

List of cognitive biases

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A cognitive bias describes a replicable pattern in perceptual distortion, inaccurate judgment, illogical interpretation, or what is broadly called irrationality.^{[1][2][3]} They are the result of distortions in the human mind that always lead to the same pattern of poor judgment, often triggered by a particular situation. Identifying "poor judgment," or more precisely, a "deviation in judgment," requires a standard for comparison, i.e. "good judgment". In scientific investigations of cognitive bias, the source of "good judgment" is that of people outside the situation hypothesized to cause the poor judgment, or, if possible, a set of independently verifiable facts. The existence of most of the particular cognitive biases listed below has been verified empirically in psychology experiments.

Cognitive biases are influenced by evolution and natural selection pressure. Some are presumably adaptive and beneficial, for example, because they lead to more effective actions in given contexts or enable faster decisions, when faster decisions are of greater value for reproductive success and survival. Others presumably result from a lack of appropriate mental mechanisms, i.e. a general fault in human brain structure, from the misapplication of a mechanism that is adaptive (beneficial) under different circumstances, or simply from noisy mental processes. Despite several decades of effort, no comprehensive theory of what creates these biases has emerged. This is why it is not straightforward to group and categorize them, and this results in what has been called "a grab bag of heuristics and biases, with no quantitative psychological theory describing the underlying processes".^[4] 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]

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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. They arise as a replicable result to a specific condition: when confronted with a specific situation, the deviation from what is normatively expected can be characterized by:

- **Ambiguity effect** – the tendency to avoid options for which missing information makes the probability seem "unknown."^[6]
- **Anchoring** – the tendency to rely too heavily, or "anchor," on a past reference or on one trait or piece of information when making decisions (also called "insufficient adjustment").
- **Attentional Bias** – the tendency of emotionally dominant stimuli in one's environment to preferentially draw and hold attention and to neglect relevant data when making judgments of a correlation or association.
- **Availability heuristic** – estimating what is more likely by what is more available in memory, which is biased toward vivid, unusual, or emotionally charged examples.
- **Availability cascade** – a self-reinforcing process in which a collective belief gains more and more plausibility through its increasing repetition in public discourse (or "repeat something long enough and it will become true").
- **Backfire effect** – when people react to disconfirming evidence by strengthening their beliefs.^[7]
- **Bandwagon effect** – the tendency to do (or believe) things because many other people do (or believe) the same. Related to groupthink and herd behavior.
- **Base rate neglect or Base rate fallacy** – the tendency to base judgments on specifics, ignoring general statistical information.^[8]
- **Belief bias** – an effect where someone's evaluation of the logical strength of an argument is biased by the believability of the conclusion.^[9]
- **Bias blind spot** – 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.^[10]
- **Choice-supportive bias** – the tendency to remember one's choices as better than they actually were.^[11]
- **Clustering illusion** – the tendency to under-expect runs, streaks or clusters in small samples of random data
- **Confirmation bias** – the tendency to search for or interpret information in a way that confirms one's preconceptions.^[12]
- **Congruence bias** – the tendency to test hypotheses exclusively through direct testing, in contrast to tests of possible alternative hypotheses.
- **Conjunction fallacy** – the tendency to assume that specific conditions are more probable than general ones.^[13]
- **Conservatism or Regressive Bias** – tendency to underestimate high values and high likelihoods/probabilities/frequencies and overestimate low ones. Based on the observed evidence, estimates are not extreme enough^{[5][14][15]}
- **Conservatism (Bayesian)** – the tendency to belief update insufficiently but predictably as a result of new evidence (estimates of conditional probabilities are conservative)^{[5][16][17]}

