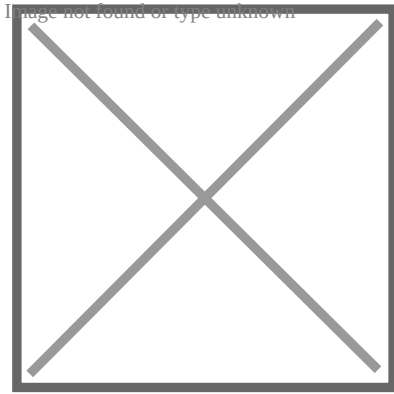




List of cognitive biases

## Description

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**Click on the image to zoom and pan. You can use the mouse-wheel to navigate the image.**

[Open a scrollable version of the application in full-screen modus](#)

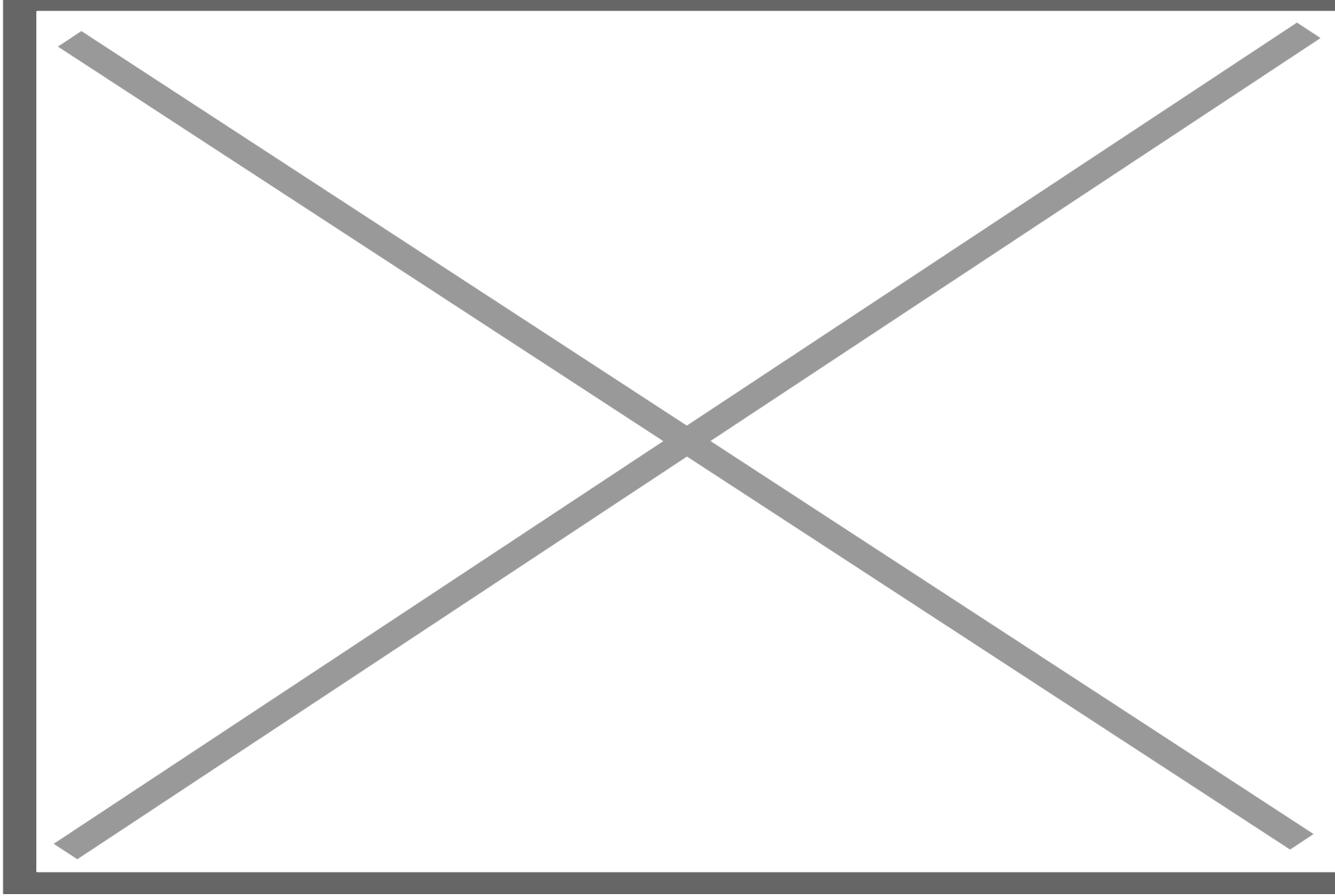
[su\_lightbox src="https://cognitive-liberty.online/cognitive-biases-zoomify/list-of-cognitive-biases.html"]Open Bias Codex in Lightbox[/su\_lightbox]

[cognitive-liberty.online/cognitive-biases-zoomify/list-of-cognitive-biases.html](https://cognitive-liberty.online/cognitive-biases-zoomify/list-of-cognitive-biases.html)

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[wl\_chord]

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## Decision-making, belief, and behavioral biases

Many of these biases affect belief formation, business and economic decisions, and human behavior in general.

| Name                                                | Description                                                                                                                                                                                                            |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Ambiguity effect</a>                    | The tendency to avoid options for which missing information makes the probability seem "unknown". <a href="#">[10]</a>                                                                                                 |
| <a href="#">Anchoring</a> or focalism               | The tendency to rely too heavily, or "anchor", on one trait or piece of information when making decisions (usually the first piece of information acquired on that subject). <a href="#">[11]</a> <a href="#">[12]</a> |
| <a href="#">Anthropocentric thinking</a>            | The tendency to use human analogies as a basis for reasoning about other, less familiar, biological phenomena. <a href="#">[13]</a>                                                                                    |
| <a href="#">Anthropomorphism</a> or personification | The tendency to characterize animals, objects, and abstract concepts as possessing human-like traits, emotions, and intentions. <a href="#">[14]</a>                                                                   |
| <a href="#">Attentional bias</a>                    | The tendency of perception to be affected by recurring thoughts. <a href="#">[15]</a>                                                                                                                                  |

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|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Automation bias</a>                           | The tendency to depend excessively on automated systems which can lead to erroneous automated information overriding correct decisions.[16]                                                                                      |
| <a href="#">Availability heuristic</a>                    | The tendency to overestimate the likelihood of events with greater "availability" in memory, which can be influenced by how recent the memories are or how unusual or emotionally charged they may be.[17]                       |
| <a href="#">Availability cascade</a>                      | A self-reinforcing process in which a <a href="#">collective belief</a> gains more and more plausibility through its increasing repetition in public discourse (or "repeat something long enough and it will become true").[18]  |
| <a href="#">Backfire effect</a>                           | The reaction to disconfirming evidence by strengthening one's previous beliefs.[19] cf. <a href="#">Continued influence effect</a> .                                                                                             |
| <a href="#">Bandwagon effect</a>                          | The tendency to do (or believe) things because many other people do (or believe) the same. Related to <a href="#">groupthink</a> and <a href="#">herd behavior</a> . [20]                                                        |
| <a href="#">Base rate fallacy</a> or<br>Base rate neglect | The tendency to ignore base rate information (generic, general information) and focus on specific information (information only pertaining to a certain case). [21]                                                              |
| <a href="#">Belief bias</a>                               | An effect where someone's evaluation of the logical strength of an argument is biased by the believability of the conclusion.[22]                                                                                                |
| <a href="#">Ben Franklin effect</a>                       | A person who has performed a favor for someone is more likely to do another favor for that person than they would be if they had <i>received</i> a favor from that person.[23]                                                   |
| <a href="#">Berkson's paradox</a>                         | The tendency to misinterpret statistical experiments involving conditional probabilities.[24]                                                                                                                                    |
| <a href="#">Bias blind spot</a>                           | The tendency to see oneself as less biased than other people, or to be able to identify more cognitive biases in others than in oneself.[25]                                                                                     |
| <a href="#">Bystander effect</a>                          | The tendency to think that others will act in an emergency situation.[26]                                                                                                                                                        |
| <a href="#">Choice-supportive bias</a>                    | The tendency to remember one's choices as better than they actually were. [27]                                                                                                                                                   |
| <a href="#">Clustering illusion</a>                       | The tendency to overestimate the importance of small runs, streaks, or clusters in large samples of random data (that is, seeing phantom patterns).[12]                                                                          |
| <a href="#">Confirmation bias</a>                         | The tendency to search for, interpret, focus on and remember information in a way that confirms one's preconceptions.[28]                                                                                                        |
| <a href="#">Congruence bias</a>                           | The tendency to test hypotheses exclusively through direct testing, instead of testing possible alternative hypotheses.[12]                                                                                                      |
| <a href="#">Conjunction fallacy</a>                       | The tendency to assume that specific conditions are more probable than general ones.[29]                                                                                                                                         |
| <a href="#">Conservatism (belief revision)</a>            | The tendency to <a href="#">revise one's belief</a> insufficiently when presented with new evidence.[5][30][31]                                                                                                                  |
| <a href="#">Continued influence effect</a>                | The tendency to believe previously learned misinformation even after it has been corrected. Misinformation can still influence inferences one generates after a correction has occurred.[32] cf. <a href="#">Backfire effect</a> |
| <a href="#">Contrast effect</a>                           | The enhancement or reduction of a certain stimulus' perception when compared with a recently observed, contrasting object.[33]                                                                                                   |

