

Introduction to Medical Psychology

Lecture 10: Depression and Suicide

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https://youtu.be/4JQG-rNc_NU

Lecture video at above link.

Today: Depression and Suicide

- Mood disorders
 - Unipolar depression + bipolar depression
- Causes and treatments for mood disorders
- Suicide and suicide prevention



Media centre

Depression

Fact sheet

Updated February 2017

Key facts

- Depression is a common mental disorder. Globally, more than 300 million people of all ages suffer from depression.
- Depression is the leading cause of disability worldwide, and is a major contributor to the overall global burden of disease.
- More women are affected by depression than men.
- At its worst, depression can lead to suicide.
- There are effective treatments for depression.

Mood disorders: overview

Mood disorders

Unipolar depressive disorder

- 1) Major depressive disorder
- 2) Dysthymic disorder

Major depressive disorder and dysthymic disorder are two forms of unipolar depressive disorders.

Bipolar depressive disorder

Major depressive episodes
+
Manic episodes

Bipolar depressive disorders are characterized by the occurrence of (cycling through) major depressive and manic episodes.

Major depressive episode

Five or more symptoms present for at least 2 weeks.

The symptoms cause distress (or impairment in social or occupational functioning) and cannot be explained by other conditions (substances/medications, diseases).

- 1) **Depressed mood most of the day (nearly every day)**
- 2) **Diminished interest/pleasure in activities**
- 3) Weight loss or gain
- 4) Insomnia or hypersomnia (too little or too much sleep)
- 5) Psychomotor agitation or retardation
- 6) Fatigue / loss of energy
- 7) Feelings of worthlessness / guilt
- 8) Cognitive / concentration difficulties, indecisiveness
- 9) Thoughts of death, suicidal ideation (imagining suicide)

Points 1 and 2 are main symptoms and one of them has to present for a diagnosis of a major depressive episode.

Manic episode

A distinct period of abnormally and persistently **elevated, expansive, or irritable mood**.

+ Persistently **increased goal-directed activity or energy** (for more than 1 week).

The symptoms cause distress (or impairment in social or occupational functioning) and cannot be explained by other conditions (substances/medications, diseases).

Three or more of the following symptoms:

- 1) Inflated self-esteem or grandiosity
- 2) Decreased need for sleep
- 3) Talkative (more than usual)
- 4) Flight of ideas
- 5) Distractibility
- 6) Increase in goal-directed activity or psychomotor agitation
- 7) Excessive involvement in activities with high potential of painful consequences (excessive spending, sexual indiscretions, or foolish business investments)

Major depressive disorder *versus* Dysthymic disorder

Dysthymic disorder (persistent depressive disorder) is a unipolar depressive disorder mild to moderate in its intensity (compared to major depressive disorder).

Main characteristic is its persistence with depressive mood for more days than not, for at least 2 years.

Periods of normal mood may occur but usually last only a few days or weeks.

Beck's depression inventory

1. Sadness 0: I do not feel sad. - 3: I am so sad I can't stand it.

2. Hopelessness 0: I am not particularly discouraged about the future - 3: I think the future is hopeless and things cannot improve.

4. Satisfaction 0: I get as much satisfaction as I used to. - 3: I am dissatisfied or bored with everything.

9. Suicidal thoughts or wishes 0: I don't have any thoughts of killing myself. - 3 I would kill myself if I had the chance.

10. Crying 0: I don't cry any more than usual. - 2: I cry all the time - 3: I used to be able to cry, but now I can't cry even though I want to.

13. Decisiveness 0: I make decisions as well as I ever could. - 3: I can't make decisions at all anymore.

16. Sleep 0: I can sleep as well as usual. - 3: I wake up several hours earlier than I used to and cannot get back to sleep.

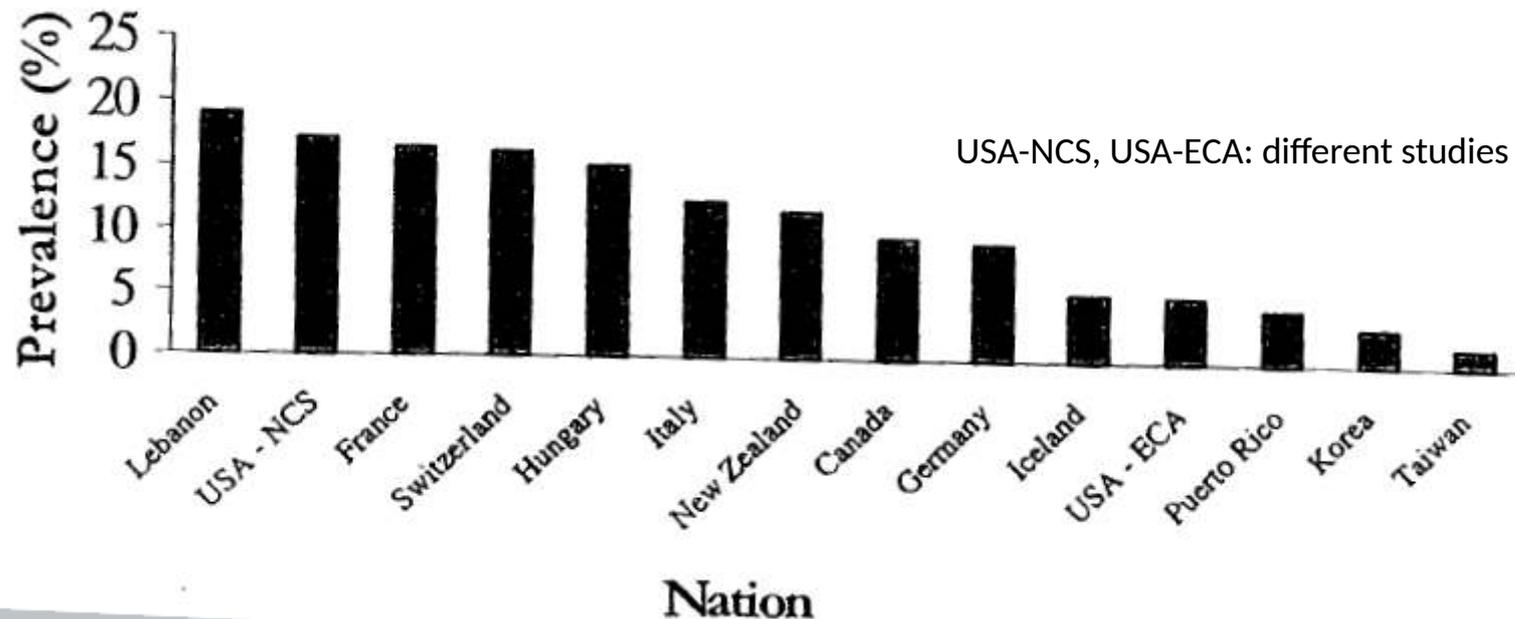
21. Sex drive 0: I have not noticed any recent change in my interest in sex. - 3: I have lost interest in sex completely.

