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# Let Me Transform You: Introducing Transformative Experiences in Entrepreneurship to Refine Uncertainty

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## ABSTRACT

The relationship between entrepreneurship and uncertainty is ambivalent: while uncertainty creates entrepreneurial opportunities, it simultaneously poses a fundamental challenge. Despite extensive theorizing, conceptual ambiguity persists regarding the locus, origin, and behavioral implications of uncertainty in entrepreneurship. This conceptual paper introduces the notion of transformative experiences (TEs) to enrich this discourse. TEs are experiences that are both epistemically and personally transformative. They alter individuals' knowledge and identities in ways that are neither accessible nor predictable ex ante. We argue that the uncertainty associated with TEs does not primarily stem from subjective perception, ignorance, or external environment. Instead, it arises from the potential of an unpredictable transformation of the decision-maker. This perspective adds a novel angle to the debate on the locus of uncertainty and extends knowledge problems beyond factual limitations to include qualia-related dimensions. We further show that under conditions of TE-induced uncertainty, traditional mitigation and coping approaches, such as information gathering, theorizing, or experimentation, may prove inadequate. To address this issue, we propose an action-oriented stance grounded in an attitude of "not wanting to know" and not trying to minimize uncertainty. The paper concludes by outlining avenues for future research on the role of TEs in entrepreneurship, with particular attention to decision-making strategies, decision outcomes, and outcome evaluations.

## 1 | Introduction

Uncertainty and entrepreneurship have a complicated relationship. While creating opportunities for both aspiring and existing entrepreneurs (e.g., McMullen et al. 2007; York and Venkataraman 2010), uncertainty also poses significant challenges for their organizations (Foss 2023). Despite uncertainty being "a conceptual cornerstone for most theories of entrepreneurship" (McMullen and Shepherd 2006, 132), the literature still lacks a universally accepted definition or conceptualization of the term (Angus et al. 2023; Townsend et al. 2018). Scholars typically distinguish between two forms of uncertainty (Alquist and Baumeister 2024b; Kahneman and Tversky 1982). The first arises from subjective ignorance, characterized by an inability to predict future events or assign probabilities to potential outcomes (Angus et al. 2023; Alquist and Baumeister 2024a; Milliken 1987). The second stems from "objective reality," referring to an open-ended and inherently unpredictable world (e.g., Foss 2023). In this view, "the facts are not yet determined" (Alquist and Baumeister 2024b, 924) because they are shaped by human agency and free will (Ehrig and Foss 2022b). Although these perspectives diverge, their common underlying assumption is that knowledge problems, defined as a lack of (factual) knowledge when acting (Dorobat et al. 2025), cause uncertainty (Townsend et al. 2018). Reducing uncertainty solely to (factual) knowledge problems, however, has shortcomings with

Broadening the conceptualization of uncertainty in entrepreneurship research to include epistemic and personal transformations resulting from decisions involving transformative experiences.

**Summary**

- We introduce transformative experiences into uncertainty research by conceptually linking them to role identity theory and presenting a synopsis of different uncertainty conceptualizations.
- TEs highlight that knowledge is not only factual but also experiential. Certain forms of knowledge, especially *qualia* (first-person, ineffable experiences), can only be acquired through lived experience, thus challenging the traditional notion of knowledge problems.
- We introduce transformative experiences to provide a new angle in uncertainty research, arguing that uncertainty can arise not only from subjective ignorance or perception or environmental unpredictability, but also from the actor's capacity for epistemic and personal transformation.
- Since the problem of qualia cannot be solved by prior information gathering, theorizing, or experimentation, this paper challenges the assumption that more information leads to better decisions. In contexts involving TEs, acting first and learning through experience becomes more effective than trying to reduce uncertainty ex ante.
- Considering TEs' implications for a distinct uncertainty source leads not only to conceptual implications for uncertainty, but also to further research opportunities on decision-making strategies, decision outcomes, and outcome evaluations.

implications for how uncertainty is conceptualized, where it is located, and how it might be addressed.

In this conceptual work, we therefore add a qualitative and personal perspective to uncertainty and knowledge problems by introducing transformative experiences (TEs). Based on a narrative literature review (Baumeister and Leary 1997) on uncertainty research, we argue that current conceptual underpinnings of uncertainty (e.g., knowledge, locus) need to be expanded. Drawing on Paul (2014, 2015), TEs are experiences that are both epistemically and personally transformative. Epistemically transformative means gaining "forms or degrees of knowledge and understanding that were previously *unavailable* and, more importantly, previously *inaccessible*, insofar as they depend on having the relevant experience" (Carel and Kidd 2020, 199, italics added). Such knowledge cannot be acquired beforehand, not simply because it is missing, but also because it cannot be obtained through deduction, prior experience, or secondhand explanations. By contrast, personally transformative implies changes in "one's values, preferences, desires, and … identity in substantive ways" (Carel and Kidd 2020, 199). These two dimensions set TEs apart from ordinary life experiences. TEs can occur at any point in life and be the result of a voluntary decision (e.g., becoming a parent). In this paper, we focus on this type.

