Managing Uncertainty in Work Organizations

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Abstract

Managing uncertainty is a crucial task for organizations. This essay argues that uncertainty management should not only be understood in terms of reducing externally generated uncertainty, as previous research has predominantly done, but should also consider internal uncertainty creation. Evidence from extant research illustrates how this expanded perspective is better able to capture the paradoxical tensions inherent in uncertainty management. A multilevel approach is proposed as processes of reducing and creating uncertainty simultaneously happen and create complementarities across levels of analysis. Major theoretical frameworks, such as self-regulation, decision-making under uncertainty, contingency theory, and organizational control, will benefit from adopting such an expanded perspective because their explanatory power is currently limited due to the one-sided view of uncertainty as an external threat to individual, team, and organizational goal-striving.

INTRODUCTION

Uncertainty is a pervasive concept in many scientific disciplines as well as in everyday life (Grote, 2009). In our personal experience, it related to cognitions and emotions in situations where we would want to know more in order to make sound judgments and act effectively. Such a lay understanding is not unlike formal definitions found in the scientific literature: For instance, Galbraith (1973) defined uncertainty as the difference between the amount of information required to perform a task and the amount of information already possessed by the actor. Definitions abound, however, and substantially differ by scientific discipline (Lipshitz & Strauss, 1997). Frequently, a distinction is made between risk and uncertainty, where risk is a quantifiable form of uncertainty based on probability estimates, while the term uncertainty is reserved for nonquantifiable uncertainty (Knight, 1921). As this essay focuses on uncertainty in work organizations, a definition

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close to those used in the organization sciences is applied: Uncertainty is a state of lacking or ambiguous information in relation to a task to be accomplished. It can have many different sources, such as incomplete information, inadequate understanding of available information, or undifferentiated (i.e., equally attractive or unattractive) alternatives (Lipshitz & Strauss, 1997).

This essay argues (i) that to date uncertainty has been treated in a rather one-sided—and often implicit—manner as externally generated threat to the functioning of individuals, teams, and organizations. It maintains (ii) that, by explicitly considering uncertainty from a broader perspective, which includes external and internal sources of uncertainty and also possible benefits of uncertainty, many phenomena in work organizations can be understood more fully. This new perspective also allows providing better support for individual and organizational uncertainty management. I develop these arguments by examining some prominent theoretical frameworks at the individual, team, and organizational level with respect to their treatment of uncertainty and by discussing several salient phenomena at each level within the suggested broader understanding of uncertainty. I will conclude with some considerations across levels and recommendations for future research.

INDIVIDUAL UNCERTAINTY MANAGEMENT

Two fundamental paradigms in psychology have uncertainty at their core: self-regulation and decision-making. Self-regulation comprises all processes that "enable an individual to guide his/her goal-directed activities over time and across changing circumstances (contexts)" (Karoly, 1993). Self-regulation models of individual functioning have been developed in close conceptual proximity to cybernetics. Individuals pursue goals, understood as reference values in control theory terms, and have to overcome externally generated disturbances in reaching those goals, where the necessary adaptations are conceptualized as negative (discrepancy reducing) feedback loops. In the most general sense, in self-regulation, uncertainty gets in the way of achieving valued goals. In the respective research, uncertainty itself is not considered in much detail, though, as individual level prerequisites and processes related to (un)successful adaptation are at the center of attention (Lord, Diefendorff, Schmidt, & Hall, 2010).

Research on decision-making is mostly undertaken within a paradigm that very explicitly addresses uncertainty even in its name, "decision-making under uncertainty." Here, uncertainty is defined in terms of probabilities attached to gains or losses the individual has to decide upon. Research has centered around people's inadequate processing of probability information from the mathematical standpoint of maximizing subjective expected utility

(Shafir & LeBoeuf, 2002). For instance, Kahneman and Tversky (1979) showed that people are more uncertainty averse in choices concerning gains compared to losses, leading them to prefer a certain lower gain over an uncertain higher gain, while preferring an uncertain higher loss over a certain lower loss. In more recent research, Wilson, Centerbar, Kermer, and Gilbert (2005) discovered the "pleasure paradox," where people's positive mood lasted longer when kept uncertain about the exact nature of a positive event. Lerner, Li, Valdesolo, and Kassam (2015) discussed differential linkages between emotions, uncertainty perceptions, and subsequent behaviors more generally, where for instance anger produces assessments of high predictability and high personal control, while fear is related to perceived low predictability and low personal control. To date, these more intricate insights into individual uncertainty management have not been applied to work contexts much, which points to a fruitful avenue for future inquiry.

