

# A Corpus Study on the Normativity of *Rationality*

Kevin Reuter<sup>1</sup>, Lucien Baumgartner<sup>2</sup>, and Michael Messerli<sup>2</sup>

<sup>1</sup>*University of Bern*

<sup>2</sup>*University of Zurich*

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## **Abstract**

In this paper, we address a key question that has been central to discussions on rationality: is the concept of rationality normative or merely descriptive? We present the findings of a corpus-linguistic study revealing that people commonly perceive the concept of rationality as normative.

**Keywords:** Rationality; Ordinary Concept of Rationality; Normativity; Empirical Studies.

## **1 The Normativity of Rationality**

When discussing language, we often classify concepts as purely descriptive, e.g., *mind* and *life*, or being normative, e.g., thin, thick, and dual character concepts like *ought* (Chrisman, 2012), *rude* (Väyrynen 2013), and *artist* (Reuter, 2019). However, certain concepts spark lively debates on whether a certain concept is purely descriptive or (at least partially) normative, including *conspiracy theory* (Coady 2007; Napolitano & Reuter 2023), *discrimination* (Lippert-Rasmussen 2006, Willemsen et al. 2024), and *ignorance* (Pritchard 2021, Meylan & Reuter forthcoming). These debates have significant implications, raising questions about whether the state should

actively intervene to curb conspiracy theories, whether any forms of discrimination might be justifiable, or whether ignorance represents simply a deficit of knowledge or a more profound failure of epistemic duty.

Likewise, the concept of *rationality* has yet to achieve consensus regarding its classification as either normative or descriptive, despite its pivotal role in economics, decision theory and philosophy. Those who use ‘rationality’ in the normative sense often argue that rationality dictates how individuals *should* make decisions—utilizing logic and reason to optimize outcomes or adhere to consistent principles (Elster 1989). Those who use ‘rationality’ in a descriptive sense, aim to *describe* actual decision-making processes, thereby also highlighting various cognitive and environmental factors that may lead people to deviate from certain behaviors.<sup>1</sup> This dual perspective is important for multiple reasons. It influences economic models that forecast market behaviors (Thaler 2015), informs ethical theories guiding moral reasoning (Foot 2003), and affects the design and implementation of policies across public health, education, and governance. These fields depend on a clear understanding of rationality’s meaning and its practical implications within their respective contexts.

So far, there are only very few empirical studies on the folk notion of rationality. Tobia (2018), Grossmann et al. (2020), Baumgartner and Kneer (2023), as well as Grüning & Beisbart (ms) provide some exceptions but only Grossmann et al. (2020) partially focus on the question we are interested in. According to their findings, the folk notion of *rationality* is more descriptive in the sense that it focuses on individual attributes and preferences distinguished from *reasonableness* which is more normative in character.

Philosophical experts on rationality also remain divided, a division that has become even more pronounced since Broome’s (1999) influential essay on normative requirements, which has triggered a vigorous debate between reason-based and coherence-based theorists. According to reason-based theorists, rationality entails responding correctly to reasons, leading many to regard it as a clearly normative concept. For instance, philosophers such as Kiesewetter and Lord argue that rationality has a strong deontic significance (Lord, 2017, p. 1134; Kiesewetter, 2017, p. 22): One ought to be rational, and if one is not rational, then this is a bad thing.

According to coherence-based theorists, rationality can broadly be under-

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<sup>1</sup>Arguably, when ‘rationality’ is used in this descriptive sense, statistical norms still play an important role.

stood as having coherent attitudes and, hence, is not a (strong) normative concept (Broome 1999). Kolodny (2008) for instance, argues that there is no requirement to be coherent. Or, put in another way, the mere fact that rationality is about having coherent attitudes does not imply that they ought to be so aligned. Similarly, Davidson (2001) argues for a rather descriptive notion of rationality. According to Davidson (2001), rationality is dependent on agents possessing propositional attitudes, where the connection between reason (the agent’s beliefs and desires) and action is rational, as the belief-desire pair specifies the reason for the action. However, this description does not imply that those desires, beliefs, and actions are justified or reasonable.

