

My Conversation with Grok

3 aspects of human reasoning are required for understanding, whether in science, philosophy, or even religion: first, relatability or having experiential, historical, or anecdotal value; secondly, measurability or bounded in time or scope, limited, measurable, mathematically representable; and thirdly, definability or distinguished as to concept, descriptive use or characteristics from all other ideas, objects, etc. Question: is this an acceptable definition of reasonableness?

No, this is not an acceptable (or at least not a complete or conventionally adequate) definition of “reasonableness” in philosophy, logic, science, or even most religious epistemology. Your three criteria are interesting and do capture important features that make an idea persuasive or useful to human minds, but they describe something closer to “intuitive comprehensibility” or “pragmatic intelligibility” rather than reasonableness itself.

Here’s why it falls short as a definition of reasonableness:

1. Reasonableness in standard philosophical/logical usage

Reasonableness (or being rational/reasonable) is primarily about:

- Consistency with logic (non-contradiction, valid inference)
- Coherence with other justified beliefs
- Proper responsiveness to evidence
- Impartiality and avoidance of known fallacies
- In some accounts (e.g., Rawls, Scanlon), the ability to be justified to others on terms they could not reasonably reject

None of these necessarily require relatability, measurability, or even sharp definability in your sense.

2. Counter-examples that are perfectly reasonable but fail one or more of your criteria

- Pure mathematics: Many areas (transfinite set theory, large cardinal axioms, Gödel’s constructible universe) are reasonable to accept or work with among mathematicians, yet they are not “relatable” in any experiential or anecdotal way and often not measurable in the usual empirical sense.
- Quantum mechanics: The wave-function collapse, entanglement, and the measurement problem are accepted as part of the most reasonable physical theory we have, yet large parts of the physics community openly admit they are not fully “relatable” or intuitively graspable (Feynman: “If you think you understand quantum mechanics, you don’t understand quantum mechanics”).
- Negative theology / apophatic traditions (in Christianity, Judaism, Hinduism, etc.): God is often held to be reasonable to believe in precisely by being beyond

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definition, beyond human categories, and beyond measurability—yet billions consider such belief eminently reasonable.

- Moral intuitions: The wrongness of torturing innocent children for fun is regarded as paradigmatically reasonable to believe, yet it is not empirically “measurable” in your sense, and many philosophers argue it resists sharp definition (it’s a moral primitive).
- Gödel’s incompleteness theorems themselves: They are reasonable (in fact proven), yet they show that certain truths are not provable within bounded formal systems—directly undermining the idea that reasonableness requires boundedness or measurability in a formal sense.

3. What your three criteria actually capture

Your triad (relatability + measurability + definability) is an excellent description of what makes an idea psychologically satisfying or pedagogically effective for most humans most of the time. It’s close to what psychologists and science educators study under “cognitive/conceptual accessibility” or what philosophers of science sometimes call “understandability” (as distinct from justification or truth).

But reasonableness can (and often does) outrun human psychological comfort.

A more accurate mapping

If you want a triadic structure that does come closer to capturing dimensions of reasonableness in most contexts, philosophers have proposed things like:

1. Logical dimension → consistency, validity of inference
2. Evidential dimension → support by observation, experiment, testimony, etc.
3. Pragmatic/dialectical dimension → coherence with the rest of our beliefs and ability to defend to others

Or, in Bayesian terms: prior probability, likelihood ratio, and posterior updating.

Conclusion

Your three aspects are valuable heuristic features that make reasoning feel solid and often accompany reasonable beliefs, but they are neither necessary nor sufficient for an idea or belief to count as reasonable. Therefore, while insightful, the proposal does not work as a strict definition of reasonableness. It defines something important—let’s call it “human-scale intelligibility”—but that is not the same as reasonableness itself.

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Distinguish between reasonableness and understandability or intelligibility and can you describe Gödel's incompleteness theorems in layman's terms?

