frontal lobe mature. These parts ("the brain’s decision making centre") are completely developed first at age 25. This means that the ability to plan for the future, to sift through impressions, foresee and calculate risks is not fully developed during the teenage years. Therefore, teenage behaviour is more steered by emotions due to the fact that the limbic system (the centre of emotions) matures more quickly.

That’s what researcher Jay Giedd concludes. When teenagers sit down and answer a questionnaire about risk taking – amazing how sensible they are. But in a situation where emotions get the upper hand, emotions win – long-term thinking loses. This doesn’t mean that teenagers can’t think logically and long-term, just that the “emotional brain” has the upper hand since the ability for rational decision making isn’t fully developed yet.
Obviously it’s significant that a teenager is at a stage in life when many processes are under development – physical as well as psychological. Especially those hormone storms influence how the brain functions. As always, there are countless individual differences.

Other research has shown that teenagers have more difficulty showing empathy than adults. Brain activity was monitored when teenagers answered questions about empathy. It was shown that in fact teenagers react like adults, but that it takes longer. The brain quite simply has to work much harder to arrive at the “right” answer. Researchers are of the opinion that this is because anatomical changes are taking place in the brain.

**Teenager’s natural search for rewards**

Why do teenagers in general live so dangerously and expose themselves to risks? For example: unprotected sex, alcohol, drugs, and fast cars. Researchers say it has to do with the teenage brain’s reward system. When researchers used magnetic resonance imaging (MRI) to find out how 10- and 19-year olds reacted while learning with a promised reward, it turned out that the 19-year olds reacted more to the rewards and how big they would be. Chasing rewards can lead the teenager to take bigger risks. Teenagers – by nature – try to find quick rewards. Since the brain’s controlling part, the frontal lobe, isn’t fully developed, it may be fruitless for an adult to preach about long-term thinking. Teenagers don’t think that far ahead, for the most part.

Accordingly, craving rewards is natural for the teenager. It’s thought to be connected to the fact that young people are more programmed to learn new things. In order to stand on our own two feet and survive on our own – the teenage years are a period when we prepare ourselves to leave family and the familiar. Instead, we must seek out the new, the different, that which will form us as separate adult individuals. Seeking “kicks” and the unfamiliar by using drugs is destructive and just plain stupid. A partial answer may be the teenager’s craving for rewards. One idea to prevent this is to instead guide the teenager towards other rewards such as “awesome” computer games, sports and leisure activities.
The art of postponing rewards

People who use drugs often have less control of their impulses than others. The “kick”/the quick reward steers behaviour at the expense of thinking and acting long-term. Having the ability to control the craving and postpone rewards is important for development and achieving personal goals. Probably the most relevant study was conducted by psychologist Walter Mischel in the late 1960s – the Marshmallow Study.

The experiment was conducted on a group of 4-year olds at a day-care centre near Stanford University in the US. Each 4-year old was offered a marshmallow with the following extra offer: If the 4-year old could wait and not eat the marshmallow until the adult experiment leader returned after completing a short errand, then the child would receive a second marshmallow. Some of the children could wait, whereas others found the temptation to immediately devour the candy too great.

Later, when the children had become teenagers, Mischel and his colleagues did a follow-up study to see how things had gone for the children. It turned out that those children (65%) who had managed to wait for the second marshmallow, on the whole, had developed into more reliable, stress-resistant, socially competent teenagers and did better in school than the other children.

Is it due to inheritance or environment? Are some parents better at enabling their children to think long-term? There is no simple answer. In a dysfunctional family where parents let their children down, it’s very likely that the children will take what they can get here and now because the future seems so uncertain. Maybe it also depends on inheritance – genetic predisposition. Regardless of the causes,
Mischel’s Marshmallow Study illustrates how important it is to weigh rationally short-term/long-term goals against each other. These are considerations and decisions we are all forced to make each and every day.

The Misunderstanding Majority
Many young people think that “everybody else” has tried drugs except them. Even adults who paint an exaggerated picture of the situation contribute to the misunderstanding majority. The media can also slant coverage of drugs and alcohol in such a way that things appear worse than they are. Young people adapt themselves to this misunderstanding. They drink more than they really want to or try drugs they maybe wouldn’t have, if only they knew how relatively few actually do – especially when it comes to drugs that stimulate the central nervous system.

4. Some statistics about drug usage

- Cannabis is by far the most common drug used by teenagers in Sweden. Most studies normally show that about 60 percent of those who have tried drugs have used cannabis exclusively. Only 5-10 percent have used other narcotics exclusively and not cannabis.