TEs have several implications for conceptualizing uncertainty. First, they add a new angle to the debate on the locus of uncertainty. In the context of TEs, uncertainty is not rooted primarily in subjective ignorance or an unpredictable environment, but in the individual's potential for transformation. This reframing shifts attention to a neglected source of uncertainty and, in doing so, contributes to greater "construct clarity" in this domain (Townsend et al. 2018). Second, TEs illustrate that epistemic states are not exhausted by factual knowledge; they also include a qualitative dimension that only emerges through the experience itself. As Chalmers (1995) notes, "[w]hen we think and perceive, there is a whir of information-processing, but there is also a subjective aspect" (201). This insight expands previous views on uncertainty (e.g., Knight 1921), which reduce it merely to the absence of factual knowledge (e.g., Foss and Grandori 2020; Westgren and Holmes 2022). Third, TEs' existence also influences how individuals navigate uncertainty. For entrepreneurs, operating in uncertain environments has become increasingly common, especially given the unprecedented frequency and scale of global crises (e.g., Caputo 2023; Jussli and Schwarz 2025). A common assumption is that uncertainty can be reduced by gathering more information, thereby making predictions and planning more reliable (Packard and Clark 2020). In the case of TEs, this strategy is neither feasible nor useful. Individuals cannot anticipate how the outcomes will feel to them, nor can they predict how the experience will transform them personally. In such decision contexts, instead of attempting to eliminate uncertainty, it may be more effective to act first, for example, learning through experience, including potential mistakes (Kurdoglu, Ates, et al. 2023), and to adapt within the new reality (Bastian and Zucchella 2022).

By introducing TEs into uncertainty research, we address Townsend et al.'s (2018) "urgent need" to elaborate on the nature of knowledge problems. In addition, we contribute to the understanding of why uncertainty occurs (Rapp and Olbrich 2020) and "how, why, and in what ways different decision contexts are uncertain" (Packard et al. 2017, 841). Importantly, we do not claim that all uncertainty stems from TEs. Rather, we argue that TEs inevitably occur in the entrepreneurial process, generating forms of unresolvable uncertainty that entrepreneurs must contend with. Consistent with Packard et al. (2017), our approach shifts away from traditional approaches to uncertainty as a matter of missing information. Instead, we focus on the deeper, more fundamental question of why uncertainty exists. In this respect, TEs are in line with Arend's (2020) call to ground research in specific situations and problems. Such cases, as Arend (2020) notes, "can better isolate the immitigabilities or the possible choices or both" (703).

In the following, we begin by reviewing different conceptualizations of uncertainty and highlighting their shared components. We then introduce TEs and their two main components, which provide the basis for discussing how the existence of TEs forms uncertainty and how to deal with it. Finally, we outline opportunities for future research to build on and extend our insights.

## 2 | Theoretical Background

### 2.1 | Uncertainty in Entrepreneurship

Entrepreneurship can be understood as judgment-based decision-making under conditions of uncertainty (Foss et al. 2007). Due to its close nexus to entrepreneurial action (e.g., McMullen and

Shepherd 2006; Wood et al. 2021), uncertainty is both integral to and essential for the entrepreneurial process (e.g., Packard et al. 2017). Yet, it represents a double-edged sword (Foss 2023; Rapp and Olbrich 2023): on one side, disruptive events (e.g., Taleb 2007; Ehrig and Foss 2022a) make uncertainty a challenge, forcing entrepreneurs to mitigate or at least anticipate its effects (Foss 2023). On the other side, uncertainty creates belief asymmetries and opportunities that potential entrepreneurs can exploit to generate value and economic rents (Angus and Barlow 2025; Felin et al. 2024; McMullen et al. 2007; York and Venkataraman 2010). Accordingly, there is considerable interest in exploring "where, how, and why uncertainty occurs, and how it shapes entrepreneurial decision-making" (Rapp and Olbrich 2020, 2). Despite extensive discourse, however, the literature lacks a unified definition or shared conceptualization of uncertainty (Angus et al. 2023; Townsend et al. 2018).

### 2.1.1 | Uncertainty Conceptualizations

To lay the groundwork for our discussion, we outline key perspectives on uncertainty. This overview is not exhaustive, but it captures the central ideas necessary for discussing their limitations. One common distinction divides uncertainty into two forms: (1) internal/subjective, stemming from cognitive limitations such as ignorance or predictive inability, and (2) external/objective, arising from the inherent unpredictability of the environment (Alquist and Baumeister 2024b; Kahneman and Tversky 1982).

