Chapter 11
Substance–Related Disorders

Perspectives on Substance–Related Disorders

- Use
  - Ingestion of psychoactive substances in moderate amounts that does not significantly interfere with social, education, or occupational functioning
- Intoxication
  - Our physical reaction to ingested substances
  - May be experienced as impaired judgment, mood changes, lowered motor ability
- Abuse
  - When substances disrupt one's education, job, or relationships with others, puts one in physically dangerous situations, or causes related legal problems

Substance Dependence

- Addiction
- Physiological dependence
  - The person is physiologically dependent on the drug, & requires greater & greater amounts of the drug to experience the same effect (**tolerance**) and will respond physically in a negative way when the substance is no longer ingested (**withdrawal**)
- **And**
- Psychological dependence
  - Drug–seeking behaviors — The repeated use of a drug, a desperate need to ingest more of the substance, & the likelihood that use will resume after a period of abstinence

Depressants

- Primarily decrease central nervous system (CNS) activity
- Reduce our levels of physiological arousal & help us relax
- Includes alcohol, sedative, hypnotic, & anxiolytic drugs
- Among the most likely to produce physical dependence, tolerance & withdrawal

Alcohol Use Disorders

- Clinical Description
  - Initial effect is apparent stimulation
    - Feeling of well–being, reduced inhibitions & become more outgoing
  - With continued drinking, alcohol depresses more areas of the brain, which impedes the ability to function properly
    - Impairs motor coordination, slows reaction time, causes confusion, reduces judgment, negatively affects vision & hearing

- Effects
  - Affects many parts of the body
    - Passes through the esophagus & into the stomach
    - Travels to the small intestine
    - The circulatory system distributes it throughout the body
    - Some goes to the lungs
    - It passes through the liver
  - Alcohol affects so many neurotransmitter systems, it's understandable it has such widespread & complex effects
    - Gamma–aminobutyric acid (GABA) system (inhibitory)
    - Glutamate system (an excitatory system)
    - Serotonin system

- Long–term Effects of Heavy Drinking
  - Withdrawal involves hand tremors, nausea or vomiting, anxiety, transient hallucinations, agitation, insomnia, & at its most extreme withdrawal delirium aka delirium tremens (DTs)
  - Can produce liver disease, pancreatitis, cardiovascular disorders, & brain damage
  - Neurotoxicity which produces Dementia
  - Deficiency of thiamine produces Wernicke's disease
  - Chronic alcohol use may damage the connections between the neurons, which can regenerate

- Fetal alcohol syndrome (FAS)
  - Abnormal facial features
  - Growth retardation, central nervous system (CSN) abnormality; or cognitive deficits, behavior problems & learning deficits
- Alcohol–related birth defects (ARBD)
  - Involves anomalies present at birth, e.g., heart or kidney defects
- Alcohol–related neurodevelopmental disorder (ARND)
  - Same as FAS but without the FAS facial features

Other Depressant–Use Disorders

- Sedatives
  - Calming
- Hypnotic
  - Sleep–inducing
- Anxiolytic
  - Anxiety–reducing

- Barbiturates
  - Includes Amytal, Seconal, & Nembutal
  - A family of sedative drugs 1st synthesized in Germany in 1882
  - Replaced alcohol & opium, & prescribed to promote sleep
  - Prescribed less often now because of their addictive properties
- Benzodiazepines
  - Includes Valium, Xanax, Quaalude, Rohypnol, & Halcion
  - Prescribed since the 1960's to reduce anxiety
  - Considered much safer than barbiturates with less risk of abuse & dependence
  - Rohypnol ("roofies") & "date rape"

- Clinical Description
  - Barbiturates
    - At low doses, relax the muscles & can produce a mild feeling of well–being
    - Larger doses have results similar to those of heavy drinking: slurred speech & problems walking, concentrating & working
    - Extremely high doses can relax the diaphragm muscles so much as to cause death by suffocation
    - Overdosing on barbiturates
    - Withdrawal from large–doses of barbiturates can lead to convulsions that may be life–threatening

- Clinical Description
  - Benzodiazepine
    - Prescribed as hypnotics & anxiolytics like barbiturates, and also as muscle relaxants & anticonvulsants
    - People who use them for nonmedical reasons first report a pleasant high & reduction of inhibition similar to the effects of drinking alcohol
    - With continued use, tolerance & dependence can develop
    - Users who try to stop taking the drug, experience symptoms similar to alcohol withdrawal including anxiety, insomnia, tremors, & delirium

- Clinical Description
  - Benzodiazepines & barbiturates
    - Like alcohol, they affect the brain by impacting the GABA system, but by a slightly different mechanism
    - There can be synergistic effects, causing the combination to reach dangerous levels

