Acta Analytica (2026) 41:789–802
https://doi.org/10.1007/s12136-026-00671-9

RESEARCH

Adequacy of Representations as their Approximation to Truth: A Non-factive Theory of Knowledge

Miloš Taliga[1]

Received: 9 September 2025 / Accepted: 12 January 2026 / Published online: 2 February 2026
© The Author(s) 2026

Abstract
The paper introduces a new non-factive theory of knowledge, employing the recent theory of verisimilitude developed by Jakob Süskind to model the relative adequacy of representations as their approximation to truth. It makes the relation of representation one of the necessary conditions of knowledge without requiring the truth condition to be satisfied. However, the relation of knowledge to truth is built at the meta-level into the notion of the adequacy of representations, which enables the proposed theory to cover any thinkable case of research yielding real knowledge, although of a non-factive kind. Despite its universality, the theory relativizes knowledge to a set of research questions, while rejecting alethic relativism, which — it is argued — does not provide a satisfactory explanation of truth in reasoning about the growth and extinction of scientific knowledge.

Keywords Non-factive theory of knowledge · Verisimilitude · Adequacy of representations · Truth condition of knowledge · Alethic relativism

1 Introduction

According to Buckwalter and Turri (2020), many of our beliefs that are supposed to represent the state of affairs are only approximately true, i.e., strictly speaking, they are not true. We commonly refer to the Ludolf's number π as 3.14; we consider a mile to be 1.6 km; and we round the actual time to (at least) whole minutes. The fact that we allow for measurement error testifies that 'such representations will always be only approximate' (Buckwalter & Turri, 2020, 94). The prevailing theories of knowledge, which take the truth condition to be a necessary condition of knowledge and thus consider knowledge to be factive, therefore face a skeptical challenge: If truth is necessary for knowledge and approximate representations are not true, then these representations cannot be our knowledge (Buckwalter & Turri, 2020, 94).

✉ Miloš Taliga
milos.taliga@umb.sk

[1] Department of Philosophy, Matej Bel University, Banská Bystrica, Slovakia

Buckwalter and Turri respond to this skeptical challenge by proposing that we reject the truth condition as a necessary condition of knowledge and replace it with a condition according to which representations of states of affairs, if they are to be knowledge, must adequately represent truth (Buckwalter & Turri, 2020, 97). They call this proposal, which attempts to include 'false but approximately true propositions' among knowledge '*the approximation account* of knowledge' (Buckwalter & Turri, 2020, 97). The approximation account holds that '[a]lthough there are potentially many ways that approximations could be adequate, one way is for them to serve our purposes well enough to facilitate action and help us to achieve our goals in a particular circumstance' (Buckwalter & Turri, 2020, 97).

I welcome the proposal of the approximation account to reject the truth condition as a necessary condition of knowledge, but I think that the adequacy of representations needs to be modeled in a different way than Buckwalter and Turri have chosen. Therefore, I introduce a new non-factive theory of knowledge that understands the adequacy of representations as their approximation to truth relativized to a set of research questions. But first (in Sect. 2), I explain why I do not consider the truth condition to be a necessary condition of knowledge, and why it is better to avoid alethic relativism. Then (in Sect. 3), I outline a theory of knowledge that is similar to the approximation account in that it is non-factive but differs from it in that it relativizes knowledge not to practical purposes that knowledge (supposedly) serves, but to research questions that knowledge answers.

2 The Truth Condition and Alethic Relativism

Buckwalter and Turri abandon the truth condition as a necessary condition of knowledge because they want to avoid skepticism. Here is their argument (Buckwalter & Turri, 2020, 94):

1. A representation is known only if it is strictly true. (premise)
2. Approximations are not strictly true. (premise)
3. Therefore, approximations are not known. (from Lines 1 and 2)
4. Many of our representations are mere approximations. (premise)
5. Therefore, many of our representations are not known. (from Lines 3 and 4)

Buckwalter and Turri do not want to accept conclusion 5 because 'given the ubiquity of approximation in personal, professional, and public life, the extent of ignorance implied by this argument is noteworthy' (2020, 94). The price they pay for avoiding the skeptical conclusion is the rejection of the truth condition as a necessary condition of knowledge.

