

Yakov Ben-Haim, *Evidence and Uncertainty: An Info-Gap Analysis of Uncertainty-Augmenting Evidence*, *Risk Analysis*, to appear.

Abstract Decisions in many disciplines are based on understanding and evidence. More evidence is better than less when it enhances the decision-maker's understanding. This is achieved by reducing uncertainty confronting the decision-maker and reducing the potential for misunderstanding and failure. However, some evidence may actually augment uncertainty by revealing prior error or ignorance. True evidence that augments uncertainty is important because it identifies inadequacies of current understanding and may suggest directions for rectifying this. True evidence that reduces uncertainty may simply reconfirm or strengthen prior understanding. Uncertainty-augmenting evidence, when it is true, can support the expansion of one's previously incomplete understanding. A dilemma arises because both reduction and enhancement of uncertainty can be beneficial, and both are not simultaneously possible on the same issue. That is, uncertainty can be either pernicious or propitious. Info-gap theory provides a response. The info-gap robustness function enables protection against pernicious uncertainty by inhibiting failure. The info-gap opportuneness function enables exploitation of propitious uncertainty by facilitating wonderful windfall outcomes. The dilemma of uncertainty-augmenting evidence is that robustness and opportuneness are in conflict; a decision that enhances one, worsens the other. This antagonism between robustness and opportuneness — between protecting against pernicious uncertainty and exploiting propitious uncertainty — is characterized in a generic proposition and corollary. These results are illustrated in an example of allocation of limited resources.

Keywords decision making, evidence, uncertainty, robustness, opportuneness