Yakov Ben-Haim, 2026, Asymmetric uncertainty and strategic interaction: An info-gap analysis, *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology,*

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Abstract Protagonists in strategic interactions face uncertainty about their own and their adversaries' intentions and capabilities, and about the general situation. Uncertainty is often represented probabilistically. However, probability distributions are often unknown due to complexity, limited knowledge, or dynamic change. We employ info-gap theory to model and manage uncertainty non-probabilistically. We consider asymmetric uncertainty: both protagonists face significant uncertainty, but one faces much more than the other. Different degrees of uncertainty can motivate different behavior. We explore two responses to uncertainty. Robust satisficing ameliorates pernicious uncertainty to obtain essential outcomes. Opportune windfalling exploits propitious uncertainty to obtain wonderful outcomes. We explore these strategies both quantitatively and qualitatively. We prove two propositions: Protagonists facing greater uncertainty have worse robustness for achieving critical outcomes (proposition 1) but have better opportuneness for achieving windfall outcomes (proposition 2). We apply these ideas quantitatively to a generic example, and qualitatively to the Cuban missile crisis and to the Japanese attack on Pearl Harbor.

Keywords Asymmetric uncertainty, strategic interaction, info-gap decision theory, Cuban missile crisis, Pearl Harbor.

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