My intuition as to why the truth condition should be rejected as a necessary condition of knowledge is different. It is based on alethic absolutism, according to which once a proposition is true, it is true forever (see, e.g., Woleński, 2022), and on the fact that knowledge, at least in the domain of science, evolves and ceases to exist. Alethic absolutism claims that only propositions are proper

truth-bearers and that statements like ‘Now it is raining.’ or ‘The apple is there.’ express propositions only after their indexicals are specified. In general, for any statement uttered by a speaker to express a fixed proposition, its meaning must be contextualized in terms of the speaker, time, place, and other factors that are important for completing the meaning of the statement. Thus, even statements such as ‘Cold baths are healthy.’ or ‘It is morally wrong to conceal truth.’ must be completed into ‘A cold bath is healthy for the person *P*.’ and ‘According to the moral view *M*, it is morally wrong to conceal truth.’ by specifying *P* and *M* (Woleński, 2022, 98–99). Otherwise, statements express no fixed propositions and cannot be proper truth-bearers. Therefore, if someone utters the statement ‘It is raining.’, for example, its meaning must be fixed relative to time and place in order to yield a proposition. If it is raining at that time and place the statement is uttered, then the proposition is true and will remain so forever.

Let us now consider, from the perspective of alethic absolutism, the fact that scientific knowledge often changes in fundamental ways. In the philosophy of science, at least since the time of Thomas Kuhn (1962), it has been common to speak of scientific paradigms that differ so much that they are considered incommensurable or, in the spirit of Feyerabend’s principle of proliferation (1970, 205), incompatible. A typical feature of such fundamental changes in the growth of scientific knowledge is, among other things, that the new paradigm is logically incompatible with the old one, and therefore both paradigms cannot be true. With this remark, I do not wish to deny that one true theory can be surpassed by another, more comprehensive true theory. I only want to point out that this is not typical of the growth of scientific knowledge, and that it does not explain how knowledge changes in scientific revolutions. For, if knowledge were conditioned by truth, then Newtonian mechanics, for example, would never have been replaced by Einstein’s theory of relativity—it would merely have been expanded upon without any parts being removed.

I therefore claim that factive theories of knowledge cannot explain fundamental changes in scientific knowledge, because if truth were a prerequisite of knowledge, scientific revolutions could not occur. Of course, proponents of factive theories of knowledge might object that revolutions can and do occur, and this only proves that the old scientific theory, which was considered knowledge, was no real knowledge because it turned out to be false. However, this objection would rather convict proponents of factive theories of knowledge of admitting that they are unable to explain revolutionary changes in science. If I may repeat the argument: it must be perfectly possible that what was once real scientific knowledge later ceased to be knowledge. Otherwise, after refuting a scientific theory, for example the most successful one today, one would not be able to explain *how scientific knowledge fundamentally changes and ceases to exist* – one could only sigh that even this (refuted) theory *was never knowledge*. And that, I think, would be too high a price to pay for practising armchair philosophy. If there are any excellent examples of knowledge, they are to be found in today’s science. However, even today’s scientific knowledge may cease

to be knowledge tomorrow. Therefore, a good theory of knowledge must be able to explain both the discontinuous growth of scientific knowledge and its extinction.[1]

From the perspective of alethic absolutism, we could sum up the above discussion by the following dilemma of the truth condition of knowledge:

> *Conjunctive premise*: If the truth condition is a necessary condition of knowledge, then knowledge cannot fundamentally change or cease to exist, because true propositions cannot become false, and if the truth condition is not a necessary condition of knowledge, then knowledge can also be something that is false.
> *Disjunctive premise*: The truth condition either is or is not a necessary condition of knowledge.
> *Conclusion*: Therefore, either knowledge cannot fundamentally change or cease to exist, or knowledge can also be something that is false.

One might object that the conjunctive premise appears unwarranted because knowledge can cease to exist even when a subject loses the justification they originally had for a true proposition.[2] However, this objection loses its force when we consider scientific revolutions again. For, whatever the precise description of scientific revolutions may be, in scientific revolutions one true and justified theory certainly does not replace another true theory that has lost its justification. No matter how justified it might have been (if it was at all), the replaced scientific theory *was false*, though perhaps approximately true. Still, it was *our knowledge*. Therefore, it would be pointless to explain the extinction of knowledge in scientific revolutions by arguing that it is caused by a loss of justification. For, the real problem is whether the truth condition is a necessary condition of knowledge – hence the dilemma.[3] I propose that we face the dilemma by accepting the second disjunct of its conclusion, i.e. that the truth condition is not a necessary condition of knowledge.[4]

[1] I know of only one similar argument that rejects the truth condition as a necessary condition of knowledge on the grounds that scientific knowledge changes and ceases to exist. It is the argument against the traditional definition of knowledge as justified true belief given by Walton in his (2011, see especially p. 151).

[2] I owe the objection to an anonymous reviewer.

[3] The objection could go on that it is necessary to distinguish scientific knowledge from ordinary knowledge attributed to individual agents, where the possibility of losing justification still seems relevant. My view is, however, that rather than inventing many mutually incompatible theories about different kinds of knowledge, epistemology should develop a single theory that can cover all kinds of knowledge (see also Sect. 3 below and the next footnote). Therefore, if factive theories of knowledge are unable to explain the extinction of scientific knowledge even by loss of justification, they need to be replaced with better theories of knowledge.

