

## Psychoactive Drugs

Psychoactive drug: A chemical that influences consciousness or behavior by altering the brain's chemical messenger system.

Your textbook characterizes five broad categories of psychoactive drugs



- Depressants: Substances that reduce the activity of the central nervous system such as alcohol, barbiturates, benzodiazepines and toxic inhalants.



- Stimulants: Substances that excite the central nervous system, heightening arousal and activity levels such as amphetamines, ecstasy, cocaine, and caffeine.



- Narcotics or Opiates: Highly addictive drugs derived from opium that relieve pain, induce feelings of well-being and relaxation such as opium, morphine and heroin.



- Hallucinogens: Drugs that alter sensation and perception and often cause visual and auditory hallucinations such as LSD, mescaline, and psilocybin.
- Marijuana: The leaves and buds of the hemp plant that is mildly hallucinogenic.

Image source: Carpenter and Huffman

## Compensatory Responses

When people use drugs, the body and brain attempts to maintain homeostasis by counteracting the effects of the drug and produces reactions that are opposite to that of the drug.

Compensatory responses:

A reaction by the body to drugs in an attempt to maintain a state of homeostasis.

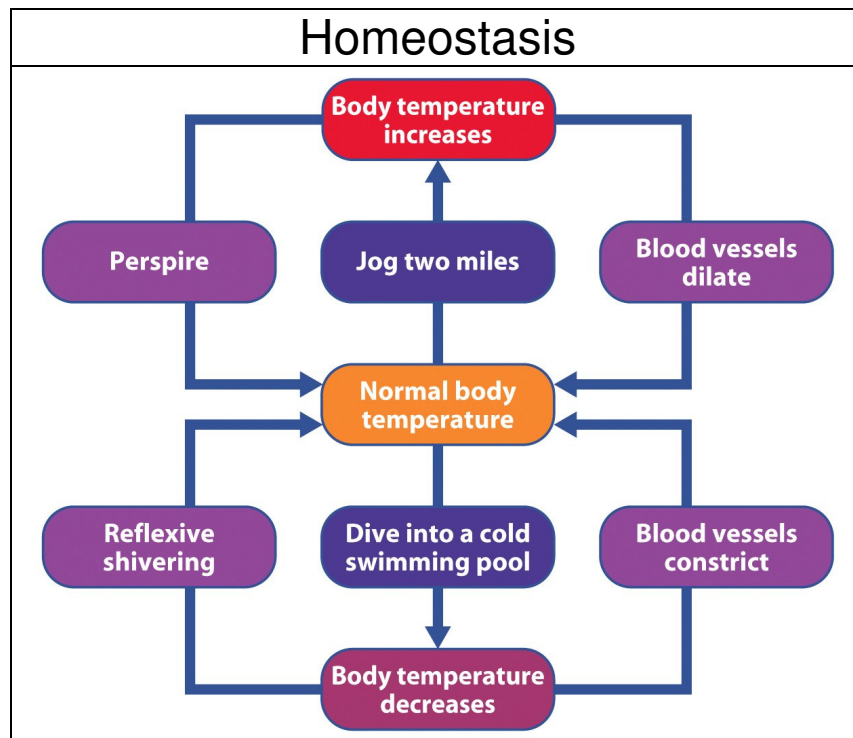


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## Compensatory Responses

This biological effect to counteract the effect of the drug is called the compensatory response. Compensatory response can be triggered biologically by taking the drug or triggered psychologically through environmental cues that signal that drug taking behavior is about to take place.



	Drug effect	Compensatory Responses
 2	Slows the body down	Stimulates the body to restore homeostasis
 1	Stimulates the body	Slows the body down to restore homeostasis

Image source: Carpenter and Huffman

## **Compensatory Responses**

Compensatory responses can help explain phenomena that most people are familiar with such as:

Drug tolerance: A tendency for larger doses of a drug to be required over time to achieve the same effect.

Drug withdrawal: The experience of strong reactions opposite to those produced by the drug













The withdrawal symptoms may be thought of the body's compensating response still becoming active in the absence of the drug.

The compensatory response can not only explain drug tolerance and drug withdrawal symptoms, but an unexpected observation that

- experienced drug users die of a drug overdose
- without increasing their normal dose
- while consuming drugs in a different (geographical) location.




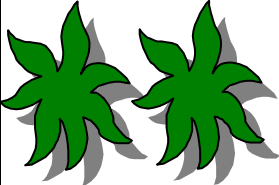


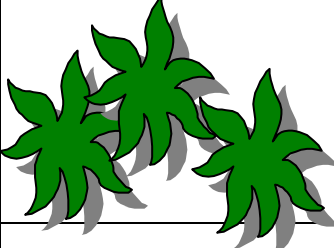


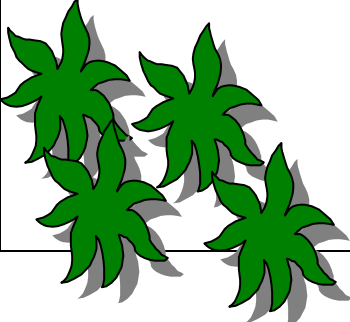


## Drug Tolerance

Tolerance: A decreased responsiveness to a drug (usually you need to increase the dosage to get the same effects)

	Tolerance	
	Dosage	Effect
January		 
February		 
March		 
April		 

## Drug Tolerance
















Tolerance: A decreased responsiveness to a drug (usually you need to increase the dosage to get the same effects)

	Tolerance		
	Dosage		Effect
January			
February			
March			
April			

## Compensatory Responses

Compensatory responses: A reaction by the body to drugs in an attempt to maintain a state of homeostasis.