Stimulants

- Amphetamine Use Disorders
  - At low doses, amphetamines can induce feelings of elation & vigor & reduce fatigue; one feels "up"
  - After a period of elevation, one comes back down and "crashes," feeling depressed or tired
  - Amphetamines are manufactured in a laboratory; and were first synthesized in 1887
  - They're prescribed for narcolepsy & ADHD
  - They're also used by truck drivers, pilots, & some college students trying to stay up all night

- Amphetamine Use Disorders
  - Intoxication involves:
    - Euphoria or affective blunting, changes in sociability, interpersonal sensitivity, anxiety, tension, anger, impaired judgment, stereotyped behaviors, & impaired social or occupational functioning
    - Physiological changes can include heart rate or blood pressure changes, perspiration or chills, nausea or vomiting, weight loss, muscle weakness, respiratory depression, chest pain, seizures, or coma
    - Severe intoxication or overdose can cause hallucinations, panic, agitation & paranoid delusions
  - Effects
    - Stimulate the CNS by enhancing the activity of norepinephrine & dopamine

- Amphetamine Use Disorders
  - Ecstasy (MDMA)
    - First synthesized in 1912 as an appetite suppressant
    - Recreational use rose sharply in the late 1980s
    - 2% of all college students used it in the prior year
    - Has been associated with confusion, depression, anxiety, paranoia, muscle tension, nausea, blurred vision, chills or sweating, and increased heart rate & blood pressure
    - There's an extremely high potential for users to become dependent, as well as great risk for long–term difficulties

  - Ecstasy (MDMA)
    - It destroys serotonin–producing neurons in animals, neurons that regulate aggression, mood, sexual activity, sleep & sensitivity to pain
    - Recent evidence indicates degeneration of dopamine following chronic use or a single high dose
    - Researchers believe that with aging & exposure to other toxic elements, Parkinsonian symptoms will develop
    - The doses which produce neurotoxicity are only 2 to 3 times more than the minimum dose needed to produce a psychotropic response, suggesting a high potential for overdose

- Cocaine Use Disorders
  - Clinical Description
    - Like amphetamines, in small amounts it increases alertness, produces euphoria, increases blood pressure & pulse, & causes insomnia & loss of appetite
    - Paranoia occurs in 2/3 or more of cocaine abusers
    - Makes the heart beat more rapidly & irregularly, & can have fatal consequences, even with ingesting only moderate amounts
    - Might adversely affect a developing fetus
  - Effects
    - Like amphetamines, cocaine enhances the activity of dopamine
    - Highly addictive

- Nicotine Use Disorders
  - Comes from the tobacco plant, which is indigenous to North America
  - Clinical Description
    - No intoxication pattern is described in DSM-IV-TR
    - Withdrawal symptoms include depressed mood, insomnia, irritability, anxiety, difficulty concentrating, restlessness, & increased appetite & weight gain
    - In small doses, it stimulates the CNS, relieves stress & improves mood
    - High doses can cause blurred vision, confusion, convulsions, & sometimes even death
    - Chronic use causes high blood pressure & increases the risk of heart disease & cancer

- Nicotine Use Disorders
  - Effects
    - It's **highly** addictive
    - Only 7-19 seconds after a person inhales the smoke, nicotine reaches the brain
      - Where it stimulates nicotinic acetylcholine receptors (nAChRs) in the midbrain reticular formation & the limbic system
    - Nicotine may affect the fetal brain, increasing the likelihood that children of mothers who smoke during pregnancy will smoke later in life
    - Nicotine use during pregnancy also can lead to reduced birth weight, premature birth, and Sudden Infant Death Syndrome (SIDS)
    - Possible genetic vulnerability that may lead to both depression & smoking

- Caffeine Use Disorders
  - Clinical description
    - Found in tea, coffee, many cola drinks & some other sodas & in cocoa products
    - In small doses, it elevates mood & decreases fatigue
    - In larger doses, it makes one feel jittery & can cause insomnia
    - Some people are more sensitive to its effects than others
  - Effects
    - 1 cup of coffee per day does not seem to harm the developing fetus
    - Regular use can result in tolerance & dependence
    - Withdrawal symptoms include headache, drowsiness, unpleasant mood
    - Seems to block adenosine reuptake, & to a lesser extent, affects serotonin

Opioid–Use Disorders

- Clinical description
  - Natural chemicals in the opium poppy that have a narcotic effect
  - Opioids refers to the family of substances that includes the natural opiates, synthetic variations (methadone, pethidine), & the comparable substances that occur naturally in the brain (enkephalins, beta–endorphins, & dynorphins)
  - They induce euphoria, drowsiness, & slowed breathing, and relieve pain (analgesics)
  - High doses can lead to death by completely depressing respiration
  - Withdrawal symptoms can be very unpleasant (although probably less–so that those from barbiturates & alcohol).
- Effects
  - Opiates activate the brain's natural opioid system

