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Uncertainty

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Abstract

Uncertainty is a gateway to the possible. Although the concept of uncertainty often connotes a negative or potentially hazardous state of being, scholars have long recognized that uncertainty also serves as a stimulus for new thought, beliefs, and actions. In this way, uncertainty can serve as an opening to the possible. The aim of this entry is to discuss how uncertainty has been conceptualized in the literature, including different types of uncertainty that people experience and how those experiences can propel us into the possible. Considerations for drawing connections among uncertainty, the possible, and related areas of inquiry are also discussed.

Keywords

Actionable uncertainty · Genuine doubt · Mundane uncertainty · Profound uncertainty · Risk · Structured uncertainty · The possible

Definition and Overview

Uncertainty refers to a state of doubt. It connotes a lack of determinateness, sureness, stability, control, and predictability. Although uncertainty typically refers to one's own experience of doubt in the present moment, it also includes past- and future-oriented doubts about others, features of the environment, and the interrelationship among self, others, and context (Jordan and McDaniel 2014). It thereby refers to a present state of not knowing, a future oriented inability to confidently predict what will happen in the future and a potential lack of clarity of how to make sense of past events.

Given that uncertainty is associated with lack of clarity, control, and determinateness, it tends to be viewed as an unpleasant state that should be quickly resolved. In this conception, states of uncertainty serve as omens that signify risk and impending harm (Byrnes 2011; Reith 2004) and because people are risk adverse (Mumford et al. 2006), they attempt to avoid, manage, mitigate, and quickly resolve their encounters with uncertainty. Along these lines, there is a tradition of scholarship aimed at the "strategic management of uncertainty" (Collis 1992; Jauch and Kraft 1986). Such efforts are focused on planning for

and controlling uncertainty in an effort to minimize potential hazards and maximize any potential benefits stemming from states of uncertainty. The notion that uncertainty can be managed, controlled, or even proactively eliminated has been traced back to what Reith (2004) has described as an "optimistic Enlightenment belief in the possibility of eliminating the uncertainties of the future through rational action in the present" (p. 384).

Not all scholars conceptualize uncertainty as a phenomenon that can be controlled or should be quickly resolved once experienced. Moreover, as will be discussed in the section that follows, there is a long line of scholars who recognize that although experiencing uncertainty is often uncomfortable and can sometimes result in negative outcomes, it can also be an animating force, which opens up new states of awareness and new possibilities for thought and action (Beghetto 2019a, c; Dewey 1910; Peirce 1958). It is this latter view of uncertainty that positions it as a gateway to the possible.

Uncertainty and the Possible

There are various ways we experience uncertainty and not all of our experiences with uncertainty motivate new possibilities. One way to think about our experiences with uncertainty is to recognize that it can be experienced at different levels of intensity. Indeed, given that daily life is always and already shot through with some level of uncertainty, we are not able to fully attend and respond to all of the uncertainties we face (Beghetto 2016; Dewey 1910). Some of the uncertainties we face are experienced at a lower level of intensity, what might be called *mundane uncertainties*, and often go by without much notice or response. Other uncertainties we face can be extremely intense or, what might be called *profound uncertainties*, which strike us as completely unknowable. Although profound uncertainties can be unsettling, we coexist with them even though there is little we can do to actively or ever resolve them. This leaves us with a wide variety of moderately intense experiences with uncertainty, what might be called

actionable unceratinty. Actionable uncertainty is a state of doubt that rises to a level of awareness whereby we find ourselves at an impasse *and* feel the need to explore and enact new possibilities. It is this latter experience of uncertainty that scholars have recognized as motivating new modes inquiry and new possibilities for thought and action (Bardt 2019; Beghetto 2019a; Dewey 1910; Glăveanu 2020; Peirce 1958).

The eighteenth-century French literary critic, Antoine Leonard Thomas (1773), for instance, underscored the primacy of doubt in thought and awareness. Thomas, in his commentary on Descartes, explained that although we dwell in a state of "universal doubt" and feel compelled to find a foothold when faced with doubt, doubt serves as basis for our thinking and existential awareness: *since I doubt, I think, since I think, I exist* (i.e., "Puisque je doute, je pense; puisque je pense, j'existe," Thomas 1773, p. 25). In this construction, it is the experience of doubt that is primary to and opens up the possibilities for our thoughts (Dubito, Ergo Cogito) and actions (Dubito, ergo faciam, see Bardt 2019, p. 30).

