**Wisdom across cultures beyond traditional decision-making paradigms**

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**Executive Summary**

Every day, we navigate an array of complex, often ill-defined decision-making situations that intersect with cultural norms, moral values, interpersonal interests, and personal preferences. By ill-defined we refer to situations for which past experience may not be directly applicable and “ready-made” solutions may not be available. Our project aims to explore how different cultures and religious groups approach these ill-defined situations, hypothesizing that diverse cultures possess unique wisdom in decision-making. Current models of decision-making, developed for well-defined situations and grounded in Western cultural norms, fail to encapsulate the complex reality of these choices, missing the nuances of how situational, ecological and cultural constraints inform and shape our decisions in the real world. How do people from various cultures and religious backgrounds demonstrate wisdom in their decision-making in these complex contexts, and how do their strategies shift as situations change?

The main aim of our research is to tackle this question. This research is necessary as it addresses the critical gap in understanding cultural influences on decision-making. We will explore the adaptive wisdom that individuals apply in their everyday lives across different cultures and religions. Our target audience includes psychologists, economists, political scientists, cultural researchers, education specialists, managers, international negotiators, and policy makers. We will use a multi-pronged approach, combining surveys, natural language processing (NLP), psychometric studies, computational modeling of individual decision-making and societal flourishing, and cross-cultural experiments. By analyzing text data and survey responses from a range of cultures about what decision strategies people report in challenging situations, we will categorize the most prevalent strategies in a range of ill-defined situations. The efficacy of these strategies will be further tested through empirically-grounded computational models of individual-level decision-making as well as societal-level Agent-Based Modeling (ABM). These models will draw from cross-cultural data to generate and evaluate hypotheses on strategy effectiveness, predictively analyzing societal flourishing under various situational, ecological and cultural conditions. We will also develop psychometric tools to assess individual knowledge and use of wise strategies in various aspects of people’s lives. Finally, our project will involve culturally-grounded experiments to investigate techniques promoting calibration in the application of wise strategies for varied aspects of one’s life. The outputs of this project will include culturally-grounded decision-making models, comprehensive psychometric tools, and a multimedia website for disseminating our findings. Our work is anticipated to have a significant impact, leading to a more inclusive understanding of decision-making that incorporates cultural diversity.

This comprehensive approach offers the promise of an inclusive understanding of wise decision-making, one that pushes the boundaries beyond Western models, thus paving the way for a more encompassing model of decision-making that mirrors the complexity and cultural diversity of the real world.

**Relation to Sir John Templeton’s Donor Intent**

Our research project is closely aligned with Sir John Templeton's intellectual legacy, particularly his exploration of wisdom and judgment in various cultural contexts. Templeton’s works, such as “Discovering the Laws of Life” (1994) and “Worldwide Laws of Life: 200 Eternal Spiritual Principles” (1998), emphasize the universality of wisdom and ethical principles, underscoring the importance of sound judgment and moral understanding in life's fulfillment. These themes are central to our project's exploration of how different cultures interpret and apply wisdom in complex decision-making scenarios. By delving into the varied expressions and applications of wisdom across cultures, our study seeks to illuminate the diverse ways in which wisdom and judgment are understood and practiced globally, resonating with Templeton’s vision of a universally relevant yet culturally nuanced understanding of wisdom. In addition, Templeton’s “The Templeton Plan: 21 Steps to Personal Success and Real Happiness” (Templeton & Ellison, 2013) and “Riches for the Mind and Spirit” (Templeton & Ellison, 1990) highlight the significance of wisdom and character in achieving personal growth and happiness. These insights are particularly pertinent to our research, which aim to uncover how wisdom is not just a philosophical concept but a practical tool for navigating life's complexities, transcending cultural differences. Our project aligns with Templeton’s belief in the transformative power of wisdom and its role in shaping sound judgment across different cultural landscapes. Thus, our research not only aligns with but also actively contributes to the expansion of Templeton's philosophical vision, exploring the multifaceted nature of wisdom and judgment in a culturally diverse world with an ever-changing landscape.

**Statement of significance**

***What is this project about?***

In our day-to-day existence, we constantly grapple with conflicts. These can arise from navigating the world through the lens of different cultural and religious perspectives (e.g., clashes between tight and loose societal norms among multicultural individuals), competing moral values (e.g., balancing family interests and economic security with a civic duty to protect society's most vulnerable), various interpersonal interests (e.g., differing wants and needs between people), or even within our personal preferences (e.g., the choice between long-term goals like health and well-being, and short-term desires like enjoying a dessert).

Our chief aim is to systematically explore and understand the nuances of wise decision-making strategies in the face of such conflicts, social dilemmas, and other challenges across different cultures, using a multi-disciplinary approach that includes natural language processing, computational modeling, psychometric studies, and cross-cultural experiments. By wise *strategies* we refer to strategies most members of a society would consider beneficial for a particular challenge. By wise *decision-making* we refer to flexible use of these strategies based on demands of the situation at hand (see examples how application of ‘intellectual humility’ as a strategy may or not be wise, see Table 1 below). This interdisciplinary collaborative approach will enable us to develop a more encompassing and culturally diverse model of decision-making that reflects the complex realities of everyday life beyond traditional Western-centric paradigms.

**Overall, this project aims to pioneer a new understanding of wise decision-making. It seeks to move beyond**  **the conventional WEIRD models of decision-making, while harnessing advanced methods from natural language processing (NLP), computational and psychometric modelling, as well as rigorous cross-cultural experiments.**

This project will pursue the following **objectives**:

1. **O1 - Cross-cultural analysis of wisdom in decision-making**: This objective aims to systematically examine how individuals across diverse cultures and religions use a range of wisdom-related decision-making strategies, including heterogeneity between cultures, individuals, and situations. The focus is on identifying and understanding the nuances of wise decision-making strategies in different cultural contexts (Projects 1, 2B, 4).
2. **O2 - Development of a comprehensive model of wise decision-making**: This objective aims to create a conceptual model that better reflects the complexity and cultural diversity of decision-making, moving beyond Western-centric paradigms (Projects 1-3).
3. **O3 - Investigation of decision-making strategies, their efficacy, and calibration**: This objective aims to categorize prevalent decision-making strategies in uncertain situations and to test these strategies' effectiveness through computational models and culturally-grounded experiments (Projects 1-5).

***Why is it important?***

This project's significance extends to redefining our understanding of decision-making. It challenges the limitations of existing Western-centric paradigms by integrating cultural, ecological, and situational factors. This is crucial in a globally interconnected world, where understanding diverse decision-making processes can lead to more inclusive and effective solutions in various fields.

***To whom would this project bear relevance and significance?***

The project’s relevance spans a wide range of professionals: from psychologists unraveling the human mind to policymakers shaping culturally sensitive policies. Educators, managers, international negotiators, and cultural researchers will find its insights invaluable for incorporating diverse perspectives into their work, fostering a more inclusive understanding of how people in different cultures make decisions concerning the world around them. It will further benefit scholars in economics, political science, and the humanities, as well as the public. ***Where would this project lead, if successfully completed?***

Successful completion would mark a paradigm shift in decision-making models. By creating a comprehensive, culturally- and religion-inclusive framework, it could revolutionize how we approach judgment and decision-making, with implications for education, policy-making, and social research, leading to more nuanced and effective strategies in these areas. The project would essentially redefine the landscape of decision-making theory and practice, making it more reflective of our diverse world.