- **Contrast effect** – the enhancement or diminishing of a weight or other measurement when compared with a recently observed contrasting object.^[18]
- **Curse of knowledge** – when better-informed people lose the ability to understand lesser-informed people
- **Decoy effect** – preferences change when there is a third option that is asymmetrically dominated
- **Denomination effect** – the tendency to spend more money when it is denominated in small amounts (e.g. coins) rather than large amounts (e.g. bills).^[19]
- **Distinction bias** – the tendency to view two options as more dissimilar when evaluating them simultaneously than when evaluating them separately.^[20]
- **Duration neglect** – the neglect of the duration of an episode in determining its value
- **Empathy gap** – the tendency to underestimate the influence or strength of feelings, in either oneself or others.
- **Endowment effect** – the fact that people often demand much more to give up an object than they would be willing to pay to acquire it.^[21]
- **Essentialism** – categorizing people and things according to their essential nature, in spite of variations.^[22]
- **Exaggerated expectation** – based on the estimates, real-world evidence turns out to be less extreme than our expectations (conditionally inverse of the conservatism bias).^{[5][23]}
- **Experimenter's or Expectation bias** – 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.^[24]
- **Functional fixedness** - limits a person to using an object only in the way it is traditionally used
- **Focusing effect** – the tendency to place too much importance on one aspect of an event; causes error in accurately predicting the utility of a future outcome.^[25]
- **Framing effect** – drawing different conclusions from the same information, depending on how that information is presented.
- **Frequency illusion** – the illusion in which a word, a name or other thing that has recently come to one's attention suddenly appears "everywhere" with improbable frequency (see also recency illusion). Sometimes called "**The Baader-Meinhof phenomenon**".
- **Gambler's fallacy** – the tendency to think that future probabilities are altered by past events, when in reality they are unchanged. Results from an erroneous conceptualization of the Law of large numbers. 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."
- **Hard-easy effect** – Based on a specific level of task difficulty, the confidence in judgments is too conservative and not extreme enough^{[5][26][27][28]}
- **Hindsight bias** – sometimes called the "I-knew-it-all-along" effect, the tendency to see past events as being predictable^[29] at the time those events happened.

(sometimes phrased as "Hindsight is 20/20")

- **Hostile media effect** – the tendency to see a media report as being biased due to one's own strong partisan views.
- **Hyperbolic discounting** – the tendency for people to have a stronger preference for more immediate payoffs relative to later payoffs, where the tendency increases the closer to the present both payoffs are.^[30]
- **Illusion of control** – the tendency to overestimate one's degree of influence over other external events.^[31]
- **Illusion of validity** – when consistent but predictively weak data leads to confident predictions
- **Illusory correlation** – inaccurately perceiving a relationship between two unrelated events.^{[32][33]}
- **Impact bias** – the tendency to overestimate the length or the intensity of the impact of future feeling states.^[34]
- **Information bias** – the tendency to seek information even when it cannot affect action.^[35]
- **Insensitivity to sample size** – the tendency to under-expect variation in small samples
- **Irrational escalation** – 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.
- **Jealousy bias** – a tendency to have persistent paranoid thoughts about a "mate poacher" and/or personal inadequacies in comparison to someone else. The irrational thoughts disrupt environments and routines because the bias creates compulsions.^[36]
- **Just-world hypothesis** – 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).
- **Knowledge bias** – the tendency of people to choose the option they know best rather than the best option.
- **Less-is-better effect** – a preference reversal where a dominated smaller set is preferred to a larger set
- **Loss aversion** – "the disutility of giving up an object is greater than the utility associated with acquiring it".^[37] (see also Sunk cost effects and endowment effect).
- **Mere exposure effect** – the tendency to express undue liking for things merely because of familiarity with them.^[38]
- **Money illusion** – the tendency to concentrate on the nominal (face value) of money rather than its value in terms of purchasing power.^[39]
- **Moral credential effect** – the tendency of a track record of non-prejudice to increase subsequent prejudice.
- **Negativity bias** – the tendency to pay more attention and give more weight to negative than positive experiences or other kinds of information.
- **Neglect of probability** – the tendency to completely disregard probability when making a decision under uncertainty.^[40]