Charles Sanders Peirce, the American Pragmatist and polymath, went further arguing that the only form of thinking that ever generates a new idea is that which occurs under a state of *genuine doubt*, not the paper doubts of philosophical speculation, but the upending doubt we feel when our typical forms of reason (e.g., induction and deduction) fail us. As Peirce has described it, new thought has its genesis in "some surprising phenomenon, some experience which either disappoints an expectation, or breaks in upon some habit or expectation" (Peirce 1958, n.p.). John Dewey (1910) similarly noted, that it is the "state of perplexity, hesitation, and doubt" (Dewey 1910, p. 9) that serves as the antecedent for new thoughts and actions. New ideas and behaviors become necessary under states of genuine uncertainty because our former ways of thought and action no longer serve us.

Actionable uncertainty viewed from this perspective represents a fundamental and continuous aspect of the human experience (Glăveanu 2020). Indeed, although uncertainty may be anticipated and minimized through planning and imposed

Uncertainty, Fig. 1 Actionable uncertainty

structures and routines, it can never be fully eliminated. This is because lived situations are dynamic and thereby always and already shot through with some level of uncertainty and risk (Beghetto 2019b; Breakwell 2014; Byrnes 2011). Rather than conceptualize uncertainty and the risks associated with it as an impending hazard, which is outside of our construction of reality (Reith 2004), scholars who view uncertainty as a signifier of the possible recognize that it can have both potential benefits and potential drawbacks. Moreover, they also recognize that attempting to avoid or rapidly resolve uncertainty can actually be more problematic than engaging with uncertainty and taking time to explore new possibilities (Beghetto 2019b; Byrnes 2011).

Encounters with actionable uncertainty thereby serve as a signifier that new thought and action is needed to arrive at a reasonable, albeit temporary, state of resolution. Instead of attempting to avoid or quickly eliminate uncertainty, we can learn to invite, engage, and sustain it by considering and enacting new possibilities. Indeed, as Dewey (1910) has explained, "acquiring the attitude of suspended conclusion" allows us to "maintain the state of doubt," protract our inquiries (Dewey 1910, p. 13), and, in turn, realize new possibilities (Dewey 1910). Figure 1 illustrates this cycle of actionable uncertainty.

As illustrated in Fig. 1, encounters with actionable uncertainty serve as a gateway to the possible, because they disrupt our expectations. These encounters often occur when we attempt to enact preconceived plans and designs. People who work with physical materials, for instance, quickly learn that no matter how clearly conceived a design they have in mind, once they attempt to enact their designs, the materials often "speak back" and resist their expectations. As Bardt (2019) has explained,

> When we manipulate actual material, wood for instance, it continually surprises and overturns the mental 'model' of wood. (p. 28)

> When a material doesn't fit our mind's assumptions – and it never does when we engage it – feelings such as doubt and belief emerge to be important ways to navigate the gulf between the mind's stable concepts of material and material's mutability. (p. 31)

The "gulf" that Bardt (2019) describes can be thought of as an opening or gateway for the possible. It is the liminal space we find ourselves in when the expected meets the unexpected (Aoki 2004; Beghetto 2017). It is in this in-between space where Dewey's "attitude of suspended conclusion" becomes important – allowing us to explore and enact new possibilities rather than attempt to ignore, force-fit, or otherwise quickly resolve the doubt we encounter. Our encounters with actionable uncertainty are not limited to our engagement with physical materials, they also occur anytime we act in the world with overwrought expectations or plans.

Professional educators, for instance, often design highly planned and sequenced lessons. Indeed, educators learn to "plan away uncertainty" by detailing minute-to-minute activities and sometimes even rehearse scripted interactions with students in an effort to avoid the risk of encountering chaotic feelings of doubt or uncertainty when teaching (Beghetto 2017). Still, no matter how carefully planned and rehearsed a lesson, uncertainties still arise when the curriculum as planned meets the curriculum as lived (Aoki 2004).