**Project Description**

***Objectives***

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***Literature Review and Limits of Current Research***

Most conflicts and social challenges people encounter in their lives involve elements of the unknown, particularly in terms of preferences and consequences—elements that are often ill-defined. We often lack complete information about others' preferences, the situations we may encounter, or the possible outcomes of our choices. In light of these unknowns, traditional approaches to decision-making—which frequently work with assumptions of well-known or defined preferences and consequences—may not fully represent the rich diversity of situations people encounter in their lives. Additionally, most decision-making approaches to date are based on models derived from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies, which may not fully capture the scenarios experienced by people in most of the world, falling short in offering wise advice for diverse, uncertain situations that characterize much of everyday decision-making.

Consider formal models of judgment and decision-making. Most aim to showcase how people make judgments and decisions based on certain normative or prescriptive principles, confined to strategies based on Western norms and values. For instance, for a long time Western scholars have put *analytical logic*, *self-interested preference maximization*, and a *decontextualized* approach to decision-analysis on a pedestal, suggesting that the right thing to do in a decision scenario is to zero -in on the most important issue for oneself, to draw a hierarchical decision tree or establish an algorithm one can efficiently apply across many situations. Despite a great value (and a possible wisdom) of such approaches, however, cultural psychological work has demonstrated that a logical analysis, rational self-interest, and a decontextualized focus are not necessarily the norm in the Majority World (e.g., Choi & Nisbett, 2000; Henrich et al., 2001; Masuda & Nisbett, 2001; Medvedev et al., 2024), beyond the WEIRD societies studied so far. Instead, many societies favor *holistic judgment*, *violate the axiom of rational self-interest*, and approach complex life matters through *context-dependent* narratives or communal strategies (Fiske, 1991; Henrich et al., 2010; Nisbett et al., 2001; Yates & Lee, 1996). In other words, strategies of judgment and decision-making are likely culturally diverse, raising questions about ways to map such diverse models of judgment in a pluralist world.

Moreover, even within samples from the Global North, data shows individual and situational heterogeneity in the type of responses that would be considered wise. For instance, the works of Grossmann (2017), Johnson, Bilovich, and Tuckett (2023), Kahneman & Frederick (2002), Loewenstein and colleagues (2001), and Petracca (2021) highlight that while these models propose general principles of good judgment, actual decision-making often deviates from these norms, reflecting diverse personal, and situational factors of influence. Many of these models also assume that, at some level, people are aware of the variability in the judgmental strategies that might be wise in one versus another context. Indeed, emerging data suggests that individuals often discern which strategy to use in specific situations, or how to integrate multiple strategies to make decisions. For example, wise people may recognize that rational strategies, which focus on maximizing one’s self-interest by following a particular set of decision rules, are most effective in closed systems where all parameters are known or predictable. Conversely, wise people may recognize that in open systems where some parameters are unknown or highly unpredictable, a different form of judgment may be preferable (e.g., strategies that involve sampling to gain additional information; Hills et al., 2015). This could include socially-conscious reasonableness (Grossmann, Eibach, et al., 2020), which balances various rules and aligns more closely with satisficing decision strategies.

This knowledge of what strategy may fit which situation is a hallmark of Aristotelian *phronesis* or practical wisdom (Grossmann, Dorfman, et al., 2020; Grossmann et al., 2021; Schwartz & Sharpe, 2006). Yet, its application in people’s everyday life remains unexplored, with little systematic study of inter- and intra-individual variability in what constitutes a wise judgment. What strategies do people consider wise when facing different cultural, moral, interpersonal, and intra-personal ill-defined conflicts? How do such wise strategies vary across the messy situations in which people find themselves at different moments of their lives? And finally, to what extent do people from different cultures converge in their views of wise decision-making for specific situations and for switching across them?

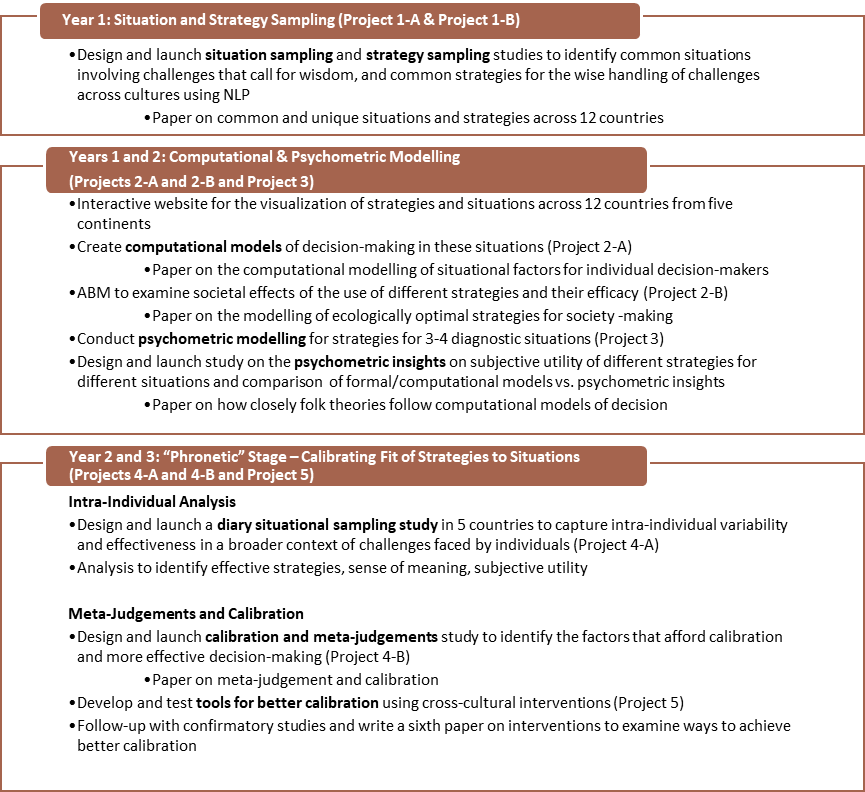
To address these questions, we propose a three-pronged approach: 1) sampling and classifying situations and strategies in unique cultural contexts, 2) devising empirically-grounded computational models of individual choice and societal processes that rely on the most frequent strategies, and finally 3) in the “phronetic” stage, evaluating how to foster calibration in application of strategies to unique contexts people may be facing in their lives. Table 1 provides an example of key research gaps our scholarship on wise decision-making across cultures aims to fill. As an example wise strategy, we use “intellectual humility’ – i.e., recognition of limits of one’s knowledge and fallibility (Porter et al., 2022), with our work well-positioned to understand how and in what situations people consider intellectual humility to be preferable, whether individual and collective intellectual humility may stand in contrast, and how to ‘phronetically’ calibrate intellectual humility across different challenges one may be encountering.

Table 1. Potential insights for wise decision-making from the project.

