Topic Fight or flight response

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The **fight-or-flight response** (also called **hyperarousal**, or the **acute stress response**) is a physiological reaction that occurs in response to a perceived [harmful event](https://en.wikipedia.org/wiki/Psychological_trauma), [attack](https://en.wikipedia.org/wiki/Trauma_(medicine)), or threat to survival.[[1]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Cannon_-_Fight_or_Flight_Response-1) It was first described by [Walter Bradford Cannon](https://en.wikipedia.org/wiki/Walter_Bradford_Cannon).

 His theory states that animals react to threats with a general discharge of the [sympathetic nervous system](https://en.wikipedia.org/wiki/Sympathetic_nervous_system), preparing the animal for fighting or fleeing.[[3]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Jansen_-_Intro_fight_or_flight_physiology-4) More specifically, the [adrenal medulla](https://en.wikipedia.org/wiki/Adrenal_medulla) produces a hormonal cascade that results in the secretion of [catecholamines](https://en.wikipedia.org/wiki/Catecholamines" \o "Catecholamines), especially [norepinephrine](https://en.wikipedia.org/wiki/Norepinephrine" \o "Norepinephrine) and [epinephrine](https://en.wikipedia.org/wiki/Epinephrine).[[4]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-5) The hormones [estrogen](https://en.wikipedia.org/wiki/Estrogen), [testosterone](https://en.wikipedia.org/wiki/Testosterone), and [cortisol](https://en.wikipedia.org/wiki/Cortisol), as well as the neurotransmitters [dopamine](https://en.wikipedia.org/wiki/Dopamine) and [serotonin](https://en.wikipedia.org/wiki/Serotonin), also affect how organisms react to stress.[[5]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-6)

This response is recognised as the first stage of the [general adaptation syndrome](https://en.wikipedia.org/wiki/Stress_(biology)#General_adaptation_syndrome) that regulates [stress](https://en.wikipedia.org/wiki/Stress_(biological)) responses among [vertebrates](https://en.wikipedia.org/wiki/Vertebrate) and other [organisms](https://en.wikipedia.org/wiki/Organism).

**Autonomic nervous system**

The autonomic nervous system is a control system that acts largely unconsciously and regulates [heart rate](https://en.wikipedia.org/wiki/Heart_rate), [digestion](https://en.wikipedia.org/wiki/Digestion), [respiratory rate](https://en.wikipedia.org/wiki/Respiratory_rate), [pupillary response](https://en.wikipedia.org/wiki/Pupillary_dilation" \o "Pupillary dilation), [urination](https://en.wikipedia.org/wiki/Micturition), and [sexual arousal](https://en.wikipedia.org/wiki/Sexual_arousal). This system is the primary mechanism in control of the fight-or-flight response and its role is mediated by two different components: the sympathetic nervous system and the parasympathetic nervous system

**Sympathetic nervous system**]

The sympathetic nervous system originates in the [spinal cord](https://en.wikipedia.org/wiki/Spinal_cord) and its main function is to activate the physiological changes that occur during the fight-or-flight response. This component of the autonomic nervous system utilises and activates the release of [norepinephrine](https://en.wikipedia.org/wiki/Norepinephrine" \o "Norepinephrine) in the reaction.[[8]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Autonomic_Nervous_System_-_Chudler-9)

**Parasympathetic nervous system**

The parasympathetic nervous system originates in the sacral spinal cord and [medulla](https://en.wikipedia.org/wiki/Medulla_oblongata), physically surrounding the sympathetic origin, and works in concert with the sympathetic nervous system. Its main function is to activate the "rest and digest" response and return the body to [homeostasis](https://en.wikipedia.org/wiki/Homeostasis) after the fight or flight response. This system utilises and activates the release of the neurotransmitter [acetylcholine](https://en.wikipedia.org/wiki/Acetylcholine).[[8]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Autonomic_Nervous_System_-_Chudler-9)