[4] An anonymous reviewer suggested that there are two ordinary notions of propositional knowledge, one according to which knowledge can cease to exist (as when we say 'The astronomical knowledge of the Middle Ages was false.') and one that still requires the truth condition (as when we refuse to regard the statement 'Ptolemy knew that the Earth was at the center of the Universe.' as true). I do not think that two notions of knowledge necessarily must apply here. If we agree that one of the necessary conditions of knowledge is that it be unrefuted, then our refusal to attribute to Ptolemy the knowledge that the Earth is at the center of the Universe may not be a consequence of requiring the truth condition, but rather of the fact that we know that what Ptolemy considered knowledge has been refuted. Ptolemy and his contemporaries did not know this at their time, and therefore (assuming that other conditions of knowledge were met) their theory was knowledge of that time. In both cases the same notion of knowledge is thus operating. (See also Sect. 3 below.)

Perhaps a final way of resisting the proposal just stated is to regard truth as something that, while not entirely within our control, is nonetheless relative, since the same proposition can be true with respect to one context and false with respect to another context. In such a case, it would be conceivable that knowledge changes, evolves, and ceases to exist because the truth it possesses in one context might be lost in another. An appropriate inspiration here might be the so-called taste predicates, where the truth of an utterance being made depends on the taste of the judging subject. For example, the statement 'This is excellent coffee.' (with a specified indexical) is true when uttered by Adam, who likes the coffee, and false when uttered by Eve, who does not. By analogy, something might cease to be knowledge in a context where it loses its truth.

The position implied is referred to as alethic relativism (see, e.g., Boghossian, 2011 or MacFarlane, 2014, Sects. 3.2.3 and 3.3) and is also alluded to by Buckwalter and Turri when they consider the objection to their argument that premise 2 is false. It is not true that approximations are not strictly true because, according to the objection of an alethic relativist, a statement such as 'π equals 3.14' could be 'strictly true in the grade school classroom but false in the laboratory' (Buckwalter & Turri, 2020, 95). The authors reply to the objection: 'It could be a failing of ours, but no matter how hard we try, we simply cannot bring ourselves to believe, or even find it plausible, that in some contexts, it is strictly true that pi is 3.14' (Buckwalter & Turri, 2020, 95). They consider the statement 'π equals 3.14' to be *strictly false*, yet it can be knowledge because it is *an approximation that adequately represents the truth*: '3.14 might be adequate, and hence known, as the value of pi in the grade school classroom but inadequate, and hence not known, as the value of pi in the lab engineering a global positioning system' (Buckwalter & Turri, 2020, 97). Thus, given the context, it is the adequacy of representations that is relativized, not their truth (see also Sect. 3 below).

Alethic relativism may seem at first glance to be a suitable approach for clarifying statements that contain taste predicates, but it is hardly applicable to scientific knowledge. Imagine an ideal situation where a scientific theory expresses a law of nature. In such a case, the truth of the scientific theory is not dependent on any consideration of any assessor but only on the way the world is (and on the meaning of linguistic expressions, which, within a certain conceptual framework, give the theory its content).[5] The scientific theory is and will be true as long as the law of nature it expresses exists. But natural laws are not sensitive to the opinion of an assessor or to time; they do not care about our interests, tastes, or preferences. And while we can (and probably must) take these factors into account when *evaluating* scientific theories, this in no way suggests that *the truth* of the theories depends on them. If the alethic relativist rejects these simple considerations, she is asking for the charge that instead of *truth*, she is talking about what *seems true* to the assessors

[5] I shall come back to the question of meaning in the next paragraph.

from a particular point of view and on the basis of some criteria (see also Gariazzo, 2017, 44).

Furthermore, alethic relativism may not be the best explanation of even those statements that contain taste predicates. Indeed, the situation in which Adam likes coffee that Eve does not like can also be explained when we reject the assumption that the truth of the statement 'This is excellent coffee.' is relative to the assessor. Instead, we refine the meaning of the statement by relativizing it to the person making it, yielding the statement 'This is, according to Adam, excellent coffee.' (again, with the indexical specified), which will be true and remain so. We thus replace alethic relativism with semantic contextualism, which is compatible with alethic absolutism. And although we cannot pretend to have thus settled the ongoing dispute between contextualism and invariantism on the question of meaning and on the issue of which approach better accounts for the linguistic evidence,[6] we can at least claim that alethic relativism, which is supported by invariantism, does not provide a satisfactory explanation of truth in reasoning about scientific knowledge.

