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Communicating uncertainty in intelligence forecasts using verbal expressions of probability and confidence

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ABSTRACT

The National Intelligence Council provides guidelines for how to interpret expressions of uncertainty in analytic reports, including verbal expressions of both probability (e.g. 'likely' or 'unlikely') and confidence (i.e. 'low', 'moderate', and 'high'). This study examined how people interpret intelligence forecasts made with these expressions. 1315 participants provided quantitative and qualitative interpretations of forecasts in two studies. The results indicated that participants used expressions of confidence to interpret the likelihood of events and that the inclusion of expressions of confidence did not improve interpretations of forecasts. Recommendations were made for research exploring alternative methods to convey uncertainty.

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U.S. intelligence agencies communicate with policymakers through oral and written reports that offer assessments of current or past events or estimates of future events. Judgments are based upon limited information available to intelligence analysts and, therefore, involve uncertainty. This uncertainty is typically expressed through verbal probability phrases, rather than numbers.¹

These phrases often represent the subjective probability of events. In other words, the judgments concern analysts' level of belief about whether their judgements are accurate.

Subjective probability is one form of epistemic uncertainty, which is used to form an introspective judgment about one's level of ignorance and can be associated with the accuracy of one's knowledge.² Van der Bles et al. developed a framework for communicating epistemic uncertainty, which includes consideration of (a) who is communicating, (b) what is being communicated, (c) the form of the communication, (d) who is the audience, and (e) the effect of uncertainty on the audience.³ The object of uncertainty can be facts, numbers, or scientific hypotheses. Intelligence analysts typically communicate uncertainty about facts, often in terms of whether or not a fact is true or will be true in the future, e.g., 'Ukraine's counteroffensive will (will not) drive Russia out of its occupied territory', or 'Russia did (did not) use disinformation to interfere with the outcome of the 2020 U.S. presidential election'. They may also communicate uncertainty about numbers, e.g., 'Iran will have the capability to produce enough highly enriched uranium for a weapon in 2 years', or 'Saddam has stocked at least 100 metric tons of CW agents'. The source of uncertainty concerning the object can result from sampling error, measurement error, ignorance, or disagreement among experts. In intelligence analysis, uncertainty typically stems from the latter two elements.

The format of uncertainty communication can be visual, numerical, and/or verbal.⁴ In the intelligence community, uncertainty is typically expressed using verbal probability phrases, such as 'remote chance' or 'very likely'. A large body of research has examined how people, in general, understand and communicate risk and uncertainty with verbal probability phrases.⁵ For example, there is a great deal of interpersonal variation in interpretations of the meanings of probability phrases.⁶ Such variability may lead to misunderstandings among consumers of intelligence about