**Reaction**

The fight-or-flight response

The reaction begins in the [amygdala](https://en.wikipedia.org/wiki/Amygdala" \o "Amygdala), which triggers a neural response in the [hypothalamus](https://en.wikipedia.org/wiki/Hypothalamus). The initial reaction is followed by activation of the [pituitary gland](https://en.wikipedia.org/wiki/Pituitary_gland) and secretion of the hormone [ACTH](https://en.wikipedia.org/wiki/Adrenocorticotropic_hormone).[[9]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-ACTH_Action-10) The [adrenal gland](https://en.wikipedia.org/wiki/Adrenal_gland)is activated almost simultaneously, via the sympathetic nervous system, and releases the hormone [epinephrine](https://en.wikipedia.org/wiki/Epinephrine). The release of chemical messengers results in the production of the hormone [cortisol](https://en.wikipedia.org/wiki/Cortisol" \o "Cortisol), which increases [blood pressure](https://en.wikipedia.org/wiki/Blood_pressure), [blood sugar](https://en.wikipedia.org/wiki/Blood_sugar), and suppresses the [immune system](https://en.wikipedia.org/wiki/Immune_system).[[10]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-physiological_reactions_-_Padgett_&_Glaser-11) The initial response and subsequent reactions are triggered in an effort to create a boost of energy. This boost of energy is activated by epinephrine binding to [liver cells](https://en.wikipedia.org/wiki/Cells_(biology)) and the subsequent production of [glucose](https://en.wikipedia.org/wiki/Glucose).[[11]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Glycogen_Metabolism_-_King-12) Additionally, the circulation of cortisol functions to turn [fatty acids](https://en.wikipedia.org/wiki/Fatty_acids) into available energy, which prepares muscles throughout the body for response.[[12]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Cell_Communication_in_Fight_or_Flight-13) Catecholamine hormones, such as [adrenaline](https://en.wikipedia.org/wiki/Epinephrine)([epinephrine](https://en.wikipedia.org/wiki/Epinephrine)) or [noradrenaline](https://en.wikipedia.org/wiki/Noradrenaline" \o "Noradrenaline) (norepinephrine), facilitate immediate physical reactions associated with a preparation for violent [muscular](https://en.wikipedia.org/wiki/Muscular" \o "Muscular)action and

[Acceleration](https://en.wikipedia.org/wiki/Acceleration) of [heart](https://en.wikipedia.org/wiki/Heart_arrhythmia) and [lung](https://en.wikipedia.org/wiki/Tachypnea) action

* [Paling](https://en.wikipedia.org/wiki/Pallor) or [flushing](https://en.wikipedia.org/wiki/Flushing_(physiology)), or alternating between both
* Inhibition of [stomach](https://en.wikipedia.org/wiki/Stomach) and [upper-intestinal](https://en.wikipedia.org/wiki/Small_intestine) action to the point where [digestion](https://en.wikipedia.org/wiki/Digestion) slows down or stops
* General effect on the [sphincters](https://en.wikipedia.org/wiki/Sphincters) of the body
* [Constriction](https://en.wikipedia.org/wiki/Vasoconstriction) of [blood vessels](https://en.wikipedia.org/wiki/Blood_vessel) in many parts of the body
* [Liberation](https://en.wikipedia.org/wiki/Metabolism) of metabolic energy sources (particularly [fat](https://en.wikipedia.org/wiki/Adipose_tissue) and [glycogen](https://en.wikipedia.org/wiki/Glycogen)) for muscular action
* [Dilation](https://en.wikipedia.org/wiki/Vasodilation) of blood vessels for muscles
* Inhibition of the [lacrimal gland](https://en.wikipedia.org/wiki/Lacrimal_gland" \o "Lacrimal gland) (responsible for [tear](https://en.wikipedia.org/wiki/Tears) production) and [salivation](https://en.wikipedia.org/wiki/Salivation)
* [Dilation of pupil](https://en.wikipedia.org/wiki/Pupillary_response) ([mydriasis](https://en.wikipedia.org/wiki/Mydriasis" \o "Mydriasis))
* [Relaxation](https://en.wikipedia.org/wiki/Muscle_contraction#Smooth_muscle_contraction) of [bladder](https://en.wikipedia.org/wiki/Urinary_bladder)
* [Inhibition](https://en.wikipedia.org/wiki/Erectile_dysfunction#Pathophysiology) of [erection](https://en.wikipedia.org/wiki/Erection)
* [Auditory exclusion](https://en.wikipedia.org/wiki/Auditory_exclusion) ([loss of hearing](https://en.wikipedia.org/wiki/Hearing_loss))
* [Tunnel vision](https://en.wikipedia.org/wiki/Tunnel_vision) (loss of [peripheral vision](https://en.wikipedia.org/wiki/Peripheral_vision))
* Disinhibition of spinal [reflexes](https://en.wikipedia.org/wiki/Reflex)
* [Shaking](https://en.wikipedia.org/wiki/Tremor).