But let us return to the problem from the beginning of this section, whether the truth condition is a necessary condition of knowledge. If it were, then, according to alethic absolutism, scientific knowledge could not evolve, change, or cease to exist because a true scientific theory cannot become either truer or false. At this point, a suggestion may arise (and does arise) that instead of truth, we should speak of degrees of truth or of approximation to truth (see, e.g., Ladyman, 2002, 232–233). The problem with this proposal is that *an approximately true scientific theory is false*, or as proponents of the approximation account of knowledge say, 'approximations are not strictly true' (Buckwalter & Turri, 2020, 94). Thus, if we consider the truth condition as a necessary condition of knowledge, *approximations cannot be knowledge*. Given that many scientific theories are approximations, knowledge would boil down to strictly true theories. However, knowledge understood in this way *could neither evolve nor disappear*, which is contrary to the fact that, at least in the realm of science, the evolution and disappearance of knowledge is an everyday affair. Therefore, the proposal to abandon the truth condition as a necessary condition of knowledge is at least worth considering.

3 Non-factive Knowledge Relativized

Buckwalter and Turri claim that 'representations need not be true in order to count as knowledge' but they must '*adequately represent* the truth' (2020, 97). They suggest that instead of objective truth, we should abandon truth as a condition of knowledge and replace it with 'a standard for judging approximations that relativizes to practical purposes' (Buckwalter & Turri, 2020, 97). This means that 'a representation might be adequate relative to one practical context but inadequate relative to

[6] Among the mass of literature, see e.g. Cappelen and Hawthorne (2009) for a defense of contextualism and the view that truth is a monadic non-relativized notion and MacFarlane (2014) for a relativized conception of truth.

another' (Buckwalter & Turri, 2020, 97). However, this does not support alethic relativism because the relativity of the adequacy of representations does not imply that a representation is true in one context but false in another one. Rather, it implies that 'the demands of successful action depend on features of the practical context, which are not always the same' (Buckwalter & Turri, 2020, 97). And this appeal to the apparent relativity of practical adequacy is, according to the authors, 'theoretically preferable to resorting to relativism about truth' (Buckwalter & Turri, 2020, 97).

Buckwalter and Turri's approximation account thus develops one of the few non-factive theories of knowledge. According to factive theories, knowledge is factive because in order for a subject S to know that *p*, the proposition represented by the variable '*p*' must be true. The vast majority of contemporary epistemological theories are factive. It is therefore appropriate, right at the outset of this section, to consider the objection that there is a misunderstanding on the part of non-factive theories. For, if the subject S believes that π is 3.14, then they actually believe that π *approximately, not exactly*, equals 3.14, i.e., their belief is true and therefore, not surprisingly, is knowledge. The approximation of representations, which Buckwalter and Turri take to argue in favor of abandoning truth as a necessary condition of knowledge, thus, in fact, according to the objection, supports the truth condition and factivity of knowledge. In summary, approximate representations are not precise beliefs that are strictly false but approximately true. They are beliefs that are true by virtue of being merely approximate (see, e.g., Goh & Choo, 2022, 6).

The question, then, is whether the content of at least some beliefs that are approximate representations and that we ordinarily consider to constitute knowledge is so finely grained to make such approximately true beliefs false, and whether we have any evidence in favor of the eventual answer.[7] According to Bricker (2022, 265; 267), there is both an affirmative answer and empirical evidence in favor of it. Empirical research shows that some representational contents of specific cognitive processes are approximations, i.e., that there are *cognitive approximations*. Bricker mentions 'foveal bias, on which the representation of visual space is systematically biased towards the center of vision (the fovea)' (2022, 269).[8] He refers to several studies that document this bias, but his comment on one of them (Bricker, 2022, 269) is particularly worth quoting at more length:

> [P]articipants were asked to use a computer mouse to point to the on-screen location of briefly presented stimuli. Despite the task itself being quite simple, it revealed not only that participants struggled to accurately represent the stimuli's precise locations in visual memory, but that they "systematically mislocalized the target closer to the center of gaze" (329). That is, their representations of target location, on which they based their subsequent actions,

[7] In other words, the task is to replace Buckwalter and Turri's skeptical challenge with a better argument from skepticism in favor of non-factive theories of knowledge by finding at least some approximately true but false beliefs that nevertheless constitute knowledge. It may be that beliefs such as 'π equals 3.14' do not belong among these beliefs. For a more detailed discussion, see Bricker (2022, Sect. 3).

[8] The fovea is a small central depression on the retina of the eye where visual acuity is highest (Rehman et al., 2023).

> misrepresented targets as being closer to their center of vision than they actually were. To be clear, mislocalization wasn't especially severe and typically ranged in the order of magnitude of single degrees (331), but it was nonetheless easily observable in a laboratory setting.[9]

This is important as it suggests that 'foveal bias does not reflect some illusionary feature of anomalous stimuli, but instead a general limitation of our visual systems' (Bricker, 2022, 269). Or, as aptly summarized by Brennen et al., whom Bricker mentions, '[i]ts origin lies in the way in which visual information is processed within the eye and brain' (Bricker, 2022, 269).