There are also many constructs in personality psychology describing personal dispositions related to uncertainty. The basic tenet is that people are averse to uncertainty, but the degree to which this is the case may differ. Examples are tolerance for ambiguity, uncertainty orientation, and learning versus performance goal orientation. Two theories that build on uncertainty aversion as a general psychological principle are uncertainty–identity theory (Hogg, 2007) and the uncertainty management theory of fairness (Lind & van den Bos, 2002). Both theories explain processes related to their focal construct, social identity in one case, perceptions of and reactions to (lack of) fairness in the other case, in terms of mechanisms of uncertainty management. People identify with a social group as a way of reducing uncertainty about how they should feel, think and behave and about what behavior to expect from others. Perceived fairness helps people to cope with high levels of uncertainty and the resulting perceived lack of control.

In order to discuss individuals' uncertainty management at work in more detail, I have chosen three pervasive phenomena—creativity, feedback seeking, and stress at work—as examples because they require proactivity and are therefore well suited to illustrate the limitations of a one-sided view on uncertainty as an external and threatening force on behavior. *Creativity*, the production and implementation of novel and useful ideas (Amabile & Pratt, 2016), is the most obvious example for the relevance of uncertainty creation in organizations. Creativity requires questioning current routines and assumptions and embracing uncertainty during exploring and learning. Research on personal dispositions and cultural factors related to openness to uncertainty has provided rather mixed evidence, though, pointing to complex interactions between personal and contextual factors underlying creative processes (Anderson, Potocnik, & Zhou, 2014).

Self-regulation theory, especially the distinction between a regulatory focus on promoting desired outcomes versus preventing undesired ones, has also informed creativity research, indicating that both promotion and prevention orientation may support creative task performance (Baas, De Dreu, & Nijstad, 2011). A promising new direction in creativity research is based on a paradox perspective, pointing to the need to both embrace and reduce uncertainty for successful innovation. Miron-Spektor and Erez (2017) argue that the outcomes of novelty and usefulness and the cognitive processes of divergent and convergent thinking involved in creativity require a delicate balance between openness to uncertainty and efforts to hone in on desired solutions.

Feedback seeking, that is efforts aimed at determining the correctness and adequacy of behavior with respect to achieving valued goals, is a crucial element of self-regulatory processes. Much of early research on feedback seeking in work organizations was based on the assumption that the prime motive for feedback seeking is the desire to reduce uncertainty about oneself (Ashford, De Stobbeleir, & Nujella, 2016). However, research has shown that this assumption may be too simplistic. On the one hand, people seem rather less than more likely to seek feedback with higher levels of uncertainty about themselves (Anseel, Beatty, Shen, Lievens, & Sackett, 2013). On the other hand, ambivalent feedback, that invokes both positive and negative emotions and thus may, in fact, increase uncertainty rather than reduce is, has been found to be particularly beneficial for performance, notably creative performance (Harrison & Dossinger, 2017). As Ashford *et al.* (2016) have stated in their recent review, learning appears to be a better framework for understanding feedback seeking behavior than uncertainty reduction, which opens up new routes for inquiry into feedback seeking as a potentially uncertainty-creating behavior.

The final example, *stress at work*, at first sight is probably the least likely phenomenon to discuss in support of arguments concerning benefits of uncertainty. One prominent model to explain stress at work focuses on the mismatch between job demands and job control (Karasek, 1979), pointing especially at detrimental effects when job demands are high, but job control is low. The job design literature has provided complementary evidence by showing that high demands—when coupled with high control—have positive effects on motivation and well-being at work (Parker, Morgeson, & Johns, 2017). Raising job demands usually entails increasing uncertainty also, because more complex tasks tend to contain elements that are not fully predictable and difficult to routinize (Griffin, Neal, & Parker, 2007). In order to manage this uncertainty well, employees need to be empowered to make decisions themselves rather than defer to managerial control. Turning this thinking around, if one wants to increase employee motivation and

commitment by providing employees with more opportunities to exercise their own capabilities and judgment, one has to introduce uncertainty into their jobs (Slocum & Sims, 1980).