Prevalence of mood disorders

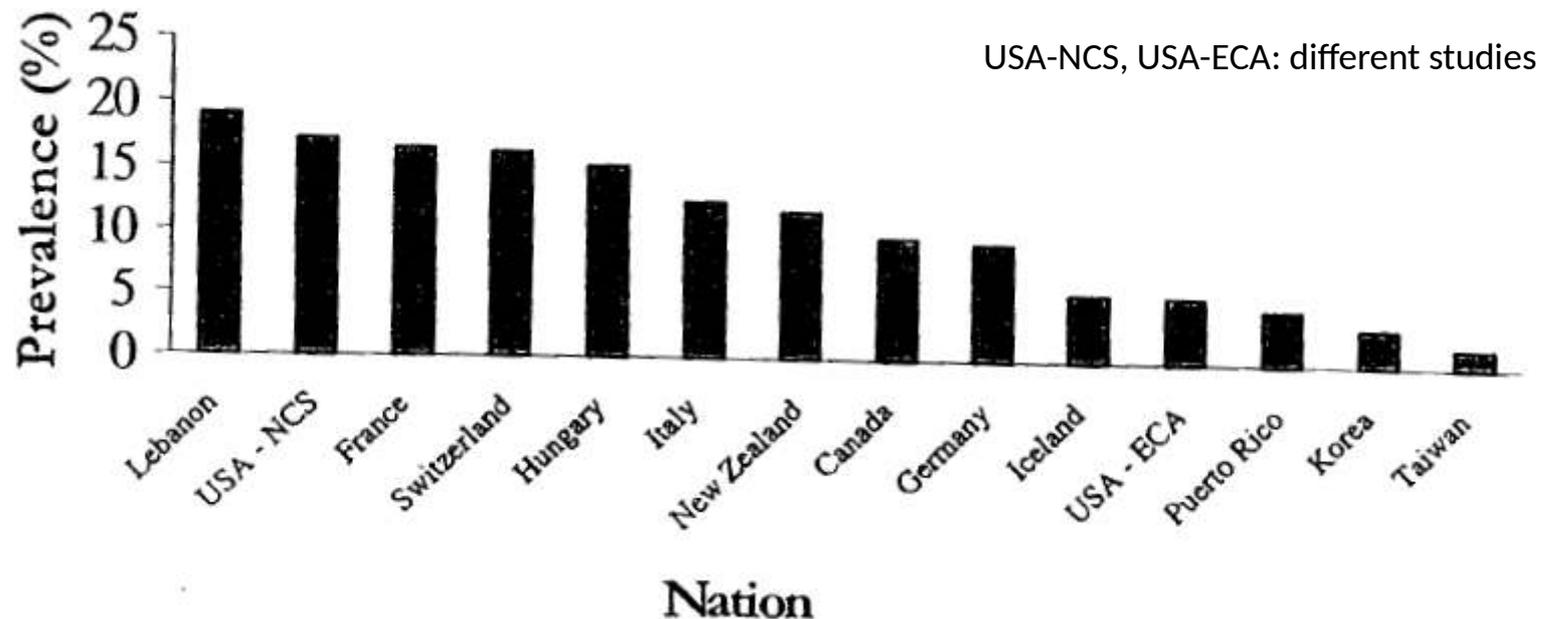
Major depressive disorder occurs with a lifetime prevalence of ~17% (USA), i.e., the probability that someone will develop with major depressive disorder at least one in their life is 17%.

Occurrence of major depressive disorder is more common in women than men (2:1).

There are differences across cultures in lifetime prevalence, e.g. 1.5% in Japan, 2.5% in China, 17% in USA (Tsai and Chentsova-Dutton, 2002):



Prevalence of mood disorders



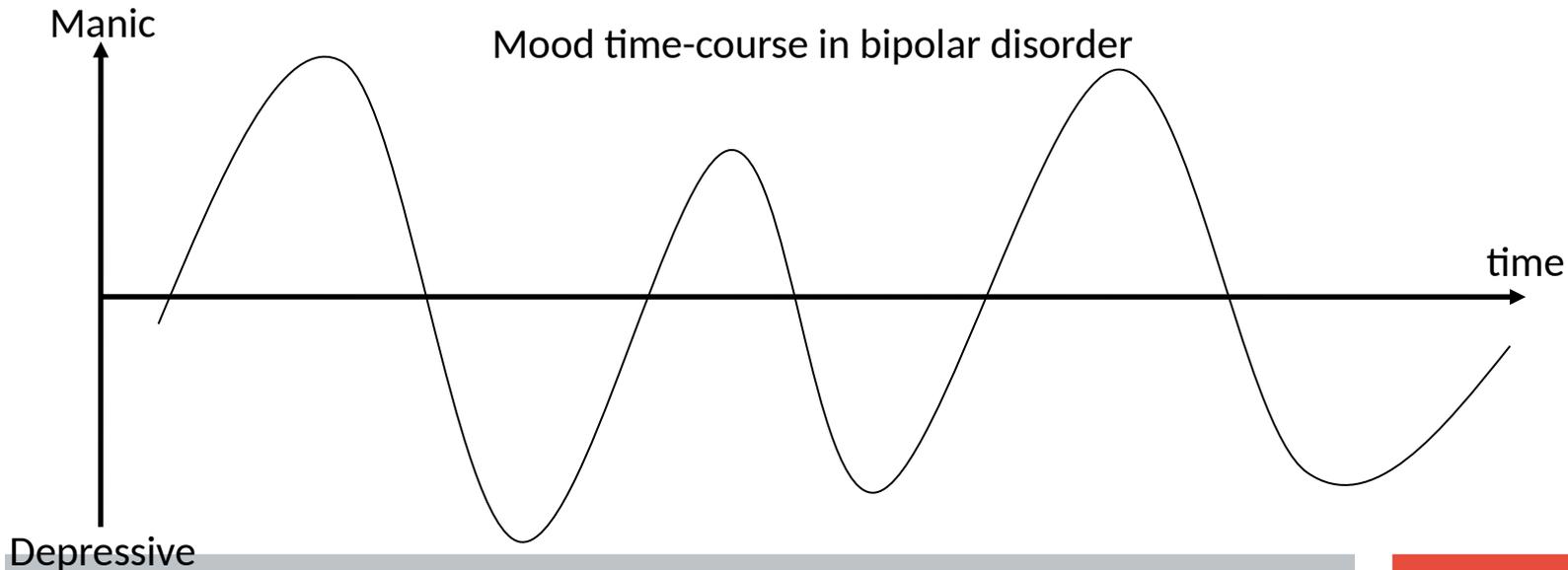
A more recent study found lifetime prevalence of 6.6% Japan, 6.5% in China (part), 9.9% in Germany, and 19.2% in the USA (Kessler and Bromet, 2013).

Prevalence of mood disorders

Dysthymic disorder (persistent depressive disorder) has an estimated lifetime prevalence of ~2.5-6%.

Bipolar depressive disorder is rarer than major depressive disorder, estimates of lifetime prevalence are ~2-3% (USA).

Bipolar depressive disorder occurs equally often in women and men.



Causes of mood disorders

Biological factors

- Genetic influences

- Neurotransmitter involvement (Norepinephrine, Serotonin)

- Neurotransmitter involvement in bipolar disorder
(Dopamine, Norepinephrine, Serotonin)

Psychological factors

- Depressogenic schemas (thinking that causes depression)

- Learned Helplessness

Inheritance of depression

The prevalence of major depressive disorder in blood relatives with clinically diagnosed **unipolar depression** is ~2-3 times higher than in the normal population (Levinson, 2006).

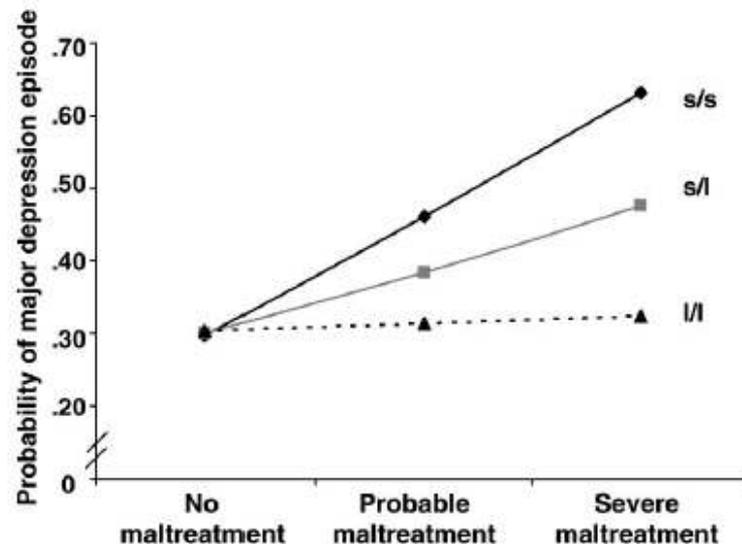
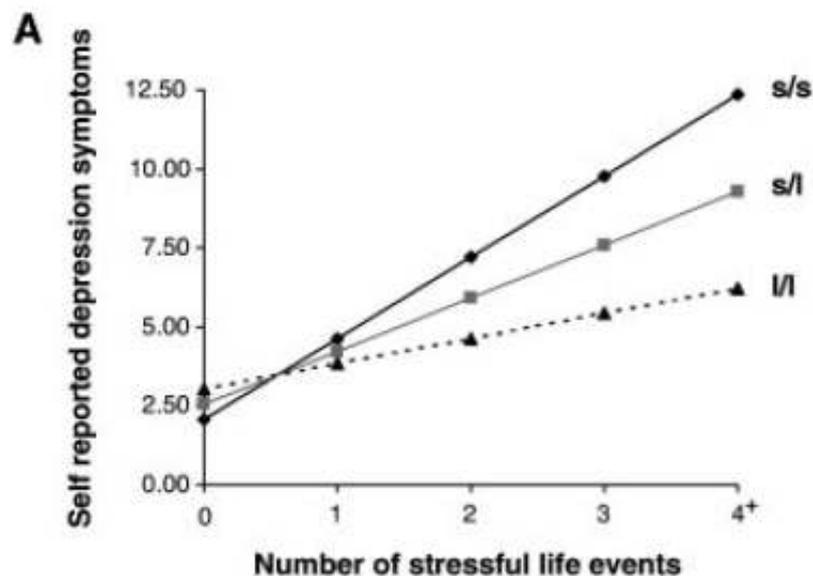
For **bipolar depressive disorder**, genetic contribution seems to be higher, with 8-10% lifetime prevalence for bipolar depressive disorder, relative to 1% (for bipolar I disorder: full manic episodes) in the general population.