It is important to mention that not all coherence theorists adhere to a descriptive notion of rationality. Worsnip (2018, p. 117) has claimed that an agent *ought* to have coherent intentions or beliefs independent of whether the intention is based on good reasons or whether the belief is true (see also Worsnip, 2022). This understanding of the requirements of rationality, has been challenged by reason-based theorists, however. In their view—similar to Kolodny’s position mentioned above—(in)coherence is often (only) an indicator of how an agent functions. And this functioning does not tell the agent what he ought, or has reason, to do.

Defenders of coherence-based theories seem to have two possible options: First, they might straightforwardly reject the idea that coherence is normative *in any meaningful way*. A consequence of this position is that they would also need to reject the idea that *rationality* is normative *in any meaningful way*. Second, they may argue that, although the concepts of coherence and rationality are not normative concepts, coherence is normative in the sense that coherence is reason-giving. Accordingly, if coherence requires you to act a certain way, you have a reason to act that way. Broome (2013, p. 203) favors the latter response. Importantly though, Broome (2020a, p. 299) not only argues that there is no normative sense of ‘rational’ that is synonymous with what one ought to do, he also (2020b) makes it clear that rationality is not a strong normative concept.<sup>2</sup>

The question of whether people believe the concept of rationality to be

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<sup>2</sup>Note that Broome (2020b, p. 40; 2021, p. 100) introduces the concept of so-called “reified rationality” (which is not a mental property), and emphasizes that there is a connection between rationality and normativity in the sense that rationality may be a source of normativity (2020b, p. 44; 2021, p. 117). However, Broome’s (2020b, p. 38) main point is that rationality is not a strong normative concept because rationality is a mental property while normativity is not.

strongly normative or not is a straightforward empirical one. Accordingly, these debates will certainly benefit from empirical data that can provide support for one position or the other. We will now present the results of a corpus study that investigates the normativity of the concept of rationality.

## 2 A Corpus Analysis of the Normativity of *Rationality*

There are multiple ways to test whether people consider the term ‘rational’ to be normative.<sup>3</sup> One way is to ask them directly. Another way is to present them with a specific case and raise the question of whether the term ‘rational’ is applicable. Both of these methods have important shortcomings. With regard to the former, whether people give reliable verdicts about the meanings of terms outside of a natural context is questionable. With regard to the latter, specific scenarios might be biased toward a desired outcome, or might simply not be representative of people’s overall notion of rationality. We therefore decided to conduct a corpus study in which we investigated people’s use of the terms ‘rational’ and ‘irrational’ by analyzing large amounts of texts. Such an approach avoids the shortcomings of questionnaire-based experimental methods, mainly because corpus studies observe people’s use of terms in everyday contexts (for recent corpus-linguistic approaches to philosophical problems, as well as the advantages and disadvantages of this approach, see Sytsma et al. 2019, Reuter & Baumgartner 2024, and Chartrand 2022).

We decided to operationalize the extent to which ‘rational’ is considered a normative term by investigating those adjectives that are frequently conjoined with the adjective ‘rational’. We know that the connective ‘and’ is often used to conjoin adjectives that have the same polarity.<sup>4</sup> For example, it is more natural to say “rude and vicious” and “generous and virtuous” than

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<sup>3</sup>In this study, we investigate how the term ‘rational’ is used and hence switch from speaking about the concept of *rationality* to the term ‘rational’. While we need to be careful to distinguish between terms and concepts, few scholars will doubt that the way people use the term ‘rational’ will be relevant for characterizing the concept of *rationality*.