For instance, Angus et al. (2023) stress the subjective character of uncertainty, distinguishing between objective unpredictability (the actual unknowability of future events) and subjective uncertainty (an individual's doubt about outcomes). Angus et al. (2023) note "[e]nvironments … cannot be 'uncertain' (they have no consciousness), but only 'unpredictable'" (1151). In this view, uncertainty requires an uncertain individual. Notably, subjective uncertainty involves not only perception but also ignorance. FeldmanHall and Shenhav (2019) define uncertainty as a state in which the person cannot (precisely) predict future states or actions. Similarly, Milliken (1987) pinpoints uncertainty in "an individual's perceived inability to predict something accurately" (136), in relation to three problems: predicting how the environment will change, how the changes will affect the individual, and how to assess the consequences of one's actions. The information uncertainty school of thought also echoes these perspectives on imperfect knowledge (Kreiser and Marino 2002). Authors such as Lawrence and Lorsch (1967) or Duncan (1972) claim that uncertainty lies in the inability to (1) assign probabilities to future events, (2) identify cause-and-effect relationships, or (3) predict the possible decision outcomes (Milliken 1987).

Others, particularly those researching the organizational side of entrepreneurship, locate uncertainty in the environment in which entrepreneurs operate. Miles and Snow (1978), for example, define environmental uncertainty as "the predictability of conditions in the organization's environment" (195). Similarly, McKelvie et al. (2011) argue that external factors, such as dynamism, generate uncertainty, since changes in highly dynamic environments have unpredictable consequences. These external factors may concern consumer demand, willingness to pay, or the behavior of third parties, such as rivals or regulators (Foss et al. 2019). Along these lines, the concept of "ecological rationality" (e.g., Gigerenzer and Gaissmaier 2011; Goldstein and Gigerenzer 2002) treats uncertainty as a structural property of the environment that heuristics can exploit (Todd and Gigerenzer 2007).

Packard et al. (2017) propose an alternative to the conventional subjective–objective distinction by focusing on the knowability of actions and outcomes in uncertain contexts. Specifically, Packard et al. (2017) differentiate between whether the means/options for action and the ends/outcomes are knowable ("closed") or unknowable ("open"). This framework produces a $2 \times 2$ matrix of four uncertainty types: (1) risk and ambiguity, (2) environmental uncertainty, (3) creative uncertainty, and (4) absolute uncertainty. Relatedly, Packard and Clark (2020) shift attention to uncertainty as a matter of (im)mitigability. Rather than asking what is uncertain or how much uncertainty exists, the authors focus on the extent to which a given uncertainty can be mitigated. In their framework, Packard and Clark (2020) distinguish between "epistemic uncertainty," which stems from a lack of knowledge that is, in principle, knowable and thus reducible through information gathering, and "aleatory uncertainty," which is rooted in fundamental ignorance and is inherently irreducible.

### 2.1.2 | The Hidden Core of Uncertainty Conceptualizations

Despite their differences, these conceptualizations share a common premise: we act in a "real world that is imperfectly understood" (March 1994, 178). This premise carries two important implications. First, the world we operate in is *open-ended* (Ehrig and Foss 2022b; Foss 2023). This "practical indeterminism" (Townsend et al. 2025) arises because human, and thus entrepreneurial, actions always have a future reference (York and Venkataraman 2010). Free will and interactions among multiple agents ensure that the future remains open and yet to be realized (Sergeeva et al. 2022; Townsend et al. 2024). In organizational contexts, this open-endedness is driven by multiple factors, "including the unpredictable behavior of people; changes in technology and politics; and unforeseeable personal, financial, or global crises" (Gigerenzer et al. 2022, 174).

Second, uncertainty centrally involves "knowledge problems" (Townsend et al. 2018) that are more, or qualitatively different, than mere ignorance of outcomes emphasized by Foss (2023). Townsend et al. (2018) define knowledge problems as an "epistemological obstacle to strategic action that manifests in terms of the novelty being confronted along one or more dimensions of action, including what is being done, who is doing it, why they are doing it, and when, where, or how they are doing it" (661). Within the entrepreneurial context, such knowledge problems arise when "new processes and new products require conjectures or … estimates, for which there are no a priori or statistical probability distributions" (Westgren and Holmes 2022, 203). As mentioned, one manifestation of such problems can be actor ignorance (Townsend et al. 2025), that is, not knowing what possibilities exist because of the sheer multitude of possibilities

(Foss and Grandori 2020). Knowledge problems also encompass difficulties in predicting outcomes, assigning probabilities to future events, interpreting ambiguities, disentangling complex causal relationships, and reconciling inconsistent expectations (Dorobat et al. 2025; Milliken 1987).

These two core elements of uncertainty in entrepreneurial research form the foundation of our argument that TEs necessitate a broader understanding of uncertainty regarding its locus, origins, and influence on decision-making in situations involving TEs. Before turning to our discussion, we first examine the concept of TEs.

## 2.2 | TEs

TEs have been studied across a wide range of disciplines, including philosophy, psychology, education, and tourism (e.g., Chirico et al. 2022; Paul 2014; Pugh et al. 2023; Zhao and Agyeiwaah 2023). Despite disciplinary differences, conceptualizations of TEs share two defining features (Chirico et al. 2022): first, TEs are conceived as extraordinary, subjectively unique experiences that produce enduring, often irreversible shifts in individuals' perspectives on themselves, others, or the world at large. Second, such experiences are marked by emotional complexity. Carel and Kidd (2020) classify TEs into three types: voluntary, nonvoluntary, and involuntary, depending on whether they result from deliberate choices, external unintended circumstances, or unintended consequences of actions.