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| **Project** | **Potential Insights** | **Example** |
| **1a: Situation sampling** | What are the most common situations, in several different cultures, that call for wisdom? | How do socioeconomic differences across and within societies influence what situations call for wisdom? |
| **1b: Strategy sampling** | What are the most common wise strategies in each of those situations in each culture? | How often and for what situations do people view “intellectual humility” as a wise strategy? |
| **2a: Computational models** | Why and when does each wise strategy “work” for aiding individual decision-making? | Does intellectual humility yield insight when a situation involves multiple unknown parameters or no decision templates are readily available? Is intellectual humility counterproductive when time is limited, parameters are known and/or decision templates are readily available? |
| **2b: Agent-based models** | How do social, economic, and physical environments affect the usefulness and social evolution of each wise strategy? | Are there differences in the individual vs. collective intellectual humility? When does society need closed-minded renegades to foster collective intellectual humility? |
| **3: Psychometric modeling** | Which people are most likely to use each strategy? How do these strategies affect well-being? | Who is most intellectually humble? Does intellectual humility reduce interpersonal conflict and polarization, or improve decisions? |
| **4a: Diary situational sampling** | How do people alter their strategies across situations? | How much does intellectual humility vary across situations? Do people know which situations call for a more or less humble approach? |
| **4b: Calibration and meta-judgments** | Who is most adept at altering strategies across situations to promote their and others’ well-being? | Who is better able to identify when intellectual humility might succeed or backfire? |
| **5: Interventions** | How can people be helped to better-identify the best strategy for the right situation? | Does distancing (taking a fly-on-the-wall perspective) help people to identify when best to rely on intellectual humility? |

Figure 1 below provides a timeline of the project stages, which are described in greater detail below.

**Figure 1: Flowchart of stages of the proposed project**

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**Project Activities and Methods**

**Project 1**. We will start with a “situation sampling” study (Project 1-A) by performing **cross-cultural surveys and leveraging natural language processing (NLP) tools** to categorize the most common and culture-unique challenging and uncertain situations that people from different countries (Brazil, Canada, China, Colombia, Ghana, India, Kazakhstan, Poland, Sri Lanka, Turkiye, the UK, and the US) encounter (up to *N* = 500, striving to balance participants by gender, socio-economic characteristics and rural-urban background, to ensure broad representation of situations within each country; based on pragmatic constraints for survey recruitment at each site; see Participants section below and Table 2 for envisioned recruitment methods in each country). Our targeted samples in this and subsequent studies are selected based on a quota representation of different quadrants on Gross National Product, % of Urbanization, % of higher education, geographic region, cultural tightness of norms, and dominant religiosity (see Table 3 below). Specifically, we will include samples from regions with a historic dominance of six major religious traditions - Buddhist (Sri Lanka, HK), Catholic (Poland, Colombia), Hindu (India), Protestant (US, Canada, Ghana), Sunni Muslim (Kazakhstan, Turkiye), as well as representatives of sites that are majority secular (UK and HK). In selection of countries, we further considered pragmatic constraints of availability of reliable sampling methods–either at professional survey companies or local universities– vis-a-vis budgetary constraints. Though these samples by no means represent the whole diversity of human decision-making, we hope that our selection along multiple economic, and socio-cultural factors can yield a rich reflection on these issues–a stepping stone for further scholarship down the line.

In Project 1-A, we will focus on ill-defined situations: those for which past experience may not be directly applicable and “ready-made” solutions may not be readily available. Next, we will curate a list of situations that are comparable in frequency as well as a set of situations that may be well-understood (based on feedback from local experts who are team members on the project as well as their research staff on site) but not mentioned frequently in other cultures. By comparable frequency we refer to situations that may be commonly encountered societally, as opposed to frequent in the sense of encountered by most people every day. For example, in some societies buying a house is something that many people do, but also do rather infrequently—an example of a scenario that people have to think about carefully, and may seek substantial outside wisdom from people who have also done it, but have also done it only once. As another example, deciding to have a child may be something that many people do, but many people also decide whether to do it only once or twice. Notably, both of these examples are highly culture-specific (in some societies most people may not be able to afford to buy a house, or vary in birth rates or freedom of choice about having a child due to religious practices, cultural norms, country-specific regulations or ecological affordances, and social support networks). Consequently, a careful evaluation of strategies via detailed discussions within the research group, guided by perspectives of diverse local experts, is essential. Specifically, for each part of the project, we will start with targeted semi-structured interviews / cognitive interviewing to identify best ways to phrase questions concerning challenges, ill-defined problems, and wisdom, including the contextualized delivery of the prompts. Like in some of our prior mixed methods work (e.g., Amarasuriya et al., 2024; Rudnev et al., 2024), we will start by pilot-testing different ways to ask questions and evaluate quality and breadth of responses, as well as their accessibility for participants coming from different educational backgrounds. For instance, we will not necessarily ask “Describe a challenge for which you need wisdom” but instead consider several options to avoid terms like “challenge” and “wisdom” if they invoke a distinct meaning of the concept that is not shared anywhere else. For instance, we can ask “Describe a situation you faced recently where you had to make a decision where you weren't initially sure what the right course of action was.” These best practices incorporate strategies that both consider culture from the inside, understanding it as its members do (an approach known as ‘emic’), and examine it from an outsider standpoint, using common criteria across cultures (referred to as ‘etic’). This dual approach aims for deeper understanding of the role of culture for psychological processes, integrating insights from cross-cultural psychology and psychological anthropology (e.g., Grossmann & Na, 2014).

In a follow-up “strategy sampling study” (Project 1-B) we will identify which decision strategies people from different cultures consider to be wise in the concrete situations identified in Project 1-A. To achieve this, we will conduct extensive surveys (up to *N* = 2,500 each, to ensure sufficiently rich and diverse text corpora for natural language processing analyses; see *Participants* section below) in which we will present situations identified in Project 1-A to a new sample, asking participants to provide written stream-of-thought reflections of what they believe to be a wise way to handle a given situation. This will be followed up by asking participants to identify individuals they admire who might have good advice about how to handle the situation, what those people’s advice might be, why they would consult those people, and why they would admire that advice (we will pilot-test different versions of this prompt to capture both views of people one personally knows as well as possible public and religious figures). Care will be taken to ensure sufficient heterogeneity of concrete situations identified in Project 1-A to be presented to participants in Project 1-B to reflect on, based on extensive consultations with local experts on the team about their suitability for the unique cultural contexts of the targeted samples, richness and diversity of topics (e.g., critical professional decisions, ethical or moral concerns, interpersonal challenges). To this end, we will include both the most common situations across sites, as well as situations that are most common in a particular culture but not in others. In the latter case, we will seek to include at least one such situation from each sample, paying attention to the pragmatic constraints of situations’ effective translation without loss of semantic meaning. Situations will be marginally adjusted to ensure a reasonable fit for the unique cultural context of each sample. In addition, we will assess participants’ familiarity with the situations as a possible moderator of the strategy selection.

In Project 1-B, we will also query the same participants about wise strategies for decision-making by randomly selecting one scenario from a battery of behavioral economics games that have rich histories of study. These will include the dictator game (“How much would you share with another if they had no say in the matter?”), the ultimatum game (“How much would you share with another if they must accept your offer for you to keep your share?”), inter-temporal discounting (“Would you rather have less now or more later?”), the prisoner’s dilemma (“Would you cooperate or defect with a stranger/family-member?”), risky choice (“Would you prefer a risky chance of a large gain or a certain smaller amount?”), the commons dilemma (“How much do you take advantage of a resource that you share with your community?”), and the public goods game (“How much would you contribute to a shared pool if that pool were then increased by half (150%) and shared with all group members?”). Whereas much prior work testing these games across cultures focused on how participants make decisions, we will ask participants to provide written stream-of-thought reflections of what they believe to be a wise way to figure out what to do in these situations, and what a person they admire may do and why (again, carefully piloting prompts in semi-structured cognitive interviews). This will allow us to gather novel insights about the folk standards of wise decision-making and potentially challenge many assumptions about ‘rational’ decision making in these environments.