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|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Courtesy bias</a>                      | The tendency to give an opinion that is more socially correct than one's true opinion, so as to avoid offending anyone. <a href="#">[34]</a>                                                                                                                                                                                                                                                                                                                |
| <a href="#">Curse of knowledge</a>                 | When better-informed people find it extremely difficult to think about problems from the perspective of lesser-informed people. <a href="#">[35]</a>                                                                                                                                                                                                                                                                                                        |
| <a href="#">Declinism</a>                          | The predisposition to view the past favorably ( <a href="#">rosy retrospection</a> ) and future negatively. <a href="#">[36]</a>                                                                                                                                                                                                                                                                                                                            |
| <a href="#">Decoy effect</a>                       | Preferences for either option A or B change in favor of option B when option C is presented, which is completely dominated by option B (inferior in all respects) and partially dominated by option A. <a href="#">[37]</a>                                                                                                                                                                                                                                 |
| <a href="#">Default effect</a>                     | When given a choice between several options, the tendency to favor the default one. <a href="#">[38]</a>                                                                                                                                                                                                                                                                                                                                                    |
| <a href="#">Denomination effect</a>                | The tendency to spend more money when it is denominated in small amounts (e.g., coins) rather than large amounts (e.g., bills). <a href="#">[39]</a>                                                                                                                                                                                                                                                                                                        |
| <a href="#">Disposition effect</a>                 | The tendency to sell an asset that has accumulated in value and resist selling an asset that has declined in value. <a href="#">[40]</a>                                                                                                                                                                                                                                                                                                                    |
| <a href="#">Distinction bias</a>                   | The tendency to view two options as more dissimilar when evaluating them simultaneously than when evaluating them separately. <a href="#">[41]</a>                                                                                                                                                                                                                                                                                                          |
| <a href="#">Dunning–Kruger effect</a>              | The tendency for unskilled individuals to overestimate their own ability and the tendency for experts to underestimate their own ability. <a href="#">[42]</a>                                                                                                                                                                                                                                                                                              |
| <a href="#">Duration neglect</a>                   | The neglect of the duration of an episode in determining its value. <a href="#">[43]</a>                                                                                                                                                                                                                                                                                                                                                                    |
| <a href="#">Empathy gap</a>                        | The tendency to underestimate the influence or strength of feelings, in either oneself or others. <a href="#">[44]</a>                                                                                                                                                                                                                                                                                                                                      |
| <a href="#">Endowment effect</a>                   | The tendency for people to demand much more to give up an object than they would be willing to pay to acquire it. <a href="#">[45]</a>                                                                                                                                                                                                                                                                                                                      |
| <a href="#">Exaggerated expectation</a>            | Based on the estimates, <a href="#">[clarification needed]</a> real-world evidence turns out to be less extreme than our expectations (conditionally inverse of the conservatism bias). <a href="#">[unreliable source?]</a> <a href="#">[5]</a> <a href="#">[46]</a>                                                                                                                                                                                       |
| <a href="#">Experimenter's or expectation bias</a> | The tendency for experimenters to believe, certify, and publish data that agree with their expectations for the outcome of an experiment, and to disbelieve, discard, or downgrade the corresponding weightings for data that appear to conflict with those expectations. <a href="#">[47]</a>                                                                                                                                                              |
| <a href="#">Focusing effect</a>                    | The tendency to place too much importance on one aspect of an event. <a href="#">[48]</a>                                                                                                                                                                                                                                                                                                                                                                   |
| <a href="#">Forer effect or Barnum effect</a>      | The observation that individuals will give high accuracy ratings to descriptions of their personality that supposedly are tailored specifically for them, but are in fact vague and general enough to apply to a wide range of people. This effect can provide a partial explanation for the widespread acceptance of some beliefs and practices, such as astrology, fortune telling, graphology, and some types of personality tests. <a href="#">[49]</a> |
| <a href="#">Form function attribution bias</a>     | In <a href="#">human–robot interaction</a> , the tendency of people to make systematic errors when interacting with a robot. People may base their expectations and perceptions of a robot on its appearance (form) and attribute functions which do not necessarily mirror the true functions of the robot. <a href="#">[50]</a>                                                                                                                           |

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| <a href="#">Framing effect</a>             | Drawing different conclusions from the same information, depending on how that information is presented. <a href="#">[51]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <a href="#">Frequency illusion</a>         | The illusion in which a word, a name, or other thing that has recently come to one's attention suddenly seems to appear with improbable frequency shortly afterwards (not to be confused with the <a href="#">recency illusion</a> or <a href="#">selection bias</a> ). <a href="#">[52]</a> This illusion is sometimes referred to as the Baader-Meinhof phenomenon. <a href="#">[53]</a>                                                                                                                                                                                                                                                                  |
| <a href="#">Functional fixedness</a>       | Limits a person to using an object only in the way it is traditionally used. <a href="#">[54]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <a href="#">Gambler's fallacy</a>          | The tendency to think that future probabilities are altered by past events, when in reality they are unchanged. The fallacy arises from an erroneous conceptualization of the <a href="#">law of large numbers</a> . For example, "I've flipped heads with this coin five times consecutively, so the chance of tails coming out on the sixth flip is much greater than heads." <a href="#">[55]</a>                                                                                                                                                                                                                                                        |
| <a href="#">Hard–easy effect</a>           | Based on a specific level of task difficulty, the confidence in judgments is too conservative and not extreme enough. <a href="#">[5]</a> <a href="#">[56]</a> <a href="#">[57]</a> <a href="#">[58]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <a href="#">Hindsight bias</a>             | Sometimes called the "I-knew-it-all-along" effect, the tendency to see past events as being predictable <a href="#">[59]</a> at the time those events happened.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <a href="#">Hostile attribution bias</a>   | The "hostile attribution bias" is the tendency to interpret others' behaviors as having hostile intent, even when the behavior is ambiguous or benign. <a href="#">[60]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <a href="#">Hot-hand fallacy</a>           | The "hot-hand fallacy" (also known as the "hot hand phenomenon" or "hot hand") is the belief that a person who has experienced success with a random event has a greater chance of further success in additional attempts.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <a href="#">Hyperbolic discounting</a>     | Discounting is the tendency for people to have a stronger preference for more immediate payoffs relative to later payoffs. Hyperbolic discounting leads to choices that are inconsistent over time – people make choices today that their future selves would prefer not to have made, despite using the same reasoning. <a href="#">[61]</a> Also known as current moment bias, present-bias, and related to <a href="#">Dynamic inconsistency</a> . A good example of this: a study showed that when making food choices for the coming week, 74% of participants chose fruit, whereas when the food choice was for the current day, 70% chose chocolate. |
| <a href="#">Identifiable victim effect</a> | The tendency to respond more strongly to a single identified person at risk than to a large group of people at risk. <a href="#">[62]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <a href="#">IKEA effect</a>                | The tendency for people to place a disproportionately high value on objects that they partially assembled themselves, such as furniture from <a href="#">IKEA</a> , regardless of the quality of the end result. <a href="#">[63]</a>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <a href="#">Illicit transference</a>       | Occurs when a term in the distributive (referring to every member of a class) and collective (referring to the class itself as a whole) sense are treated as equivalent. The two variants of this fallacy are the <a href="#">fallacy of composition</a> and the <a href="#">fallacy of division</a> .                                                                                                                                                                                                                                                                                                                                                      |
| <a href="#">Illusion of control</a>        | The tendency to overestimate one's degree of influence over other external events. <a href="#">[64]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <a href="#">Illusion of validity</a>       | Belief that our judgments are accurate, especially when available information is consistent or inter-correlated. <a href="#">[65]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <a href="#">Illusory correlation</a>                    | Inaccurately perceiving a relationship between two unrelated events. <a href="#">[66]</a> <a href="#">[67]</a>                                                                                                                                                                                                                             |
| <a href="#">Illusory truth effect</a>                   | A tendency to believe that a statement is true if it is <a href="#">easier to process</a> , or if it has been <a href="#">stated multiple times</a> , regardless of its actual veracity. These are specific cases of <a href="#">truthiness</a> .                                                                                          |
| <a href="#">Impact bias</a>                             | The tendency to overestimate the length or the intensity of the impact of future feeling states. <a href="#">[68]</a>                                                                                                                                                                                                                      |
| <a href="#">Information bias</a>                        | The tendency to seek information even when it cannot affect action. <a href="#">[69]</a>                                                                                                                                                                                                                                                   |
| <a href="#">Insensitivity to sample size</a>            | The tendency to under-expect variation in small samples.                                                                                                                                                                                                                                                                                   |
| <a href="#">Irrational escalation</a>                   | The phenomenon where people justify increased investment in a decision, based on the cumulative prior investment, despite new evidence suggesting that the decision was probably wrong. Also known as the sunk cost fallacy.                                                                                                               |
| <a href="#">Law of the instrument</a>                   | An over-reliance on a familiar tool or methods, ignoring or under-valuing alternative approaches. "If all you have is a hammer, everything looks like a nail."                                                                                                                                                                             |
| <a href="#">Less-is-better effect</a>                   | The tendency to prefer a smaller set to a larger set judged separately, but not jointly.                                                                                                                                                                                                                                                   |
| <a href="#">Look-elsewhere effect</a>                   | An apparently statistically significant observation may have actually arisen by chance because of the size of the parameter space to be searched.                                                                                                                                                                                          |
| <a href="#">Loss aversion</a>                           | The disutility of giving up an object is greater than the utility associated with acquiring it. <a href="#">[70]</a> (see also <a href="#">Sunk cost effects</a> and endowment effect).                                                                                                                                                    |
| <a href="#">Mere exposure effect</a>                    | The tendency to express undue liking for things merely because of familiarity with them. <a href="#">[71]</a>                                                                                                                                                                                                                              |
| <a href="#">Money illusion</a>                          | The tendency to concentrate on the nominal value (face value) of money rather than its value in terms of purchasing power. <a href="#">[72]</a>                                                                                                                                                                                            |
| <a href="#">Moral credential effect</a>                 | The tendency of a track record of non-prejudice to increase subsequent prejudice.                                                                                                                                                                                                                                                          |
| <a href="#">Negativity bias</a> or<br>Negativity effect | Psychological phenomenon by which humans have a greater <a href="#">recall</a> of unpleasant memories compared with positive memories. <a href="#">[73]</a> <a href="#">[74]</a> (see also actor-observer bias, <a href="#">group attribution error</a> , positivity effect, and <a href="#">negativity effect</a> ). <a href="#">[75]</a> |
| <a href="#">Neglect of probability</a>                  | The tendency to completely disregard probability when making a decision under uncertainty. <a href="#">[76]</a>                                                                                                                                                                                                                            |
| <a href="#">Normalcy bias</a>                           | The refusal to plan for, or react to, a disaster which has never happened before.                                                                                                                                                                                                                                                          |
| <a href="#">Not invented here</a>                       | Aversion to contact with or use of products, research, standards, or knowledge developed outside a group. Related to <a href="#">IKEA effect</a> .                                                                                                                                                                                         |
| <a href="#">Observer-expectancy effect</a>              | When a researcher expects a given result and therefore unconsciously manipulates an experiment or misinterprets data in order to find it (see also <a href="#">subject-expectancy effect</a> ).                                                                                                                                            |
| <a href="#">Omission bias</a>                           | The tendency to judge harmful actions (commissions) as worse, or less moral, than equally harmful inactions (omissions). <a href="#">[77]</a>                                                                                                                                                                                              |