Hallucinogen–Use Disorders

- Marijuana
  - Clinical description
    - Marijuana is the dried parts of the cannabis or hemp plant, which grows wild throughout the tropical & temperate regions of the world: *weed*
    - Reactions differ from person to person
      - Feelings of well–being
      - They usually include mood swings
      - Heightened sensory experiences
    - In larger doses, a user can experience paranoia, hallucinations, & dizziness
    - Frequent marijuana users may experience impairments of memory, concentration, motivation, self–esteem, relationships with others, & employment

- Marijuana
  - Tolerance
    - Some chronic & heavy users report tolerance, with inability to reach the levels of pleasure they experienced earlier
  - Withdrawal
    - Major symptoms do not usually occur
    - Chronic users report a period of irritability, restlessness, appetite loss, nausea, & difficulty sleeping, but without craving or psychological dependence

- Marijuana
  - Effects
    - May be beneficial for reducing nausea associated with chemotherapy, or easing the symptoms of glaucoma
    - But the smoke contains as many carcinogens as tobacco smoke
    - Long–term use may contribute to diseases such as lung cancer
    - Delivery system
      - Most users inhale the drug by smoking the dried leaves Others use hashish
    - Contains over 80 varieties of cannabinoids, which alter mood & behavior
      - The most common of those chemicals includes tetrahydrocannabinols (THC)
        - Anandamide

- LSD (d–lysergic acid diethylamide) & other hallucinogens
  - Clinical description
    - Naturally occurring derivatives of the grain fungus ergot have been found historically, but LSD is produced synthetically in laboratories
    - Hallucinogens occurring naturally in a variety of plants
      - Psilocybin
      - Lysergic acid amide
      - Dimethyltryptamine (DMT) from Virola tree
      - Mescaline (found in the peyote cactus plant)
    - Phencyclidine (PCP) also is processed synthetically

- Clinical description
  - Intoxication
    - Similar to those for marijuana: perceptual changes such as the subjective intensification of perceptions, depersonalization, hallucinations, dilated pupils, rapid heartbeat, sweating, & blurred vision
  - Tolerance
    - Develops quickly
    - If taken repeatedly over a period of days, they completely lose their effectiveness
  - Withdrawal
    - None reported
  - Concerns
    - The possibility of psychotic reactions
    - "Bad trips"
    - Flashbacks

- LSD & other hallucinogens
  - Effects
    - Most of these drugs bear some resemblance to neurotransmitters
      - LSD, psilocybin, lysergic acid amide & DMT are chemically similar to serotonin
      - Mescaline resembles norepinephrine
      - A number of other hallucinogens resemble acetylcholine
    - But we don't understate the mechanisms responsible for the hallucinations & other perceptual changes

Other Drugs of Abuse

- Inhalants
  - Found in volatile solvents, making them available to breathe directly into the lungs
    - Spray paint, hair spray, paint thinner, nail polish remover, felt–tipped markers, airplane glue, contact cement, dry–cleaning fluid, spot remover
  - Most commonly used by males age 13-15 with lower SES
  - Rapidly absorbed into the bloodstream

Other Drugs of Abuse

- Inhalants
  - Effects
    - The high resembles that of alcohol intoxication
      - Includes dizziness, slurred speech, incoordination, euphoria & lethargy
    - Users build up a tolerance
    - Withdrawal lasts from 2-5 days
      - Involves sleep disturbance, tremors, irritability, & nausea
    - Use also can increase aggressive & antisocial behavior
    - Long–term use can damage bone marrow, kidneys, liver & brain

Other Drugs of Abuse

- Anabolic–androgenic steroids
  - Derived from, or a synthesized form of, testosterone
  - Legitimately used to treat people with asthma, anemia, breast cancer, & males with inadequate sexual development
  - Because it can produce increased body mass (anabolic action), it's often used illicitly
  - Can be taken orally or through injection
  - Dependence
  - With long–term use, mood disturbances are common, including depression, anxiety & panic attacks
  - More serious physical consequences may result from its regular use

Other Drugs of Abuse

- Designer drugs
  - Besides Ecstasy (MDMA), also includes related substances of MDEA / Eve & BDMPEA / Nexus
    - Heighten auditory & visual perception & senses of taste & touch
  - Gamma hydroxybutyrate (GHB, liquid Ecstasy)
    - CNS depressant that in low doses, produces a state of relaxation & increased tendency to verbalize
    - Can result in seizures, severe respiratory depression & coma
  - Ketamine (K, Special K, Cat Valium)
    - Dissociative anesthetic that produces a sense of detachment & reduced awareness of pain
  - Use of any of these drugs can result in tolerance & dependence