Through this situation-to-strategy sampling chain, augmented with context-rich reflections on possible decisions for established social dilemmas, we seek to obtain a naturalistic, text-rich, and balanced corpus of wisdom-related decision strategies and their justifications. Subsequently, in each country, we will use cutting-edge NLP tools like BERTopic (<https://github.com/MaartenGr/BERTopic>)—a topic modeling technique that leverages Bidirectional Encoder Representations from Transformers (BERT) embeddings and *c*lass-based *T*erm *F*requency-*I*nverse *D*ocument *F*requency (c-TF-IDF) matrices to create dense clusters allowing for easily interpretable topics whilst keeping important words in the topic descriptions. We will also use *L*arge-*L*anguage *M*odel-(LLM)-assisted classification (e.g., Bhatia, 2023) to establish the structure of the wisdom-related decision space in each culture. Because of the scope of our work, traditional human-based coding of all responses across twelve countries may be impractical due to the scale of the project. Therefore, we will use the recent advances in embedding-based models and LLMs to zero in on a nuanced understanding of contextual information in the narratives (by using pre-trained models like BERT and other cutting-edge pre-trained language models from huggingface.co). Care will be taken to ensure the use of tools (e.g., tokenizers, normalization of Noisy User Generated Text; NUGT) that work well in the target languages (Chinese, Brazilian Portuguese, English, Hindi, Russian [dominant language in urban Kazakhstan], Sinhalese, Spanish, Turkish) by relying on generalizable or language-specific tools in Python. We will also consider using Kullback-Leibler divergence scores and similar techniques to evaluate the distance between topics; thereby probing the network of semantic connections across strategies.

At each step, we will ensure translation accuracy via back-translation, expert consultation, and (for NLP-derived results) cross-linguistic validation (re-running topic modeling on texts translated into English). This unique approach will allow us to peek into the world of wise decision-making beyond the standard self-report questions. By analyzing these reflections, admired persons, and justifications, we plan to create a catalog of the most common strategies people in different cultures consider to be wise when facing ill-defined situations (e.g., by whether a person asks themselves whether they have enough information about it—i.e., shows intellectual humility; or whether they consider others’ views and emotions—i.e., shows empathy). We will further enhance the interpretability of these strategies by asking LLMs to provide summaries of each topic using texts identified as being highly associated with each topic. Beyond NLP classification of decision strategies via embedding-driven topic modelling and summaries with LLMs, these responses will be further classified in relation to strategy efficacy (useful/not useful), judged by a multicultural team of raters (examining intra-class correlations and Fleiss’ κ to test for inter-rater reliability). We will then create a multimedia website to share insights with other scholars and the general public about the most common strategies used in different situations by people from diverse cultures.

***Participants***. We should note that recruiting well-powered samples of participants from countries like Ghana, Brazil, Colombia, India, Kazakhstan, Canada, Poland, Sri Lanka, the United States, the United Kingdom, China, and Turkiye presents unique challenges due to differences in Internet access and the availability of survey platforms, such as Prolific. Therefore, we have developed a tailored approach. In countries like Canada, the UK, and the US, we will rely on Prolific for participant recruitment. However, in regions where Prolific is not as accessible or widely used, we will collaborate with local experts to determine the most suitable methods for gathering diverse groups of participants (see Table 2 for example strategies below).

Hereby, we acknowledge that achieving our target sample sizes may not be straightforward in every location. Thus, we have set a minimum criterion of 200 participants per survey in Projects 1-A and 1-B at each site. Our goal is to exceed this threshold, contingent on the temporal window for data collection at each stage. This approach will allow us to adapt our recruitment strategy according to the specific challenges and opportunities presented by each location. Also, we are committed to ensuring gender balance and regional (and when possible socio-economic) diversity in our participant pool. For example, in Ghana, efforts will be made to recruit participants from both matrilineal and patrilineal cultural regions, reflecting the country's diverse social fabric. In Turkiye, our efforts will focus on recruiting participants from diverse regions, age groups, genders, and occupations, considering social structures and economic backgrounds. In all sites, we will strive to include community samples rather than solely relying on college-educated strata of the population alone.

These recruitment strategies and target sample sizes are detailed in Table 2 below, which outlines our planned approach for each site based on the information and resources currently available to us. This table serves as a guide, subject to refinement as we further engage with local experts and adapt to the evolving contexts of our research locations.

In each study, for each participant we will record their basic value orientation, cultural orientation, endorsement of tight (vs. loose) cultural norms, political attitudes (7-point scale; very liberal to very conservative), as well as a set of religiosity-related variables: religious group affiliation, frequency of participation in religious activities, and importance of religion in one’s life. Furthermore, to the extent country-specific institutional ethics review board guidelines permit, we will gather a suite of demographic variables, including typical socio-economic and educational factors. We will use these variables to cross-examine and classify strategies in the present initiative and provide for other scholars to pursue in the openly accessible database later.

Table 2. *Targeted recruitment methods and expected sample characteristics*.

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| Country | Targeted recruitment method | Brief description of expected sample characteristics |
| Canada | Prolific Academic | crowdworkers from the Prolific platform, targeting Canadian residents and balancing by gender. Sample tends to overrepresent white Canadians but is fairly balanced in terms of level of education. |
| USA | Prolific Academic | crowdworkers from the Prolific platform, targeting US residents and balancing by gender and region to ensure diversity ("representative" sample in the Prolific description). Sample tends to overrepresent white Americans but is fairly balanced in terms of level of education. |
| UK | Prolific Academic | crowdworkers from the Prolific platform, targeting UK residents and balancing by gender and region to ensure diversity ("representative" sample in the Prolific description). Sample tends to overrepresent white UK residents but is fairly balanced in terms of level of education. |
| Turkiye | 1) University Student Sample: from TOBB University of Economics and Technology | data collection in the exchange of course credit, targeting Turkish university students and balancing by gender. Sample tends to overrepresent middle or upper-middle SES Turkish residents. |
|  | 2) Community Sample: through a research agency, Vera | Turkish residents, balancing by age, gender, and SES. |
| Kazakhstan | Public Opinion Research Institute; Institute of Marketing Research "Elim" | data collection will be administered by a research agency targeting residents of Kazakhstan balancing by gender, age, and education. |
| Ghana | Community sample from Accra, Kumasi and Tamale. Survey to be undertaken by field data enumerators. | Nationally representative survey targeting households in three cities in Ghana. The sampling procedure will take into account age, gender, location (i.e., low vs high income areas), ethnic and religious backgrounds of the households/respondents. |
| China | Community sample through online platform, like [www.wjx.cn](http://www.wjx.cn/) or University Student Sample | crowdworkers from the wjx.cn platform participate for paid, targeting Chinese residents and balancing by gender. Student Sample from the Hong Kong University of Science & Technology, participate for course credit or for paid. |
| Poland | crowdworkers from Answeo, Flow, or other local data collection company | data collection will be administered by a research agency targeting residents of Poland balancing by gender, age, and education (if possible). |
| Colombia | CognoSight and and community sample data collection | data collection will be administered by a contractor from the research group at Universidad de Los Andes targeting residents of Colombia balancing by genders, age, education and location. |
| Brazil | crowdworkers from Offerwise or similar and community sample data collection | a) In Study 1 data collection through a survey company targeting a representative sample and b) in Studies 3-5 data collection will be administered by a research group at Universidade Federal do Rio Grande do Sul targeting residents of Brazil in 5 states balancing by genders, age, education and location. |
| India | Community samples obtained in collaboration with S. P. Jain Institute of Management and Research, Centre for Wisdom in Leadership | data collection will be administered by a contractor from the research group at the S. P. Jain Institute of Management and Research, targeting residents of India balancing by genders, age, and education. |
| Sri Lanka | Community samples obtained in collaboration with the Marga Institute https://margasrilanka.org/ | data collection will be administered by a contractor from the research group at the MArga Institute targeting residents of Sri Lanka balancing by genders, age, and education. |