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|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Optimism bias</a>                 | The tendency to be over-optimistic, overestimating favorable and pleasing outcomes (see also <a href="#">wishful thinking</a> , <a href="#">valence effect</a> , <a href="#">positive outcome bias</a> ).<br>[78][79]                                                                                          |
| <a href="#">Ostrich effect</a>                | Ignoring an obvious (negative) situation.                                                                                                                                                                                                                                                                      |
| <a href="#">Outcome bias</a>                  | The tendency to judge a decision by its eventual outcome instead of based on the quality of the decision at the time it was made.                                                                                                                                                                              |
| <a href="#">Overconfidence effect</a>         | Excessive confidence in one's own answers to questions. For example, for certain types of questions, answers that people rate as "99% certain" turn out to be wrong 40% of the time.<br>[5][80][81][82]                                                                                                        |
| <a href="#">Pareidolia</a>                    | A vague and random stimulus (often an image or sound) is perceived as significant, e.g., seeing images of animals or faces in clouds, the <a href="#">man in the moon</a> , and hearing non-existent <a href="#">hidden messages</a> on <a href="#">records played in reverse</a> .                            |
| <a href="#">Pessimism bias</a>                | The tendency for some people, especially those suffering from <a href="#">depression</a> , to overestimate the likelihood of negative things happening to them.                                                                                                                                                |
| <a href="#">Placebo effect</a>                | The belief that a medication works—even if merely a placebo.                                                                                                                                                                                                                                                   |
| <a href="#">Planning fallacy</a>              | The tendency to underestimate task-completion times.<br>[68]                                                                                                                                                                                                                                                   |
| <a href="#">Post-purchase rationalization</a> | The tendency to persuade oneself through rational argument that a purchase was good value.                                                                                                                                                                                                                     |
| <a href="#">Pro-innovation bias</a>           | The tendency to have an excessive optimism towards an invention or innovation's usefulness throughout society, while often failing to identify its limitations and weaknesses.                                                                                                                                 |
| <a href="#">Projection bias</a>               | The tendency to overestimate how much our future selves share one's current preferences, thoughts and values, thus leading to sub-optimal choices.<br>[83][84][74]                                                                                                                                             |
| <a href="#">Pseudocertainty effect</a>        | The tendency to make risk-averse choices if the expected outcome is positive, but make risk-seeking choices to avoid negative outcomes.<br>[85]                                                                                                                                                                |
| <a href="#">Reactance</a>                     | The urge to do the opposite of what someone wants you to do out of a need to resist a perceived attempt to constrain your freedom of choice (see also <a href="#">Reverse psychology</a> ).                                                                                                                    |
| <a href="#">Reactive devaluation</a>          | Devaluing proposals only because they purportedly originated with an adversary.                                                                                                                                                                                                                                |
| <a href="#">Recency illusion</a>              | The illusion that a phenomenon one has noticed only recently is itself recent. Often used to refer to linguistic phenomena; the illusion that a word or language usage that one has noticed only recently is an innovation when it is in fact long-established (see also <a href="#">frequency illusion</a> ). |
| <a href="#">Regressive bias</a>               | A certain state of mind wherein high values and high likelihoods are overestimated while low values and low likelihoods are underestimated.<br>[5][86]<br>[87] <a href="#">unreliable source?</a>                                                                                                              |
| <a href="#">Restraint bias</a>                | The tendency to overestimate one's ability to show restraint in the face of temptation.                                                                                                                                                                                                                        |
| <a href="#">Rhyme as reason effect</a>        | Rhyming statements are perceived as more truthful. A famous example being used in the O.J Simpson trial with the defense's use of the phrase "If the gloves don't fit, then you must acquit."                                                                                                                  |

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| <a href="#">Risk compensation</a> /<br>Peltzman effect                      | The tendency to take greater risks when perceived safety increases.                                                                                                                                                                                                                                                                                                            |
| <a href="#">Selection bias</a>                                              | The tendency to notice something more when something causes us to be more aware of it, such as when we buy a car, we tend to notice similar cars more often than we did before. They are not suddenly more common – we just are noticing them more. Also called the Observational Selection Bias.                                                                              |
| <a href="#">Selective perception</a>                                        | The tendency for expectations to affect perception.                                                                                                                                                                                                                                                                                                                            |
| <a href="#">Simmelweis reflex</a>                                           | The tendency to reject new evidence that contradicts a paradigm. <a href="#">[31]</a>                                                                                                                                                                                                                                                                                          |
| <a href="#">Sexual overperception bias</a> / sexual<br>underperception bias | The tendency to over-/underestimate sexual interest of another person in oneself.                                                                                                                                                                                                                                                                                              |
| <a href="#">Social comparison bias</a>                                      | The tendency, when making decisions, to favour potential candidates who don't compete with one's own particular strengths. <a href="#">[88]</a>                                                                                                                                                                                                                                |
| <a href="#">Social desirability bias</a>                                    | The tendency to over-report socially desirable characteristics or behaviours in oneself and under-report socially undesirable characteristics or behaviours. <a href="#">[89]</a>                                                                                                                                                                                              |
| <a href="#">Status quo bias</a>                                             | The tendency to like things to stay relatively the same (see also <a href="#">loss aversion</a> , <a href="#">endowment effect</a> , and <a href="#">system justification</a> ). <a href="#">[90]</a> <a href="#">[91]</a>                                                                                                                                                     |
| <a href="#">Stereotyping</a>                                                | Expecting a member of a group to have certain characteristics without having actual information about that individual.                                                                                                                                                                                                                                                         |
| <a href="#">Subadditivity effect</a>                                        | The tendency to judge probability of the whole to be less than the probabilities of the parts. <a href="#">[92]</a>                                                                                                                                                                                                                                                            |
| <a href="#">Subjective validation</a>                                       | Perception that something is true if a subject's belief demands it to be true. Also assigns perceived connections between coincidences.                                                                                                                                                                                                                                        |
| <a href="#">Surrogation</a>                                                 | Losing sight of the strategic construct that a measure is intended to represent, and subsequently acting as though the measure is the construct of interest.                                                                                                                                                                                                                   |
| <a href="#">Survivorship bias</a>                                           | Concentrating on the people or things that "survived" some process and inadvertently overlooking those that didn't because of their lack of visibility.                                                                                                                                                                                                                        |
| <a href="#">Time-saving bias</a>                                            | Underestimations of the time that could be saved (or lost) when increasing (or decreasing) from a relatively low speed and overestimations of the time that could be saved (or lost) when increasing (or decreasing) from a relatively high speed.                                                                                                                             |
| <a href="#">Third-person effect</a>                                         | Belief that mass communicated media messages have a greater effect on others than on themselves.                                                                                                                                                                                                                                                                               |
| <a href="#">Parkinson's law of triviality</a>                               | The tendency to give disproportionate weight to trivial issues. Also known as bikeshedding, this bias explains why an organization may avoid specialized or complex subjects, such as the design of a nuclear reactor, and instead focus on something easy to grasp or rewarding to the average participant, such as the design of an adjacent bike shed. <a href="#">[93]</a> |
| Unit bias                                                                   | The standard suggested amount of consumption (e.g., food serving size) is perceived to be appropriate, and a person would consume it all even if it is too much for this particular person. <a href="#">[94]</a>                                                                                                                                                               |