UNCERTAINTY MANAGEMENT IN TEAMS

Besides many theories in social psychology that aim at explaining particular social processes, two overarching frameworks refer to team processes and outcomes more generally. They both happen to be related to uncertainty. One framework is a *team-level version of self-regulation* theory, where now it is not the individual actor who sets goals and strives to achieve them in the face of potentially adverse environmental conditions, but it is the team, with cross-level interactions tying team-level and individual-level self-regulation together (Chen & Kanfer, 2006). The second framework, building and expanding on self-regulation, is *team adaptation*, where the emphasis is on the interaction between teams and their environments and the processes that allow teams to readjust team functioning during and after external disturbances (Kozlowski & Bell, 2008). One frequently used distinction for such adaptation processes is that between action and transition phases in teams (Marks, Mathieu, & Zaccaro, 2001). Processes during transition phases are to prepare teams for what is to come, while processes in action phases comprise execution of plans and ad hoc adjustments if needed. Beyond this short-term view on team adaptation, there are also models that describe longer-term adaptation as teams get to know each other, learn from their daily working together and develop and adjust routines for accomplishing their tasks (Dionysiou & Tsoukas, 2013). As in individual-level theories, the dominant assumption is that uncertainty stems mostly from the environment and that teams have to reduce it to operate effectively.

Three team-level phenomena in work organizations are described to illustrate the necessity to broaden the view on uncertainty management at that level as well: leadership, diversity, and voice. Implicit in much of the research on *leadership* is the assumption that leaders reduce uncertainty for their subordinates by providing guidance and support, be it, for instance, as transformational leaders who give a greater sense of purpose to their teams by invoking and enacting a vision of a desirable organizational future, or as directive leaders who set goals and plan and supervise their achievement. In recent years, research has begun to look at leadership coming not only from the formal leader, but also from team members, resulting in different forms of shared or distributed leadership (Denis, Langley, & Sergi, 2012). Findings from a range of team settings seem to indicate that shared leadership is beneficial for team performance, but questions remain, for instance in relation to the management of complex tasks (D'Innocenzo, Mathieu, &

Kukenberger, 2016). One could argue that sharing leadership involves both reducing uncertainty as more resources can be devoted to managing uncertainty, but it also creates uncertainty as roles are redefined and adapted in the team. Depending on the balance between these two processes in a particular team, shared leadership may or may not be suitable for accomplishing complex tasks.

Diversity in teams has received growing attention over the last decades, especially as a means to foster innovation (Anderson *et al.,* 2014). In simple terms, having team members with diverse knowledge, expertise, and attitudes working together should infuse variety into decision-making and problem-solving that promotes information elaboration and creation of novel and useful ideas. However, the evidence for team diversity being beneficial for innovation or more generally for team performance is mixed because diversity also brings about frictions and conflict based on processes of social categorization, such as stereotyping. Over the years, a multitude of mediators and moderators have been suggested to further explain under which conditions information elaboration or social categorization becomes more salient (Van Knippenberg & Mell, 2016). Only recently, though, the fact that team diversity creates uncertainty for team members about the right ways to think and act has been acknowledged as one important underlying mechanism. Following Hogg's (2007) uncertainty–identity theory, uncertainty reduction is considered a motive for members' identification with diverse teams and for specific behavior in those teams, such as performance monitoring (Guillaume, Dawson, Otaye-Ebede, Woods, & West, 2017).

Lastly, *voice* or speaking up in teams is a phenomenon closely linked to uncertainty management (Grote, 2015). Voice has been defined as "discretionary communication of ideas, suggestions, concerns, or opinions about work-related issues with the intent to improve organizational or unit functioning" (Morrison, 2011, p. 375). Uncertainty comes into play as individuals evaluate costs and benefits of speaking up for themselves, but speaking up can also increase uncertainty for the team. When concerns are raised about a particular course of action or a reassessment of a situation is offered, the need for more knowledge is created. Often this increased uncertainty is exactly what keeps people from speaking up, especially in critical situations where the team's emotional and cognitive resources are stretched already (Bienefeld & Grote, 2012). The uncertainty resulting from voicing doubts and new ideas will be beneficial if the team is able to shift into a mode of divergent thinking during its on-going activity, but is also capable of converting back to convergent thinking to adapt their course of action in a timely manner. Important prerequisites for this to happen are inclusive leadership and psychological safety because they create a nonthreatening climate within the team, which

frees resources for problem-solving and learning (Nembhard & Edmondson, 2006).