- **Normalcy bias** – the refusal to plan for, or react to, a disaster which has never happened before.
- **Observer-expectancy effect** – when a researcher expects a given result and therefore unconsciously manipulates an experiment or misinterprets data in order to find it (see also subject-expectancy effect).
- **Omission bias** – the tendency to judge harmful actions as worse, or less moral, than equally harmful omissions (inactions).^[41]
- **Optimism bias** – the tendency to be over-optimistic, overestimating favorable and pleasing outcomes (see also wishful thinking, valence effect, positive outcome bias).^{[42][43]}
- **Ostrich effect** – ignoring an obvious (negative) situation.
- **Outcome bias** – 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.
- **Overconfidence effect** – 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.^{[5][44][45][46]}
- **Pareidolia** – 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 man in the moon, and hearing non-existent hidden messages on records played in reverse.
- **Pessimism bias** – the tendency for some people, especially those suffering from depression, to overestimate the likelihood of negative things happening to them.
- **Planning fallacy** – the tendency to underestimate task-completion times.^[34]
- **Post-purchase rationalization** – the tendency to persuade oneself through rational argument that a purchase was a good value.
- **Pro-innovation bias** – the tendency to reflect a personal bias towards an invention/innovation, while often failing to identify limitations and weaknesses or address the possibility of failure.
- **Pseudocertainty effect** – the tendency to make risk-averse choices if the expected outcome is positive, but make risk-seeking choices to avoid negative outcomes.^[47]
- **Reactance** – 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 Reverse psychology).
- **Reactive devaluation** – devaluing proposals that are no longer hypothetical or purportedly originated with an adversary
- **Recency bias** – a cognitive bias that results from disproportionate salience of recent stimuli or observations – the tendency to weigh recent events more than earlier events (see also *peak-end rule*, *recency effect*).
- **Recency illusion** – the illusion that a phenomenon, typically a word or language usage, that one has just begun to notice is a recent innovation (see also frequency illusion).
- **Restraint bias** – the tendency to overestimate one's ability to show restraint in the face of temptation.
- **Rhyme as reason effect** – rhyming statements are perceived as more truthful.
- **Selective perception** – the tendency for expectations to affect perception.
- **Semmelweis reflex** – the tendency to reject new evidence that contradicts a

paradigm.^[48]

- **Social comparison bias** – the tendency, when making hiring decisions, to favour potential candidates who don't compete with one's own particular strengths.^[49]
- **Social desirability bias** - the tendency to over-report socially desirable characteristics or behaviours and under-report socially undesirable characteristics or behaviours.^[50]
- **Status quo bias** – the tendency to like things to stay relatively the same (see also loss aversion, endowment effect, and system justification).^{[51][52]}
- **Stereotyping** – expecting a member of a group to have certain characteristics without having actual information about that individual.
- **Subadditivity effect** – the tendency to estimate that the likelihood of an event is less than the sum of its (more than two) mutually exclusive components.^[53]
- **Subjective validation** – perception that something is true if a subject's belief demands it to be true. Also assigns perceived connections between coincidences.
- **Time-saving bias** – 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.
- **Unit bias** – the tendency to want to finish a given unit of a task or an item. Strong effects on the consumption of food in particular.^[54]
- **Well travelled road effect** – underestimation of the duration taken to traverse oft-traveled routes and over-estimate the duration taken to traverse less familiar routes.
- **Zero-risk bias** – preference for reducing a small risk to zero over a greater reduction in a larger risk.

Social biases

Most of these biases are labeled as attributional biases.

- **Actor-observer bias** – the tendency for explanations of other individuals' behaviors to overemphasize the influence of their personality and underemphasize the influence of their situation (see also Fundamental attribution error), 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).
- **Defensive attribution hypothesis** – defensive attributions are made when individuals witness or learn of a mishap happening to another person. In these situations, attributions of responsibility to the victim or harm-doer for the mishap will depend upon the severity of the outcomes of the mishap and the level of personal and situational similarity between the individual and victim. More responsibility will be attributed to the harm-doer as the outcome becomes more severe, and as personal or situational similarity decreases.
- **Dunning–Kruger effect** an effect in which incompetent people fail to realise they are incompetent because they lack the skill to distinguish between competence and

incompetence^[55]