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|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Weber–Fechner law</a>          | Difficulty in comparing small differences in large quantities.                                                                                   |
| <a href="#">Well travelled road effect</a> | Underestimation of the duration taken to traverse oft-traveled routes and overestimation of the duration taken to traverse less familiar routes. |
| <a href="#">Women are wonderful effect</a> | A tendency to associate more positive attributes with women than with men.                                                                       |
| <a href="#">Zero-risk bias</a>             | Preference for reducing a small risk to zero over a greater reduction in a larger risk.                                                          |
| <a href="#">Zero-sum bias</a>              | A bias whereby a situation is incorrectly perceived to be like a zero-sum game (i.e., one person gains at the expense of another).               |

## Social biases

Most of these biases are labeled as [attributional biases](#).

| Name                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Actor-observer bias</a>              | The tendency for explanations of other individuals' behaviors to overemphasize the influence of their personality and underemphasize the influence of their situation (see also <a href="#">Fundamental attribution error</a> ), and for explanations of one's own behaviors to do the opposite (that is, to overemphasize the influence of our situation and underemphasize the influence of our own personality). |
| <a href="#">Authority bias</a>                   | The tendency to attribute greater accuracy to the opinion of an authority figure (unrelated to its content) and be more influenced by that opinion. <sup>[95]</sup>                                                                                                                                                                                                                                                 |
| <a href="#">Cheerleader effect</a>               | The tendency for people to appear more attractive in a group than in isolation. <sup>[96]</sup>                                                                                                                                                                                                                                                                                                                     |
| <a href="#">Defensive attribution hypothesis</a> | Attributing more blame to a harm-doer as the outcome becomes more severe or as personal or situational <a href="#">similarity</a> to the victim increases.                                                                                                                                                                                                                                                          |
| <a href="#">Egocentric bias</a>                  | Occurs when people claim more responsibility for themselves for the results of a joint action than an outside observer would credit them with.                                                                                                                                                                                                                                                                      |
| <a href="#">Extrinsic incentives bias</a>        | An exception to the <i>fundamental attribution error</i> , when people view others as having (situational) extrinsic motivations and (dispositional) intrinsic motivations for oneself                                                                                                                                                                                                                              |
| <a href="#">False consensus effect</a>           | The tendency for people to overestimate the degree to which others agree with them. <sup>[97]</sup>                                                                                                                                                                                                                                                                                                                 |
| <a href="#">Forer effect</a> (aka Barnum effect) | The tendency to give high accuracy ratings to descriptions of their personality that supposedly are tailored specifically for them, but are in fact vague and general enough to apply to a wide range of people. For example, <a href="#">horoscopes</a> .                                                                                                                                                          |
| <a href="#">Fundamental attribution error</a>    | The tendency for people to over-emphasize personality-based explanations for behaviors observed in others while under-emphasizing the role and power of situational influences on the same behavior <sup>[74]</sup> (see also actor-observer bias, <a href="#">group attribution error</a> , positivity effect, and <a href="#">negativity effect</a> ). <sup>[75]</sup>                                            |

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|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#"><u>Group attribution error</u></a>        | The biased belief that the characteristics of an individual group member are reflective of the group as a whole or the tendency to assume that group decision outcomes reflect the preferences of group members, even when information is available that clearly suggests otherwise.                   |
| <a href="#"><u>Halo effect</u></a>                    | The tendency for a person's positive or negative traits to "spill over" from one personality area to another in others' perceptions of them (see also <a href="#"><u>physical attractiveness stereotype</u></a> ). <sup>[98]</sup>                                                                     |
| <a href="#"><u>Illusion of asymmetric insight</u></a> | People perceive their knowledge of their peers to surpass their peers' knowledge of them. <sup>[99]</sup>                                                                                                                                                                                              |
| <a href="#"><u>Illusion of external agency</u></a>    | When people view self-generated preferences as instead being caused by insightful, effective and benevolent agents.                                                                                                                                                                                    |
| <a href="#"><u>Illusion of transparency</u></a>       | People overestimate others' ability to know them, and they also overestimate their ability to know others.                                                                                                                                                                                             |
| <a href="#"><u>Illusory superiority</u></a>           | Overestimating one's desirable qualities, and underestimating undesirable qualities, relative to other people. (Also known as "Lake Wobegon effect", "better-than-average effect", or "superiority bias"). <sup>[100]</sup>                                                                            |
| <a href="#"><u>Ingroup bias</u></a>                   | The tendency for people to give preferential treatment to others they perceive to be members of their own groups.                                                                                                                                                                                      |
| <a href="#"><u>Just-world hypothesis</u></a>          | The tendency for people to want to believe that the world is fundamentally just, causing them to rationalize an otherwise inexplicable injustice as deserved by the victim(s).                                                                                                                         |
| <a href="#"><u>Moral luck</u></a>                     | The tendency for people to ascribe greater or lesser moral standing based on the outcome of an event.                                                                                                                                                                                                  |
| <a href="#"><u>Naïve cynicism</u></a>                 | Expecting more <i>egocentric bias</i> in others than in oneself.                                                                                                                                                                                                                                       |
| <a href="#"><u>Naïve realism</u></a>                  | The belief that we see reality as it really is – objectively and without bias; that the facts are plain for all to see; that rational people will agree with us; and that those who don't are either uninformed, lazy, irrational, or biased.                                                          |
| <a href="#"><u>Outgroup homogeneity bias</u></a>      | Individuals see members of their own group as being relatively more varied than members of other groups. <sup>[101]</sup>                                                                                                                                                                              |
| <a href="#"><u>Self-serving bias</u></a>              | The tendency to claim more responsibility for successes than failures. It may also manifest itself as a tendency for people to evaluate ambiguous information in a way beneficial to their interests (see also <a href="#"><u>group-serving bias</u></a> ). <sup>[102]</sup>                           |
| <a href="#"><u>Shared information bias</u></a>        | Known as the tendency for group members to spend more time and energy discussing information that all members are already familiar with (i.e., shared information), and less time and energy discussing information that only some members are aware of (i.e., unshared information). <sup>[103]</sup> |
| <a href="#"><u>System justification</u></a>           | The tendency to defend and bolster the status quo. Existing social, economic, and political arrangements tend to be preferred, and alternatives disparaged, sometimes even at the expense of individual and collective self-interest. (See also status quo bias.)                                      |
| <a href="#"><u>Trait ascription bias</u></a>          | The tendency for people to view themselves as relatively variable in terms of personality, behavior, and mood while viewing others as much more predictable.                                                                                                                                           |

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[Ultimate attribution error](#)

Similar to the fundamental attribution error, in this error a person is likely to make an internal attribution to an entire group instead of the individuals within the group.

[Worse-than-average effect](#)

A tendency to believe ourselves to be worse than others at tasks which are difficult. [104]

## Memory errors and biases

Main article: [List of memory biases](#)

In [psychology](#) and [cognitive science](#), a memory bias is a [cognitive bias](#) that either enhances or impairs the recall of a [memory](#) (either the chances that the memory will be recalled at all, or the amount of time it takes for it to be recalled, or both), or that alters the content of a reported memory. There are many types of memory bias, including:

| Name                                                          | Description                                                                                                                                                                                                                                     |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Bizarreness effect</a>                            | Bizarre material is better remembered than common material.                                                                                                                                                                                     |
| <a href="#">Choice-supportive bias</a>                        | In a self-justifying manner retroactively ascribing one's choices to be more informed than they were when they were made.                                                                                                                       |
| Change bias                                                   | After an investment of effort in producing change, remembering one's past performance as more difficult than it actually was. [105] <a href="#">unreliable source?</a>                                                                          |
| <a href="#">Childhood amnesia</a>                             | The retention of few memories from before the age of four.                                                                                                                                                                                      |
| Conservatism or Regressive bias                               | Tendency to remember high values and high likelihoods/probabilities/frequencies as lower than they actually were and low ones as higher than they actually were. Based on the evidence, memories are not extreme enough. [86][87]               |
| Consistency bias                                              | Incorrectly remembering one's past attitudes and behaviour as resembling present attitudes and behaviour. [106]                                                                                                                                 |
| <a href="#">Context effect</a>                                | That cognition and memory are dependent on context, such that out-of-context memories are more difficult to retrieve than in-context memories (e.g., recall time and accuracy for a work-related memory will be lower at home, and vice versa). |
| <a href="#">Cross-race effect</a>                             | The tendency for people of one race to have difficulty identifying members of a race other than their own.                                                                                                                                      |
| <a href="#">Cryptomnesia</a>                                  | A form of <a href="#">misattribution</a> where a memory is mistaken for imagination, because there is no subjective experience of it being a memory. [105]                                                                                      |
| <a href="#">Egocentric bias</a>                               | Recalling the past in a self-serving manner, e.g., remembering one's exam grades as being better than they were, or remembering a caught fish as bigger than it really was.                                                                     |
| <a href="#">Fading affect bias</a>                            | A bias in which the emotion associated with unpleasant memories fades more quickly than the emotion associated with positive events. [107]                                                                                                      |
| <a href="#">False memory</a>                                  | A form of <a href="#">misattribution</a> where imagination is mistaken for a memory.                                                                                                                                                            |
| <a href="#">Generation effect</a><br>(Self-generation effect) | That self-generated information is remembered best. For instance, people are better able to recall memories of statements that they have generated than similar statements generated by others.                                                 |