<sup>4</sup>As Elhadad & McKeown (1990) noted, linguistic constructs such as conjunctions impose constraints on the polarity of the arguments. Hatzivassiloglou & McKeown (1997, p. 175) were among the first to demonstrate “that conjunctions between adjectives provide indirect information about orientation”.

it is to say “rude and virtuous” and “generous and vicious”. Accordingly, if ‘rational’ and ‘irrational’ have a strong normative dimension, we would expect people to conjoin other normative terms that have the same polarity with our target adjective. Thus, “rational and sane” and “irrational and stupid” should be typical and very common, whereas “rational and ignorant” and “irrational and clear” should be atypical and less common.<sup>5</sup> Arguably, our method only reveals the evaluative dimension of ‘rational’, but not its normative dimension. We will deal with this objection in Section 2.3 below.

An alternative approach could have involved collecting phrases structured as “rational but x” and “irrational but x”. Typically, the conjunction ‘and’ links adjectives sharing the same polarity, whereas ‘but’ tends to join adjectives with opposing polarities. Therefore, we might expect phrases like “rational but ugly” or “irrational but powerful”, where ‘rational’ pairs with negative evaluative adjectives and ‘irrational’ with positive ones. However, the occurrence of adjectives linked by ‘but’ is significantly less frequent compared to those linked by ‘and’. For instance, in the NOW corpus, there are approximately 2,700 instances of “irrational and x”, but only about 50 for “irrational but x”. Gathering a sufficient number of examples for a robust statistical analysis using ‘but’ would be considerably more challenging and time-consuming. Consequently, we chose to focus our analysis on combinations using the ‘and’ connective.

## 2.1 Methods and Results

As we are primarily interested in the way that laypeople use the terms ‘rational’ and ‘irrational’, a corpus using posts and discussion notes from Reddit, the social news website, was created (no specific subreddits were selected). We then searched for and collected comments featuring the phrases “irrational and x” and “rational and x”. Approximately 5,000 comments were collected for each phrase (5010 for “irrational and x” and 4918 for “rational and x”), through the now defunct Reddit-API, *Pushshift*.<sup>6</sup> The data collection process started on March 20, 2021, using a programmed crawler that

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<sup>5</sup>Willemsen et al. (2024) conducted a corpus study using the ‘and’ modifier to show that evaluative adjectives behave differently from descriptive adjectives (we will return to such a comparison in Section 2.3).

<sup>6</sup>We could have opted to search for the phrases “x and irrational” and “x and rational”, in which the order of adjectives is reversed. As demonstrated by the data from the NOW corpus presented in Section 2.2, the order of adjectives seems largely irrelevant.

searched backward through time in batches of Reddit comments for adjective conjunctions in phrases containing “and rational” (or “and irrational”), extracting relevant comments until our quota was reached.<sup>7</sup> The data collection was not restricted to any specific subreddit (i.e., thematic Reddit community).

Table 1 below lists the 30 most frequent adjectives that were conjoined with “irrational and” and with “rational and”. These adjectives account for 41.3% (resp. 55.8%) of all the uses we collected. In order to determine the evaluative intensity of all the conjoined adjectives, we used the sentiment dictionary SentiWords, which contains values that indicate the polarity as well as the strength of the polarity for tens of thousands of English words. These values range from “-1” meaning very negative to “+1” meaning very positive. For example, the term ‘arrogant’ is listed as having a sentiment value of -0.73 and ‘happy’ of +0.64. We measured the evaluative intensity of all the conjoined adjectives by calculating the average sentiment value. For those adjectives that were conjoined with “rational and [target adjective]”, the average sentiment value was +0.315. The average sentiment values for adjectives that were connected with ‘irrational’ (“irrational and [target adjectives]”) was -0.322.

Our data analysis reveals a strong co-occurrence of negatively connoted adjectives with the term ‘irrational’. Almost all the terms in the 30 most frequently conjoined adjectives are negative thick adjectives or derogatory adjectives. These results strongly suggest that ‘irrational’ is not considered a descriptive term. The results for the term ‘rational’ are somewhat more varied, and include terms such as ‘logical’, ‘intelligent’, and ‘objective’, which neither support nor contradict the idea that ‘rational’ is a normative concept. However, most terms, such as ‘sane’, ‘sensible’, ‘mature’, ‘good’, and ‘moral’ clearly indicate that many people consider the concept of rationality to be a normative concept that is used to approve of a person’s behavior. Importantly, the average sentiment values for ‘rational’ (+0.315) and ‘irrational’ (-0.322) suggest that the term ‘rational’ is as positive as the term ‘irrational’ is negative.