- **Egocentric bias** – occurs when people claim more responsibility for themselves for the results of a joint action than an outside observer would.
- **Extrinsic incentives bias** – an exception to the *fundamental attribution error*, when people view others as having (situational) extrinsic motivations and (dispositional) intrinsic motivations for oneself
- **Forer effect** (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, horoscopes.
- **False consensus effect** – the tendency for people to overestimate the degree to which others agree with them.^[56]
- **Fundamental attribution error** – 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 (see also actor-observer bias, group attribution error, positivity effect, and negativity effect).^[57]
- **Halo effect** – the tendency for a person's positive or negative traits to "spill over" from one area of their personality to another in others' perceptions of them (see also physical attractiveness stereotype).^[58]
- **Illusion of asymmetric insight** – people perceive their knowledge of their peers to surpass their peers' knowledge of them.^[59]
- **Illusion of external agency** – when people view self-generated preferences as instead being caused by insightful, effective and benevolent agents
- **Illusion of transparency** – people overestimate others' ability to know them, and they also overestimate their ability to know others.
- **Illusory superiority** – 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").^[60]
- **Ingroup bias** – the tendency for people to give preferential treatment to others they perceive to be members of their own groups.
- **Just-world phenomenon** – the tendency for people to believe that the world is just and therefore people "get what they deserve."
- **Moral luck** – the tendency for people to ascribe greater or lesser moral standing based on the outcome of an event rather than the intention
- **Naive cynicism** – expecting more *egocentric bias* in other than in oneself
- **Outgroup homogeneity bias** – individuals see members of their own group as being relatively more varied than members of other groups.^[61]
- **Projection bias** – the tendency to unconsciously assume that others (or one's future selves) share one's current emotional states, thoughts and values.^[62]
- **Self-serving bias** – 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 group-serving bias).^[63]
- **System justification** – 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.)

- **Trait ascription bias** – the tendency for people to view themselves as relatively variable in terms of personality, behavior, and mood while viewing others as much more predictable.
- **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^[64]

Memory errors and 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:

- **Choice-supportive bias**: remembering chosen options as having been better than rejected options (Mather, Shafir & Johnson, 2000)
- **Change bias**: after an investment of effort in producing change, remembering one's past performance as more difficult than it actually was^[65]
- **Childhood amnesia**: 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 lower than they actually were and low ones higher than they actually were. Based on the evidence, memories are not extreme enough^{[66][67]}
- **Consistency bias**: incorrectly remembering one's past attitudes and behaviour as resembling present attitudes and behaviour.
- **Context effect**: 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)
- **Cross-race effect**: the tendency for people of one race to have difficulty identifying members of a race other than their own
- **Cryptomnesia**: a form of *misattribution* where a memory is mistaken for imagination, because there is no subjective experience of it being a memory.^[65]
- **Egocentric bias**: 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
- **Fading affect bias**: a bias in which the emotion associated with unpleasant memories fades more quickly than the emotion associated with positive events.^[68]
- **False memory** – a form of *misattribution* where imagination is mistaken for a memory.

- **Generation effect (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.
- **Google effect:** the tendency to forget information that can be easily found online.
- **Hindsight bias:** the inclination to see past events as being predictable; 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.
- **Illusion-of-truth effect:** 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.
- **Illusory correlation** – inaccurately remembering a relationship between two events. [5][69]
- **Lag effect:** see spacing effect
- **Leveling and Sharpening:** 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.^[70]
- **Levels-of-processing effect:** that different methods of encoding information into memory have different levels of effectiveness (Craik & Lockhart, 1972).
- **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.
- **Misinformation effect:** that misinformation affects people's reports of their own memory.
- **Misattribution:** when information is retained in memory but the source of the memory is forgotten. One of Schacter's (1999) Seven Sins of Memory, Misattribution was divided into Source Confusion, Cryptomnesia and False Recall/False Recognition.^[65]
- **Modality effect:** 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 via writing.
- **Mood congruent memory bias:** the improved recall of information congruent with one's current mood.
- **Next-in-line effect:** that a person in a group has diminished recall for the words of others who spoke immediately before or after this person.
- **Osborn effect:** that being intoxicated with a mind-altering substance makes it harder to retrieve motor patterns from the Basal Ganglion. (e.g., Shushaka, 1958).
- **Part-list cueing effect:** that being shown some items from a list makes it harder to retrieve the other items (e.g., Slamecka, 1968).
- **Peak-end rule:** 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 traumatic event.