UNCERTAINTY MANAGEMENT IN ORGANIZATIONS

Starting from early studies on contingencies for the design of organizational structures and processes to today's strategic management literature, environmental uncertainty is considered a key construct for understanding and shaping organizational action (Van de Ven, Ganco, & Hinings, 2013). Two important theoretical frameworks that spell out mechanisms for uncertainty management in organizations are contingency theory and organizational control theory. Contingency theory was developed in a series of models in the 1960s, all following the main thrust that Tayloristic minimization of uncertainty as a fundamental design principle can only be successful in environments with few uncertainties and well-known tasks, while all other conditions require designs that support active adaptation to uncertainties. Much of recent writing has emphasized that contingencies may not be so clear-cut and that many organizations need to adopt mechanisms for reducing and absorbing external uncertainty simultaneously. In their discussion of the future of contingency theory, Van de Ven *et al.* (2013) also argued for the need to pay more attention to the generative capacity of individuals in organizational design as a source of internal uncertainty.

Organizational control theory has evolved from the question of how managers can ensure that their subordinates direct their efforts toward achieving the organization's goals (Cardinal, Kreutzer, & Miller, 2017). Uncertainty is regarded as an inherent element in the manager–subordinate relationship based on agency theory as outlined in economics, which holds that subordinates' motivation and behavior is geared to own personal goals rather than the organization's objectives unless controlled by their managers. Similar to contingency theory, different kinds of control mechanisms are assumed to match particular organizational conditions. Long, Sitkin, Cardinal, and Burton (2015) contrasted the agency perspective of organizational control with an information processing perspective, which focuses more on managers' role in reducing uncertainty for their subordinates rather than for themselves. They find that combinations of different control mechanisms generally are more effective than a single mechanism and that with increasing levels of uncertainty stemming from highly complex tasks, informal control mechanisms such as frequent personal meetings become more important than formal control of subordinates' behavior or output.

These conceptual developments align with a general tendency in organizational research to explore more complex patterns of uncertainty management rather than emphasize uncertainty reduction alone. To illustrate this

general tendency, I discuss three research streams: innovation, organizational change, and managing paradox.

Innovation research has long been dominated by the distinction between exploitation and exploration introduced by March (1991). Exploitation aims at making the most of existing knowledge, in terms of highly efficient routine processes accomplishing well-established goals. Exploration, on the other hand, is concerned with knowledge creation and learning, which may eventually lead to new options for exploitation. Recent management literature has addressed the necessity to concurrently exploit and explore to stay competitive, termed *ambidexterity*, which has been shown to be particularly important in highly uncertain environments (O'Reilly & Tushman, 2013). An on-going debate concerns the question of whether radical innovation on the one hand and routine performance/incremental innovation on the other, can—simultaneously or sequentially—happen within the same organizational unit or only in parallel structures geared toward one or the other. A more explicit consideration of uncertainty management might help to solve this conundrum because it would help to study particular configurations of uncertainty and effective mechanisms for responding to those uncertainties. Furthermore, the deliberate introduction of uncertainty, which is central to any organizational initiative aimed at radical innovation, should be addressed.

Organizational change is a fascinating domain with respect to uncertainty management. Core to any change is by definition an increase in uncertainty for everyone affected by the change, which is thought to be a root cause for resisting change as well (Bordia, Hobman, Jones, Gallois, & Callan, 2004). Providing opportunities for active participation in the change process is believed to alleviate resistance because it grants individuals some control over the process and helps to reduce uncertainty. Furthermore, the necessity of change needs to be irrefutable for individuals to be willing to bear the uncertainty. Interestingly, though, Sonenshein (2010) found that managers simultaneously presented change as significant and insignificant in their communication to employees in order to reach out to both employees who welcomed change and those who feared it. Uncertainty is prevalent not only for the people affected by the change but also for those driving the change. One of the few studies which has examined change agents themselves looked at the impact of their personal support networks on the successful implementation of change (Battilana & Casciaro, 2012). It was found that changes which implied a higher degree of uncertainty seemed to require more diverse networks.