- Amphetamine was previously the second most common narcotic. It now shares second place with ecstasy, at least among youth. Since the beginning of this century, both the use and supply of ecstasy has decreased in Stockholm. However, an increase of both cocaine and amphetamine has been noted.

- According to the study “Drug Trends in Sweden 2008” by The Swedish Council for Information on Alcohol and Other Drugs (CAN), 17 percent of boys and 15 percent of girls in the 2nd year of upper secondary school answered that they had used narcotics. This was a somewhat higher percent of girls than in 2007. 2 percent of the girls had used drugs within the last 30 days as opposed to 4 percent of boys.

Drug usage (cannabis excluded) is at 3 percent in Sweden. In England, usage is at 9 percent. The Nordic countries, generally speaking, show a lower percentage of drug usage than most other countries in Europe.

- Regarding various types of narcotics, the study “Drug Trends in Sweden 2007” of upper secondary school students shows that 1 percent of boys and 2 percent of girls have tried amphetamine. 2 percent of both sexes have tried ecstasy and 1 percent has tried cocaine.

- The predominant narcotic used by those who were hospitalised the first time for narcotics abuse 2006 was amphetamine – more than 25 % had taken amphetamine. Slightly more than 3 % had taken cocaine as opposed to 0.4 % who had taken ecstasy.

- Narcotics-related mortality has declined in Sweden. Likewise, the number of people admitted to mandatory inpatient care due to narcotics-related diseases has declined.

Statistics from CAN, The Swedish National Institute of Public Health and others.

Ecstasy and amphetamine laboratories
Seen globally, Europe is the main centre for ecstasy production, even if its relative importance is declining as production spreads to other parts of the world. Both production and confiscation are still concentrated in Europe. Laboratories have been uncovered in Belgium, Germany, Estonia, Lithuania, the Netherlands, Poland and Great Britain. The major part of amphetamine seized in 2003 came from the Netherlands, followed by Poland and thereafter Belgium.

Narcotics production – an environmental problem
The Narcotics Squad in Halland visited the Netherlands 2002 and got to see confiscated components from ecstasy and amphetamine labs. The equipment revealed that there are several ways to produce ecstasy.
Common to all was the relative simplicity (given that one has the necessary competence in chemistry) of carrying out production. Latent danger was ever present.

“That the risk of explosion is great, regardless of what method is used, is beyond any doubt. We learned that one should never touch any component without being absolutely certain about what one is doing. The risk of flying into the air is real. Every year there are several labs that blow up.” (according to Ingmar Nilja of the Narcotics Squad).

Production creates a large quantity of waste products which have become an environmental problem when the illegal labs dump chemical waste, oils etc.

The unshielded handling of dangerous chemicals used in drug production poses a worldwide threat to the environment.

Risks increase abroad

Many of us have probably had the same experience – it’s easier to “let go” abroad and perhaps do things we wouldn’t do at home. Tilda hadn’t taken drugs back home in Sweden. But, well on foreign soil together with new friends, she was tempted to take the plunge and try it.

In Sweden, the attitude towards taking drugs is both negative and prohibitive. Narcotics are both more expensive and less commonplace here than in some countries young people visit (according to Ulf Guttormsson, CAN investigator).

About 75% of the 239 youth who participated in the questionnaire survey “Speed – youth’s experiences with narcotics abroad” 2005 deemed that drug usage was more acceptable outside Sweden. That’s why it was “more suitable” to do it while travelling abroad rather than at home.

Easier access to drugs also contributed to their decisions. Had it been difficult to get hold of cannabis, ecstasy and cocaine abroad, the youths would never have tried drugs in most cases.

Abuse of heavier drugs like ecstasy and amphetamine is three times as common in England compared to Sweden. Trips abroad constitute a serious risk factor when it comes to drug use.
Conclusion
Tilda most probably had no idea about what she was doing. How ecstasy works. How impure ecstasy can be, How much she was taking. How the drug would affect her and how dangerous it is.

Taking drugs is a gamble – it can go alright or end up really badly. No one can ever be absolutely certain about what will happen because basically you would have had to have been there when it was being made to know what it contains. You'd also have to know from experience how this drug affects just you.

The only sound advice one can give is: Don’t try it! Learn to say no. Things can really get out of hand – as they did for Tilda. Then it’s far too late for regrets.