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<sup>7</sup>Some comment batches did not contain any adjective conjunction. In such cases, the crawler would jump back 8 minutes in time to continue the search.

irrational and x			rational and x		
Term	Number	Percentage	Term	Number	Percentage
emotional	255	5.09	logical	501	10.19
illogical	204	4.07	reasonable	348	7.08
stupid	192	3.83	calm	157	3.19
unreasonable	130	2.59	intelligent	153	3.11
dangerous	102	2.04	irrational	140	2.85
angry	88	1.76	sane	123	2.50
selfish	79	1.58	objective	112	2.28
crazy	78	1.56	normal	90	1.83
immature	70	1.40	sensible	81	1.65
unfair	68	1.36	mature	74	1.50
violent	55	1.10	critical	66	1.34
dumb	51	1.02	scientific	63	1.28
insane	49	0.98	fair	60	1.22
ignorant	48	0.96	good	60	1.22
delusional	47	0.94	informed	54	1.10
unpredictable	47	0.94	emotional	52	1.06
ridiculous	44	0.88	open	49	1.00
wrong	42	0.84	compassionate	48	0.98
harmful	40	0.80	respectful	48	0.98
impulsive	38	0.76	realistic	47	0.96
irresponsible	38	0.76	smart	47	0.96
unstable	38	0.76	moral	45	0.92
paranoid	36	0.72	empathetic	44	0.89
cruel	35	0.70	coherent	43	0.87
weird	35	0.70	justified	43	0.87
hateful	34	0.68	honest	41	0.83
aggressive	32	0.64	thoughtful	41	0.83
unfounded	32	0.64	healthy	39	0.79
erratic	31	0.62	clear	37	0.75
immoral	31	0.62	pragmatic	37	0.75
	2069	41.30		2743	55.77

Table 1: A list of the 30 most frequent adjectives conjoined with ‘irrational’ and ‘rational’ from our self-built corpus based on Reddit data.

## 2.2 Data from the NOW Corpus

At this stage, one might wonder whether the self-built Reddit corpus accurately represents ordinary English speakers? While Reddit provides a vast pool of natural language data, it is also known for hosting controversial opinions and AI generated data. This could potentially distort the assembled uses of ‘rational’ and ‘irrational’. To address this concern, we decided to also display the results from the NOW corpus, one of the largest open-access corpora available online, containing 19 billion words from web-based newspapers and magazines from 2010 to the present (as of June 2024). Although journalistic articles might also carry their own biases, similar findings between the

two sources would strengthen the robustness and representativeness of our results. We used the same methodology again, and the results are shown in Table 2 (upper part). Additionally, we analyzed the reverse order of the adjectives, examining the use of the phrases “*ADJ* and irrational” as well as “*ADJ* and rational” (Table 2 (lower part)).<sup>8</sup> Readers can easily replicate our analysis by visiting <https://www.english-corpora.org/now/>, registering (a process that takes only 2 minutes), and entering [rational and ADJ] and [irrational and ADJ] (without the square brackets) into the search field.

irrational and x			rational and x		
Term	Number	Percentage	Term	Number	Percentage
disgraceful	251	6.50	reasonable	301	5.17
unreasonable	239	6.19	logical	286	4.92
unlawful	205	5.31	emotional	173	2.97
illogical	111	2.87	irrational	170	2.92
unconstitutional	95	2.46	pragmatic	137	2.36
irresponsible	78	2.02	scientific	131	2.25
dangerous	72	1.86	sensible	113	1.94
arbitrary	72	1.86	fair	102	1.75
emotional	70	1.81	responsible	102	1.75
unfair	62	1.61	objective	98	1.68