Risk for unipolar major depression is also higher in people with relatives having bipolar depressive disorder, but the reverse is not true.

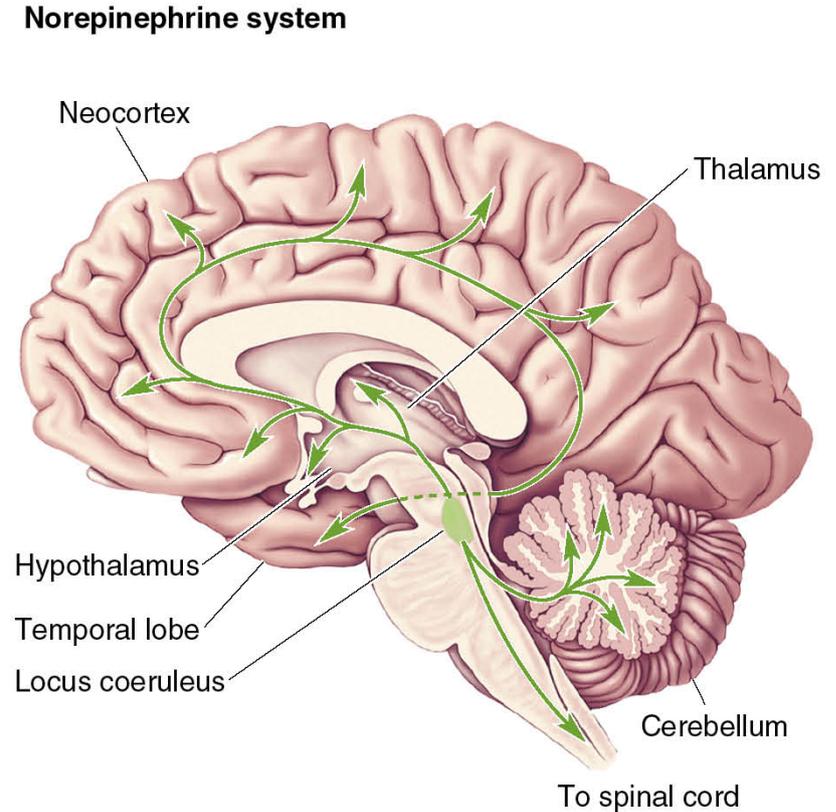
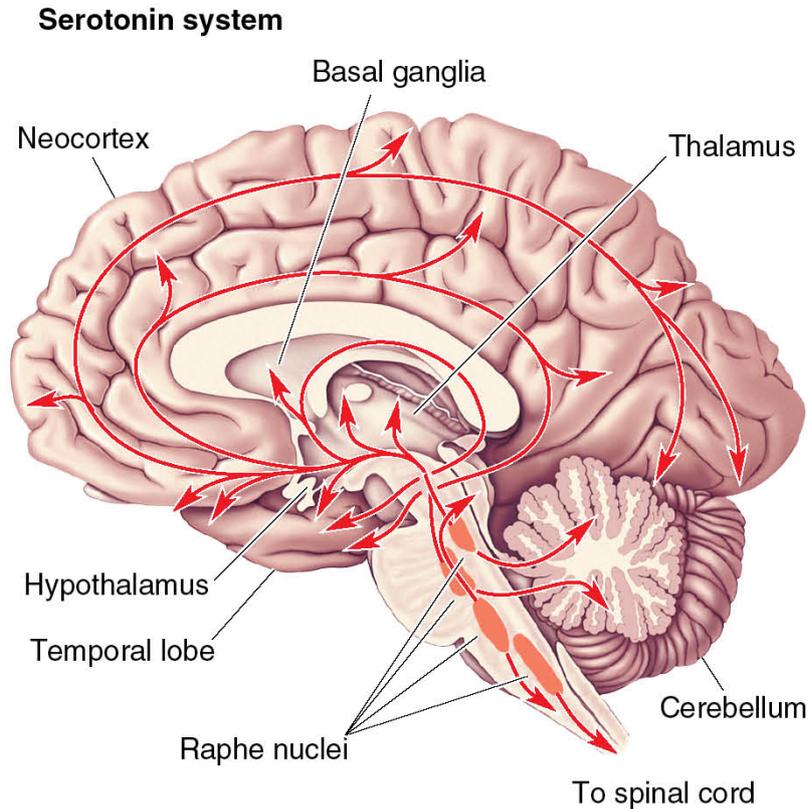
Interaction of genetic and environmental factors

Caspi et al. (Science, 2003) showed an interaction of genetic influence (polymorphisms of serotonin transporter genes: s/s, s/l, l/l) and the number of stressful life events. A particular form of the gene (s/s) in combination with many stressful life events (between ages 21-26; employment, financial, health, or relationship problems), led to higher risk of depression. The combination s/s polymorphism and severe childhood maltreatment (age 3-11) also led to higher depression risk.

The study was a prospective cohort study, following and testing ~1000 children from New Zealand from age 3 to 26.

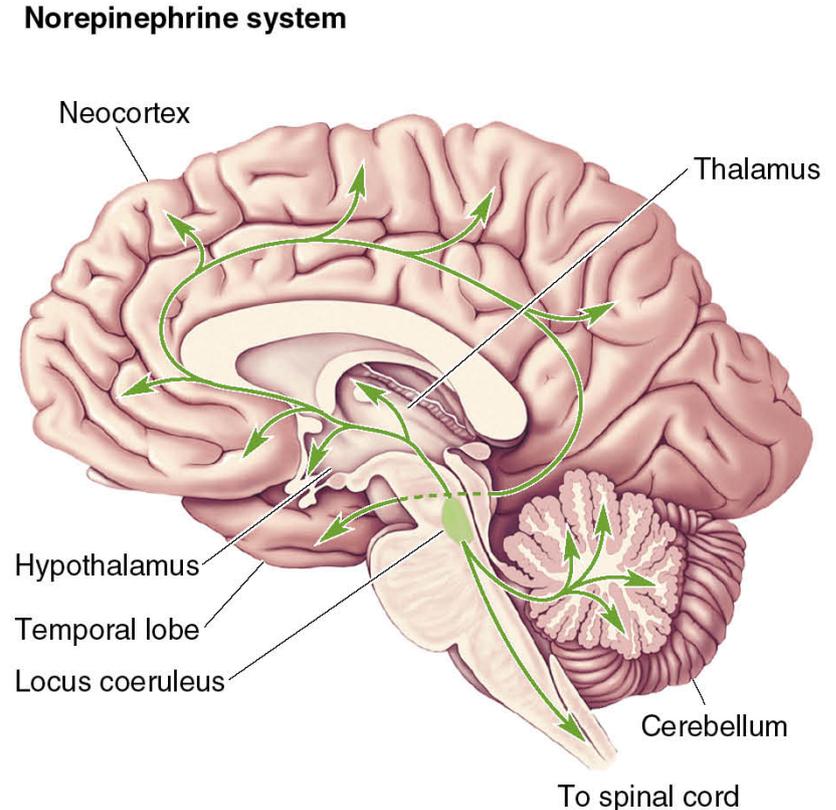
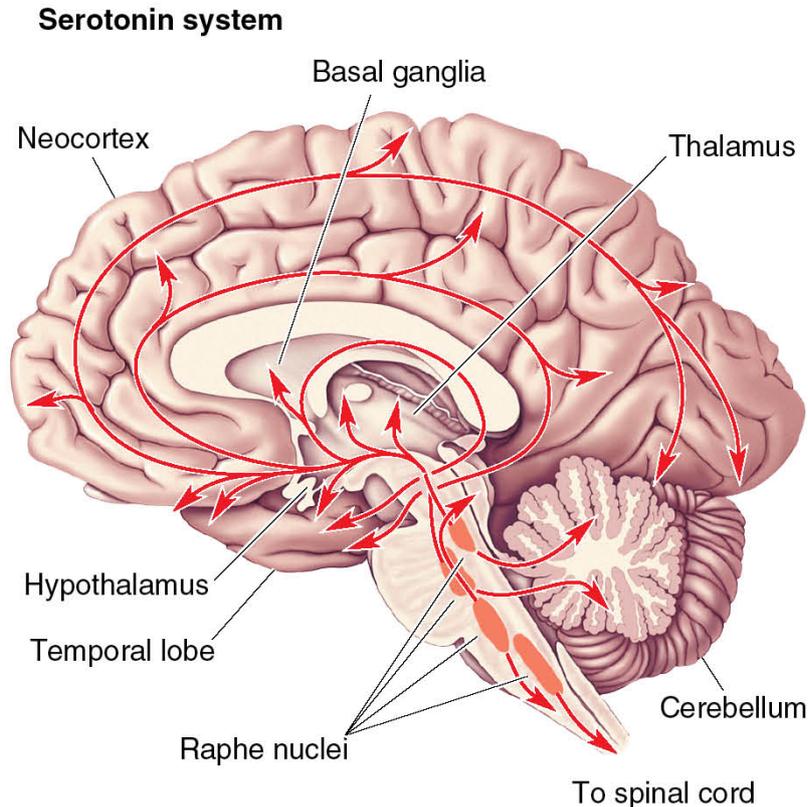