Contingency thinking is pervasive in the organizational literature, as many of the above examples show. However, the assumption that there are best matches between organizational and environmental characteristics, which

lead to either/or choices, has been challenged by proponents of paradoxical thinking. Their main argument is that any situation an organization can find itself in will require a mix of seemingly contradictory responses, such as concurrently catering for efficiency and adaptability, routine and innovation, and stability and change (Schad, Lewis, Raisch, & Smith, 2016). The necessity to *manage paradoxical tensions* has been elaborated on in a number of research domains, innovation and organizational change being among the prime examples (Lüscher & Lewis, 2008; Miron-Spektor & Erez, 2017). While there is still substantial debate around the question of how organizations—and individuals and teams for that matter—can simultaneously respond to conflicting demands (Grote, Kolbe & Waller, 2018; O'Reilly & Tushman, 2013; Schad *et al.*, 2016), the literature on paradox opens a new perspective on uncertainty management, which will be expanded on in the concluding section of this essay.

AN ATTEMPTED SYNTHESIS ACROSS LEVELS AND SOME RESEARCH RECOMMENDATIONS

The discussion up to this point has provided ample evidence that to date uncertainty has been treated in a rather one-sided manner with reducing external uncertainty as the dominant focus. I have also given some examples for an emerging broader view, where processes of reducing and creating uncertainty are intertwined and where uncertainty may be beneficial, such as in creativity, innovation, organizational change, learning about oneself through feedback seeking, carrying out more demanding jobs, sharing leadership functions, working in more diverse teams, or voicing concerns in team decision-making.

However, a more agentic approach to uncertainty management still raises many questions of how responsiveness to external uncertainty and the deliberate creation of internal uncertainty interact to bring about success or failure at the individual, team, and organizational level. The literature on managing paradox (Schad *et al.*, 2016) provides an important starting point for research into these questions because it emphasizes the concurrent consideration of seemingly contradictory, but interdependent management practices. Tensions between concepts such as learning versus performance, cooperation versus competition, or profit versus purpose are assumed to be fundamental to constituting these concepts themselves, as two sides of the same coin. Thus, research on any of these concepts should adopt an and/both rather than an either/or perspective in order to gain a more complete understanding of the tensions involved and the best ways to manage them.

Studying uncertainty management with a paradox lens involves an expansion toward a multi-level framework, as processes of reducing and creating

uncertainty may simultaneously happen at different levels of an organization and also outside its boundaries. For instance, in their study of new ventures, Hmieleski and Ensley (2007) found intriguing configurations of team diversity and leadership styles indicating that responses to external uncertainty are themselves a mix of reducing (directive leadership, homogenous teams) and increasing uncertainty (empowering leadership, heterogeneous teams). These responses incorporate the team level, but also the organizational level in as much as the use of particular leadership styles and team compositions constitute deliberate decisions by top management.

A research agenda built on a multi-level framework of uncertainty reduction and creation in organizations will also stimulate psychological and organizational theorizing more generally. Introducing deliberate increases of uncertainty into models of self-regulation opens up new avenues for research where individual agency reaches beyond finding the best ways to protect goal striving against external threats. Especially, more knowledge on how new goals and the uncertainty surrounding their achievement are embraced is dearly needed (Scherbaum & Vancouver, 2010). Examining self-regulatory processes may benefit from the rigorous operationalization of uncertainty in decision-making research in order to better understand the ambiguity of uncertainty itself for decision-makers. Such research would align well with the growing literature that shows the importance of harnessing cognitive and emotional ambivalence for successful performance. A more complete understanding of the interplay between uncertainty creation and reduction at different levels of the organization is also crucial for enriching contingency theory with more elaborate configurations of individual agency and structural mechanisms and for complementing models of organizational control by considering uncertainties at different levels of the organization. Lastly, examining the tensions between uncertainty reduction and uncertainty creation for individuals, teams, and organizations becomes ever more important with the current surge of opportunities and challenges attached to the so-called second machine age (Brynjolfsson & McAfee, 2014).

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