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COMMENTARY

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The time factor: Unravelling the threads of uncertainty tolerance

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Uncertainty is a fundamental aspect of medical practice that persists throughout the entirety of a practitioner's career. Ineffective management of uncertainty leads to adverse outcomes, encompassing heightened stress, burnout and implications for both decision-making and communication with patients.[1] The concept of uncertainty tolerance (UT) is now widely used to account for how professionals appraise and respond to uncertainty. In this regard, Hillen's framework now serves as a reference in studies aiming to explore UT, both in professionals and medical students.[2] This integrative UT framework addresses uncertainty through three dimensions: its sources, the responses engaged by practitioners and the moderating factors, encompassing all personal or situational characteristics that may influence their overall UT.

Quantitative studies employing psychometric scales have demonstrated significant variability in individuals' tolerance for uncertainty. This has led to considering tolerance for uncertainty as a predetermined personality trait, acknowledged as a major moderating factor in individuals' UT. Several qualitative studies highlighted the dynamic nature of UT, accounting for its evolution over time and diverse situations. As a result, the conceptualisation of UT as a dynamic state is now widely acknowledged in medical education. Accordingly, Hillen's UT framework identifies the situational characteristics as important moderators of UT.

However, the real nature of contextual factors influencing practitioners' UT, and how they interact with their perception and responses to uncertainty, remains elusive. Therefore, identifying contextual moderators of UT should be regarded as a significant research and training challenge, with the goal of developing uncertainty management skills among medical students in their authentic work settings.

In a recent literature review, Yap et al. identified role ambiguity as a moderator with a negative impact on practitioners and residents UT.[3] Conversely, in this review, sharing experiences and teamwork provided practitioners additional support in dealing with their uncertainty. Among pregraduate students, Stephens et al. identified four groups of moderating factors, including individual factors, sociocultural factors, academic factors and reflective learning.[4] In postgraduate trainees, Ilgen et al. identified the lack of self-confidence and limited self-efficacy perception as strong moderators of uncertainty experience.[5] Clinical environment characteristics were not identified as uncertainty moderators in student and trainees' populations.

Importantly, none of the studies exploring UT moderators explicitly addressed the influence of time pressure on practitioners' UT. Many clinical situations entail time constraints, making it an essential characteristic of the future professionals' work environment. Uncertainty is closely linked to an emotional stress response,

which directly shapes the way an individual engages in the clinical problem, as suggested by the process model of emotion regulation.[6] In a clinical vignette study, ALQahtani et al. showed how time pressure increased stress from uncertainty among participants, supporting time pressure as an essential moderator of UT.[7]

Decision making is another key component of the UT construct, pertaining to the behavioural response domain. Several studies explored the influence of time constraints on decision making. ALQahtani et al. found time pressure resulting in a decrease in diagnostic accuracy, rooted in participants considering fewer plausible alternative hypotheses.[7] These results have recently been extended by Wu et al., who explored individuals' responses to uncertainty through a four-armed bandit task study.[8] In their work, uncertainty resulted in slower decision making and a decrease in rates of evidence accumulation. The introduction of time pressure decreased uncertainty-directed exploration in participants (i.e, the process of seeking out new options or information that may improve understanding or uncover potentially better outcomes), who opted for repeated choices more often, indicating a 'resource-rational shift towards simpler, lower-cost strategies under time pressure'. Other studies, including work by Sherbino et al., found a strong negative correlation between response time and diagnostic performance, highlighting the reliability of System 1 in providing rapid and accurate diagnosis.[9] However, these results were obtained by presenting participants with routine clinical cases and expecting them to provide a single correct answer. As the authors emphasised, when confronted with ill-defined problems, implementing deliberate thinking may be valuable in addressing the uncertainty at hand, in line with the adaptive expertise approach.

This impact of time pressure on both stress and diagnostic accuracy suggests two direct implications for time pressure's influence on UT in clinical practice. First, the slower reaction time observed under high uncertainty suggest that perceiving and integrating uncertainty is a time-consuming process, according to Han's definition of uncertainty as 'a conscious, metacognitive awareness of own ignorance'. Accordingly, time pressure could serve not only as a moderator of individual responses but also as a moderator of individuals' ability to perceive the dimension of uncertainty in a clinical problem. The 'time factor' could thus represent a crucial element of the UT framework, moderating the early stage of uncertain stimuli perception, and to some extent resulting in practitioners struggling with identifying the uncertain stimuli within their clinical situation.

Besides, time pressure is likely to exert a significant influence on the responses that physicians implement to regulate their uncertainty. Ilgen et al. found that deliberate practice and rehearsing steps through mental simulation before clinical encounters are essential resources for physicians in responding to uncertainty.[5] Instituting therapeutic trials has also been identified as an effective strategy for managing uncertainty, as well as the 'test of time', allowing physicians to diminish uncertainty by considering additional clinical information provided through the patient's evolving clinical condition.[10] Relating with others has also been previously identified as an important strategy, enabling both students and experienced physicians to regulate their uncertainty by sharing experiences and responsibilities.[3,5] Collaboration also involves patients, as shared decision-making has been found efficient to deal with the aversive cognitive and emotional effects of uncertainty.[10] While effective, these strategies for regulating uncertainty are time-consuming, posing a challenge for application in situations with tight time constraints. Thus, time pressure could both restrict the number of alternative strategies practitioners consider and limit their ability to implement them. Time constraints may consequently lead to the implementation of less adaptive responses, directly impacting practitioners' UT in these situations.

The factor of time emerges as a distinct and central moderator of practitioners' UT, transcending the wide spectrum of the clinical situations encountered by physicians in their work environment. Future research should explore the real-world impact of time pressure on practitioners' UT, examining how these constraints influence their perception of and response to clinical uncertainty. Understanding these dynamics is crucial for developing effective strategies to enhance practitioners' comfort in uncertainty amid the challenging and time-pressured healthcare landscape.

AUTHOR CONTRIBUTIONS

All authors jointly drafted the papers, and critically proofread the successive versions of the manuscript. All authors approved this final version of the manuscript to be published and agree to be accountable of this work.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors have nothing to report.

ETHICS STATEMENT

This project has deemed exempt by the Rennes University Hospital Ethics Committee.

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