Research on decision-making primarily concentrates on voluntary TEs, and this paper adopts this focus. We draw on Paul's (2014, 2015) philosophical account of TEs, because it is relevant for decision-making (Isaacs 2020; Pettigrew 2015) and grounded in philosophical underpinnings that can be related to the outlined understandings of uncertainty. In this view, TEs are those experiences that entail both epistemic and personal transformations. The term "transformation" is used deliberately here. Although change and transformation are often treated synonymously, "transformation in contrast to change is not about improving on what is, but creating what is not" and "creating a new context—a new realm of possibility which did not previously exist" (Appelbaum and Wohl 2000, 281).

### 2.2.1 | Epistemic Transformation

Epistemically transformative means that through the experience, we gain not only knowledge that we did not have before (unavailable knowledge), but more importantly, knowledge that we could not have without the experience (inaccessible knowledge) (Carel and Kidd 2020). The decision to have a child exemplifies this. The phenomenological reality of parenthood cannot be fully understood in advance, no matter how extensively one consults other parents, reads books about this, or engages in introspection and reflection. Both the experience and the knowledge it yields remain opaque until lived. The reason lies in the fact that knowledge is not solely factual, but also has a first-person, qualitative dimension (Isaacs 2020; Monaco et al. 2005; Pettigrew 2015). This dimension is referred to as "qualia" (Tye 2017), which are the "properties of sensations and perceptual states, namely the properties that give them their qualitative … character—those that determine 'what it is like' to have them" (Shoemaker 1991, 507). Jackson's (1982, 1986) thought experiment, Mary's Room, illustrates this idea of qualia as properties of knowledge. Mary, a scientist who has spent her entire life in a black-and-white environment, knows everything about the science of color. However, as she has never seen colors, she "is in an impoverished epistemic position" (Paul 2015, 154). Upon leaving the room and seeing red for the first time, Jackson (1982) argues that Mary *learns* something new, which means that her previous knowledge was incomplete. Despite having all the "physical information" (Jackson 1982), she acquires new knowledge, the experiential property of redness, that was previously inaccessible to her.

### 2.2.2 | Personal Transformation

In contrast, personal transformation refers to experiences that either (1) profoundly shape an individual's core values, preferences, or beliefs, or (2) alter one's self-view and understanding of one's desires (Carel and Kidd 2020; Paul 2015). In making a decision that entails a TE, the actor "brings into existence a future self that is radically different from who she previously was" (Das and Paul 2020, 187). Again, parenthood is a fitting example. Choosing to become a parent means assuming the parental role, much like how one adopts other societal roles—for instance, that of an entrepreneur. According to (role) identity theory (Stets and Burke 2000; Stryker and Burke 2000), identities are constituted through the adoption, performance, and internalization of such roles. Roles are functions or labels within a society (Burke and Tully 1977; Stryker and Burke 2000). They carry socially constructed expectations, behavioral standards, and symbolic meanings regarding appropriate enactment (Wagenschwanz 2021; Wry and York 2017). By performing a role, individuals internalize the expectations and meanings associated with it (e.g., Stets and Burke 2000).

Transitions into new roles, or shifts between roles, trigger identity work (Brown 2022; Sveningsson and Alvesson 2003). Identity work comprises the activities individuals undertake to create, maintain, express, or discard identities associated with their self-concept (Ibarra 1999; Snow and Anderson 1987). This process involves adapting one's identity to preserve both coherence and distinctiveness (Wagenschwanz 2021). Such role changes alter the ways in which individuals interpret and make sense of information, experiences, or events in their broader environment (Wittman 2019). Accordingly, we situate personal transformations within (role) identity theory, linking them to micro- or macro-role identity changes (Bousfiha and Berglund 2025) that occur throughout the entrepreneurial process. Having established the conceptual foundation of TEs, we now move on to our argument concerning their implications for conceptualizing and navigating uncertainty.

# 3 | Discussion: The Impact of TEs on Uncertainty in Entrepreneurship

In the following, we address (1) how TEs fit into the question of the locus of uncertainty, (2) how they relate to knowledge problems, and (3) what mitigation options exist in cases of TEs (Table 1). Thus, considering TEs provides us with further insights into how we can broaden and potentially better understand the concept of uncertainty in entrepreneurial research.