Neurotransmitters and depression



Drugs that affect serotonin (5-HT: 5-hydroxytryptamine) and norepinephrine (NE) systems in the brain can cause depression or elevate mood.

Neurotransmitters and depression



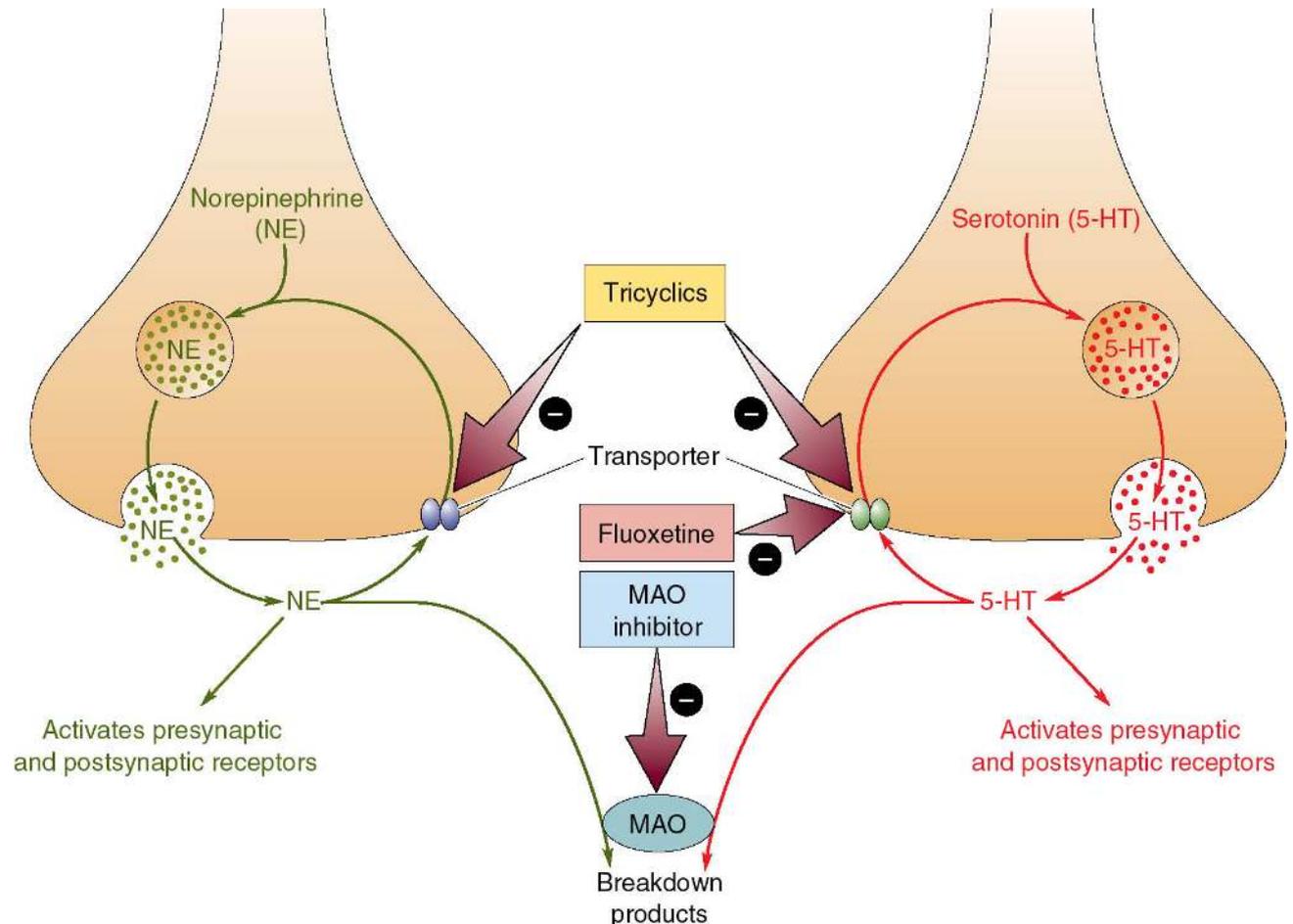
Serotonin and norepinephrine are neurotransmitters that project from brain stem nuclei (serotonin: Raphe nuclei; norepinephrine: locus coeruleus) to various sites throughout the brain. They form an ascending reticular activating system controlling sleep and wakefulness (see class 5: sleep).

Anti-depressive medication

Current antidepressants affect the metabolism of serotonin (5-HT: 5-hydroxytryptamine) or norepinephrine (NE):

Tricyclics (imipramine: Tofranil) inhibit reuptake of NE and 5-HT into the synapse.

That means, NE and 5-HT stay longer in the space between synapses, leading to more activation of the post-synaptic neuron.