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|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">Google effect</a>               | The tendency to forget information that can be found readily online by using Internet search engines.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <a href="#">Hindsight bias</a>              | The inclination to see past events as being more predictable than they actually were; also called the "I-knew-it-all-along" effect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Humor effect                                | That humorous items are more easily remembered than non-humorous ones, which might be explained by the distinctiveness of humor, the increased cognitive processing time to understand the humor, or the emotional arousal caused by the humor. <a href="#">[108]</a>                                                                                                                                                                                                                                                                                                                                 |
| <a href="#">Illusion of truth effect</a>    | That people are more likely to identify as true statements those they have previously heard (even if they cannot consciously remember having heard them), regardless of the actual validity of the statement. In other words, a person is more likely to believe a familiar statement than an unfamiliar one.                                                                                                                                                                                                                                                                                         |
| <a href="#">Illusory correlation</a>        | Inaccurately remembering a relationship between two events. <a href="#">[5]</a> <a href="#">[67]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Lag effect                                  | The phenomenon whereby learning is greater when studying is spread out over time, as opposed to studying the same amount of time in a single session. See also <a href="#">spacing effect</a> .                                                                                                                                                                                                                                                                                                                                                                                                       |
| <a href="#">Leveling and sharpening</a>     | Memory distortions introduced by the loss of details in a recollection over time, often concurrent with sharpening or selective recollection of certain details that take on exaggerated significance in relation to the details or aspects of the experience lost through leveling. Both biases may be reinforced over time, and by repeated recollection or re-telling of a memory. <a href="#">[109]</a>                                                                                                                                                                                           |
| <a href="#">Levels-of-processing effect</a> | That different methods of encoding information into memory have different levels of effectiveness. <a href="#">[110]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| List-length effect                          | A smaller percentage of items are remembered in a longer list, but as the length of the list increases, the absolute number of items remembered increases as well. For example, consider a list of 30 items ("L30") and a list of 100 items ("L100"). An individual may remember 15 items from L30, or 50%, whereas the individual may remember 40 items from L100, or 40%. Although the percent of L30 items remembered (50%) is greater than the percent of L100 (40%), more L100 items (40) are remembered than L30 items (15). <a href="#">[111]</a> <a href="#">[further explanation needed]</a> |
| <a href="#">Misinformation effect</a>       | Memory becoming less accurate because of interference from <i>post-event information</i> . <a href="#">[112]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <a href="#">Modality effect</a>             | That memory recall is higher for the last items of a list when the list items were received via speech than when they were received through writing.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <a href="#">Mood-congruent memory bias</a>  | The improved recall of information congruent with one's current mood.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Next-in-line effect                         | People taking turns speaking in a group tend to have diminished recall for the words of others <a href="#">[clarify]</a> who spoke immediately before them. <a href="#">[113]</a>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <a href="#">Part-list cueing effect</a>     | That being shown some items from a list and later retrieving one item causes it to become harder to retrieve the other items. <a href="#">[114]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <a href="#">Peak-end rule</a>               | That people seem to perceive not the sum of an experience but the average of how it was at its peak (e.g., pleasant or unpleasant) and how it ended.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Persistence                                 | The unwanted recurrence of memories of a <a href="#">traumatic event</a> . <a href="#">[citation needed]</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#"><u>Picture superiority effect</u></a>                                  | The notion that concepts that are learned by viewing pictures are more easily and frequently recalled than are concepts that are learned by viewing their written word form counterparts. <a href="#">[115]</a> <a href="#">[116]</a> <a href="#">[117]</a> <a href="#">[118]</a> <a href="#">[119]</a> <a href="#">[120]</a> |
| Positivity effect ( <a href="#"><u>So cioemotional selectivity theory</u></a> )    | That older adults favor positive over negative information in their memories.                                                                                                                                                                                                                                                 |
| <a href="#"><u>Primacy effect, recency effect &amp; serial position effect</u></a> | That items near the end of a sequence are the easiest to recall, followed by the items at the beginning of a sequence; items in the middle are the least likely to be remembered. <a href="#">[121]</a>                                                                                                                       |
| Processing difficulty effect                                                       | That information that takes longer to read and is thought about more (processed with more difficulty) is more easily remembered. <a href="#">[122]</a>                                                                                                                                                                        |
| <a href="#"><u>Reminiscence bump</u></a>                                           | The recalling of more personal events from adolescence and early adulthood than personal events from other lifetime periods. <a href="#">[123]</a>                                                                                                                                                                            |
| <a href="#"><u>Rosy retrospection</u></a>                                          | The remembering of the past as having been better than it really was.                                                                                                                                                                                                                                                         |
| Self-relevance effect                                                              | That memories relating to the self are better recalled than similar information relating to others.                                                                                                                                                                                                                           |
| <a href="#"><u>Source confusion</u></a>                                            | Confusing episodic memories with other information, creating distorted memories. <a href="#">[124]</a>                                                                                                                                                                                                                        |
| <a href="#"><u>Spacing effect</u></a>                                              | That information is better recalled if exposure to it is repeated over a long span of time rather than a short one.                                                                                                                                                                                                           |
| <a href="#"><u>Spotlight effect</u></a>                                            | The tendency to overestimate the amount that other people notice your appearance or behavior.                                                                                                                                                                                                                                 |
| Stereotypical bias                                                                 | Memory distorted towards stereotypes (e.g., racial or gender).                                                                                                                                                                                                                                                                |
| Suffix effect                                                                      | Diminishment of the recency effect because a sound item is appended to the list that the subject is <i>not</i> required to recall. <a href="#">[125]</a> <a href="#">[126]</a>                                                                                                                                                |
| <a href="#"><u>Suggestibility</u></a>                                              | A form of misattribution where ideas suggested by a questioner are mistaken for memory.                                                                                                                                                                                                                                       |
| <a href="#"><u>Tachypsychia</u></a>                                                | When time perceived by the individual either lengthens, making events appear to slow down, or contracts. <a href="#">[127]</a>                                                                                                                                                                                                |
| <a href="#"><u>Telescoping effect</u></a>                                          | The tendency to displace recent events backward in time and remote events forward in time, so that recent events appear more remote, and remote events, more recent.                                                                                                                                                          |
| <a href="#"><u>Testing effect</u></a>                                              | The fact that you more easily remember information you have read by rewriting it instead of rereading it. <a href="#">[128]</a>                                                                                                                                                                                               |
| <a href="#"><u>Tip of the tongue phenomenon</u></a>                                | When a subject is able to recall parts of an item, or related information, but is frustratingly unable to recall the whole item. This is thought to be an instance of "blocking" where multiple similar memories are being recalled and interfere with each other. <a href="#">[105]</a>                                      |
| Travis Syndrome                                                                    | Overestimating the significance of the present. <a href="#">[129]</a> It is related to the enlightenment <a href="#">Idea of Progress</a> and <a href="#">chronological snobbery</a> with possibly an <a href="#">appeal to novelty logical fallacy</a> being part of the bias.                                               |

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|                                     |                                                                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Verbatim effect                     | That the "gist" of what someone has said is better remembered than the verbatim wording. <a href="#">[130]</a> This is because memories are representations, not exact copies. |
| <a href="#">von Restorff effect</a> | That an item that sticks out is more likely to be remembered than other items.<br><a href="#">[131]</a>                                                                        |
| <a href="#">Zeigarnik effect</a>    | That uncompleted or interrupted tasks are remembered better than completed ones.                                                                                               |

## Common theoretical causes of some cognitive biases

- [Bounded rationality](#) – limits on optimization and rationality
  - [Prospect theory](#)
  - [Mental accounting](#)
  - [Adaptive bias](#) – basing decisions on limited information and biasing them based on the costs of being wrong
- [Attribute substitution](#) – making a complex, difficult judgment by unconsciously substituting it by an easier judgment[\[132\]](#)
- [Attribution theory](#)
  - [Salience](#)
  - [Naïve realism](#)
- [Cognitive dissonance](#), and related:
  - [Impression management](#)
  - [Self-perception theory](#)
- [Heuristics in judgment and decision making](#), including:
  - [Availability heuristic](#) – estimating what is more likely by what is more available in memory, which is biased toward vivid, unusual, or emotionally charged examples[\[66\]](#)
  - [Representativeness heuristic](#) – judging probabilities on the basis of resemblance[\[66\]](#)
  - [Affect heuristic](#) – basing a decision on an emotional reaction rather than a calculation of risks and benefits[\[133\]](#)
- Some theories of [emotion](#) such as:
  - [Two-factor theory of emotion](#)
  - [Somatic markers hypothesis](#)
- [Introspection illusion](#)
- Misinterpretations or [misuse of statistics](#); [innumeracy](#).