### 3.1 | Locus of Uncertainty

Currently, there is a theoretical debate in the literature about the locus of uncertainty—namely, whether uncertainty arises from the actor or the environment (Townsend et al. 2018). As mentioned, uncertainty has been traditionally framed either (1) as a subjective phenomenon rooted in perception (Angus et al. 2023) or ignorance in the sense of not knowing (e.g., Foss 2023; Milliken 1987) or (2) as an objective property of the environment (e.g., Gigerenzer and Gaissmaier 2011; McKelvie et al. 2011), produced by the free, unpredictable will of interdependent actors (e.g., Sergeeva et al. 2022; Townsend et al. 2024). TEs extend this debate by revealing a distinct source of uncertainty: the transformable self. Here, uncertainty is neither a product of perception or ignorance, nor a characteristic of the environment; it emerges from the individual's potential to undergo epistemic and personal transformation. The self, conceived as a holder of different (role) identities with subjective, ineffable experiences, serves as a locus of uncertainty. Therefore, when decisions involve TEs, uncertainty arises not before or after the decision, but within the act of deciding itself. In this respect, TEs share similarities with the notion of "irreducible a priori uncertainty" (Townsend et al. 2018), but with an important distinction. The uncertainty associated with TEs is not a priori, since it does not preexist the decision.

Consider the decision to become an entrepreneur. Starting new ventures entails high degrees of novelty and uniqueness in lived experience (Uygur and Kim 2016). Before making this decision, individuals cannot know what it is like to be an entrepreneur because such knowledge is inaccessible. It cannot be extrapolated from prior experience, deduced from existing knowledge, or conveyed through secondhand accounts (e.g., Kurdoglu et al. 2022; Nagel 1974; Ongchoco et al. 2024). The transition into the entrepreneurial role entails a fundamental identity change (e.g., Brown 2022). By becoming an entrepreneur, an individual not only redefines their self-view but is also classified and treated differently by others (e.g., Chasserio et al. 2014; Prochotta et al. 2022). The person integrates new meanings and expectations associated with this role into their evolving self-concept (Hoang and Gimeno 2010; Wagenschwanz 2021). In this sense, the uncertainty stems less from incomplete knowledge about outcomes and more from the fact that the actor's very identity, and thus sense-making, will be altered by the decision itself.

This example illustrates the shortcomings of some of the current uncertainty conceptualizations: although the available courses of action (i.e., starting a business or not) and their outcomes (i.e., being an entrepreneur or not) are knowable beforehand—and would thus not qualify as uncertainty according to Packard et al. (2017)—uncertainty nonetheless persists. The source of uncertainty lies in the epistemic and personal transformation generated by the decision, a transformation that cannot be anticipated beforehand.

### 3.2 | Epistemic States, Knowledge Problems, and Qualia

Apart from the locus of uncertainty, TEs show the need to broaden the understanding of *knowledge* in uncertainty

**TABLE 1** | Added value of considering TEs in uncertainty research.

| Uncertainty aspect | Established perspective | Contribution of the TE perspective |
|---|---|---|
| Locus of uncertainty | Unclear whether uncertainty lies in the actor, the action, or the environment | Uncertainty can also lie in potential personal transformations tied to decision-making |
| | Uncertainty results from subjective perceptions or environmental conditions | Uncertainty can also stem from actors themselves (e.g., qualia, identity); thus, uncertainty can be caused by transformations of the self |
| Knowledge problems/ epistemic states | Uncertainty arises from gaps in factual knowledge | Gaps can also refer to qualitative dimensions of knowledge (subjective and experiential) that emerge through decisions or experiences |
| | Uncertainty arises from ignorance as missing or uncollected information that is potentially knowable | Knowledge must not be ignored, but can be fundamentally unattainable |
| Behavior under uncertainty | Uncertainty is mitigable by information search or theorizing | In TEs, knowledge is inaccessible beforehand; thus, information gathering becomes ineffective. Instead, TEs require action despite uncertainty (not plannable) |
| | More information leads to better decision-making | Information search is often ineffective, as knowledge only arises through experience, due to the quale component |
| | Theorization provides orientation in uncertain situations | In unique, novel situations, in whereby actors cannot access the "what it is like to" knowledge, theorizing is only of limited help |

research. Existing literature reduces uncertainty to "knowledge problems" (Townsend et al. 2018). These problems are framed as epistemological obstacles, interpreted as informational or factual deficiencies (Foss and Grandori 2020; Townsend et al. 2018; Westgren and Holmes 2022). For instance, Knight (1921) notes "the world is made up of objects which are practically infinite in variety… and … it is evident that only an *infinite intelligence could grasp all of the possible combinations*" (207, italics added) and "we live only by knowing *something* about the future" (199, italics added). Casting knowledge problems as deficits in *factual* understanding suggests that (1) uncertainty could, in principle, be eliminated if all relevant information were available and (2) the actor simply lacks factual knowledge *about* something. Similarly, Packard and Clark (2020) argue that even a seemingly random event, such as a coin toss, would be fully predictable if all relevant factors were known in detail.