Continuing with the example of teaching, there are various sources of rupture that can emerge when the planned lesson meets the lived lesson. These sources include (Beghetto 2017):

- *Social ruptures* (unexpected emotional, behavioral, ideational, and interactional responses of students, e.g., students engaging in side conversations, students getting upset, or taking the lesson in unexpected directions)
- *Internal ruptures* (unexpected responses of instructors, e.g., conflicting internal dialogues; recognizing a potentially new direction that the lesson can take; feeling disorganized, confused, frustrated, disconnected)
- *Material ruptures* (unexpected interactions, resistance, and problems with the planned use of tools, materials, and technologies, e.g., technology failing, learning materials affording unexpected uses)
- *Societal-situational ruptures* (unexpected situational, societal, and global factors that disrupt seemingly stable habits, routines, and expectations and result in states of actionable uncertainty, e.g., COVID-19 pandemic of 2020 causing school closures and resulting rapid and mass movement to online forms of teaching and learning)

In addition to these surprising encounters with uncertainty, it is also possible for encounters with actionable uncertainty to be designed into an experience to provoke possibility thinking and creative action (Beghetto 2019c). Intentionally designing or planning for uncertainty may at first blush seem oxymoronic. Indeed, how can uncertainty, which is a state of not knowing be planned or designed into an experience? Although it may be true, as Charles Sanders Peirce has argued, that genuine states of uncertainty, which engender situations of surprise, disruption, and unknowing, cannot be willed into being (Lane 2014); it is still possible to design situations wherein opportunities for encountering and working with uncertainty are purposefully induced.

An example of doing so, what has elsewhere been called *structured uncertainty* (Beghetto 2019c)*,* involves designing experiences that blend predetermined elements with to-be-determined elements. The predetermined elements provide the *structure* to help guide the experience, such as providing criteria for success, guidelines

for engaging with the experience, and information on how assistance might be obtained during the experience. The to-be-determined elements represent the *uncertainty* of the experience because how those elements are engaged with and resolved is not known or determined in advance. Exploring the concept of structured uncertainty a bit further can help clarify how designed experiences can also serve as a gateway to the possible.

Let us take the example of a designed learning experience. Learning experiences can be thought of as including four core elements (Beghetto 2019b): the *what* (i.e., the task to be accomplished), the *how* (i.e., the procedures or approach for accomplishing the task); the *outcome* (i.e., the expected result of engaging in the task), and the *criteria* (i.e., the guidelines, rules, supports available, or other features that help determine a successful outcome). As has been discussed, most plans and designs endeavor to *eliminate* uncertainty by predetermining all the elements of an experience in advance (see Fig. 2, Panel A), whereas structured uncertainty blends predetermined elements with to-be-determent elements (see Fig. 2, Panel B).

Designed encounters with uncertainty vary in complexity with respect to how much uncertainty is introduced by the to-be-determined elements (Beghetto 2018). More specifically, as illustrated in Fig. 2 (Panel B), designed experiences can range from somewhat less complex experiences (e.g., a teacher teaches one way of completing a task and then requires students to come up with their own way of completing the task) to more complex experiences that include multiple to-be-determined elements (e.g., students are asked to identify their own task, their own way of completing it, their own products that demonstrate successful completion, and even assist with the development of criteria for success).