  

x and irrational			x and rational		
Term	Number	Percentage	Term	Number	Percentage
arbitrary	234	6.31	calm	359	6.55
rational	170	4.58	reasonable	307	6.28
unlawful	149	4.02	logical	294	6.02
unreasonable	126	3.40	fair	149	3.05
illogical	106	2.86	scientific	140	2.87
emotional	87	2.34	emotional	130	2.66
unfair	71	1.91	sane	119	2.44
illegal	70	1.89	peaceful	108	2.21
dangerous	56	1.51	sensible	108	2.21
irresponsible	50	1.35	objective	78	1.60

Table 2: A list of the 10 most frequent adjectives conjoined with “and” after “irrational” / “rational” (upper part of the table), as well as before “irrational” / “rational” (lower part of the table) from the NOW Corpus.

A comparison between the two tables reveals some notable differences. For example, ‘calm’ and ‘intelligent’ appear more frequently with “rational and” in the Reddit corpus than in the NOW corpus. However, the overall conclusion remains robust. Most adjectives conjoined with “irrational and” are distinctly negative, while those conjoined with “rational and” are predominantly positive. Additionally, there is significant overlap in the most

<sup>8</sup>Thanks to a reviewer of this journal for this suggestion.



frequent terms for both phrases across the two corpora.

### 2.3 From Polarity to Evaluativity to Normativity

While our corpus studies suggest that *rationality* is a normative concept, this conclusion can be contested. Our data merely show that ‘rational’ and ‘irrational’ carry positive and negative polarity, respectively. To resist the idea that ‘rational’ is a normative term, two objections can be raised. First, one might argue that certain terms, like ‘sunny’ are value-laden without being evaluative, and ‘rational’ could be similar. Second, even if ‘rational’ is evaluative, this does not necessarily imply normativity. Thus, moving from polarity to normativity requires addressing both objections. Let us begin by exploring the shift from polarity to evaluativity.<sup>9</sup>

Our raw data does not itself rule out the possibility that the value-laden dimension of ‘rational’ and ‘irrational’ is merely *associated* with—and not semantically entailed by—these terms. For example, terms such as ‘sunny’ or ‘bloody’ are value associated without being intrinsically evaluative. Thus, critics may be concerned that our study cannot distinguish between evaluative and value-associated concepts. However, we do not think that this objection is likely to succeed. Willemsen et al. (2024) used a similar method to identify the evaluativity of epistemic concepts. Table 3 presents the average sentiment values for the thick terms ‘illogical’ and ‘inappropriate’, as well as the value-associated terms ‘limited’ and ‘active’. The results of our corpus study suggest that the terms ‘rational’ and ‘irrational’ group together with the thick terms but not with value-associated terms.<sup>10</sup>

Turning to the second objection, even if we grant that ‘rational’ and ‘irrational’ are evaluative terms, it is another step to claim that they are normative and, therefore, action-guiding. This objection is not specific to ‘rational’, however, but can be applied more broadly to other thick terms such as ‘friendly’ and ‘rude’. Now, most philosophers seem to consider thick terms like ‘friendly’ and ‘rude’ as inherently normative. For instance, Williams (1985) argues that thick concepts are both world-guided and action-guiding.

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<sup>9</sup>We thank a reviewer of this journal for their valuable feedback, which prompted us to address these points more thoroughly.

<sup>10</sup>Another response consists of highlighting that recent studies (Reuter, Baumgartner, Willemsen, 2024) have identified that the ‘truly’ modifier can only be reasonably applied to normative concepts and not to value-associated concepts. The results from COCA and the NOW corpus suggest that “truly rational” is a relatively frequent phrase.

Category	Term	Value
normative	inappropriate	-0.40
normative	illogical	-0.33
target term	irrational	-0.32
value-associated	active	+0.07
value-associated	limited	+0.09
target term	rational	+0.31

Table 3: Sentiment values for epistemic, value-associated terms, as well as our two target terms.