This framing reflects an implicit conception of uncertainty akin to physicalism, the belief that "complete physical knowledge is complete knowledge" (Jackson 1982, 291). Yet, TEs, with their quale component, challenge this fact-centric view on knowledge. They underscore that knowledge, relevant for informed decision-making, is not limited to empirical facts ("knowing about something"), but also about knowing how it feels or what Nagel (1974, 1980) describes as "what it is like to be". Just as Mary learns something genuinely new when she leaves the black-and-white room and perceives the color red, the aspiring entrepreneur acquires new knowledge in experiencing "what it is like" to be an entrepreneur, even after having all the "physical information." Qualia cannot be obtained through prior knowledge, (secondhand) reports, intuition, or reasoning; they must be lived (Shupe 2016). As such, qualia connect to Chalmers' (1995) "hard problem of consciousness," namely the difficulty of reconciling first-person experience with objective explanation. One reason for this difficulty lies in the inadequacy of language: when experiences are translated into words, much of their essence is lost (Ramachandran and Hirstein 1997). This limitation stresses why physicalism fails. As Jackson (1982) notes, "if physicalism is true, then if you know everything expressed or expressible in explicitly physical language, you know everything" (291)—a claim making TEs infeasible.

Incorporating qualia extends existing perspectives on uncertainty. Uncertainty cannot solely be a product of an epistemic limitation in understanding of causal processes that shape future world states (Townsend et al. 2024). Knowledge is more than "physical information" (knowing all about the future world) and includes the "phenomenological features of experience" (Nagel 1980, 323). In doing so, our argument also provides explanations for why uncertainty exists in some cases. For instance, Foss (2023) emphasized that certain business decisions are "far too unique" to be represented statistically. We build on this argument, highlighting that uncertainty also arises from the uniqueness of experiential knowledge, that is, the "what it is like" knowledge.

The broader epistemology also shapes how ignorance is understood. Existing definitions tend to view ignorance as a lack of information about probabilities, outcomes, or both (Alvarez et al. 2020; Foss 2023), or more generally as "a state of knowledge in which a person does not know the answer to a question" (Gigerenzer and Garcia-Retamero 2017, 180). Bastian and Zucchella (2022) argue that ignorance is unavoidable because complete knowledge or sufficient information about everything is unattainable. We expand this logic: not only is information lacking, but there will also always be a deficit of "what it is like" knowledge that cannot be resolved ex ante. Therefore, TEs require a more nuanced view of why the answer is unknown. Specifically, the answer may be unknown because (1) the person has not invested enough effort in information searching, although the answer is in principle obtainable; (2) the answer depends on the free will and unpredictable actions of other actors; or (3) the answer is tied to first-person knowledge. TEs demonstrate that knowledge problems, including actor ignorance, cannot be understood solely as deficits in factual information. These problems also reflect limits of epistemic accessibility and the very nature of knowledge itself.

### 3.3 | Implications of TEs for Behavior Under Uncertainty

After discussing the implications for the locus of uncertainty and knowledge problems, we now consider what the existence of TEs means for entrepreneurial behavior under TE-induced uncertainty. Hereby, we focus on actions taken to navigate uncertainty (i.e., information searching, theorizing/experimentation) and the decision-making processes described in the literature. Traditional approaches to decision-making under uncertainty assume that uncertainty can be mitigated through the acquisition of additional information (e.g., Packard and Clark 2020). This perspective presupposes that "more information" is inherently beneficial. Since uncertainty arises at the moment of decision-making in the cases of TEs, information gathering becomes not only less effective but potentially counterproductive. The effort devoted to such a search consumes (cognitive) resources (e.g., Gigerenzer and Gaissmaier 2011), while the relevant knowledge is, by definition, inaccessible a priori. In such cases, information search becomes obsolete. This inaccessibility of knowledge supports Packard and Clark's (2020) assertion that the "unknowability of qualia presents an irresolvable hurdle" (773), leading to an immitigable form of uncertainty. Yet, what distinguishes TEs is that they also involve personal transformations. Personal transformations likewise constitute an irresolvable hurdle. They induce uncertainty by altering the actor's identity, that is, preferences, values, and perspectives (Carel and Kidd 2020). Consequently, the informational value of any data collected is limited. Even if information about potential outcomes were available, its utility would be constrained by the unpredictability of how the decision-maker will change. To integrate such information meaningfully into a decision, actors would need foreknowledge not only of the outcomes but also of their future, postexperience self, which is impossible.

A second stream of literature suggests that uncertainty can be navigated through theorizing or experimentation (Camuffo et al. 2024; Felin and Zenger 2017; Felin et al. 2024; Foss et al. 2025). Entrepreneurs engage in theorizing and experimentation to construct, test, and revise their "theories" of value creation (Zellweger and Zenger 2023). However, as Foss (2023) notes, experimentation is "called into question" when decisions involve novel, impactful, and highly unique situations. The uniqueness leads to a lack of "any sort of statistical tabulation to have any value for guidance" (Knight 1921, 231).