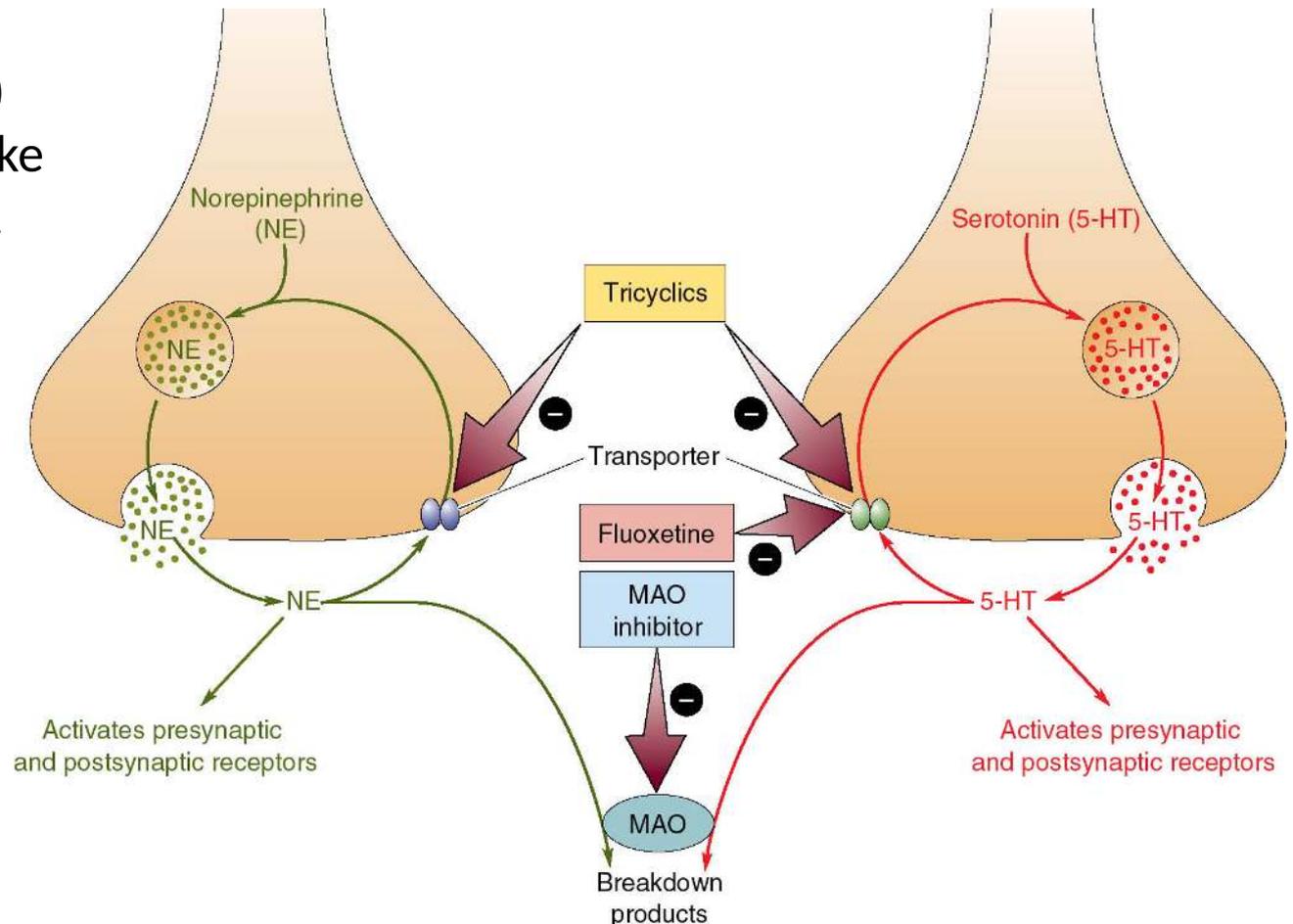


Anti-depressive medication

Current antidepressants affect the metabolism of serotonin (5-HT) or norepinephrine (NE):

SSRIs (fluoxetine: Prozac) selectively inhibit reuptake of 5-HT into the synapse.

SSRI: selective serotonin reuptake inhibitor

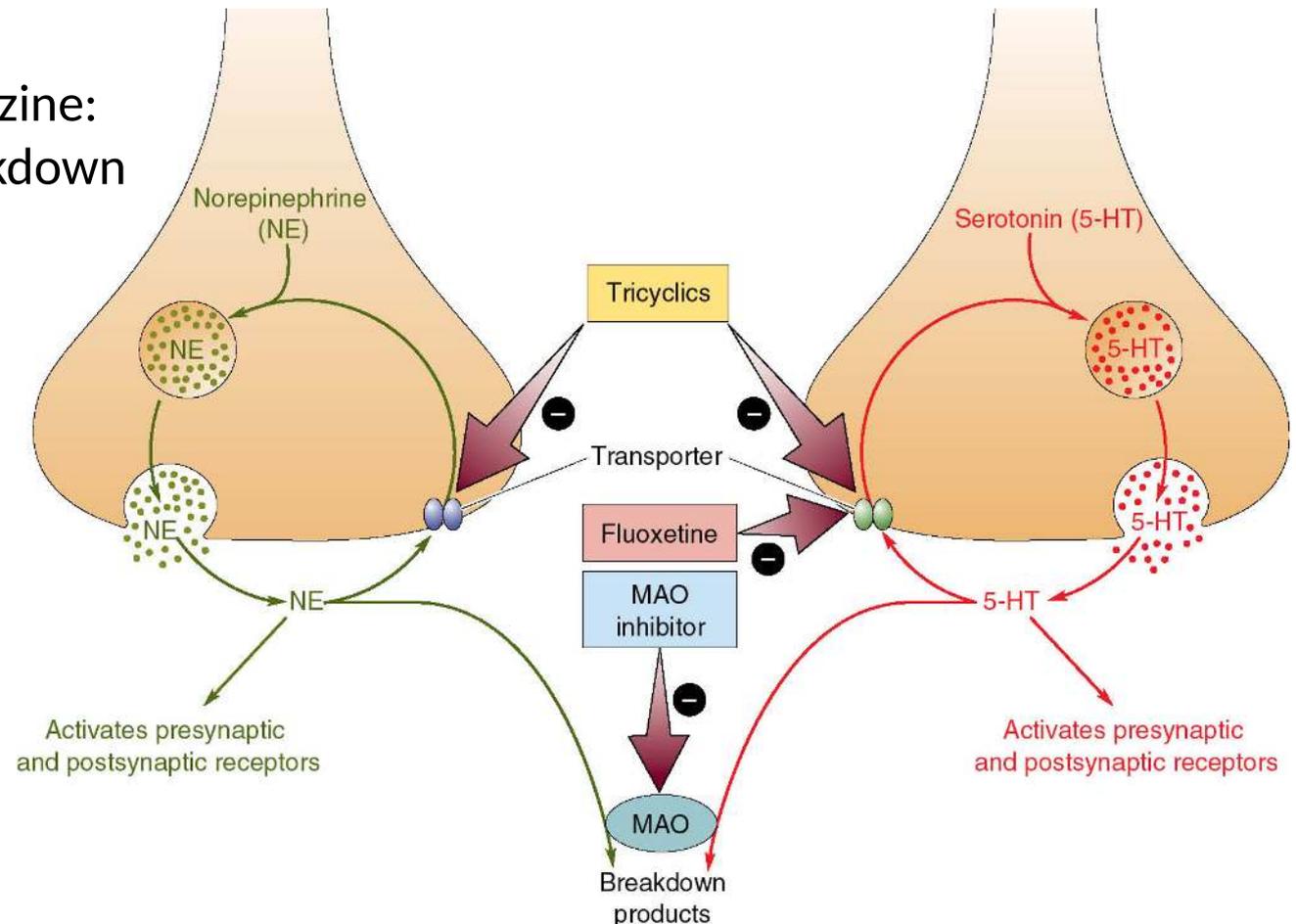


Anti-depressive medication

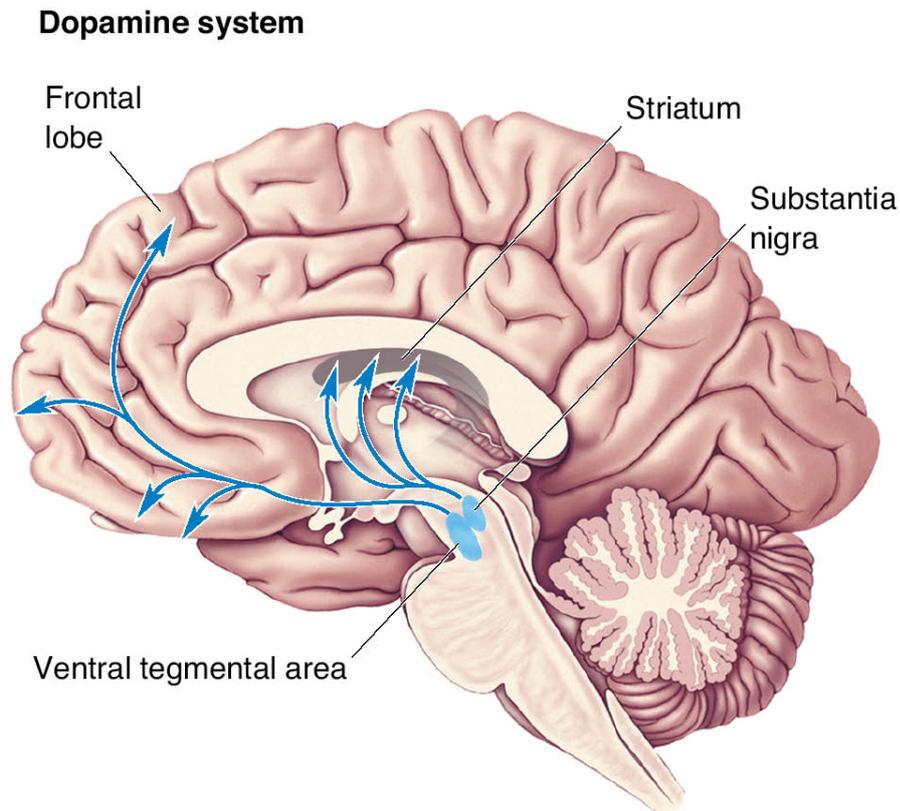
Current antidepressants affect the metabolism of serotonin (5-HT) or norepinephrine (NE):

MAO inhibitors (phenelzine: Nardil) inhibit the breakdown of 5-HT and NE.