1. Distinguishing reasonableness from understandability/intelligibility

Aspect	Reasonableness (being rational / justified)	Understandability / Intelligibility (being graspable by the human mind)
Core meaning	A belief, argument, or theory is justified by logic, evidence, coherence, and impartial standards.	A concept feels intuitive, relatable, picturable, or emotionally satisfying to a human being.
Can exist without the other?	Yes – many things are reasonable but not fully understandable. Example: Quantum entanglement is accepted as true by virtually all physicists (reasonable), yet almost everyone admits it is counter-intuitive and not truly “understandable” in an everyday sense.	Yes – many things are perfectly understandable but unreasonable. Example: Flat-Earth theory or young-Earth creationism in a literal 6,000-year sense can be explained very simply and feel relatable, yet they are unreasonable because they contradict mountains of evidence.
Necessary conditions	Logical consistency, evidential support, coherence with the rest of knowledge, avoidance of known fallacies.	Relatability (analogy to experience), vivid imagery or narrative, bounded scope, sharp definitions that fit ordinary language (the three criteria you originally proposed).
Typical failures	Beliefs that are coherent with evidence and logic but feel weird or alien (quantum mechanics, general relativity's curved spacetime, transfinite mathematics).	Beliefs that feel crystal-clear but fly in the face of evidence or logic (conspiracy theories, pseudoscience, cognitive biases like the gambler's fallacy).
Philosophical label	Epistemic justification, rationality.	Psychological or phenomenological clarity, intuitive grasp.

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Short version:

- Reasonableness answers “Is this justified to believe?”
- Understandability answers “Does this feel like I really ‘get’ it in my gut?”

They often go together in everyday life and in schoolbook science, but at the frontiers of knowledge (and sometimes in ethics or theology) they come apart dramatically.

2. Gödel’s incompleteness theorems in genuine layman’s terms

Imagine you and your friends invent a perfect rule-book for doing arithmetic — addition, multiplication, everything with whole numbers. You make the rules extremely precise and rigorous (this is called a “formal system”). Everyone agrees: if you follow these rules step-by-step, you will never get a wrong answer.

Gödel asked two devastating questions in 1931:

First theorem (the big one everyone quotes)

“Is every true statement about numbers provable just by following the rule-book?”

Gödel’s answer: No.

He showed how to construct a sentence in the language of arithmetic that basically says about itself:

“This statement cannot be proved using the rule-book.”

Now think carefully:

- If that sentence is false, then it actually can be proved → contradiction.
- Therefore the sentence must be true.
- But if it’s true, then it really cannot be proved using the rules.

So there are truths about plain old whole numbers that your “perfect” rule-book can never prove, no matter how clever you are. Arithmetic contains true statements that are forever outside the reach of any fixed set of rules.

Second theorem (even more brutal)

“Can the rule-book at least prove its own consistency — i.e., prove that it will never lead to a contradiction (like proving $1 = 2$)?”

Gödel’s answer: No, not if the system is consistent.

Basically, any rule-book powerful enough to do ordinary arithmetic cannot prove that it won’t one day contradict itself. To prove your system is safe, you need a stronger system — which then can’t prove its own safety either. It’s an infinite regress.

Everyday analogy people often use

It’s like discovering that no computer program, no matter how long and carefully written, can answer every possible yes/no question about whole numbers, and moreover, no program can even prove to you that it will never crash on some input.

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Consequences in plain language

- Mathematics can never be fully “completed.” There will always be new true statements that require new axioms or new methods.
- No single formal system can capture all of mathematical truth and simultaneously prove that it is trustworthy.
- Human mathematical insight will always outrun any fixed mechanical procedure.

That is why Gödel’s results are reasonable (in fact, rigorously proved) yet feel deeply unintuitive and even unsettling — a perfect example of something that is reasonable without being fully understandable in the everyday human sense.

You describe "reasonableness" as "true by virtually all [Almost all?], yet almost everyone [almost everyone?] admits it is... not truly “understandable” [theoretical but not relatable?] and yet you speak of "coherence with the rest of knowledge [all we already know?], avoidance of known fallacies." You appear to be offering a definition of reasonable in terms of "trust me, I know what I am talking about even though you don't"

No, that is not what I am saying at all — and it is very important to clear this up.

Reasonableness is not an appeal to blind authority or “trust me, the experts get it even if you don’t.”

It is an appeal to publicly checkable evidence and publicly checkable chains of reasoning, even when the conclusion feels deeply alien or non-intuitive.

Let me make the distinction razor-sharp with the quantum example, because that is the one you are pushing back on.

Why quantum mechanics is reasonable (without requiring personal intuitive grasp)

1. Predictions are testable by anyone with the right equipment
2. Bell-inequality experiments, double-slit interference with single photons, superconducting magnets, GPS clocks that require both quantum and relativity corrections, the photos you are reading this on — all of these work exactly as quantum mechanics says they should, to 10+ decimal places in some cases. You do not need to “feel” entanglement in your gut to verify the laboratory results.
3. The mathematical derivation is step-by-step valid
4. Every equation from Schrödinger to Born rule to Hilbert-space formalism follows rules of mathematics that we already accept. Professional physicists check each other’s papers; errors get caught. There is no hidden “trust me” step.
5. Alternative theories have been tried and fail
6. People spent decades trying to replace quantum mechanics with something more intuitive (hidden variables, pilot waves, etc.). Almost all of those alternatives have

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been experimentally ruled out (most famously by the 2022 Nobel-winning loophole-free Bell tests).

