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

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• **Other Depressant–Use Disorders**

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

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• **Clinical Description**
  
  • **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”

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• **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

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• **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
### 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

## 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

### 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

### 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

- 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

- 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

- 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

• 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

• Biological Treatments
  – Antagonistic treatment
    • Blocking the effects of drugs so they no longer produce a pleasant experience
  – 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
  – 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