MAO: monoamine oxidase (NE and 5-HT are monoamines)



Neurotransmitters and bipolar disorder

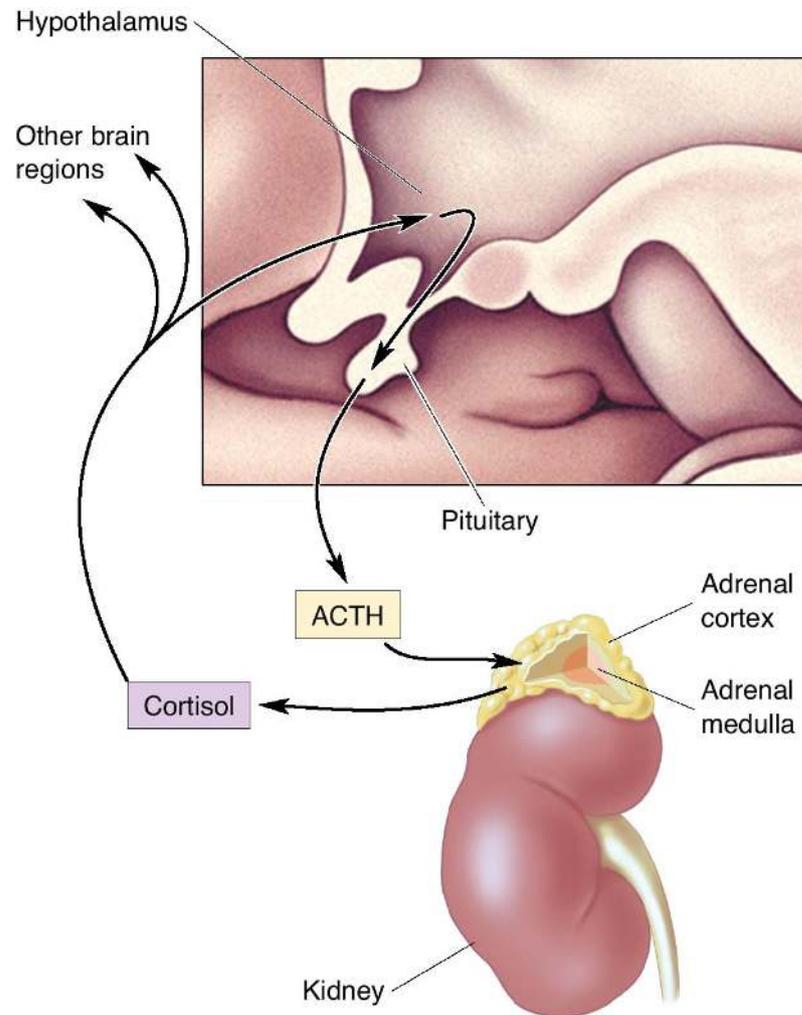


During a manic episode, norepinephrine levels are elevated, but serotonin levels are low in both manic and depressive phases.

Lithium is helpful in attenuating manic episodes and has been shown to affect the **dopamine** neurotransmitter system (blue).

In particular the pathway from the ventral tegmental area to frontal cortex is called “reward system” and is also stimulated by cocaine or amphetamines. Stimulation with these drugs leads to manic-like behavior.

Cortisol and mood disorders



Blood cortisol levels are elevated during major depressive episodes (both in unipolar and bipolar depression).

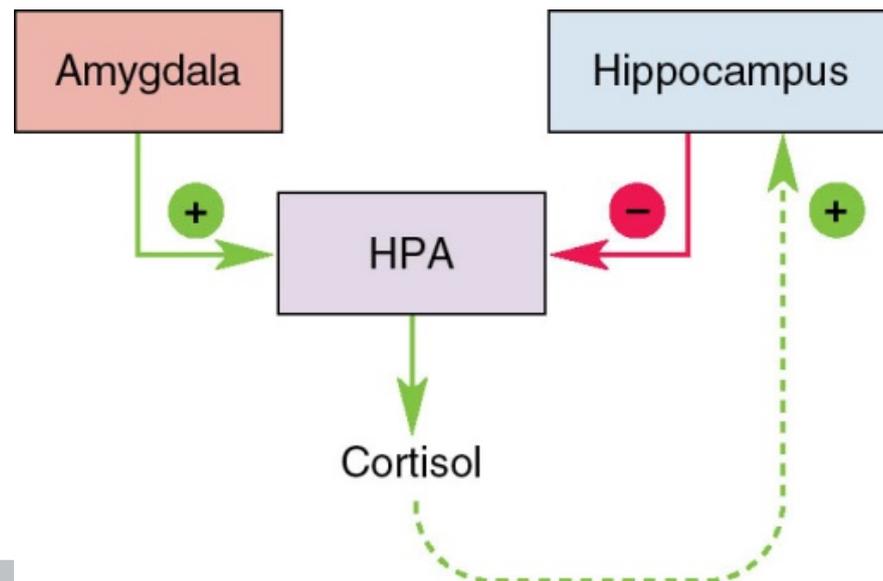
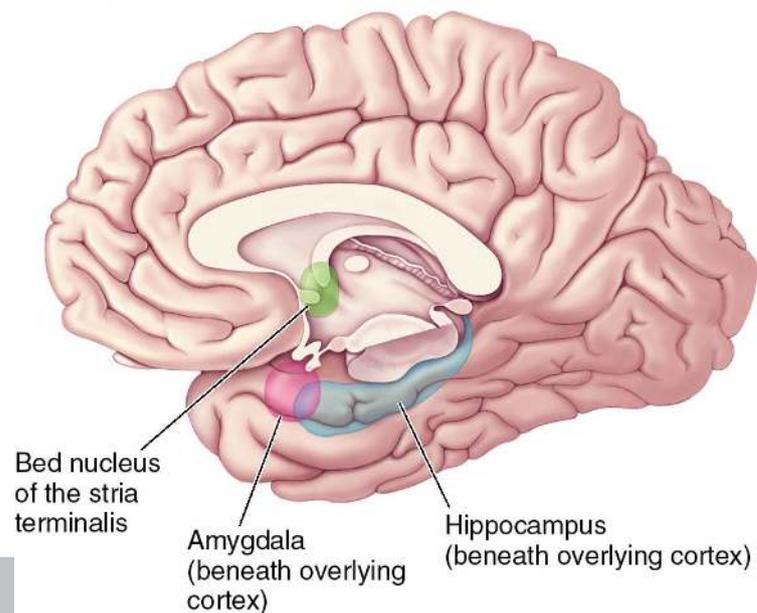
Remember: Blood-borne cortisol can enter the brain and will inhibit the release of CRH (corticotropin releasing hormone) from hypothalamus (negative feedback) which in turn suppresses ACTH (adreno-corticotrophic hormone) secretion from the pituitary gland.

This feedback mechanism seems to be impaired in depressive patients.

The HPA Axis, the hippocampus, and depression

Neurons in the hippocampus have glucocorticoid (cortisol) receptors and these neurons inhibit the HPA axis via the hypothalamus and lessen the secretion of CRH (negative feedback loop).