This dual nature implies that thick concepts not only describe aspects of the world but also direct our behavior based on those descriptions. Kirchin (2013) presents a similar view, though with different terminology, asserting that behavior we describe with thick terms influence how we interact with others and the world. He explains that these aspects *pull* us toward certain actions, justifying some behaviors while discouraging others. For example, the positive evaluative dimension of friendliness encourages people to engage in friendly behavior, while the negative evaluative aspect of rudeness compels us to avoid rude actions.

This reasoning can also be applied to terms like ‘rational’. If ‘rational’ is understood as a positively evaluative term, it too becomes action-guiding. To elaborate, if we view being rational as a positive and desirable trait, it follows that we should strive to act rationally. The fact that being rational is seen as something good implies that we have reasons to act in rational ways (even if other reasons may counteract these reasons in specific circumstances)—just as the positive dimension of being friendly gives us reasons to act kindly. In this sense, the concept of *rationality* does not merely describe a way of thinking or decision-making; it prescribes a way of acting.

### 3 Implications, Limitations and Conclusion

In this paper, we built a corpus from the social media agglomeration website Reddit in order to examine the use of ‘rational’ and ‘irrational’ in natural language use. The results of this study suggest that the notion of rationality is a normative concept that is often attributed to approve or disapprove of people’s behavior. A comparison of this corpus data with the use of the terms ‘rational’ and ‘irrational’ on the NOW corpus, supports the conclusions of our original corpus analysis.

The outcome of our studies are in tensions with the results of Grossman et al. (2020), who argue that *rational* is more strongly associated with analytical skills. More specifically, Grossman et al. (2020) claim that, among other things, people believe that ‘reasonableness’ is more often associated with socially oriented characteristics, such as honesty, fairness and interpersonal sensitivity, while ‘rational’ is more often associated with logic, systematicity and analytical skills. While the list of the most frequent terms does indeed contain words associated with logic and analytic skills, it also includes many terms from other epistemic and moral domains, such as ‘sane’, ‘mature’, ‘fair’, ‘informed’, and ‘compassionate’. Why our methodology points into a different direction compared to Grossman et al. (2020), needs to be examined in future studies.

In conclusion, let us first address the most important limitation, and then the most significant philosophical implication. There are various ways in which rationality might manifest normativity. For instance, rationality might be instrumentally normative. If rationality is instrumentally normative, then rationality might lead to something else that is good or which one ought to pursue.<sup>11</sup> Alternatively, rationality might be normative because it is constitutive for agency (Korsgaard 1996).<sup>12</sup> In addition, one might argue that rationality itself is the reason that an agent ought to be rational, and that there is no “why-be-rational” challenge since rationality consists of responding correctly to reasons (Kiesewetter 2017, p. 160). Our results do not allow us to conclusively determine in which sense exactly rationality is normative as described above. So, what then is the main philosophical implication?

Many philosophers acknowledge the importance of analyzing the everyday concept of rationality for developing a comprehensive theory of rationality. Broome (2016), for instance, contends that theories of rationality should align with our ordinary understanding of rationality. However, Broome also asserts that the ordinary concept of rationality is not inherently normative.<sup>13</sup>

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<sup>11</sup>For a discussion, see Kiesewetter 2017, pp. 103-106; Kolodny 2005, pp. 543-544; Kolodny 2008, pp. 444-447; Broome 2007, pp. 171-172 and Wedgwood 2017, p. 5, 211, 231. While Wedgwood argues that rationality is indeed instrumentally normative, Kiesewetter, Broome, and Kolodny reject this idea.

<sup>12</sup>For a critical discussion, see Kolodny 2005, p. 544; Kolodny 2008, p. 442 and p. 447, and Wedgwood 2017, pp. 206-207.

<sup>13</sup>Note that we do not dispute his claim that the concept of rationality as used in the past might have been non-normative; however, the data pertaining to the *actual* use of the

Therefore, it appears that the results from our study present a straightforward *dilemma* for him and other philosophers who share a similar perspective: either they must reconsider their assertion that our best theory of rationality should be based on our everyday notion of rationality, or alternatively, they must develop a theory of rationality rooted in a normative concept of rationality.

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