Table 3. *Quota sampling of targeted countries. Selected countries aim to cover different socio-economic, geographic, and cultural quartiles.*

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Country | GNI | % urban (2022) | % higher ed | Region | World religions (dominant) | Religiosity (WVS) | Tightness |
| Brazil | Q2 | Q1 | Q2 | S America | Catholicism | Q1 | Q4 |
| Canada | Q1 | Q1 | Q1 | N America | Protestantism | Q3 | Q3 |
| China | Q2 | Q2 | Q2 | East Asia | Buddhism | Q4 | Q2 |
| Colombia | Q3 | Q1 | Q2 | S America | Catholicism | Q3 | Q4 |
| Ghana | Q3 | Q3 | Q4 | Africa | Protestantism | Q1 | Q1 |
| India | Q4 | Q4 | Q3 | South / Southeast Asia | Hinduism | Q2 | Q1 |
| Kazakhstan | Q2 | Q3 | Q2 | Central Asia | Islam | Q3 | Q2 |
| Poland | Q2 | Q3 | Q2 | Europe | Catholicism | Q2 | Q3 |
| Sri Lanka | Q3 | Q4 | Q3 | South / Southeast Asia | Buddhism | - | Q1 |
| Turkiye | Q2 | Q2 | Q1 | Middle East | Islam | Q2 | Q2 |
| UK | Q1 | Q1 | Q1 | Europe | Protestantism | Q4 | Q3 |
| US | Q1 | Q1 | Q1 | N America | Protestantism | Q2 | Q3 |
| Note. GNI = Gross National Income per capita in 2022, per World Bank. Higher education based on tertiary school enrollment (% gross, 2019-2022). Tightness = degree of endorsement of tight (vs. loose) cultural norms; scores from Jackson, Gelfand, and Pieper (2020). <https://osf.io/pq9mf>. WVS = estimates from World Value Survey [www.worldvaluessurvey.org](http://www.worldvaluessurvey.org/). | | | | | | | |

**Project 2**. We will employ computational modeling to shed light on a) the adaptiveness of cultural differences in decision strategies, and b) the societal dynamics that result from people using the identified decision strategies in their social interactions under differing ecological and cultural conditions. This method affords identifying beneficial strategies for ill-defined situations and predicting strategy effectiveness amidst socio-economic and demographic shifts, assessing their fit for global challenges.

**2-A. Modeling real-world social dilemmas and the decision strategies individuals use to navigate them.** Wise reasoning requires consideration of the ‘right’ things in the right contexts. But *what* those things are can be complicated to assess, requiring people to engage in a protracted process of information search. Project 1 will provide a rich body of data about the types of situations that require wise reasoning, as well as the strategies people believe would produce decisions that benefit the greater good, in a diversity of contexts and cultures. However, such data do not say whether and why such strategies actually lead to socially beneficial decisions*.* To better understand the adaptiveness of the wise decision strategies identified in Project 1-B, we will thus conduct a computational deconstruction of wise decision-making in two of the most commonly identified ill-defined social decision problems from Project 1, using “resource-rational” analysis (Lieder & Griffiths, 2020). This approach assumes that both the information people seek out, as well as the metacognitive strategies that they use to determine whether and when to seek such information, are adapted to arrive at the best solutions, *conditional on* the available time, information, and cognitive resources, as well as the decision maker’s values and the socio-cultural norms and expectations of their environment. Resource-rational analysis leverages the power of mathematical modeling to understand how people’s decision strategies are adapted to their socio-cultural, physical, and economic environment, as well as their values, beliefs, and cognitive constraints. Computational methods can be used to derive the most adaptive decision strategy, given specific combinations of cultural, situational, and personal factors. Adaptiveness is measured by how good the outcomes of a strategy tend to be on average according to the decision maker’s values and their preference for saving time and mental effort. Resource-rational analysis thus offers a powerful way to systematically analyze the adaptiveness of cultural differences in decision strategies. Our analysis will thus provide a novel perspective on *why* different cultures might find different decision problems more or less challenging, and arrive at different strategies for solving them.

The first step in this process will be to mathematically formalize a subset of social scenarios identified in Project 1, by formally specifying the goals and values of the decision-maker, what information they have, and what information (such as situational variables, consequences of actions for self and others) remain uncertain. To make this tractable, we will build on the well-developed taxonomies of formal game-theoretic models of a wide range of social dilemmas (e.g., Fudenberg & Tirole, 1991; Kollock, 1998; Ostrom et al., 1994). For each real-world social dilemma we model, we will first identify the most similar class of game-theoretic models. Assuming sufficient similarity to extant game theoretical models, we will extend the corresponding mathematical formalism as necessary and specify its parameters to formalize the description of the real-world social dilemma as accurately as possible. If no existing model is appropriate to capture key aspects of the dilemma, we will develop an appropriate computational model from scratch, using the general framework of multi-agent partially observable Markov decision problems (Gmytrasiewicz & Doshi, 2005). Based on a recent large-scale analysis of real-world dilemmas (Yudkin et al., 2023), we expect that many real-world social dilemmas will involve internal conflicts between people’s self-interest, their concern for the welfare of others, social obligations, and moral norms. To model this, we will extend models of social preferences developed in behavioral economics (e.g., Fehr & Schmidt, 1999). Moreover, we also expect that, unlike most economic games, many real-world social dilemmas will involve substantial ambiguity about the nature of the situation, potential consequences, and the goals and preferences of other people. We will formalize this uncertainty as a probability distribution over the type and parameters of the social situation, and then model the challenge of reducing and acting under this uncertainty as a partially observable Markov Decision Process (Littman, 2009).