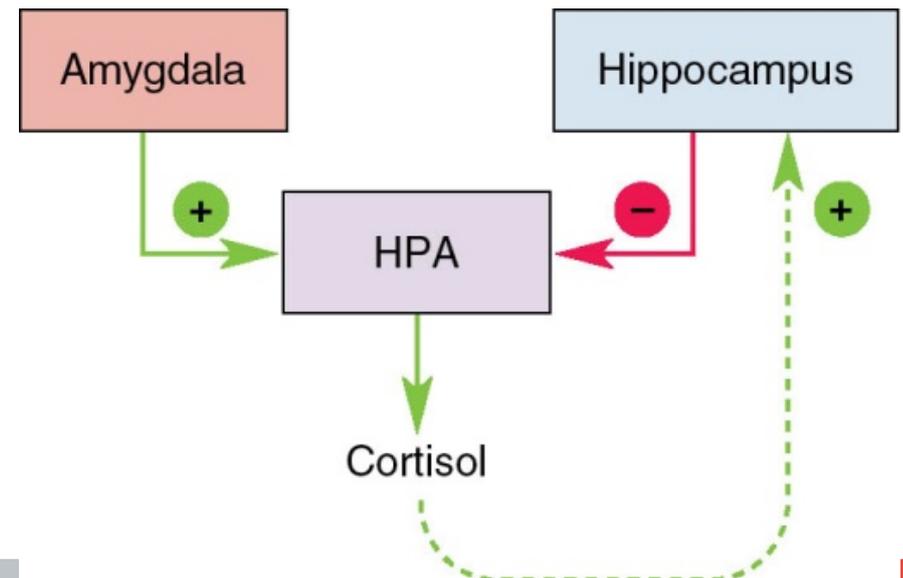
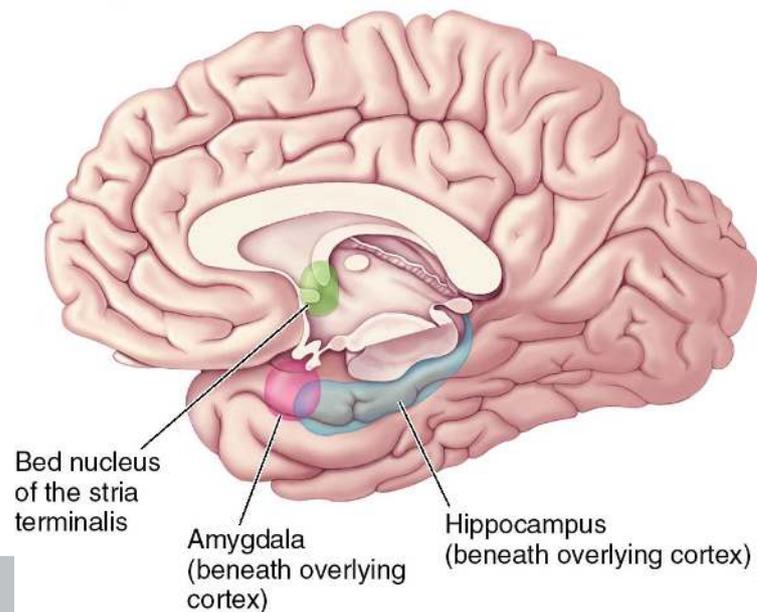
Patients with severe depression show increased blood levels of cortisol, possibly due to a low number of hippocampal glucocorticoid (cortisol) receptors and thus an impaired negative feedback system. Receptor numbers can be affected by traumatic childhood experience: thus childhood trauma can be a risk factor for later occurrence of depression.



The HPA Axis, the hippocampus, and depression

Sustained high levels cortisol can lead to over-excitation and cell death in the hippocampus, an area also important for memory function.

Accordingly, depressive patients with elevated cortisol levels often show memory problems and cognitive impairments.



Beck's cognitive theory

In the late 1960s, Aaron Beck hypothesized that depression is caused by negative cognitions

Early experience

Formation of dysfunctional beliefs

e.g., "If I'm not perfectly successful, then I'm nobody."

Critical Incident

e.g., rejection

Beliefs activated

Negative automatic thoughts

e.g., "I'm ugly/worthless.", "No one loves me.", "It is hopeless."

Depression symptoms

Beck's cognitive theory

Beck also observed cognitive biases in depressive patients that maintain the dysfunctional beliefs:

- All-or-none reasoning: e.g., “I have to get it 100% right or it's not worth trying.”
- Selective abstraction: focus on negative details, e.g., “I didn't have a moment of pleasure today” based on only one negative incident.
- Arbitrary inference: e.g., “I'm a hopeless failure” when scoring low in only one irrelevant university test.

Beck developed Cognitive-Behavioral therapy (CBT) to challenge these dysfunctional beliefs and cognitive biases. It is relatively short (10-20 sessions), focuses on here-and-now problems and teaches the patients to question their own automatic negative thinking.

Cognitive restructuring example



→ **Connie** Connie, a 33-year-old homemaker and mother of a 4-year-old son, Robert, is referred . . . to a psychiatric outpatient program because . . . she has been depressed and unable to concentrate ever since she separated from her husband 3 months previously. Connie left her husband, Donald, after a 5-year marriage. Violent arguments between them, during which Connie was beaten by her husband, had occurred for the last 4 years of their marriage, beginning when she became pregnant with Robert. There were daily arguments during which Donald hit her hard enough to leave bruises on her face and arms. . . .

Before her marriage . . . she was close to her parents [and] had many friends who she also saw regularly In high school she had been a popular cheerleader and a good student. . . . She had no personal history of depression, and there was no family history of . . . mental illness.

During the first year of marriage, Donald became increasingly irritable and critical of Connie. He began to request that Connie stop calling and seeing her friends after work, and refused to allow them or his in-laws to visit their apartment. . . . Despite her misgivings about Donald's behavior toward her, Connie decided to become pregnant. During the seventh month of the pregnancy . . . Donald began complaining [and] began hitting her with his fists. She left him and went to live with her parents for a week. He expressed remorse . . . and . . . Connie returned to her apartment. No further violence occurred until after Robert's birth. At that time, Donald began using cocaine every weekend and often became violent when he was high.

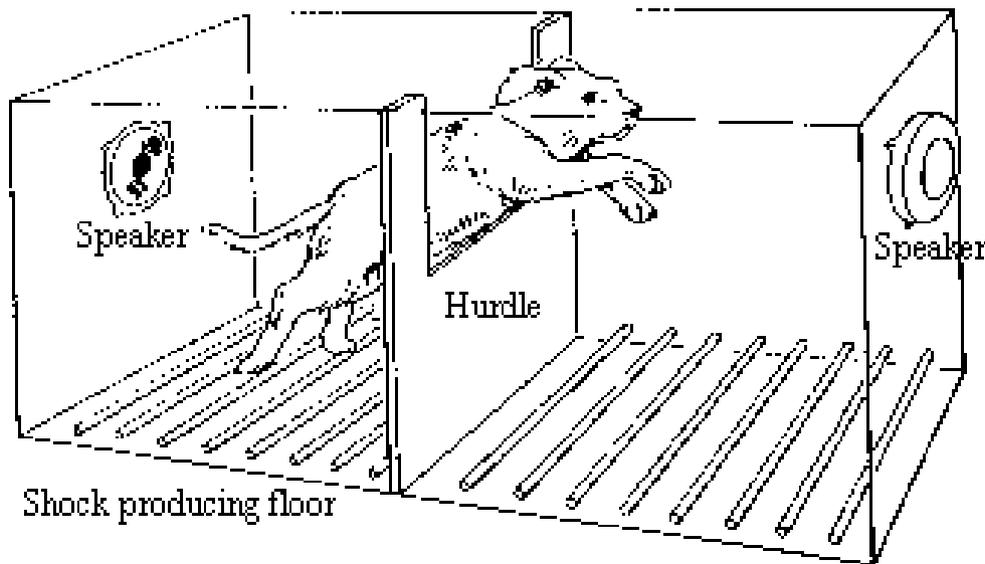
In the 3 months since she left Donald, Connie has become increasingly depressed. Her appetite has been poor and she has lost 10 pounds. She cries a lot and often wakes up at 5:00 A.M. and is unable to get back to sleep. . . . Connie is pale and thin. . . . She speaks slowly, describing her depressed mood and lack of energy. She says that her only pleasure is in being with her son. She is able to take care of him physically but feels guilty because her preoccupation with her own bad feelings prevents her from being able to play with him. She now has no contacts other than with her parents and her son. She feels worthless and blames herself for her marital problems, saying that if she had been a better wife, maybe Donald would have been able to give up the cocaine. . . .

Source: Adapted with permission from *DSM-IV-TR Casebook: A Learning Companion to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (Copyright © 2002). American Psychiatric Association.

Learned helplessness

Another psychological theory of depression is based on the concept of learned helplessness (Martin Seligman, 1972). In experiments with dogs, he showed that dogs that were exposed to conditions in which they had no control over aversive effects learnt that they are “helpless”.