TEs accentuate this problem: both qualia and personal transformations cannot be derived through theorizing or experimentation, based, for instance, on imagination or previous experiences. Qualia cannot be extrapolated through imagination (Ongchoco et al. 2024) because actors remain confined to their own subjective standpoint (Nagel 1974). Similarly, personal transformations cannot be estimated, as individuals experience shifts in perspective when considering their future selves (e.g., Macrae et al. 2015; Trope and Liberman 2003) and treat them as strangers (Burum et al. 2016). Research shows that people simulate future events using different mental perspectives: while near-future simulations lead to an actor-centered, first-person perspective, distant-future simulations shift to observer-based, third-person representations (Macrae et al. 2015). These cognitive dynamics complicate attempts to theorize personal transformation in advance.

Given the limitations of other approaches, a compelling approach to navigating TE-induced uncertainty may be to combine “not thinking” with action and subsequent reflection. This approach resonates with the concepts of “revelatory value” (Paul 2014), deciding and then discovering whether an outcome is suitable. In this respect, actors should operate as if the environment is indeterminate (Townsend et al. 2025). When dealing with TE-induced uncertainty, there should be a shift away from the imperative of reducing uncertainty and toward an openness to action (Lerner et al. 2018). This action-oriented stance departs from the dominant assumption of entrepreneurial action in uncertainty research that entrepreneurs first make decisions and then behave rationally in accordance with it (Lerner et al. 2018). Instead, it emphasizes acting first, followed by critical reflection on whether the outcome of the TE aligns with the individual (Paul 2014; Villiger 2024). In addition, this approach also opposes the assumption that when dealing with uncertainty, common to rational choice theory, gathering information is always positive and free of negative effects (e.g., Packard and Clark 2020; Sharot and Sunstein 2020). Importantly, this approach enables individuals to act despite epistemic irresolvabilities, allowing them to either achieve their goals or learn from failure (Kurdoglu, Jekel, et al. 2023). In doing so, actors create new states of the world from which they can reassess and adjust their course, automatically generating new uncertainties in the process (Bastian and Zucchella 2022). In this sense, the entrepreneurs' judgments and actions become continually “revisited, renewed, and revised” (Packard et al. 2017, 1). In entrepreneurship, which is an action-oriented process (Frese and Gielnik 2023), it is critical to initiate behavior, “make decisions on what is, till then, unknown to thrive” (Bastian and Zucchella 2022, 85), and “give shape to [...] emerging possibilities” (Townsend et al. 2024, 470). Importantly, sound decision-making does not invariably depend on precise knowledge or the accurate forecasting of actions and outcomes (Grandori 2023).

## 4 | Future Research and Implications

Introducing TEs into entrepreneurship and decision-making under uncertainty presents multiple promising avenues for future research (see Table 2). Understanding when TEs occur (T1 and T2) and their impact on decision-making strategies (T3) and outcomes (T4) would enable researchers to provide valuable insights to potential entrepreneurs, helping them prepare for critical decisions and potentially fostering entrepreneurial well-being and the likelihood of success.

Despite the centrality of TEs' potentiality in the entrepreneurial process, empirical analyses remain scarce on the types of decisions, contextual factors, and personal characteristics that increase the likelihood of entrepreneurs undergoing TEs. We therefore stress the need for research on antecedents of TEs, thereby enabling their predictions. Role identity theory (Stets and Burke 2000; Stryker and Burke 2000) offers a promising lens for identifying TEs in entrepreneurship, given that role transitions are often associated with identity changes (e.g., Brown 2022; Wittman 2019). Examples include individuals choosing to become entrepreneurs, exiting or retiring from entrepreneurship, or undergoing major role transitions within the entrepreneurial process, such as adopting a leader identity (e.g., Priest and Middleton 2016). Beyond examining how such transitions generate a qualitatively different sense of self, it is equally important to consider how individuals experience their new roles and perform identity work. Anchoring the study of TEs in role identity theory presents an additional advantage: entrepreneurial role identity shifts have already been observed as prevalent in prior research (Lex et al. 2022; Tripathi et al. 2020). For example, Cesinger et al. (2022) found that sustainable entrepreneurs switch between different entrepreneurial identities over time to resolve tensions between business logic and social or environmental values.

Second, it is of interest to examine how knowledge of and experience with TEs influence entrepreneurial decision-making strategies. This concerns all phases of entrepreneurial decision-making. Research branches include (1) how previous TEs affect entrepreneurs' behaviors when confronted with potentially transformative decisions (pre-decision), (2) how they shape entrepreneurs' preferences regarding decision-making strategies after choices have been made (post-decision), and (3) how TEs interact with specific strategies, such as heuristics and eristics, during decision-making under uncertainty (peri-decision). Heuristics are strategies that involve ignoring or selectively considering certain information to make quick, easy, and/or accurate decisions (Gigerenzer and Gaissmaier 2011). Under moderate uncertainty, heuristics yield the highest utility (Kurdoglu et al. 2022). However, as uncertainty increases and heuristic cues in the environment lose their informational value or availability, striving for accuracy through heuristics becomes neither feasible nor adaptive (Kurdoglu, Jekel, et al. 2023). In such contexts, eristics, that is, decision-making strategies grounded in interoceptive signals and oriented toward satisfying hedonic needs, may become more useful (Kurdoglu, Ates, et al. 2023; Kurdoglu, Jekel, et al. 2023). Specifically, future research may investigate how (1) heuristics and eristics enable entrepreneurs to navigate TE-induced uncertainty, and (2) experiencing TEs alters the use of these strategies. Addressing these questions would provide entrepreneurs with insights into their decision-making to reflect and adapt their decision-making approaches to better manage different forms of uncertainty.