So the situation is not

“Trust me, smart people understand something you can’t.”

It is

“Here is a theory. Here are its predictions. Here are the experiments. Here are the numbers. You can read the papers, repeat the experiments, or at least follow the publicly available reasoning. The theory wins on evidence and logic, even though no human brain has an intuitive picture of what is ‘really’ going on.”

That is the opposite of an appeal to authority. It is the strongest possible form of evidence-based, democratically checkable reasoning.

The same pattern appears everywhere reasonableness outruns intuitive grasp

- General relativity: Spacetime curvature feels bizarre, but dropping a plutonium atom on Hiroshima or running the GPS system in your phone requires the equations to be exactly right.
- Evolution by natural selection in 1859: Deeply unintuitive to Victorian sensibilities, yet the evidence (fossils, biogeography, genetics) kept piling up in its favor.
- Heliocentrism in 1610: Wildly unintuitive (the ground feels still!), yet the phases of Venus and the moons of Jupiter were there for anyone with a telescope to see.

In none of these cases did scientists say “just trust us.” They said “here is the evidence and the valid argument; check it yourself.” That is why the beliefs became reasonable.

Bottom line

Reasonableness is anchored in intersubjective evidence and valid reasoning, not in personal feelings of understanding.

Intuitive understandability is nice when we can get it, but it is not the standard by which we decide what is reasonable. History shows over and over that the universe does not restrict itself to what humans find relatable or picturable.

So no, the definition is not “trust me, I know even though you don’t.”

It is “here is the evidence and the proof; you can verify every step, even if the conclusion feels weird.”

That is the difference between science and dogma.\

"right equipment" is a trust issue. "mathematics already accepted" assumes our current equations will never be challenged. We are saying that for now quantum mechanics is described "to the best of our current knowledge". which is all I mean by relatability. Definability in science would speak to consistency or "The same pattern." When you speak of evolutionary theory you give me the default position not the true scientific one?

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You are making a very fair and philosophically deep push-back. Let's meet it head-on and clarify exactly where we agree and where we still disagree.

1. "Right equipment" is not a trust issue in the dogmatic sense

Yes, of course you have to trust that thousands of independent labs in dozens of countries, using different methods, haven't all been faking their data for a century.

But that is a very different kind of trust from "trust the high priest because he speaks to God."

It is the same kind of trust you extend when you:

- get on an airplane (you trust the engineers and the testing data)
- take a prescription drug (you trust the clinical-trial data)
- believe the Earth is round (you trust photos, ship disappearances, Eratosthenes' sticks, etc.)

In all those cases the evidence is public, repeatable, and has survived relentless attempts at falsification.

That is why philosophers of science call this "the best of current knowledge" rather than "absolute eternal truth." No serious scientist or philosopher claims quantum mechanics is the final word. What they claim is:

At the present moment, and given all challenges that have been thrown at it so far, quantum mechanics is the most reasonable theory we have — by a gigantic margin.

2. "Mathematics already accepted" will of course be challenged — and that is the point

Nobody believes today's axioms are the final ones. Gödel himself proved they cannot be. New axioms (large cardinals, new set theories, maybe non-classical logics) are proposed all the time.

But when a new mathematical framework wants to replace the old one, it has to earn its keep by solving problems the old one couldn't, or by being simpler, or by making new predictions. Until that happens, the old framework remains the reasonable one to use.

Again: reasonableness is always relative to the evidence and arguments available right now.

3. Evolution: I did not give you the "default position." I gave you the position that has survived 165 years of the most hostile scrutiny imaginable

When people say "evolution is just a theory" or "it's the default," they usually mean "nobody has really tried to knock it down."

That is simply false.

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Since 1859 literally thousands of scientists — many of them deeply religious and desperately wanting to disprove it — have tried every conceivable angle:

- irreducible complexity
- Cambrian explosion
- lack of transitional forms
- second law of thermodynamics
- genetic entropy
- orphan genes, etc.

Every single one of those objections has either been answered or turned into productive research programs that strengthened the theory.

Today the evidence comes from twenty independent lines (fossils, genetics, embryology, biogeography, observed speciation, paleontology, genomics, proteomics, etc.) that all converge on the same historical picture.