In the second step of our analysis, we will specify a set of cognitive operations that our model can perform to reach a decision (e.g., recalling relevant information from memory, seeking outside input from other individuals), how these operations differ in terms of costs and informational value, and how those operations can be combined into a decision strategy. We will, thereby, specify a space of potential decision strategies in terms of a meta-level Markov decision process (Griffiths et al., 2019). To ensure tractability, we will use as a starting point a recently developed memory-based decision-making architecture (Zhao et al., 2022) that leverages NLP methods to capture the semantic space of reasons the model can recall, using the verbal protocols collected in Project 1-B. In addition, we will incorporate operations for seeking information from other people, in addition to or instead of purely internal memory-based reason generation. Using this cognitive architecture, we can express decision strategies as probabilistic rules for when to query one’s memory or another person for different reasons for or against a potential decision. Our model will distinguish between several different types of reasons, including immediate and/or future harms versus benefits for oneself versus others. We will add additional cognitive operations (e.g., performing a mental simulation, inferring another person’s intention from their behavior, reasoning about costs and benefits, applying a moral rule) depending on what is warranted by the specific decisions to be modeled.

In the third step of our analysis, we will use our AI-based optimization methods (e.g., Heindrich et al., 2023) to compute which decision strategies (e.g., social/interactive, memory-based, or a combination thereof) result in the best trade-off between achieving the decision-maker’s goals and reducing decision costs (e.g., the time and effort required) for a given social dilemma. We will also examine whether and how the model identifies different optimal trade-offs depending on cultural and environmental factors (e.g., scarcity, density/tightness of social contacts, and strictness of social norms). We will thereby leverage AI to discover wise decision strategies separately for many or all of the cultures studied in this project, including several non-Western cultures. Analyzing these strategies will provide a more mechanistic understanding of when and why crucial aspects of practical wisdom, such as asking oneself why one’s currently preferred decision might be wrong (intellectual humility), or remembering what it feels like to be criticized (perspective-taking), lead to more beneficial outcomes. Our resource-rational framework will allow us to model how wise decision strategies express such virtues within the constraints imposed by factors such as time pressure, limited information, and bounded working memory, which can be severe in complex real-world decisions. Comparing the wise decision strategies for a given dilemma across cultures will elucidate which aspects of practical wisdom are shared across cultures, which are culture-specific, and what environmental and cultural factors make them adaptive. Moreover, by comparing wise decision strategies *across* dilemmas, we will be able to explore whether and how practical wisdom requires the adaptive selection of situation-appropriate decision strategies.

After applying analysis steps 1-3 to two or more social dilemmas from Project 1-A, we will conduct large-scale simulations to predict the distribution of people’s responses to different social dilemmas and the resulting social interactions. This will generate precise predictions about how the decision strategies people consider wise (according to Project 1-B) differ across different social dilemmas and cultural environments. We will then compare the predicted nature and frequency of resource-rational strategies against the actual strategies identified in Project 1-B and people’s responses to the survey measures administered in Project 3. This will accomplish two things. First, simulating how well each strategy would resolve a given social dilemma will give us a theoretically and quantitatively grounded metric for evaluating the adaptiveness of the strategies people report using in Project 1-B. This metric will allow us to compare the objective adaptiveness of each strategy to people’s subjective perceptions of its value. For example, simulations might reveal that the tightness (vs. looseness) of societal norms in a culture alters the value of decision strategies that seek outside advice. We will test whether similar patterns are observed in the empirical data from Project 1-A & 1-B.

Second, comparing the behavior of our models to the descriptions collected in Project 1-B will allow us to identify whether there are additional strategies that are mentioned frequently in verbal reports but are not captured by the model, or vice versa. In the final analysis, we will investigate the reasons for these potential discrepancies. The goal of this analysis will be to determine whether some of the other strategies people report in Project 1-B are adaptive for different situations, other (cultural) environments, or people with different personal characteristics. To answer this question, we will fit the parameters of our models of the social dilemma and people’s cognitive constraints to the characteristics of strategies described by participants in project 1-B. This innovative use of the resource-rational framework (Lieder & Griffiths, 2020) will elucidate which additional individual factors (e.g., fallible memory), socio-cultural factors (e.g., different levels of power), and situational factors (e.g., ambiguity) make it wise for people to use the decision strategies identified in Project 1-B. Developing precise models of several of the decision strategies observed in Project 1-B will facilitate the development of rigorous psychometric measures of what (types of) strategies people use in Project 3. Moreover, our simulation results on which strategies are adaptive for which situations will provide a theoretical benchmark for scoring the adaptiveness of people’s self-reported strategy use in Project 3.

**2-B. Agent-based modelling**: In conjunction with modeling individual-level decision strategies, our project will implement societal-level agent-based models (ABMs) with empirically plausible priors (Grossmann et al., 2023). These ABMs will build on and extend the computational models of individual decision-making, ensuring a cohesive and efficient modeling approach. ABMs are especially valuable because they allow us to explore emergent properties of social interactions and norms that are not apparent at the individual level. This means that while individual models show how a person might decide in a specific situation, ABMs show us how these individual decisions can interact and lead to larger societal patterns and norms. Here, our “small world” simulations will build on insights from the prior steps.

We will model scenarios identified in the earlier stage (e.g., marriage decision-making, balancing personal preferences against parental recommendations, ethical dilemma of lying under oath to protect a family member), exploring how cultural norms and institutional strength influence decisions. For example, consider a scenario involving ethical decision-making in different cultural contexts, such as the decision to follow personal preferences versus parental guidance in marriage. An individual-level model might show how a person weighs these factors based on personal beliefs and external pressures. However, an ABM can simulate how these individual decisions, when made by many people in a society, can lead to a prevalent cultural norm. In some societies, this might result in a norm that strongly values parental guidance, while in others, personal preference might become the dominant norm.

Another example is the decision to lie to protect a family member, which can be influenced by factors like legal systems, inequality in access to legal resources, ethical systems (e.g., Haidt, 2012; Shweder et al., 1997), or tight versus loose cultural norms (Gelfand et al., 2011). Using individual-level models helps us to understand the decision-making process of a person facing this dilemma. In contrast, ABMs enable us to see how these individual decisions, when replicated across a society, might lead to an emergent norm about the acceptability of lying in certain circumstances, and how such norms can vary across societies.

By integrating these approaches, our project will provide a comprehensive understanding of decision strategies, capturing both the depth of individual decision-making processes and the breadth of societal influences and emergent norms. This will enable us to better predict the effectiveness of various strategies in diverse socio-economic and demographic contexts.

**Project 3**. A key goal of this research is to investigate inter- and intra-individual heterogeneity and stability in wise decision-making strategies, and explore whether and how measures of this capacity relate to real-world navigation of decisions and decision satisfaction. To this end, concurrently with the computational modelling described above, Project 3-A will carry out multi-level multi-group exploratory and confirmatory psychometric studies (*N* = 300, for each sample) to test individual differences in the use of NLP-derived wise decision strategies in members of various societies. In the exploratory phase, we will start with cognitive interviews to pilot-test responses with additional open-ended response options. This will tell us whether we have captured strategies effectively or if other strategies may need to be considered in the quantitative part of the exploratory modelling. Specifically, we aim to identify general and language-specific NLP-derived wise decision strategies across a subset of 3-4 diagnostic situations—i.e., situations that are most common across societies and well-understood in each. Participants will bring to mind and reconstruct the most recent episode involving one of these situations and report on their use of the strategies in the process of deciding on these situations. Here, we move beyond reflections on theories of wise decision-making toward their use in specific situations. We also plan to ask people to report on how the resulting decision affected the well-being of everyone affected by it. The decision’ s net effect on all stakeholders’ well-being can then be used as an approximation to how good it was to use the strategy in that situation (i.e, a criterion for evaluating strategy effectiveness). Project 4-A described below will build on these psychometric insights to further probe intra-individual heterogeneity and stability of wise decision-making strategies in people’s own lives.

