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Ambiguity in Decision Environments Increases Decision-Makers' Reliance on Worldviews

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INTRODUCTION

The information processing paradigm emphasizes the central role of information in decision-making, alongside problem attributes, context, and the cognitive characteristics of decision-makers (O'Donnell & David, 2000; Payne et al., 1993). In this vein, multiple streams of theoretical and experimental research suggest that individuals are highly susceptible to the information they receive. Even minor variations in how information presented can alter decision outcomes (Kleinmuntz & Schkade, 1993; Yigitbasioglu & Velcu, 2012). However, real-world observations often reveal situations where additional information does not seem to influence policy decisions, particularly in complex domains like sustainability and climate change (Geden, 2016; Hayden, 2021; Lehtonen et al., 2016). Several explanations exist for this "non-use" of information, such as the influence of institutional contexts or personal agendas. Yet, researchers also report that the use of information varies significantly across different decision domains. In some cases, information aligns more with expectations from research (e.g., evidence-based medicine), while in others, such as policy-making, information use departs from research expectations (Cairney & Oliver, 2017; Rich & Oh, 2000). Current explanations for the barriers to information use in decision-making do not fully account for these differences, as institutional constraints and personal agendas affect both fields (Rousseau & Gunia, 2016; Weiss, 1979).

PROBLEM STATEMENT

We hypothesised that the key difference between contexts such as medicine and policy-making lies, in part, in the nature of the tasks decision-makers encounter. Specifically, these two types of contexts differ in the clarity and formulation of goals. In contexts such as medicine, the goal is usually clear and well-defined (e.g., "save the patient's life"). In contrast, policy-making contexts are more ambiguous (Dörner, 1997; Levinthal & Rerup, 2021; Rainey & Jung, 2015), which allow leeway in goal formulation and goals often involve conflicts and tradeoffs without a clear optimal solution. As a result, decision-makers may fill this "goal ambiguity" with their personal worldviews, which can influence their actions and the way they utilize information.

APPROACH

A computer-based decision-making experiment design has been selected to investigate the role of sustainability indicators in dynamic decision-making environments. This method has been extensively used in the literature to investigate decision-making processes (Gary & Wood, 2016; Gonzalez, 2005; Humphreys et al., 2016). Participants will be asked to be the leader of a fictional human settlement and to allocate a pre-set amount of monetary resources to economic growth or environmental sustainability policies with the support of a dashboard of indicators. Specifically, participants will access the decision environment, have a few minutes to familiarise themselves with the task, and play 30 rounds. Next, participants will make what they believe are the best investment decisions. The dynamic decision environment in which participants play is a gamified version of the World Dynamics model (Forrester, 1971) overlayed with a graphical user interface (Cunico et al., 2022) and hosted on an online simulation platform Such a design was selected because it allows for rigorous examination of the effects of goal ambiguity levels (IV), information (IV) and worldviews (IV) on allocation decisions (DV).

RESULTS

We found that both information ($p < 0.01$) and worldviews ($p < 0.01$) significantly affected decision outcomes, particularly under ambiguous, unclear conditions. Ambiguity amplified the impact of information and worldviews on decision-making, serving as a moderating factor ($p < 0.05$). Particularly, when considering these factors together, worldviews emerged as the strongest explanatory factor under ambiguous conditions, while they did not significantly affect decisions under the clear goal condition.

DISCUSSION

Ambiguous decision environments appear to act as a ‘master switch’ in the decision-making process (Sobrepere i Profitós et al., 2022). Their presence activates the driving effect of worldviews, which is otherwise less impactful in clearer decision contexts. This finding provides insight into the observed differences in the use of information across various contexts and reconciles these observations with conflicting experimental results. It also suggests that the cognitive processes decision-makers engage in vary significantly depending on the level of ambiguity. Consequently, ambiguity should be studied not only for its influence on the learning process (Levinthal & Rerup, 2021; Spencer & Rerup, 2024) but also for its intrinsic effects on decision-making. These findings carry both theoretical and practical implications. Theoretically, they illuminate the intrinsic cognitive processes characteristic of ambiguous decision environments, which often underpin critical and strategic decisions (Csaszar, 2018; Nutt & Wilson, 2010). Practically, they highlight that in ambiguous contexts, worldviews may overshadow information provision in shaping decisions. This underscores the need for knowledge brokers to adopt different approaches when supplying information to policymakers, such as co-producing knowledge and addressing shifts in policymakers’ mental models.

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KEYWORDS

Mental Models, Dynamic Decision-Making, Ambiguity

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