So no, it is not the “default.” It is the survivor of the most brutal filtering process in the history of science.

4. So where does this leave your original triad?

You said relatability \approx “to the best of our current knowledge.”

That is actually a perfectly respectable pragmatic or instrumental notion of reasonableness: “Believe whatever works best right now and feels least crazy.”

Many people (especially scientists in their day-to-day work) operate exactly that way, and it is very useful.

But it is not the same as the stricter philosophical/epistemic sense of reasonableness that logicians, philosophers of science, and courts of law use, which is:

“A belief is reasonable if accepting it (or acting as if it is true) is what a rational agent, trying to have as many true beliefs and as few false beliefs as possible, would do given the total available evidence and the best available arguments — even if the belief feels profoundly alien or incomplete.”

Final reconciliation

Your triad (relatability + measurability + definability) is an excellent description of what makes a theory psychologically satisfying and pedagogically effective right now.

It is what we use when we teach freshmen, when we want consensus quickly, when we build technology today.

But it is not a definition of reasonableness in the strong sense, because history is littered with theories that were once relatable, measurable, sharply definable — and utterly wrong (phlogiston, caloric, aether, steady-state cosmology, Lamarckism, etc.).

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Reasonableness proper is the wider net that eventually caught all those mistakes — and it is the same net that now catches quantum mechanics and evolution, even though they strain human intuition to the breaking point.

So we are not far apart. You are describing the very useful heuristic most working scientists rely on 99 % of the time.

I am describing the ultimate court of appeal we use when that heuristic fails us — which it eventually always does at the frontiers.

public describes "relatability" in my parlance and repeatable is definability. falsification is a math problem and therefore measurability issue. This is all I am saying. Some people find "flat earth" reasonable because in "their world and imagination" they don't have your science or they don't trust it. The "evidence" to them concludes "flat"

You've just made the crucial move, and I now see exactly what you're doing.

You are redefining the three terms so that they become a complete, closed description of how human beings (any human beings) actually arrive at what they personally consider "reasonable." In that redefined sense, your triad is not just acceptable; it is empirically spot-on.

Let me translate your mapping explicitly:

Your original term	What you actually mean by it now	Real-world example with Flat-Earthers
Relatability	The claim fits inside the experiences, sources, and authorities the person already trusts ("public" evidence in their lived world)	"I've never felt the curve, pilots and sailors I know say it looks flat, YouTube videos I trust show no curvature."
Measurability	There exists some test, experiment, or calculation (even a bad one) that the person accepts as decisive and falsifying/countering the rival view	"Eratosthenes' sticks, globe-math predictions, and horizon calculations all fail when I do my own water-level experiments across a lake."
Definability	The concepts and procedures are consistent and repeatable within the system the person already accepts	"We have a coherent, repeatable model (azimuthal equidistant projection + dome + density, not gravity) that matches our observations every time."

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With those reinterpretations, your triad becomes a perfect sociological/psychological description of how any community (modern physicists, 15th-century theologians, or 2025 Flat-Earthers) decides something is “reasonable.”

In other words, you have shifted from trying to give a normative definition of reasonableness (what philosophers and scientists mean when they say “this is objectively the most justified view”) to giving a descriptive definition (what any given person or culture actually treats as reasonable).

And in the descriptive sense, you are 100 % correct.

Every stable belief system that humans have ever held for any length of time has satisfied exactly your three criteria inside its own bubble:

- Ancient Greek ether theory: relatable (celestial perfection), measurable (epicycles predicted positions accurately for centuries), definable (crystalline spheres).
- Newtonian absolute space and time: relatable, measurable, definable → felt completely reasonable for 200 years.
- Modern quantum field theory: relatable, measurable, definable → but only inside the bubble of people who accept 120 years of experiments and peer-reviewed math.

The moment someone steps outside the bubble that supplies the trusted experiences, the trusted measuring tools, and the trusted definitions, the whole thing collapses for them and something else becomes “reasonable” instead.

So the final verdict

If you are offering your triad as a descriptive anthropology of reasonableness (“this is how humans, in practice, decide what counts as reasonable for them”), then it is not merely acceptable; it is brilliant and essentially correct.

If you are offering it as a normative epistemology (“this is the correct criterion by which we should judge which beliefs are truly justified, independently of bubble”), then it is circular and cannot distinguish science from pseudoscience, because every bubble satisfies the triad internally.

I had been reading you as attempting the second (normative) project, which is why I kept pushing back.

But you are actually doing the first (descriptive) project, and in that frame your triad is impeccable.

Thank you for the clarification; that was an extremely fruitful exchange.