

An Introduction To Reasoning

Real-World Reasoning

Basic Evaluation Of Inferences – Evaluating The Reasoning

1 Two Criteria Of Evaluation*

2 Ignoring Confidence Indicators*

A star () indicates that there are exercise sets covering this section and previous unmarked sections.*

This piece in relation to others: This is a chapter on the two criteria of evaluation of reasoning. It should not come before Classifying & Analyzing Reasoning as this chapter uses its terminology. For more practice evaluating simple inferences, see the chapters on Everyday Inferences.



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2007-2017

Basic Evaluation Of Inferences – Evaluating The Reasoning

1 Two Criteria Of Evaluation*

1. An inference is a set of propositions, some of which – the reasons or premises – are supposed to justify belief in another – the target claim or conclusion.

The critical thinker does not accept the conclusion of an inference just because some reasons are available; rather, the critical thinker examines the inference to make sure it is sound. For an inference to be sound, it has to meet two general criteria.

The *first* is that the propositions expressing the reasons must be true, or at least, accepted by you (the person doing the evaluating) as true.

The *second* is that the reasoning – the connection between the reasons and the target – must be good.

Here is a slogan to keep in mind when evaluating:

Check the reasons. Check the reasoning.

or (in the form of questions)

Are the premises true? Does the conclusion follow?

If *either one* of these requirements is not met, the inference is unsatisfactory.

If an inference meets these criteria, we call it *sound* (or sometimes (*properly*) *convincing* or a *good* inference). If not, it is "unsound" (or "bad", and "unconvincing").

(The criteria for a good *explanation* are given in *Inductive & Scientific Reasoning*.)

2. Imagine you are given the following:

(Since) 1 [democracy requires the consent of the governed,] 2 it is just

1. Democracy requires the consent of the governed.

2. Democracy is just.

In order to evaluate this inference you would first wonder if democracy really does

require the consent of the governed. In doing so, you are checking the truth of the reason offered. You also need to check the reasoning, by thinking about whether requiring the consent of the governed is a good reason for believing that democracy is just.

Take as another example the following inference:

Smith is going to pick Jack up from the airport and is tracking his flight on-line: 1 [The plane is delayed for 30 minutes.] (So,) 2 I don't need to leave just yet.

- 1 The plane Jack is on is delayed for 30 minutes.

- 2 Smith doesn't need to leave for the airport just yet.

Is Smith's inference sound? Again it depends on two things: the truth of the information she is working with, and the connection between the reason and the target. If the information is false, the conclusion should not be accepted. Perhaps Smith is looking at the wrong flight, or has misread the information, or perhaps the information on the web site is incorrect. The second thing to check is that the target follows from the reason. Even if the plane is delayed, perhaps she should leave now anyway, so that she can be sure to get to the airport on time.

3. To repeat: Both the reasons and the reasoning of any inference need to be checked and failure to satisfy *either one* of these two criteria is enough to reject the inference — belief of the conclusion has not been justified.

Simply forcing yourself to evaluate the reasons and the connection between the reasons and the target is a tremendous step to becoming a critical reasoner. These tasks are difficult for humans to do (at all) and difficult to do well. Humans are more interested in the conclusion than in how it is justified. Our laziness makes us inclined to accept any premises given, especially when the relationship between reasons and target is complex and requires a lot of effort to follow. Perhaps the most difficult passages to evaluate critically are those where someone argues for a conclusion which you already believe. In these cases, we are inclined to be lazy and agree that the premises are true and that there is a strong connection between premises and conclusion.

Thinking that an inference is good or bad simply because you (already) accept or reject the conclusion is called *mistaking the conclusion for the argument*.

4. One of the criteria for a sound inference is that the propositions expressing the reasons must be true or at least believed by you, the evaluator. (The other is that the reasoning is valid or strong.)

Since the propositions expressing the reasons in inferences can be about anything at all, knowing whether they are true or false requires knowledge of the relevant topics. For example, suppose as a reason a speaker asserts "The Allied forces suffered more fatalities in World War II than the Axis forces.". In order to say whether this proposition is true, you need to be knowledgeable about World War II. Whenever you cannot accept a premise as true, for whatever reason, you then say that the inference of which it is a part is unsound because it fails the first criterion.

In this book we are not able to discuss the truth or falsity of the billions of propositions concerning specific topics. This would mean discussing how different disciplines (mathematics, physics, geology, psychology, etc., etc.) gather and process evidence.

The chapter on *Problems With Meaning* discusses various ways in which the meaning of a proposition might be unclear. If a proposition lacks a clear meaning, you cannot say whether it is true or false and so the process of evaluating the premises does not even get started.

5. We turn now, however, to the second criterion, making sure that the reasoning – the connection between the reason(s) and target – is good.

To be good, the reasoning in an inference must be either valid or strong; if it is weak, it is not good.

You think the reasoning in an inference is *valid* when you think the conclusion would *have to* be true, assuming that the premises are true. In other words, you think that, if the premises are true, it is *impossible* for the conclusion to be false.