Project 3 will help us understand how much these strategies are applied in decision-making and whether they lead to greater sense of subjective utility (or efficacy) or a sense of conflict resolution. This way, we will be able to pinpoint contexts where the application of identified wise decision-making strategies is most difficult and where further development is needed (e.g., intercultural, moral, religious, interpersonal, or intra-individual contexts). Moreover, by bringing together psychometric and formal/computational insights, we can compare insights about empirically-derived folk theories of judgment in different cultures with insights from the formal models of ecologically optimal decision-making. This way we can identify when insights from the computational and agent-based models for the same key situations go against the cultural norms for “wise” strategies in a given society, and explore what situational and cultural factors most likely affect misalignment between these empirical and formal results.

**Project 4 (A and B)**. Using insights from Projects 2 and 3, we will start the “phronetic stage”—i.e., we will examine the fit of strategies to specific situations. In Project 4-A, we will first refine our psychometric measures for robust capturing of intra-individual stability (and variability) in actual strategy use across different challenges that people encounter in their personal lives. To this end, we will rely on longitudinal event-reconstruction diary studies of challenges people experience in their lives. To reduce attrition, for pragmatic reasons we will hold one session per week for a duration of two weeks; within each session participants will be prompted to provide event reconstruction of three challenges they encountered during a given week (thus six challenges per person in total; three scenarios is the minimum criterion to start modelling the cross-temporal trajectories within each week, whereas six scenarios will allow us to obtain a reliable estimate of wisdom-related strategies, per prior research Grossmann, 2017). Using the strategies that we identified and formally probed in Projects 2 and 3, we will evaluate how people use them *across* naturalistic contexts of challenges they experience. For cost-related reasons, we will focus on a sub-set of five cultures from North and South America, Europe, Africa, and Asia (*N* = 150, per site). Further, we will examine how switching of strategies across different situations is aligned with their subjective efficacy/utility (also captured in the same sample upon completion of the week), to evaluate the degree of *calibration* of strategies to the situation at hand.

Next, building on Projects 2 and 3 and intra-individual variability insights above, in Project 4-B we will examine the effectiveness of meta-judgment—that is, do people’s folk theories provide accurate knowledge when to switch across different strategies? Here, we will rely on psychometric methods from Project 3, while also assessing personality, cultural and religious orientation, values, and situational factors promoting calibration/effective strategy switching. We will explore these factors in a series of cross-cultural within-person online experiments to identify cultural and individual factors promoting calibration/optimal switching. For pragmatic reasons, we will implement these experiments in five countries, selected based on their socio-economic, geographic, and political diversity (Brazil, China, Ghana, Poland, the US) (target *N* = 200 per site per experiment; aggregated across five sites, target *N* per experiment = 1,000). We will further invite other scholars from our networks (e.g., [warwick.ac.uk/research/priorities/behaviour-brain-society/cdmcl](http://warwick.ac.uk/research/priorities/behaviour-brain-society/cdmcl)) that cover respective countries to join our efforts to conduct experiments on their sites, to ensure even broader representations of countries in Project 4.

**Project 5**. Informed by insights from Projects 2–4 about factors that afford calibration, in the final phase of our research we will implement a series of proof-of-concept interventions. Building on modelling (Project 2) and experience sampling results (Project 4), we will systematically vary key parameters of the scenarios participants engage with, to assess the use of strategies across situations, and the likelihood of switching between different situations as a function of these parameters. Hereby, prior insights will inform the extent to which some strategies may be advantageous in particular situations (Project 2) and will be perceived as effective for well-being of people involved (Projects 3-4). We will implement these interventions in twelve countries (target *N* = 400 per site per experiment). These interventions will be designed to explore effective ways of achieving calibration in decision-making. We will focus on a diverse selection of societies, chosen for their varying socio-economic systems and cultural values and beliefs. Drawing from the findings of previous studies by our team (e.g., Becker et al., 2023; Grossmann et al., 2021; Lieder & Griffiths, 2017) and others (e.g., He et al., 2022) and our own computational modelling results, we aim to test and refine techniques that enhance the calibration of effective use of decision strategies. These strategies will be tailored to move beyond a rigid, one-size-fits-all decision-making approach.

For instance, it is possible that one candidate factor affording greater calibration may involve the ability to adopt a ‘fly on the wall’ perspective (Kross & Ayduk, 2017). This self-distanced/decentered viewpoint, also known as the outside-in view in decision-making literature, encourages a broader perspective that can prevent the indiscriminate application of a single strategy to diverse problems. By doing so, we aim to avoid the pitfall of treating every task as a nail for the proverbial hammer and instead tailor strategies to the specific nuances of each decision-making scenario. By relying on emerging intervention studies that foster fly-on-the-wall decentered viewpoint via third-person self-talk (e.g., Gainsburg & Kross, 2020; Grossmann et al., 2021; see Orvell et al., 2019, for a review), we can simultaneously test possible benefits from calibration across a range of societies, thus proving their effectiveness beyond the WEIRD contexts.

Another intervention strategy we will evaluate involves guiding people to discover which decision strategy works best for them depending on the type of social dilemma they are in (e.g., a Public Good Dilemma or a Chicken Dilemma; Camerer, 2003). To achieve this, we will extend our systematic metacognitive reflection intervention (Becker et al., 2023) to social dilemmas (e.g., “What approach did you take to figure out how to resolve the dilemma?” and “Would you want other people to take that approach when they are interacting with you?”). In addition to helping people learn valuable lessons from their experiences in previous social dilemmas, we will help them apply those lessons to new social dilemmas via analogical transfer (Gick & Holyoak, 1983). To achieve this, we will devise Socratic questions that guide people to analyze the structure of their current dilemma (e.g., “Which of the following statements best describes the essence of the dilemma you are facing?”), and then recall what strategies they used in structurally analogous situations and select the one that previously had the best outcomes for the greater good (e.g., “What approaches have you used in previous situations that fit this description?” “Which of those approaches tended to produce best outcomes for everyone involved?”).

***Statement on Open Science Practices***

We are deeply committed to Open Science principles and the move towards robust and credible psychological and social sciences. Our project will involve cross-validation and pre-registration of models for confirmatory analyses and pre-registration of hypotheses for intervention studies on Open Science Framework (OSF). As we outline in the outputs and outcomes, preprints, materials, and data will be shared widely with the academic community by posting on PsyArXiv/OSF & GitHub (for computational models) to help foster collaborations and promote cumulative insights about wisdom, judgment, folk theories, psychology & religion, and cultural psychology. We will also harmonize all data and invite scholars from decision sciences, psychology, evolutionary and cultural anthropology, psycholinguistics, and complex systems to use it for their research needs, promoting the data in our research networks, social media channels and at scientific conferences (APS, CogSci, SPSP, JDM, Psychonomics, IACCP, Human Behavior and Evolution Society).

Table 4 outlines the key steps of the project activities, and core people involved.