Causes of Substance–Use Disorders

- Biological Dimensions
  - Familial & Genetic Influences
    - Twin & adoption studies indicate certain people may be genetically vulnerable to drug abuse
  - Neurobiological influences
    - Almost all abused substances affect the brain's "pleasure pathway"
      - It's believed to include the dopaminergic system and its opioid–releasing neurons, which begin in the midbrain ventral tegmental area, and then work their way forward through the nucleus accumbens and on to the frontal cortex
    - There may be other pleasure pathways in the brain too

- Psychological Dimensions
  - Positive Reinforcement
    - Taking drugs feels pleasurable
      - Even laboratory animals will work to have drugs injected into their bodies such as cocaine, amphetamines, opiates, sedatives & alcohol
  - Negative Reinforcement
    - Many drugs provide escape from:
      - Physical pain (opiates)
      - Stress (alcohol)
      - Panic & anxiety (benzodiazepines)
    - Referred to as self–medication, tension reduction
    - Opponent–process theory

- Psychological Dimensions
  - Cognitive Factors
    - Expectancy effect
      - What people expect to experience when they use drugs influences how they react to them
      - Expectancies develop before people use drugs, as a result of the drug use of parents & peers, advertising, & media figures who model drug use
    - Relapse
      - Their expectations about the positive effects of the drug create powerful "urges"
  - Social Dimensions
    - Effects of media exposure vs. peer pressure
    - Exposure to alcohol as preschoolers
    - Drug–addicted parents

- Cultural Dimensions
  - Each culture has its own preferences for psychoactive drugs & those it finds unacceptable
  - Poor economic conditions in certain parts of the world limit the availability of drugs
  - Different expectancies for the affects of certain drugs
- Integrative Model (figure 11.11)
  - Equifinality
    - A particular disorder may arise from multiple & different paths

Treatment of Substance–Use Disorders

- Biological Treatments
  - Agonist Substitution
    - Provides the person with a safe drug that has a chemical makeup similar to the addictive drug
      - Cross–tolerance
    - Methadone as a heroin substitute
    - Nicotine treatment
      - Nicotine gum or patch vs. gum
      - Without psychological treatment, many smokers relapse after they stop using the gum or patch

- Biological Treatments
  - Antagonistic treatment
    - Blocking the effects of drugs so they no longer produce a pleasant experience
    - Naltrexone to treat opiate dependence
  - Aversive treatment
    - Prescription of drugs that make ingesting the abused substances extremely unpleasant
    - Antabuse (disulfiram)
      - Prevents the breakdown of acetaldehyde, a by–product of alcohol, causing feelings of illness
      - People who drink alcohol after taking Antabuse experience nausea, vomiting, & elevated heart rate and respiration

- Psychosocial Treatments
  - While biological treatments can be beneficial, they usually must be combined with psychosocial treatments too
  - Inpatient facilities
    - Extremely expensive, often exceeding $15,000
    - Research suggests there may be no difference between inpatient care & quality outpatient care in the outcomes for alcoholic patients or for drug treatment in general

- Psychosocial Treatments
  - Alcoholics Anonymous & its variations (Cocaine Anonymous, Narcotics Anonymous)
    - 12–Step programs
    - Based on the idea of alcoholism as a disease & that alcoholics must acknowledge their addiction to alcohol & its destructive power over them
    - The addiction is seen as more powerful than any individual
    - The individual must look to a Higher Power to help them overcome their shortcomings
    - Effectiveness
      - AA clearly is an effective treatment for **some** people with alcohol dependence

- Psychosocial Treatments
  - Controlled Use
    - Some abusers of some substances (esp. alcohol & nicotine) may be capable of being social users
    - Widely accepted in the United Kingdom
    - Is at least as effective as abstinence
  - Component Treatment
    - Aversion therapy
      - Uses a conditioning model to pair an aversive stimulus with substance use
      - Covert sensitization
    - Contingency Management
    - Combining treatments in a shotgun–like effort can be beneficial
    - Matching treatment to individuals is promising

- Psychosocial Treatments
  - Relapse Prevention
    - Relapse as a failure of cognitive & behavioral coping skills
      - Examine beliefs about the positive aspects of the drug & confront the negative consequences of its use
      - High–risk situations are identified
      - Strategies are developed
      - Research suggests it may be useful in treating marijuana dependence, smoking, cocaine abuse & alcohol dependence
  - Sociocultural Intervention
    - Changing cultural values to reduce drug use
    - Requires the cooperation of governmental, educational, & religious institutions