Now, if someone's reporting of an object's location is guided by a foveal-biased representation and expressed by the statement 'The object is there.', the key question is whether one knows where the object is, since '*there* refers to a representation that slightly mislocalizes the object in space' (Bricker, 2022, 270). And since '*there* in many cases will refer to a location in space where the object is not, "the object is *there*" is not strictly true, regardless of how close to truth it might be' (Bricker, 2022, 270). Hence, 'we can only retain broad knowledge of the locations of objects in our visual environments if we replace factivity with a weaker constraint on knowledge' (Bricker, 2022, 270).

However, what constraint? We have seen that Buckwalter and Turri's approximation account takes the truth condition to be replaced by a condition of adequate representation of truth that is relativized to practical purposes varying according to the requirements of successful action in a particular context. However, this approach encounters the problem that theoretical sciences aim to provide knowledge that *may have no practical purpose*. The reason is that theoretical sciences seek to answer the question 'Why?', whereas practical problems concern the question 'How?'. More precisely, theoretical sciences formulate universal and statistical laws, most of which say what effect results from what cause. When we face a practical problem, however, 'what we know […] is the effect that we wish to produce, but we know of no cause of that effect' (Miller, 2023, 28) or 'we know a cause of the desired effect, but we do not know how to bring that cause about' (Miller, 2023, 29). The trouble, then, is that '[w]hereas the laws and theories of science give us a licence to infer effects from causes, what we need is a licence to infer causes from effects' (Miller, 2023, 29). And even if we are lucky enough to have a law that imputes the desired effect to an earlier cause, we still need to determine the initial conditions that are equally necessary for the effect to occur in the desired spatio-temporal location. And these conditions, of course, are not prescribed by the laws of theoretical sciences. Knowledge provided by theoretical sciences may thus not meet the demands of successful action prescribed by a particular practical context—*its mission need not be to facilitate action*. Newton's second law of motion, for example, states that the force acting on an object is equal to the object's mass multiplied by its acceleration, but it provides no guidance on how to act successfully, whatever our practical goal may be,

[9] In the quoted passage, Bricker uses numbers in brackets to refer to the pages of the study (Sheth & Shimojo, 2001), from which the embedded quotation also originates.

nor does it meet any practical demands that would make it our knowledge. In short, *theoretical knowledge may have nothing to do with practical usefulness*.[10] Therefore, it is not correct to relativize the adequacy of approximate representations to practical contexts and make it a necessary condition of knowledge.

We need a different approach to the idea of the adequacy of approximate representations; one that meets the following desiderata: (a) it covers every area of research[11]; (b) it does not insist on truth being necessary for knowledge; (c) it is consistent with the fact that knowledge evolves and ceases to exist; and (d) it relativizes knowledge in an appropriate, i.e., harmless, way. I believe that the new theory of verisimilitude proposed by Süskind (in press) satisfies requirements (a)–(d), although this was not its primary aim. The aim of Süskind's theory of verisimilitude was to propose a definition of closeness to the truth that avoids the familiar problems that have plagued previous theories, that is, to clarify the sense in which the notion of closeness to the truth is objective and, at the same time, to show how the verisimilitude appraisals of scientific (and, in principle, other) hypotheses can be critically tested. In the remainder of this paper, I will attempt to show that Süskind's theory can also be utilized by a non-factive theory of knowledge.

The suggestion that the adequacy of approximate representations should be understood as their approximation to truth has already been put forward by Bricker (2022, Sect. 4). He, however, does not address the question of what exactly this might mean,[12] but 'merely' argues that it is a more appropriate approach for a non-factive theory of knowledge than Buckwalter and Turri's approximation account because, unlike the latter, it 'preserves the vital truth-knowledge connection' (Bricker, 2022, 276). Bricker depicts a situation in which Anna plans to hike from Blair Atholl to the Falls of Tarf in the Cairngorms. According to her internet research, the track is 60 miles long, although in reality it is around 12 miles, which Anna is unaware of. Her estimate of the distance is thus miles away from the truth, but it still successfully leads her to her destination, also because it allowed her to prepare appropriately for the challenging hike. Bricker concludes: 'While oftentimes a close proximity with truth is required for a belief to successfully guide an agent's actions towards her goal, there is no reason that this needs to be the case.' (2022, 277) On the one hand, it seems obvious that Anna's representation of the distance was indeed far from the truth. On the other hand, one could object that Anna's practical purposes could not divorce the adequacy of her representation from its approximate truth, as they would only have an impact of how approximate to truth her representation must be to count as knowledge.[13] Nevertheless, the argument against Buckwalter

[10] I cannot argue the thesis further in this paper due to the lack of scope, so I refer to Miller (2023); to chapter 5 in Miller (2006); and to subsection 2.2.g) in Miller (1994, 38–45).