- **Picture superiority effect:** that concepts are much more likely to be remembered experientially if they are presented in picture form than if they are presented in word form.^[71]
- **Placement bias** – tendency to remember ourselves to be better than others at tasks at which we rate ourselves above average (also **Illusory superiority** or **Better-than-average effect**)^[72] and tendency to remember ourselves to be worse than others at tasks at which we rate ourselves below average (also **Worse-than-average effect**)^{[5][64]}
- **Positivity effect:** that older adults favor positive over negative information in their memories.
- **Primacy effect, Recency effect & Serial position effect**^[73]: that items near the end of a list are the easiest to recall, followed by the items at the beginning of a list; items in the middle are the least likely to be remembered.^[73]
- **Processing difficulty effect**
- **Reminiscence bump:** the recalling of more personal events from adolescence and early adulthood than personal events from other lifetime periods (Rubin, Wetzler & Nebes, 1986; Rubin, Rahhal & Poon, 1998).
- **Rosy retrospection:** 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.
- **Self-serving bias** – perceiving oneself responsible for desirable outcomes but not responsible for undesirable ones.
- **Source Confusion:** misattributing the source of a memory, e.g. misremembering that one saw an event personally when actually it was seen on television.
- **Spacing effect:** that information is better recalled if exposure to it is repeated over a longer span of time.
- **Stereotypical bias:** memory distorted towards stereotypes (e.g. racial or gender), e.g. "black-sounding" names being misremembered as names of criminals.^[65]
- **Suffix effect:** the weakening of the recency effect in the case that an item is appended to the list that the subject is *not* required to recall (Morton, Crowder & Prussin, 1971).
- **Suggestibility:** a form of misattribution where ideas suggested by a questioner are mistaken for memory.
- **Subadditivity effect** – the tendency to estimate that the likelihood of a remembered event is less than the sum of its (more than two) mutually exclusive components.^{[5][74]}
- **Telescoping effect:** 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.
- **Testing effect:** that frequent testing of material that has been committed to memory improves memory recall.
- **Tip of the tongue** phenomenon: 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 an instance of "blocking" where multiple similar memories are being

recalled and interfere with each other.^[65]

- **Verbatim effect:** that the "gist" of what someone has said is better remembered than the verbatim wording (Poppenk, Walia, Joannisse, Danckert, & Köhler, 2006).
- **Von Restorff effect:** that an item that sticks out is more likely to be remembered than other items (von Restorff, 1933).
- **Zeigarnik effect:** 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^[75]
- **Attribution theory**
 - **Saliency**
 - **Naïve realism**
- **Cognitive dissonance**, and related:
 - **Impression management**
 - **Self-perception theory**
- **Heuristics**, 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^[32]
 - **Representativeness heuristic** – judging probabilities on the basis of resemblance^[32]
 - **Affect heuristic** – basing a decision on an emotional reaction rather than a calculation of risks and benefits^[76]
- Some theories of emotion such as:
 - **Two-factor theory of emotion**
 - **Somatic markers hypothesis**
- **Introspection illusion**
- Misinterpretations or **misuse of statistics**; **innumeracy**.

Methods for dealing with cognitive biases

Reference class forecasting was developed by Daniel Kahneman, Amos Tversky, and Bent Flyvbjerg to eliminate or reduce the impact of cognitive biases on decision making.^[77]

See also

- Cognitive bias mitigation
- Affective forecasting
- Black swan theory
- Cognitive distortion
- Cross-race effect
- Dysrationalia
- Index of public relations-related articles
- Publication bias
- List of common misconceptions
- List of fallacies
- List of memory biases
- Lists of thinking-related topics
- List of topics related to public relations and propaganda
- Logical fallacy
- Ludic fallacy
- Media bias
- Recall bias
- Systematic bias

Notes

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