**Function of physiological changes**]

The physiological changes that occur during the fight or flight response are activated in order to give the body increased strength and speed in anticipation of fighting or running. Some of the specific physiological changes and their functions include:[[14]](https://en.wikipedia.org/wiki/Fight-or-flight_response" \l "cite_note-Physiological_Changes_-_Tripod-15)[[15]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-The_Science_of_Stress_-_Olpin-16)

* Increased [blood flow](https://en.wikipedia.org/wiki/Blood_flow) to the muscles activated by diverting blood flow from other parts of the body.
* Increased blood pressure, heart rate, blood sugars, and fats in order to supply the body with extra energy.
* The [blood clotting](https://en.wikipedia.org/wiki/Coagulation) function of the body speeds up in order to prevent [excessive blood loss](https://en.wikipedia.org/wiki/Bleeding) in the event of an injury sustained during the response.
* Increased [muscle tension](https://en.wikipedia.org/wiki/Muscle_tone) in order to provide the body with extra speed and strength.

Emotional components

**Emotion regulation**]

In the context of the fight or flight response, emotional regulation is used proactively to avoid threats of stress or to control the level of emotional arousal.

**Emotional reactivity**

During the reaction, the intensity of emotion that is brought on by the stimulus will also determine the nature and intensity of the behavioral response.[[18]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Emotional_Reactivity_-_Avero-19) Individuals with higher levels of emotional reactivity may be prone to [anxiety](https://en.wikipedia.org/wiki/Anxiety) and [aggression](https://en.wikipedia.org/wiki/Aggression), which illustrates the implications of appropriate emotional reaction in the fight or flight response.

Cognitive components

**Content specificity**

The specific components of cognitions in the fight or flight response seem to be largely negative. These negative cognitions may be characterised by: attention to negative stimuli, the perception of ambiguous situations as negative, and the recurrence of recalling negative words.[[21]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Content_specificity_-_Reid-22) There also may be specific negative thoughts associated with emotions commonly seen in the reaction.

**Perception of control**[

[Perceived control](https://en.wikipedia.org/wiki/Perceived_control) relates to an individual's thoughts about control over situations and events.[[23]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Perceived_Control_-_Weems-24) Perceived control should be differentiated from actual control because an individual's beliefs about their abilities may not reflect their actual abilities. Therefore, overestimation or underestimation of perceived control can lead to anxiety and aggression

**Social information processing**

The social information processing model proposes a variety of factors that determine behavior in the context of social situations and preexisting thoughts.[[25]](https://en.wikipedia.org/wiki/Fight-or-flight_response#cite_note-Social_Information_Processing_-_Crick-26) The attribution of hostility, especially in ambiguous situations, seems to be one of the most important cognitive factors associated with the fight or flight response because of its implications towards aggression