[11] That is, it covers any research, regardless of whether it falls under theoretical sciences, applied sciences, natural sciences, social sciences, humanities, formal sciences, arts, everyday knowledge, etc.

[12] Bricker (2022, 275) mentions that he found inspiration in Popper's theory of truthlikeness (Popper 1963, chapter 10.3), which is notoriously flawed in both its qualitative and quantitative definitions (see Miller 1974; Tichý 1974), but which Bricker does not comment on. See also the next paragraph of this paper.

[13] I owe the objection to an anonymous reviewer.

and Turri's approximation account has already been made: Theoretical knowledge sometimes serves no practical purpose, and therefore *it would be a mistake to insist that practical purposes have an impact on the approximate truth of our knowledge* and thus on the adequacy of our representations.

I therefore sympathize with Bricker when he says that 'even if knowledge isn't strictly factive, it is clear that there is still some close connection between cases of knowledge and the truth' (Bricker, 2022, 277). Although Bricker does not attempt to clarify exactly where this close connection lies, I agree with him that 'truthlikeness is the most promising extant option for future development available to the nascent non-factive project' (Bricker, 2022, 280). In particular, I consider Süskind's theory of verisimilitude to be the most promising extant option, even though the author did not originally develop it to defend a non-factive theory of knowledge. The reason for my optimism is that Süskind's theory solves the problems that previous theories of verisimilitude have failed to solve while appropriately relativizing the approximation to truth to research problems.[14] Süskind assumes that if hypotheses 'are always attempts at answering certain questions, then perhaps, instead of asking which of two hypotheses is closer to truth, we should be asking which of them is closer to being true about the questions they are both trying to solve' (in press, 7). He therefore proposes that 'a hypothesis comes closer to truth the better it does at answering the questions it was meant to answer' (in press, 2), that is, it 'can come closer to truth by becoming true about more (and wrong about fewer) of those questions' (in press, 8). More formally, Süskind's definition of verisimilitude is as follows (in press, 8):

> DEF: Given a set $P = \{Q_1, Q_2, Q_3,...\}$ of questions, and two propositions A and B, we say that A is at least as close as B to the truth about P iff, for each $Q \in P$, we have: (1) if B implies the true answer to Q, then so does A, and (2) if A implies a false answer to Q, then so does B. We say that A is strictly closer than B to the truth about P iff A is at least as close as B but B is not at least as close as A.

The details of Süskind's theory of verisimilitude are not crucial for the purposes of this paper, so I shall just note that his theory (unlike Popper's original theory)[15] does not fail to compare false hypotheses, nor does it suffer from the problem of language dependence that has plagued several other theories of verisimilitude.[16] Moreover, the verisimilitude appraisals of hypotheses that Süskind's theory puts forward are intersubjectively testable, block arbitrary changes in the preferences of

[14] As Süskind (in press, 7) also points out, Popper (1979, appendix 2; see also Popper 1976, Sect. 4) had already come up with the idea of relativizing verisimilitude to research problems, but he did not develop it in satisfactory detail.

[15] For details about the failure of Popper's original definition, see Miller (1974) and Tichý (1974).

[16] The problem of dependence on language (or on a conceptual framework) was first formulated by Miller and detected by him in Tichý's theory – see Miller (1974, 176–177) and (Miller 1976). However, other theories suffer from this problem as well – for details, see e.g. Miller (2006, chapter 11) or Süskind (in press, Sects. 2.2 and 2.3).

hypotheses as well as their incommensurability, and avoid both the postulation of essential properties and dogmatism (for details, see Süskind in press, Sects. 2.3; 3.1 and 3.2).

I claim that Süskind's theory of verisimilitude is appropriate for a non-factive theory of knowledge because it meets desiderata (a) to (d) above. Desideratum a): Süskind's theory can be applied to any research that aims to answer a set of questions. Since it operates with the truth of answers to research questions, it can also cover those areas of research where it is questionable whether it makes sense to speak of truth as the aim of the research. For, regardless of the aim of the research (e.g., describing laws governing natural phenomena; proposing appropriate courses of action; establishing norms of behavior or examining assumptions of our experience, etc.), as long as we want to answer questions through research, the answers can be true or false. Therefore, the absence of truth at the object level (as the aim of research) is not a barrier to talking about truth at the meta-level (e.g., stating that an answer according to which a certain norm of behavior is right is not true because that norm is not appropriate for such and such reasons). Thus, there is indeed a close connection between knowledge and truth, which Bricker (2022, 277) alluded to, albeit not at the object level, but at the meta-level. A hypothesis that constitutes knowledge does not have to be true, but it must approach truth; and it does so when it yields (also) true answers to research questions. Without this, a hypothesis cannot be knowledge.