Third, future research could investigate how decisions involving TEs influence entrepreneurs' subsequent evaluations of both the decisions and their outcomes. Given that TEs are

**TABLE 2** | Overview of potential avenues for future research.

| Research type | Research topics | Key research questions |
|---|---|---|
| (A) Fundamental research | T1: Linking TEs to entrepreneurship | • Which decision types, characteristics, and contexts are likely to result in TEs for entrepreneurs?<br>• Are there specific personal characteristics that increase the likelihood that decisions will be transformative? |
| | T2: Linking TEs to entrepreneurial role identities | • Are there specific entrepreneurial phases or decisions prone to personal transformations?<br>• How does an entrepreneur's identity change and engage in identity work during/after TEs?<br>• What kind of new "what it is like" knowledge is acquired by the individual after new role adaptations? |
| (B) Applied research | T3: Linking TEs to decision strategies (heuristics and eristics) | • Pre-decision: How does knowledge and experience about potential future TEs impact decision-making strategies?<br>• Peri-decision: Do entrepreneurs adjust their decision-making strategies to the far-reaching nature of TEs?<br>• Post-decision: Do entrepreneurs prefer specific decision-making strategies after TEs? |
| | T4: Linking TEs to outcome evaluation, including entrepreneurial regret | • How do TEs impact entrepreneurial evaluations of decisions and their outcomes?<br>• Entrepreneurial regret: How do unpredictable outcomes from transformative decisions influence regret? Is entrepreneurial regret influenced by TE-induced shifts? |

inherently unpredictable and often irreversible, the experience of entrepreneurial regret (Quach et al. 2021) offers a starting point for research and an example of how such outcomes may unfold. Experienced regret is the response to unfavorable events after they occur (Hatak and Snellman 2017) and is necessarily tied to a choice (Hirigoyen and Labaki 2012). Despite its relevance, experienced regret has received little attention in entrepreneurship research (Quach et al. 2021; Hsu et al. 2019), although it can even occur in successful entrepreneurs (Markman et al. 2005). TEs offer a compelling frame for studying experienced regret. Analogous to becoming a parent, where individuals report identity loss and detachment from their former, child-free selves (Matley 2020; Piotrowski et al. 2023), entrepreneurial decisions, triggering TEs, may lead to regret even when outcomes appear objectively positive. For instance, a transition from self-employment to a more strategic managerial position may create dissatisfaction for entrepreneurs who value hands-on, operational involvement. Crucially, such regret does not necessarily stem from decisions made under uncertainty that later produce negative or "wrong" outcomes. Rather, it may arise because TEs alter the evaluative preferences through which outcomes are judged. Exploring this link would benefit from research that captures how entrepreneurs reinterpret TEs and negotiate potential regret. Such findings would offer guidance for aspiring or existing entrepreneurs to anticipate or avoid forms of regret.

## 5 | Concluding Remarks

This paper introduces the concept of TEs into the discourse on uncertainty in entrepreneurship to extend established notions of uncertainty by adding a subjective, qualia-related knowledge dimension. Instead of redefining uncertainty per se, we highlight shortcomings of existing conceptualizations and demonstrate how TEs enrich the ongoing debate. In doing so, we also respond to calls in the literature to clarify the locus, nature, and sources of uncertainty (Rapp and Olbrich 2020; Townsend et al. 2018) and provide conceptual tools to better understand knowledge problems. Specifically, we advance the understanding of three issues: the locus of uncertainty, the concept of knowledge, and the mitigation of TE-induced uncertainty. Following Packard et al. (2017), we shift attention from what is unknown to why certain outcomes are unknowable, thereby contributing to explanations of why uncertainty emerges. Drawing on TEs, we argue that, in addition to factual knowledge problems and an open-ended world, uncertainty may stem from individuals' capacity for transformation. This insight broadens the limits of uncertainty and knowledge problems: it is not simply a lack of (factual) knowledge (e.g., Foss and Grandori 2020; Knight 1921), but an emergent property of decisions whose consequences are fundamentally unknowable ex ante as they involve qualitative dimensions of knowledge only attainable through experiences. These insights carry important implications for entrepreneurial decision-making. Efforts to mitigate uncertainty through information gathering (Packard and Clark 2020) or theorizing (Felin et al. 2024) may be ineffective or even futile when required knowledge is inaccessible before experience or action. Uncertainty in the context of TEs must be accepted, with action preceding understanding.

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**Conflicts of Interest**

The authors declare no conflicts of interest.

**Data Availability Statement**

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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