A 2012 [Psychological Bulletin](#) article suggested that at least eight seemingly unrelated biases can be produced by the same [information-theoretic](#) generative mechanism that assumes noisy information processing during storage and retrieval of information in human memory.[\[5\]](#)

## Individual differences in decision making biases



People do appear to have stable individual differences in their susceptibility to decision biases such as [overconfidence](#), [temporal discounting](#), and [bias blind spot](#).<sup>[134]</sup> That said, these stable levels of bias within individuals are possible to change. Participants in experiments who watched training videos and played debiasing games showed medium to large reductions both immediately and up to three months later in the extent to which they exhibited susceptibility to six cognitive biases: [anchoring](#), bias blind spot, [confirmation bias](#), [fundamental attribution error](#), [projection bias](#), and [representativeness](#).<sup>[135]</sup>

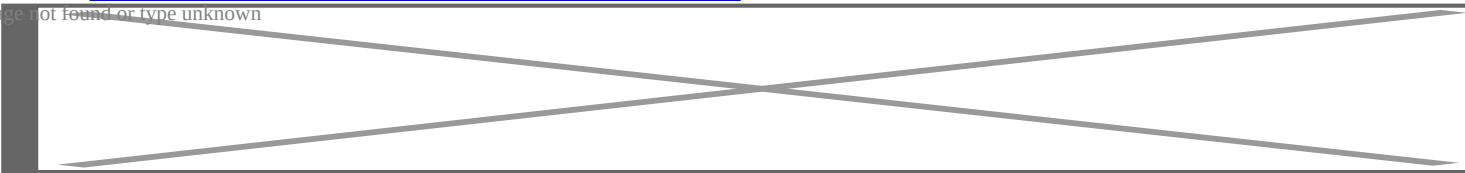
## Debiasing

[Debiasing](#) is the reduction of biases in judgment and decision making through incentives, nudges, and training. [Cognitive bias mitigation](#) and [cognitive bias modification](#) are forms of debiasing specifically applicable to cognitive biases and their effects.

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Source: [en.wikipedia.org/wiki/List\\_of\\_cognitive\\_biases](https://en.wikipedia.org/wiki/List_of_cognitive_biases)

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## Further References

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Plain numerical DOI: 10.1037/0021-9010.88.5.879

[DOI URL](#)

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### Show/hide publication abstract

"Interest in the problem of method biases has a long history in the behavioral sciences. despite this, a comprehensive summary of the potential sources of method biases and how to control for them does not exist. therefore, the purpose of this article is to examine the extent to which method biases influence behavioral research results, identify potential sources of method biases, discuss the cognitive processes through which method biases influence responses to measures, evaluate the many different procedural and statistical techniques that can be used to control method biases, and provide recommendations for how to select appropriate procedural and statistical remedies for different types of research settings."

Tversky, A., & Kahneman, D.. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*

Plain numerical DOI: 10.1016/0010-0285(73)90033-9

[DOI URL](#)

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"This paper explores a judgmental heuristic in which a person evaluates the frequency of classes or the probability of events by availability, i.e., by the ease with which relevant instances come to mind. in general, availability is correlated with ecological frequency, but it is also affected by other factors. consequently, the reliance on the availability heuristic leads to systematic biases. such biases are demonstrated in the judged frequency of classes of words, of combinatorial outcomes, and of repeated events. the phenomenon of illusory correlation is explained as an availability bias. the effects of the availability of incidents and scenarios on subjective probability are discussed. © 1973."

Kahneman, D., & Tversky, A.. (1996). On the reality of cognitive illusions.. Psychological Review

Plain numerical DOI: 10.1037/0033-295X.103.3.582

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"The study of heuristics and biases in judgement has been criticized in several publications by g. gigerenzer, who argues that 'biases are not biases' and 'heuristics are meant to explain what does not exist' (1991, p. 102). the article responds to gigerenzer's critique and shows that it misrepresents the authors' theoretical position and ignores critical evidence. contrary to gigerenzer's central empirical claim, judgments of frequency—not only subjective probabilities—are susceptible to large and systematic biases. a postscript responds to gigerenzer's (1996) reply."

Oechssler, J., Roider, A., & Schmitz, P. W.. (2009). Cognitive abilities and behavioral biases. Journal of Economic Behavior and Organization

Plain numerical DOI: 10.1016/j.jebo.2009.04.018

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"We use a simple, three-item test for cognitive abilities to investigate whether established behavioral biases that play a prominent role in behavioral economics and finance are related to cognitive abilities. we find that higher test scores on the cognitive reflection test of frederick [frederick, s., 2005. cognitive reflection and decision-making. journal of economic perspectives 19, 25-42] indeed are correlated with lower incidences of the conjunction fallacy and conservatism in updating probabilities. test scores are also significantly related to subjects' time and risk preferences. test scores have no influence on the amount of anchoring, although there is evidence of anchoring among all subjects. even if incidences of most biases are lower for people with higher cognitive abilities, they still remain substantial. © 2009 elsevier b.v. all rights reserved."

Griffiths, T. L., Chater, N., Kemp, C., Perfors, A., & Tenenbaum, J. B.. (2010). Probabilistic models of cognition: exploring representations and inductive biases. Trends in Cognitive Sciences

Plain numerical DOI: 10.1016/j.tics.2010.05.004

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"Cognitive science aims to reverse-engineer the mind, and many of the engineering challenges the mind faces involve induction. the probabilistic approach to modeling cognition begins by identifying ideal solutions to these inductive problems. mental processes are then modeled using algorithms for approximating these solutions, and neural processes are viewed as mechanisms for implementing these algorithms, with the result being a top-down analysis of cognition starting with the function of cognitive processes. typical connectionist models, by contrast, follow a bottom-up approach, beginning with a characterization of neural mechanisms and exploring what macro-level functional phenomena might emerge. we argue that the top-down approach yields greater flexibility for exploring the representations and inductive biases that underlie human cognition. © 2010 elsevier ltd."

Stanovich, K. E., & West, R. F.. (2008). On the Relative Independence of Thinking Biases and Cognitive Ability. Journal of Personality and Social Psychology

Plain numerical DOI: 10.1037/0022-3514.94.4.672

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"In 7 different studies, the authors observed that a large number of thinking biases are uncorrelated with cognitive ability. these thinking biases include some of the most classic and well-studied biases in the heuristics and biases literature, including the conjunction effect, framing effects, anchoring effects, outcome bias, base-rate neglect, 'less is more' effects, affect biases, omission bias, myside bias, sunk-cost effect, and certainty effects that violate the axioms of expected utility theory. in a further experiment, the authors nonetheless showed that cognitive ability does correlate with the tendency to avoid some rational thinking biases, specifically the tendency to display denominator neglect, probability matching rather than maximizing, belief bias, and matching bias on the 4-card selection task. the authors present a framework for predicting when cognitive ability will and will not correlate with a rational thinking tendency. (psycinfo database record (c) 2016 apa, all rights reserved)"

Hallion, L. S., & Ruscio, A. M.. (2011). A Meta-Analysis of the Effect of Cognitive Bias Modification on Anxiety and Depression. Psychological Bulletin

Plain numerical DOI: 10.1037/a0024355

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"Cognitive biases have been theorized to play a critical role in the onset and maintenance of anxiety and depression. Cognitive bias modification (cbm), an experimental paradigm that uses training to induce maladaptive or adaptive cognitive biases, was developed to test these causal models. Although cbm has generated considerable interest in the past decade, both as an experimental paradigm and as a form of treatment, there have been no quantitative reviews of the effect of cbm on anxiety and depression. This meta-analysis of 45 studies (2,591 participants) assessed the effect of cbm on cognitive biases and on anxiety and depression. cbm had a medium effect on biases ( $g = 0.49$ ) that was stronger for interpretation ( $g = 0.81$ ) than for attention ( $g = 0.29$ ) biases. cbm further had a small effect on anxiety and depression ( $g = 0.13$ ), although this effect was reliable only when symptoms were assessed after participants experienced a stressor ( $g = 0.23$ ). When anxiety and depression were examined separately, cbm significantly modified anxiety but not depression. There was a nonsignificant trend toward a larger effect for studies including multiple training sessions. These findings are broadly consistent with cognitive theories of anxiety and depression that propose an interactive effect of cognitive biases and stressors on these symptoms. However, the small effect sizes observed here suggest that this effect may be more modest than previously believed." Gigerenzer, G.. (1991). How to make Cognitive Illusions Disappear: Beyond "Heuristics and Biases". European Review of Social Psychology

Plain numerical DOI: 10.1080/14792779143000033

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"Most so-called 'errors' in probabilistic reasoning are in fact not violations of probability theory. Examples of such 'errors' include overconfidence bias, conjunction fallacy, and base-rate neglect. Researchers have relied on a very narrow normative view, and have ignored conceptual distinctions—for example, single case versus relative frequency—fundamental to probability theory. By recognizing and using these distinctions, however, we can make apparently stable 'errors' disappear, reappear, or even invert. I suggest what a reformed understanding of judgments under uncertainty might look like." Roiser, J. P., Elliott, R., & Sahakian, B. J.. (2012). Cognitive mechanisms of treatment in depression. Neuropsychopharmacology

Plain numerical DOI: 10.1038/npp.2011.183

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"Cognitive abnormalities are a core feature of depression, and biases toward negatively toned emotional information are common, but are they a cause or a consequence of depressive symptoms? Here, we propose a 'cognitive neuropsychological' model of depression, suggesting that negative information processing biases have a central causal role in the development of symptoms of depression, and that treatments exert their beneficial effects by abolishing these biases. We review the

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evidence pertaining to this model: briefly with respect to currently depressed patients, and in more detail with respect to individuals at risk for depression and the effects of antidepressant treatments. as well as being present in currently depressed individuals, negative biases are detectable in those vulnerable for depression due to neuroticism, genetic risk, or previous depressive illness. recent evidence provides strong support for the notion that both antidepressant drugs and psychological therapies modify negative biases, providing a common mechanism for understanding treatments for depression. intriguingly, it may even be possible to predict which patients will benefit most from which treatments on the basis of neural responses to negative stimuli. however, further research is required to ascertain whether negative processing biases will be useful in predicting, detecting, and treating depression, and hence in preventing a chronic, relapsing course of illness."