Hence, the aim of research (at the object level) need not be truth, and Süskind's theory of verisimilitude does not even require truth as a necessary condition of knowledge. This implies satisfying desideratum (b) above, namely, not insisting that truth is necessary for knowledge. However, vigilance is advisable with the desideratum (c) that demands a theory of knowledge to respect the fact that knowledge evolves and ceases to exist. Although Süskind's theory relativizes the verisimilitude of hypotheses to research problems, it is the hypotheses that answer the problems, not the research problems, that constitute knowledge. This is important if we are to reconcile Süskind's explanation of progress with the desideratum (c). According to Süskind, 'so long as we want to make progress, we should make the methodological decision to let the set of these questions freely grow, but not shrink' (in press, 2). This is necessary to prevent arbitrary changes in the verisimilitude appraisals: 'If hypothesis *A* is better than *B* at approximating the truth of our current problem-situation, then there is no way for the problem-situation to grow that would suddenly bring *B* closer to the truth than *A*.' (Süskind in press, 11).

The decision that the set of our research problems cannot shrink, however, does not mean that our knowledge cannot disappear. Knowledge extinction is not about reducing the number of research questions but rather about eliminating the hypotheses that propose answers to them. If we consider unrefuted criticizable truthlike hypotheses to be knowledge, then knowledge ceases to be knowledge the moment it is refuted. It cannot lose the other features (criticizability, truthlikeness, and hypotheticality) because any hypothesis that attempts to solve a problem can always be criticized (see Popper, 1963, chapter 8.2); its truthlikeness is determined by its (true and false) answers to research questions, and its truth cannot be justified in any way

(which is why it is a hypothesis).[17] However, the above features are not sufficient conditions of knowledge, and although I consider each of them to be a necessary condition of knowledge, I do not claim that this is an exhaustive (closed) list of necessary conditions.

The last requirement for an acceptable approach to the adequacy of approximate representations was the desideratum (d), i.e., the requirement for the theory of knowledge to relativize knowledge in an appropriate (i.e., harmless) way. This is precisely what Süskind's theory of verisimilitude can be used to do because it relativizes verisimilitude, which we understand here as a necessary condition of knowledge expressing the degree of adequacy in which the world (whatever it is)[18] is represented, to a set of research questions (see the definition DEF above). Hypotheses are always an attempt to solve certain problems; therefore, their verisimilitude depends on the solutions they propose to the research problems. However, Süskind's theory does not generate verisimilitude appraisals of hypotheses that vary according to the conceptual framework needed to express the hypotheses: 'If *A* is closer to the truth (of our current problem-situation) than *B*, then this order will hold independently of the language in which *A* and *B* are expressed. […] Closeness to truth is unaffected by translations from one language into another.' (Süskind in press, 10) Thus, the verisimilitude of hypotheses is not dependent on the conceptual framework within which they are formulated, but on the research questions they seek to answer.[19]

4 Conclusion

As Bricker (2022, 280) notes, the project of a non-factive conception of knowledge is fledgling. However, given the wide applicability of Süskind's theory of verisimilitude, I find it very promising and literally universal. In Sect. 2, I argued that the rejection of the truth condition as a necessary condition of knowledge is a natural consequence of the acceptance of alethic absolutism and the fact that knowledge evolves and ceases to exist. To this, Buckwalter and Turri's (2020) approximation account adds the argument that much of our knowledge is mere approximations that are not (strictly) true and proposes replacing the truth condition in theories of knowledge with a condition of adequate representation of truth that is relativized to practical purposes varying according to the requirements of successful action in a particular context. In Sect. 3, I argued that their proposal fails to explain how

[17] For arguments why the truth of any hypothesis is unjustifiable, see e.g. Popper (1982, chapter 1.2) or Miller (1994, chapter 3).

[18] I deliberately speak of *the degree* of adequacy and of *any world* because Süskind's theory also gives the promise of a quantitative expression of the degree to which the hypothesis approaches truth (Süskind in press, 8), and the world that is explored through the research questions can be (according to the argument from this paper's section) the physical world, the social world, the world of morality, the world of technology, the world of the arts, etc.

[19] For a more detailed answer to the expected objection as to whether Süskind is not exchanging one kind of relativism for another, see Süskind (in press, Sect. 3.1, especially pp. 10–13).

knowledge is possible in theoretical sciences which may have nothing in common with practical usefulness or successful action. However, I agree with Bricker (2022) that the existence of cognitive approximations is not an illusion and that a theory applying the idea of approximation to truth is more promising than the approximation account of Buckwalter and Turri. I therefore suggest taking advantage of Süskind's new theory of verisimilitude (in press), as it successfully addresses the key problems that previous theories have failed to solve and appropriately relativizes verisimilitude to research questions. The adequacy of representations underlying the approximation account can thus be clarified via Süskind's theory.