Seligman's Learned Helplessness



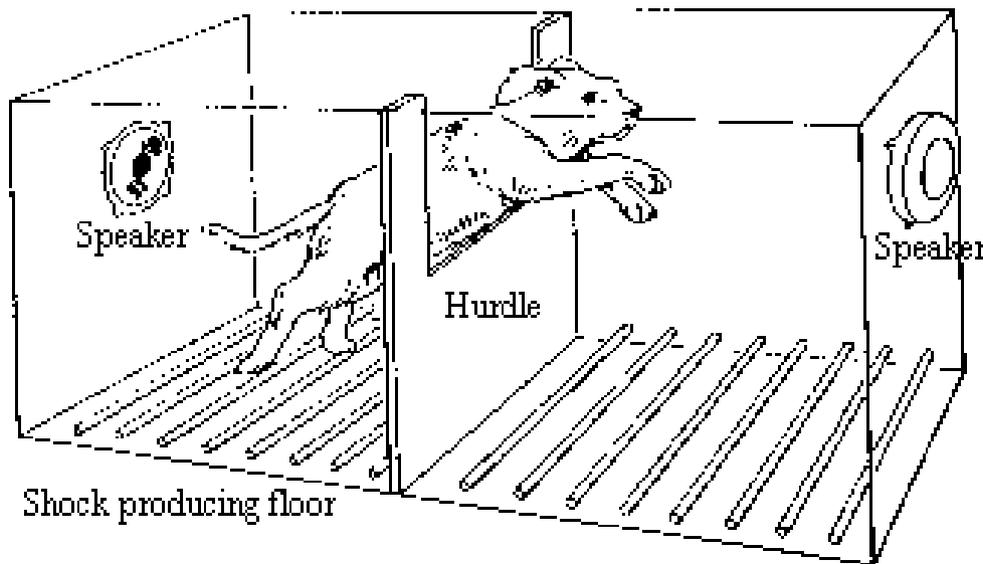
The experiments consisted of two parts:

- 1) Learning helplessness**
- 2) Testing the learned helplessness in a shuttle box (see left)**

Learned helplessness

1) Learning helplessness: Dogs were divided in groups and put into a harness. One group received electro shocks at random but could end them by pressing a lever. Another group (helpless) was yoked to these shocks, i.e. they received the same shocks but these seemed to end randomly (by lever presses of the other group's dogs).

Seligman's Learned Helplessness



2) Then the dogs were put into a shuttle box: electric shocks were announced by a sound and by jumping over the hurdle, the dogs could escape these shocks.

The “helpless dogs” were passive and did not try to escape, whereas the dogs that had control before, learned to evade the shocks.

Learned helplessness

Seligman (1972) used “directive therapy” to get the dogs with learned helplessness to learn that they can “change their fate”: forcible exposure to the fact that the shock can be evaded by crossing into the other compartment. He also emphasized the importance of prevention, so that helplessness is not learnt in the first place.

The concept of learned helplessness is also used for testing animal models of depression in the tail-suspension test: rats that are suspended from a rope struggle less if they are in a state of learned hopelessness. Anti-depressants will improve their “depression” and make them struggle more.



Suicide and suicide attempts

It is estimated that about 50-90% of suicides occur during a depressive episodes.

Patients with recurrent depressive episodes have 15% lifetime risk to commit suicide.

Completed suicides are distinguished from suicide attempts (much more frequent than completed suicides).

Which of the following countries do you think to have the highest/lowest suicide rate?

Japan, Germany, USA, South Korea, Lithuania, China

Differences in suicide rates by country

Japan: 18.5 /100,000/year (2012), it was 20.9 in 2011

Germany: 9.2 (2012)

USA: 12.1 (2012)

South Korea: 28.9 (2012)

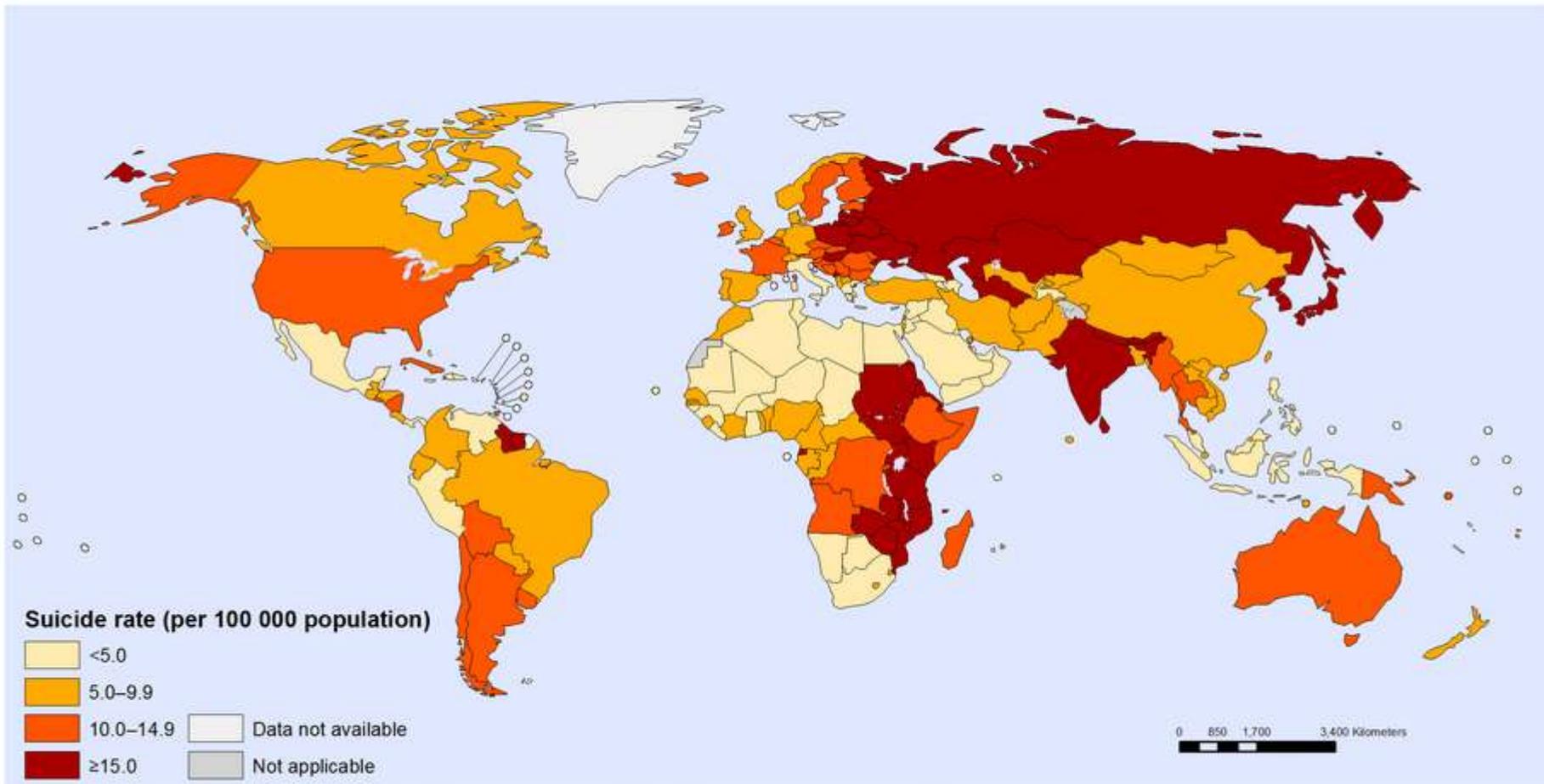
Lithuania: 28.2 (2012)

China: 7.8 (2012)

Source: WHO

Suicide rates by country

Age-standardized suicide rates (per 100 000 population), both sexes, 2012



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Health Statistics and Information Systems (HSI)
World Health Organization



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Suicide rate by sex (male:female ratio)

Male-to-female ratio

| | |
|---------------------|-------------------|
| Japan: | 2.7 (Male:Female) |
| Germany: | 3.5 |
| USA: | 3.7 |
| South Korea: | 2.3 |
| Lithuania: | 6.1 |
| China: | 0.8 |

Source: WHO

Suicide attempts occur three times more often in women compared to men (USA).

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Summary: Depression/Suicide

Depression and suicide

- Mood disorders

 - Unipolar depression: Major depressive disorder, dysthymic disorder

 - Bipolar depression: Major depressive + manic episodes

- Causes and treatments for mood disorders

 - Inheritance, Interaction of genes & environment

 - Norepinephrine, serotonin neurotransmitter systems

 - elevated cortisol (stress hormone)

 - Negative dysfunctional beliefs

 - Learned helplessness

- Suicide and suicide prevention