Haselton, M. G., Nettle, D., & Andrews, P. W.. (2015). The Evolution of Cognitive Bias. In *The Handbook of Evolutionary Psychology*

Plain numerical DOI: 10.1002/9780470939376.ch25

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"(From the book) in this chapter, martie haselton, daniel nettle, and paul andrews present theory and empirical research on the evolution of cognitive biases in social interaction. they provide sound arguments that certain social cognitive biases are in fact designed and functional, resulting in better solutions to adaptive problems than cognitive mechanisms that 'accurately' detected social signals. they call for an evolutionary reformulation of the entire 'heuristics and biases' literature, which typically cast humans as making illogical and unfounded errors. this new line of work has already led to the discovery of new cognitive biases and offers much promise for the future discovery of additional adaptive biases. it also may lead to the detumescence of decades of work that has cast humans erroneously as fundamentally irrational and hopelessly muddled in their judgment and decision making. (psycinfo database record (c) 2006 apa,"

Haselton, M. G., & Nettle, D.. (2006). The paranoid optimist: An integrative evolutionary model of cognitive biases. *Personality and Social Psychology Review*

Plain numerical DOI: 10.1207/s15327957pspr1001\_3

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## Show/hide publication abstract

"Human cognition is often biased, from judgments of the time of impact of approaching objects all the way through to estimations of social outcomes in the future. we propose these effects and a host of others may all be understood from an evolutionary psychological perspective. in this article, we elaborate error management theory (emt; haselton & buss, 2000). emt predicts that if judgments are made under uncertainty, and the costs of false positive and false negative errors have been asymmetric over evolutionary history, selection should have favored a bias toward making the least costly error. this perspective integrates a diverse array of effects under a single explanatory umbrella, and it yields new content-specific predictions."

Croskerry, P.. (2003). The importance of cognitive errors in diagnosis and strategies to minimize them. Academic Medicine

Plain numerical DOI: 10.1097/00001888-200308000-00003

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## Show/hide publication abstract

"In the area of patient safety, recent attention has focused on diagnostic error. the reduction of diagnostic error is an important goal because of its associated morbidity and potential preventability. a critical subset of diagnostic errors arises through cognitive errors, especially those associated with failures in perception, failed heuristics, and biases; collectively, these have been referred to as cognitive dispositions to respond (cdrs). historically, models of decision-making have given insufficient attention to the contribution of such biases, and there has been a prevailing pessimism against improving cognitive performance through debiasing techniques. recent work has catalogued the major cognitive biases in medicine; the author lists these and describes a number of strategies for reducing them ('cognitive debiasing'). principle among them is metacognition, a reflective approach to problem solving that involves stepping back from the immediate problem to examine and reflect on the thinking process. further research effort should be directed at a full and complete description and analysis of cdrs in the context of medicine and the development of techniques for avoiding their associated adverse outcomes. considerable potential exists for reducing cognitive diagnostic errors with this approach. the author provides an extensive list of cdrs and a list of strategies to reduce diagnostic errors."

Bertrand, M., & Morse, A.. (2011). Information Disclosure, Cognitive Biases, and Payday Borrowing. Journal of Finance

Plain numerical DOI: 10.1111/j.1540-6261.2011.01698.x

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"If people face cognitive limitations or biases that lead to financial mistakes, what are possible ways lawmakers can help? one approach is to remove the option of the bad decision; another approach is to increase financial education such that individuals can reason through choices when they arise. a third, less discussed, approach is to mandate disclosure of information in a form that enables people to overcome limitations or biases at the point of the decision. this third approach is the topic of this paper. we study whether and what information can be disclosed to payday loan borrowers to lower their use of high-cost debt via a field experiment at a national chain of payday lenders. we find that information that helps people think less narrowly (over time) about the cost of payday borrowing, and in particular information that reinforces the adding-up effect over pay cycles of the dollar fees incurred on a payday loan, reduces the take-up of payday loans by about 10 percent in a 4 month-window following exposure to the new information. overall, our results suggest that consumer information regulations based on a deeper understanding of cognitive biases might be an effective policy tool when it comes to regulating payday borrowing, and possibly other financial and non-financial products."



Ioannidis, J. P. A., Munafò, M. R., Fusar-Poli, P., Nosek, B. A., & David, S. P.. (2014). Publication and other reporting biases in cognitive sciences: Detection, prevalence, and prevention. Trends in Cognitive Sciences

Plain numerical DOI: 10.1016/j.tics.2014.02.010

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## Show/hide publication abstract

"Recent systematic reviews and empirical evaluations of the cognitive sciences literature suggest that publication and other reporting biases are prevalent across diverse domains of cognitive science. in this review, we summarize the various forms of publication and reporting biases and other questionable research practices, and overview the available methods for probing into their existence. we discuss the available empirical evidence for the presence of such biases across the neuroimaging, animal, other preclinical, psychological, clinical trials, and genetics literature in the cognitive sciences. we also highlight emerging solutions (from study design to data analyses and reporting) to prevent bias and improve the fidelity in the field of cognitive science research. © 2014 elsevier ltd."

Montibeller, G., & von Winterfeldt, D.. (2015). Cognitive and Motivational Biases in Decision and Risk Analysis. Risk Analysis

Plain numerical DOI: 10.1111/risa.12360

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## Show/hide publication abstract

"Behavioral decision research has demonstrated that judgments and decisions of ordinary people and experts are subject to numerous biases. decision and risk analysis were designed to improve judgments and decisions and to overcome many of these biases. however, when eliciting model components and parameters from decisionmakers or experts, analysts often face the very biases they are trying to help overcome. when these inputs are biased they can seriously reduce the quality of the model and resulting analysis. some of these biases are due to faulty cognitive processes; some are due to motivations for preferred analysis outcomes. this article identifies the cognitive and motivational biases that are relevant for decision and risk analysis because they can distort analysis inputs and are difficult to correct. we also review and provide guidance about the existing debiasing techniques to overcome these biases. in addition, we describe some biases that are less relevant because they can be corrected by using logic or decomposing the elicitation task. we conclude the article with an agenda for future research."

Douglas, C., Bateson, M., Walsh, C., Bédoué, A., & Edwards, S. A.. (2012). Environmental enrichment induces optimistic cognitive biases in pigs. Applied Animal Behaviour Science

Plain numerical DOI: 10.1016/j.applanim.2012.02.018

[DOI URL](#)

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"The objective assessment of affective (emotional) state in farm livestock, especially positive states, poses a significant challenge. In human psychology, there is evidence that affective state can alter cognition, with more positive states being associated with an increased likelihood of judging ambiguous information positively (a phenomenon described as optimistic cognitive bias). The aim of this study was to investigate whether judgement biases could be used to assess affective states in pigs housed in environments with different levels of enrichment. Two groups of five gilts were housed in either enriched (e) or barren (b) environments for the first five weeks of the experiment. The enriched group had more space, straw and objects to manipulate. The pigs were trained on a go/no-go task to discriminate two auditory cues, a positive cue that predicted a food reward if the pig approached a hatch, and a negative cue that predicted a mildly aversive experience if the pig approached the same hatch. The quality of the pigs' environment was then changed over time in a balanced, cross-over design (either ebe or beb). Tests of cognitive bias were made on individual pigs before and after each change in environment using an unreinforced, ambiguous, auditory cue different from either the positive or the negative cue. In test sessions, positive, negative and ambiguous cues were presented in a randomised sequence, and the pigs' responses (whether they approached the hatch and latency to approach) were recorded. Both groups were more likely to approach the hatch and were faster to approach the hatch in response to the ambiguous cue when currently housed in the enriched environment. There was also an interaction between current and past environment, whereby pigs that started in the enriched environment were subsequently less likely and slower to approach the hatch when moved to a barren environment than pigs initially housed in the barren environment. These results show that pigs have more optimistic judgement biases in enriched environments indicative of a more positive affective state. Also, pigs that have spent time in an enriched environment react more negatively to being subsequently housed in a barren environment. We conclude that cognitive bias has potential to provide additional information about the effect of various management regimes on farmed animals' welfare. This will be increasingly important for identifying practices to promote positive affective states..."

Greenwald, A. G.. (1980). The totalitarian ego: Fabrication and revision of personal history. American Psychologist

Plain numerical DOI: 10.1037/0003-066X.35.7.603

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"ABSTRACT: this article argues that (a) ego, or self, is an organization of knowledge, (b) ego is characterized by cognitive biases strikingly analogous to totalitarian information-control strategies, and (c) these totalitarian-ego biases function to preserve organization in cognitive structures. Ego's cognitive biases are egocentricity (self as the focus of knowledge), 'beneffectance' (perception of responsibility for desired, but not undesired, outcomes), and cognitive conservatism (resistance to cognitive change). In addition to being pervasively evident in recent studies of normal human cognition, these three biases are found in actively functioning, higher level organizations of knowledge, perhaps best exemplified by theoretical paradigms in science. The thesis that egocentricity, beneffectance, and conservatism act to preserve knowledge organizations leads to the proposal of an intrapsychic analog

of genetic evolution, which in turn provides an alternative to prevalent motivational and informational interpretations of cognitive biases."