The more to-be-determined elements, the more uncertainty and, in turn, the more room for the possible. Even in designed experiences that include one to-be-determined element, the possible can still be animated in ways that enable all participants to explore and benefit from new possibilities. Consider the example of a teacher who
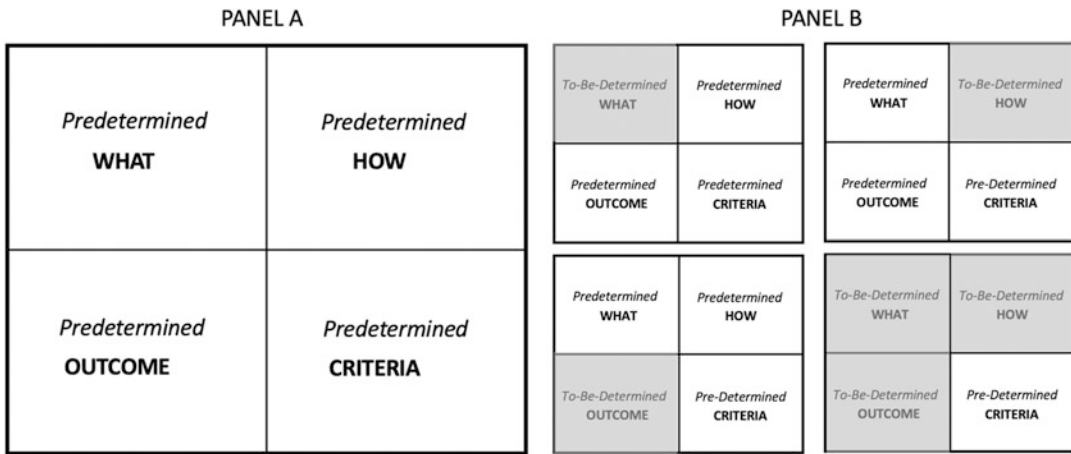
Uncertainty, Fig. 2 Variations in designing encounters with uncertainty

requires students to come up with their own way of solving a problem and the students collectively come up with and share with each other more than a dozen viable possibilities. The result of doing so can extend the possibilities beyond what any one individual in the group (including the teacher) could come up with on their own.

Finally, designing encounters with uncertainty also includes making sure that supports are available to people as they work with the to-be-determined elements (Beghetto 2018). Example supports include timely assistance (i.e., letting people know how they can receive as-needed assistance), dynamic challenges (i.e., increasing or reducing complexity by adding or removing uncertainty), and guidance (i.e., criteria, guidelines, and ground rules). These supports structure the experience and help to ensure that the uncertainty encountered remains actionable, rather than becoming over- or underwhelming.

Conclusion

Although uncertainty can be an uncomfortable aspect of our lived experiences, it can also prompt us to consider and enact new possibilities for thought and action. As has been discussed, not all encounters with uncertainty result in new possibilities. There are, however, at least two instances when we can act on uncertainty. The

first pertains to situations wherein our expectations run up against our lived experiences and our habitual ways of thinking and acting no longer serve us. In such cases, the doubt we encounter serves as a signifier that exploring and enacting new possibilities are necessary to work with and, at least temporarily, resolve the uncertainty we face.

The second instance where we can act on uncertainty is when we have designed experiences that require engagement with to-be-determined aspects of the experience. In such cases, we are presented with structured opportunities to engage with uncertainty in an effort to move toward a full array of new possibilities for ourselves, others, and our collective experiences in the world (Glăveanu 2018). Although we can experience some sense of resolution through the enactment of new possibilities, uncertainty always and already remains central to our experience and thereby can later necessitate further exploration and enactment of additional possibilities for the way we think, know, and act. This process occurs even in seemingly settled situations (e.g., scientific understanding, completed artistic works) as uncertainty can emerge from new ways of knowing and when "finished" works open to new interpretations (Anderson 1987).

Conceptualizing uncertainty as a gateway to the possible represents an important line of inquiry that offers an alternative perspective

to conceptualizations that view uncertainty as something that should be avoided or immediately resolved once encountered. Indeed, viewing uncertainty as a gateway to new possibilities for thought and action can help us approach encounters with uncertainty with a willingness to suspend our desire to quickly conclude the experience and instead engage with this state of doubt in an effort to explore the new possibilities it affords (Beghetto 2016; Dewey 1910). This perspective is in line with descriptions of related experiences that help animate the possible, including the experience of wonder (Glăveanu 2020), states of awe (see Chirico, "▶ Awe"), creative learning (see Beghetto, "▶ Creative Learning and the Possible"), and risk taking (see Vacondio and Dickert, "▶ Risk"). Future work building on a conceptualization of actionable uncertainty as a gateway to the possible can help advance theory and research aimed at exploring how unexpected and designed encounters with uncertainty open up new ways of thought and action for ourselves and others. Such efforts may also help us realize complimentary perspectives in related and even seemingly incompatible work on uncertainty and the possible.

Cross-References

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