You think the reasoning in an inference is *strong* when you think, assuming the reasons are true, that the conclusion is very likely true, but not necessarily true. In other

words, the reasons make the conclusion likely but they don't guarantee it.

You think the reasoning in an inference is *weak* when you think that, assuming the reasons are true, the conclusion is only likely or not likely to be true. Another way to think about it is that the reasoning is weak when the reasons don't give enough support to the conclusion for you to be willing to accept the conclusion; the reasons fail to convince you to accept the target.

6. Here are some examples. the following is a valid inference:

1 [Every child loves candy.] 2 [Manuel is a child.] (So,) 3 Manuel loves candy.

1 Every child loves candy.

2 Manuel is a child.

3 Manuel loves candy.

If we assume the premises are true, we *have to* believe the conclusion. Notice that the first premise is dubious – not every child loves candy – but this doesn't affect the *strength of the reasoning*: it is still valid. Right now we are checking the reasoning, not the truth of the reasons.

The reasoning in the following inference, on the other hand, is strong (but not valid):

1 [Almost everyone who drives a Hummer votes Republican.] 2 [Jack drives a Hummer.] (So,) 3 he votes Republican.

1 Almost everyone who drives a Hummer votes Republican.

2 Jack drives a Hummer.

3 Jack votes Republican.

This is not valid reasoning, because Jack might be one of the few owners of Hummers who doesn't vote Republican, but it is strong: the words "almost all" tell us we can be fairly confident of the conclusion.

Two Criteria For Sound Inferences

1. The proposition(s) expressing the reason(s) are true.
2. The reasoning is at least strong.

Sound inference = true reasons + valid or strong reasoning
(any false reason **or** weak reasoning makes the inference *unsound*)

Strengths Of Reasoning In Inferences: Valid, Strong, Weak

Valid: Under the assumption that the premises are true, the conclusion would have to be true.

Strong: Under the assumption that the premises are true, the conclusion would very likely be true.

Weak: Even assuming that the premises are true, the conclusion would not very likely be true.

[Exercise Set \(1\)](#) | [Exercise Set \(2\)](#)

2 Ignoring Confidence Indicators*

1. When evaluating an inference, you think about whether the reasons successfully justify belief of the target. Basically, this means thinking about ways in which the target (the conclusion) might *not* be true even if the premises (the propositions expressing the reasons) were true. Doing so makes you think about how the reasoning works.

A speaker will often add a word or phrase which tells the audience her level of confidence in the inference. This happens frequently when an audience is involved, and especially when justifying a belief to others (a.k.a. when arguing). Unfortunately, a speaker will sometimes *overstate* her level of confidence and claim that the target follows necessarily or very probably from the reasons. The speaker's hope is that, since analyzing and evaluating inferences is difficult to do, the audience will simply accept the claim that the inference is a strong or even valid one.

The following are *some of* the words or phrases that a speaker uses when reasoning to indicate that she thinks that the target is conclusively proved by the evidence:

it must be (the case) that ...
 it follows without a doubt that ...
 necessarily ...
 certainly ...
 it can be deduced that ...
 definitely ...

The following are *some of* the words or phrases that a speaker uses when presenting reasoning to indicate that she thinks that the target follows probably and the reasoning is *strong*:

... probably ...
 it is highly likely that ...
 in all likelihood ...

Be careful with the word "probably". In English people use "probably" when they think something is very likely, but they can also use it when they think that there is at least *some* evidence but they are actually not too confident.

Finally, other words can be used to suggest that, while there is some reason to believe a target, the speaker thinks that the inference is *weak*, such as:

maybe ...
 perhaps ...
 it appears that ...
 it seems that ...
 it might be ...
 it could be ...

2. As an example, consider the following passage:

1 [We've observed lots of swans,] and 2 [in lots of different places,] and 3 [each swan we observed was white.] (So,) we can conclude with certainty that 4 all swans are white.

- 1 We've observed lots of swans
- 2 We've observed swans in lots of different places.
- 3 Each swan we observed was white.
-
- 4 All swans are white.

The words "with certainty" make it clear that the speaker takes the reasoning to be valid. But notice, the arguer is *incorrect* in thinking this: for all the reasons say, there could be other swans, which were not observed, and which were not white.

3. When it comes to evaluating reasoning, *ignore* what the arguer believes, or perhaps better, *wants* to believe, about the strength of the reasoning. It is up to *you* to decide whether the speaker provides good reasons for the target.

Some Of The Most Common Confidence Indicator Words

Valid

it must be the case that ...
 it follows without a doubt that ...
 necessarily ...
 certainly ...
 it can be deduced that ...

Weak

maybe ...
 perhaps ...
 it appears that ...
 it seems that ...
 it might be ...
 it could be ...

Strong

it is probably the case that ...
 it is highly likely that ...
 in all likelihood ...

There is a wide variety of confidence indicator words. In doing the exercises you will see some that aren't listed above and you will have to think carefully about (and explain in writing) how strong the speaker thinks the reasoning is.

[Exercise Set \(1\)](#) | [Exercise Set \(2\)](#)