Bateson, M., Desire, S., Gartside, S. E., & Wright, G. A.. (2011). Agitated honeybees exhibit pessimistic cognitive biases. *Current Biology*

Plain numerical DOI: 10.1016/j.cub.2011.05.017

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## Show/hide publication abstract

"Whether animals experience human-like emotions is controversial and of immense societal concern [1-3]. because animals cannot provide subjective reports of how they feel, emotional state can only be inferred using physiological, cognitive, and behavioral measures [4-8]. in humans, negative feelings are reliably correlated with pessimistic cognitive biases, defined as the increased expectation of bad outcomes [9-11]. recently, mammals [12-16] and birds [17-20] with poor welfare have also been found to display pessimistic-like decision making, but cognitive biases have not thus far been explored in invertebrates. here, we ask whether honeybees display a pessimistic cognitive bias when they are subjected to an anxiety-like state induced by vigorous shaking designed to simulate a predatory attack. we show for the first time that agitated bees are more likely to classify ambiguous stimuli as predicting punishment. shaken bees also have lower levels of hemolymph dopamine, octopamine, and serotonin. in demonstrating state-dependent modulation of categorization in bees, and thereby a cognitive component of emotion, we show that the bees' response to a negatively valenced event has more in common with that of vertebrates than previously thought. this finding reinforces the use of cognitive bias as a measure of negative emotional states across species and suggests that honeybees could be regarded as exhibiting emotions. video abstract: © 2011 elsevier ltd."

Peters, E. R., Moritz, S., Schwannauer, M., Wiseman, Z., Greenwood, K. E., Scott, J., ... Garety, P. A.. (2014). Cognitive biases questionnaire for psychosis. *Schizophrenia Bulletin*

Plain numerical DOI: 10.1093/schbul/sbs199

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"Objective: the cognitive biases questionnaire for psychosis (cbqp) was developed to capture 5 cognitive distortions (jumping to conclusions, intentionalising, cata-strophising, emotional reasoning, and dichotomous think-ing), which are considered important for the pathogenesis of psychosis. vignettes were adapted from the cognitive style test (cst), 1 relating to " anomalous perceptions " and " threatening events " themes. method: scale structure, reliability, and validity were investigated in a psychosis group, and cbqp scores were compared with those of depressed and healthy control samples. results: the cbqp showed good internal consistency and test-retest reliability. the 5 biases were not independent, with a 2-related factor scale providing the best fit. this structure suggests that the cbqp assesses a general thinking bias rather than distinct cognitive errors, while anomalous perception and threatening events theme scores can be used separately. total cbqp scores showed good convergent validity with the cst, but individual biases were not related to existing tasks purporting to assess similar reasoning biases. psychotic and depressed populations scored higher than healthy controls, and

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symptomatic psycho-sis patients scored higher than their nonsymptomatic counterparts, with modest relationships between cbqp scores and symptom severity once emotional disorders were partialled out. anomalous perception theme and intentionalising bias scores showed some specificity to psychosis. conclusions: overall, the cbqp has good psychometric properties, although it is likely that it measures a different construct to existing tasks, tentatively suggested to represent a bias of interpretation rather than reasoning, judgment or decision-making processes. it is a potentially useful tool in both research and clinical arenas."

Hoppe, E. I., & Kusterer, D. J.. (2011). Behavioral biases and cognitive reflection. *Economics Letters*

Plain numerical DOI: 10.1016/j.econlet.2010.11.015

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"In a large-scale laboratory experiment, we investigate whether subjects' scores on the cognitive reflection test (crt) are related to their susceptibility to the base rate fallacy, the conservatism bias, over confidence, and the endowment effect. © 2010 elsevier b.v."

Marshall, J. A. R., Trimmer, P. C., Houston, A. I., & McNamara, J. M.. (2013). On evolutionary explanations of cognitive biases. *Trends in Ecology and Evolution*

Plain numerical DOI: 10.1016/j.tree.2013.05.013

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## Show/hide publication abstract

"Apparently irrational biases such as overconfidence, optimism, and pessimism are increasingly studied by biologists, psychologists, and neuroscientists. functional explanations of such phenomena are essential; we argue that recent proposals, focused on benefits from overestimating the probability of success in conflicts or practising self-deception to better deceive others, are still lacking in crucial regards. attention must be paid to the difference between cognitive and outcome biases; outcome biases are suboptimal, yet cognitive biases can be optimal. however, given that cognitive biases are subjectively experienced by affected individuals, developing theory and collecting evidence on them poses challenges. an evolutionary theory of cognitive bias might require closer integration of function and mechanism, analysing the evolution of constraints imposed by the mechanisms that determine behaviour. © 2013 elsevier ltd."

Croskerry, P., Singhal, G., & Mamede, S.. (2013). Cognitive debiasing 1: Origins of bias and theory of debiasing. *BMJ Quality and Safety*

Plain numerical DOI: 10.1136/bmjqs-2012-001712

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## Show/hide publication abstract

"Numerous studies have shown that diagnostic failure depends upon a variety of factors. psychological factors are fundamental in influencing the cognitive performance of the decision maker. in this first of two papers, we discuss the basics of reasoning and the dual process theory (dpt) of decision making. the general properties of the dpt model, as it applies to diagnostic reasoning, are reviewed. a variety of cognitive and affective biases are known to compromise the decision-making process. they mostly appear to originate in the fast intuitive processes of type 1 that dominate (or drive) decision making. type 1 processes work well most of the time but they may open the door for biases. removing or at least mitigating these biases would appear to be an important goal. we will also review the origins of biases. the consensus is that there are two major sources: innate, hard-wired biases that developed in our evolutionary past, and acquired biases established in the course of development and within our working environments. both are associated with abbreviated decision making in the form of heuristics. other work suggests that ambient and contextual factors may create high risk situations that dispose decision makers to particular biases. fatigue, sleep deprivation and cognitive overload appear to be important determinants. the theoretical basis of several approaches towards debiasing is then discussed. all share a common feature that involves a deliberate decoupling from type 1 intuitive processing and moving to type 2 analytical processing so that eventually unexamined intuitive judgments can be submitted to verification. this decoupling step appears to be the critical feature of cognitive and affective debiasing."

Das, T. K., & Teng, B. S.. (1999). Cognitive biases and strategic decision processes: An integratwe perspective. Journal of Management Studies

Plain numerical DOI: 10.1111/1467-6486.00157

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## Show/hide publication abstract

"Previous studies have not adequately addressed the role of cognitive biases in strategic decision processes. in this article we suggest that cognitive biases are systematically associated with strategic decision processes. different decision processes tend to accentuate particular types of cognitive bias. we develop an integrative framework to explore the presence of four basic types of cognitive bias und er five different modes of decision making. the cognitive biases include prior hypotheses and focusing on limited targets, exposure to limited alternatives, insensitivity to outcome probabilities and illusion of manageability. the five modes of strategic decision making are rational, avoidance, logical incrementalist, political and garbage can. we suggest a number of key propositions to facilitate empirical testing of the various contingent relationships implicit in the framework. lastly, we discuss the implications of this framework for research and managerial practice."

Gudmundsson, S. V., & Lechner, C.. (2013). Cognitive biases, organization, and entrepreneurial firm survival. European Management Journal

Plain numerical DOI: 10.1016/j.emj.2013.01.001

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"Entrepreneur's cognitive biases have emerged as one of the central themes in understanding the performance of entrepreneurial firms. research has shown that entrepreneur's overconfidence and optimism bias help firm creation, but also contribute to firm failure. prior studies using cognitive biases to explain entrepreneurial outcomes are lacking. first, they usually focus on a single cognitive bias. second, as yet no studies have identified a cognitive bias that, unlike overconfidence and optimism, acts positively both on firm creation and survival. in research on failure avoidance in high consequence industries, distrust is emerging as an important cognitive bias explaining non-failure in non-routine situations, but entrepreneurship research has paid little attention to distrust in entrepreneurs. third, research on cognitive biases is generally affected by survival bias: most studies have focused on cognitive biases among surviving firms alone, but we still know little about diverse multilevel impacts on both survivors and non-survivors. to address this gap, we built a multilevel model explaining the interplay of cognitive biases, the different cognitive make-ups of entrepreneurs, and their influence on organization and survival. our results show that overconfidence is the chief negative influence on survival. optimism bias and distrust are conflicting cognitive biases influencing overconfidence, but showing a directly opposite influence on firm survival respectively. further, entrepreneur's cognitive types show diverse influence on organization such as the propensity to delegate and financial orientation, but congruent positive influence on opportunity orientation. the study concludes by suggesting that entrepreneurs should balance their organizations, for instance through hiring policies, to prevent extreme overconfidence, optimism or distrust becoming a predominant organizational culture. © 2013 elsevier ltd."

### Category

1. Cognitive science
2. General
3. General psychology
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