When people use drugs, the body and brain attempts to counteract the effects of the drug and produces reactions that are opposite to that of the drug.










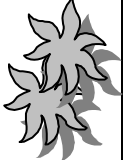






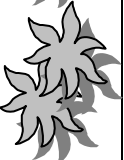
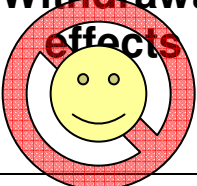
	<b>Dosage +</b>	<b>Compensatory Response</b>	<b>= Drug Effect</b>
	<i>Drug</i>	<i>+ - Counteracts drug</i>	
January	↑ 		↑ 
February	↑↑ 	 ↓ 	↑ 
March	↑↑↑ 	 ↓↓ 	↑ 
April	↑↑↑↑ 	 ↓↓↓ 	↑ 

## Withdrawal Effects

Withdrawal:

The experience of strong reactions opposite to those produced by the drug

The withdrawal symptoms may be thought of the body's compensating response still becoming active in the absence of the drug.

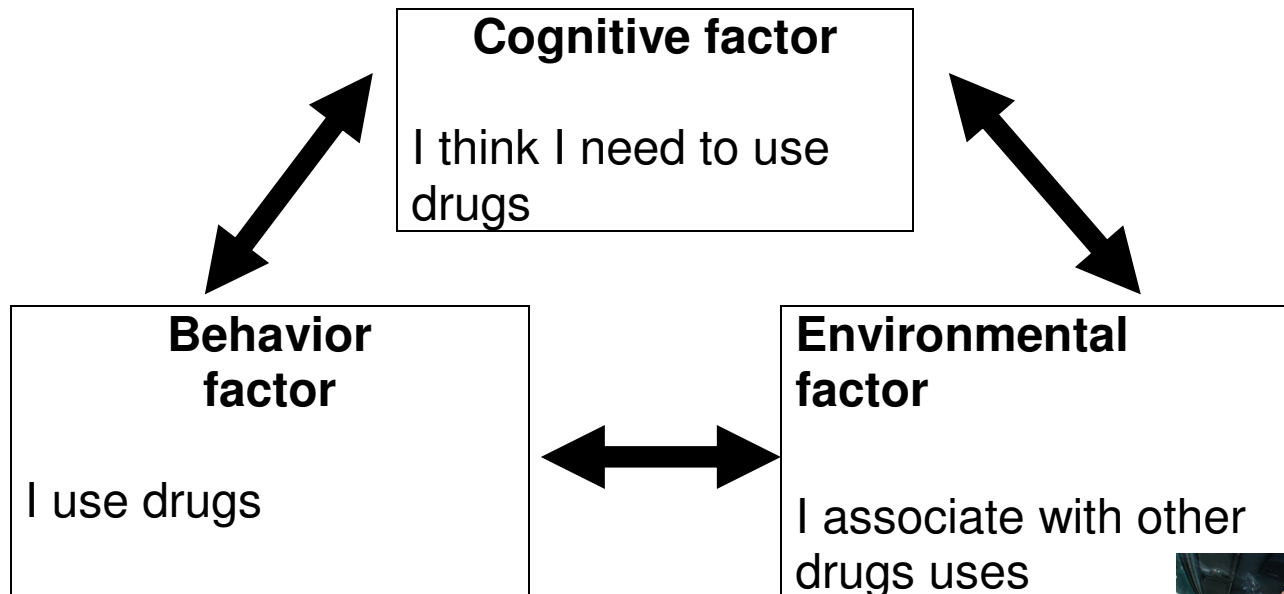
	Dosage + <i>Drug</i>	Compensatory Response <i>- Counteracts drug</i>	Drug Effect	Withdrawal
January	↑ 		↑ 	
February	↑↑ 	 ↓ 	↑ 	
March	↑↑↑ 	 ↓↓ 	↑ 	
April	↑↑↑↑ 	 ↓↓↓ 	↑ 	
May		 ↓↓↓↓ 		<b>Withdrawal effects</b> 



## Withdrawal Effects

Not only can the compensatory response become triggered biologically through the use of a drug, it can be triggered by environmental cues.

















If you want to reduce drug use, you may need to change environments. According to the principle of reciprocal determinism, beliefs, environment and behavior are intertwined.



In order to understand the problems of drug abuse, you need to understand

- the process of reciprocal determinism,
- as well as the neurochemical basis of addiction (the neurotransmitter dopamine) and
- learning (classical conditioning and operant conditioning).

## Classically Conditioned Compensatory Responses

	Dosage +	Compensatory Response	Drug Effect	Withdrawal
	<i>Drug</i> +	<i>- Counteracts drug</i>		
January	↑ 		↑ 	
February	↑↑ 	 ↓	↑ 	
March	↑↑↑ 	 ↓	↑ 	
April	↑↑↑↑ 	 ↓	↑ 	
May 1		 ↓		<b>Withdrawal effects</b> 
May 2	↑↑↑↑ 	 ↓	↑↑↑↑ Drug over dose 