The result of piecing this patchwork together is a new non-factive theory of knowledge that does not consider truth, justification or belief to be necessary conditions of knowledge, but rather unrefutedness, criticizability, verisimilitude, and hypotheticality. With a certain amount of simplification, we can say that knowledge consists of unrefuted, criticizable, truthlike hypotheses that, while not necessarily true, must adequately represent the reality they investigate through the questions they pose. The adequacy of representations is thus approximate and relativized, not with respect to whether they help us to act successfully in changing contexts but with respect to what answers they provide to growing research problems. To bring this idea into focus, the paper utilizes Süskind's theory of verisimilitude, which can be applied to all areas of research, since every research is an attempt to solve a certain set of problems. As a result, the proposed non-factive theory of knowledge can cover any area of research, including research within the theoretical sciences, applied sciences, natural sciences, social sciences, humanities, philosophy, arts, ethics, or practical everyday activities. Clearly, the complexity of this nascent project naturally requires further research beyond the scope and aims of this paper.

Funding Open access funding provided by The Ministry of Education, Science, Research and Sport of the Slovak Republic in cooperation with Centre for Scientific and Technical Information of the Slovak Republic. This work was supported by the VEGA research grant No. 1/0388/25*The idea of representation, its place, and its role in the philosophy of science and artfunded by the Scientific Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic.*

Declarations

Ethics Approval and Consent to Participate Not applicable.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Boghossian, P. (2011). Three kinds of relativism. In S. D. Hales (Ed.), *A Companion to Relativism* (pp. 53–69). Blackwell.

Bricker, A. M. (2022). Knowing falsely: The non-factive project. *Acta Analytica, 37*(2), 263–282.

Buckwalter, W., & Turri, J. (2020). Knowledge and truth: A skeptical challenge. *Pacific Philosophical Quarterly, 101*(1), 93–101.

Cappelen, H., & Hawthorne, J. (2009). *Relativism and monadic truth*. Oxford University Press.

Feyerabend, P. (1970). Consolations for the specialist. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the Growth of Knowledge* (pp. 197–230). Cambridge University Press.

Gariazzo, M. (2017). Can we make sense of MacFarlane's relative truth? *Manuscrito, 40*(2), 39–70.

Goh, E., & Choo, F. (2022). Addressing two recent challenges to the factive account of knowledge. *Synthese, 200*(6), Article 435.

Kuhn, T. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Ladyman, J. (2002). *Understanding philosophy of science*. Routledge.

MacFarlane, J. (2014). *Assessment sensitivity. Relative truth and its applications*. Oxford University Press.

Miller, D. (1974). Popper's qualitative theory of verisimilitude. *British Journal for the Philosophy of Science, 25*(2), 166–177.

Miller, D. (1976). Verisimilitude redeflated. *British Journal for the Philosophy of Science, 27*(4), 363–381.

Miller, D. W. (1994). *Critical rationalism. A restatement and defence*. Open Court Publishing Company.

Miller, D. (2006). *Out of error. Further essays on critical rationalism*. Ashgate.

Miller, D. (2023). Putting science to work. *Intelligere Revista De História Intellectual, 9*(15), 14–44.

Popper, K. R. (1976). A note on verismilitude. *British Journal for the Philosophy of Science, 27*(2), 147–159.

Popper, K. R. (1979). *Objective Knowledge* (2nd ed). Oxford University Press.

Popper, K. R. (1982). *Realism and the aim of science*. Hutchinson.

Popper, K. R. (1963). *Conjectures and Refutations*. Routledge & Kegan Paul.

Rehman, I., Mahabadi, N., Motlagh, M., Ali, T. (2023). Anatomy, head and neck, eye fovea. *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK482301/. Accessed 1 August 2025

Sheth, B., & Shimojo, S. (2001). Compression of space in visual memory. *Vision Research, 41*(3), 329–341.

Süskind, J. (n.d.). Approaching truth by resolving questions. *British Journal for the Philosophy of Science* (in press). https://doi.org/10.1086/727773.hal-04760657

Tichý, P. (1974). On popper's definitions of verisimilitude. *The British Journal for the Philosophy of Science, 25*(2), 155–160.

Walton, D. (2011). Reasoning about knowledge using defeasible logic. *Argument & Computation, 2*(2–3), 131–155.

Woleński, J. (2022). Absoluteness of truth and the Lvov-Warsaw school. In A. Brożek & J. Jadacki (Eds.), *At the Sources of the Twentieth-Century Analytical Movement* (pp. 143–155). Brill.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.