**Table 4** **: Timetable.** Main trainees and main mentors are designated for each task. *(IG = Igor Grossmann, FL = Falk Lieder, SJ = Sam Johnson, MR = Maksim Rudnev, TH = Thomas Hills, CS = Cendri Hutcherson, PM = Project Manager, DS= Doctoral Student, PDF = Postdoctoral Fellow, WD= Web Designer, \* = milestone)*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Obj** | **Task** | **Main**  **Trainee(s)** | **Main**  **Mentor(s)** | **Months** | | | | | | | | |  |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | |
| 1 | Design for **Projects 1-A** and **1B** (sampling studies) | PDF1 | IG, SJ, MR,TH |  |  |  |  |  |  |  |  |  | |
| 1 | Ethics for Projects 1-A and 1-B | - | PM |  |  |  |  |  |  |  |  |  | |
| 1 | Translation of 1-A materials | - | PM |  |  |  |  |  |  |  |  |  | |
| 1 | Virtual kickoff | PM, DS | IG |  |  |  |  |  |  |  |  |  | |
| 1 | Conduct Project 1-A (pilots & situation sampling) | PM, DS | IG |  |  |  |  |  |  |  |  |  | |
| 1 | Analysis of -1A | PDF1 | IG, SJ, TH |  |  |  |  |  |  |  |  |  | |
| 1 | Design revision for Project 1-B | PDF1 | IG, SJ, TH |  |  |  |  |  |  |  |  |  | |
| 1 | Translation of 1-B materials | - | PM |  |  |  |  |  |  |  |  |  | |
| 1 | Conduct Project 1-B (pilots & strategy sampling) | PM, DS | IG |  |  |  |  |  |  |  |  |  | |
| 1 | Analysis of 1-B | PDF1 | IG, SJ, TH |  |  |  |  |  |  |  |  |  | |
| 1 | Create website visuals | WD, PM, PDF1, DS | IG |  |  |  |  |  |  |  |  |  | |
| 1 | Write-up of Projects 1-A, 1-B | PDF1 | IG, SJ, MR,TH |  |  |  |  | **\*** |  |  |  |  | |
| 2 | **Project 2-A**: Computational modelling | PDF2 | FL, CH, IG |  |  |  |  |  |  |  |  |  | |
| 2 | **Project 2-B**: ABM of optimal strategies | PDF3 | SJ, TH, IG |  |  |  |  |  |  |  |  |  | |
| 2 | Write-up of 2-A results | PDF2 | FL, CH, IG |  |  |  |  |  |  | **\*** |  |  | |
| 2 | Write-up of 2-B results | PDF3 | SJ, TH, IG |  |  |  |  |  |  | **\*** |  |  | |
| 2 | Design **Project 3 (incl. pilots)** | PDF4 | IG, MR |  |  |  |  |  |  |  |  |  | |
| 2 | Ethics for Project 3 | - | PM |  |  |  |  |  |  |  |  |  | |
| 2 | Conduct Project 3 (psychometric insights) | DS/PDF4/PM | IG |  |  |  |  |  |  |  |  |  | |
| 2 | Analysis of 3 | PDF4 | IG, MR |  |  |  |  |  |  |  |  |  | |
| 2 | Write-up of 3 | PDF1/4 | IG, SJ, FL, CH, TH |  |  |  |  | **\*** |  |  |  |  | |
| 3 | Design for **Project 4-A (incl. pilots)** | PDF4 | IG, MR |  |  |  |  |  |  |  |  |  | |
| 3 | Ethics for Project 4-A | - | PM |  |  |  |  |  |  |  |  |  | |
| 3 | Pilot testing for Project 4-A | DS/PDF4 | IG |  |  |  |  |  |  |  |  |  | |
| 3 | Conduct 4-A (diary situational sampling) | PM/DS | IG |  |  |  |  |  |  |  |  |  | |
| 3 | Analysis of 4-A | PDF4 | IG, MR |  |  |  |  |  |  |  |  |  | |
| 3 | Design of **Project 4-B** | PDF4 | IG, FL, SJ |  |  |  |  |  |  |  |  |  | |
| 3 | Ethics for Project 4-B | - | PM |  |  |  |  |  |  |  |  |  | |
| 3 | Conduct 4-B (calibration and meta-judgment) | PM, DS, PDF3 | IG, SJ |  |  |  |  |  |  |  |  |  | |
| 3 | Analysis of Project 4-B | PDF4 | IG, FL, SJ |  |  |  |  |  |  |  |  |  | |
| 3 | Write-up of Project 4 | PDF4 | IG, FL, SJ |  |  |  |  |  |  | **\*** |  |  | |
| 3 | Design of **Project 5** (incl. pilots) | DS, PDF3 | IG, FL, SJ |  |  |  |  |  |  |  |  |  | |
| 3 | Ethics for Project 5 | - | PM |  |  |  |  |  |  |  |  |  | |
| 3 | Conduct Project 5  (calibration tools) | PM, MA1, PDF3 | IG |  |  |  |  |  |  |  |  |  | |
| 3 | Analysis of 5 | PDF3, DS | IG, FL, SJ |  |  |  |  |  |  |  |  |  | |
| 3 | Confirmatory Studies | DS | IG, SJ, FL |  |  |  |  |  |  |  |  |  | |
| 3 | Write-up of Project 5 | DS | IG, FL, SJ |  |  |  |  |  |  |  |  | **\*** | |
| 3 | Capstone symposium | PM | IG |  |  |  |  |  |  |  |  |  | |

***Psychometric Considerations***

*Statistical power in intensive assessment research*. Questions of power (Lakens, 2022) can be complex for complex studies including multiple levels (e.g., responses clustered in countries; longitudinal studies; Bolger & Laurenceau, 2013) . This is why we set a minimum target sample for initial studies at 200 per site and estimate to have between 250 and 150 participants at any measurement point for longitudinal designs. Based on power analyses for mixed effects modelling calculations ([https://koumurayama.shinyapps.io/summary\_statistics\_based\_power](https://koumurayama.shinyapps.io/summary_statistics_based_power/)), this sample size would be sufficient to detect a small-moderate effect (*d* = .35) with α = 5% and β = 20%. Notably, calculation of power is complicated by the multi-level (multi-group/multi-timepoint) structure of the present project. As Enders and colleagues (2023) have noted, “power analyses for multilevel designs require unique considerations that make them more challenging than those for single-level regression models.” In particular, we don’t know how stable decision-making characteristics are across countries (in Projects 1–3) and timespans (in latter Projects 4–5). Our projected design for the within-person experiments includes 200 participants per site, or 1,000 participants across five sites, affording well-powered comparisons of within-person conditions (e.g., role of situational affordances and other contextual factors for variability). Our projected design for the cross-cultural between-group interventions includes 400 participants per site, or 4,000 participants across ten sites, affording high-powered tests of intervention conditions compared to control conditions while controlling for responses nested in countries. Based on guidelines by Bickel (2007), to determine effective sample sizes in multilevel modeling, we need to be confident we have sufficient power to detect at least a medium fixed effect. We will compute more precise power analyses using a Monte Carlo simulation study based on the pilot data from the latter studies.

*Dealing with Missing Data*: In all Projects relying on psychometric or empirical analyses, for statistical modelling we will use robust maximum likelihood estimation and full-information maximum likelihood (FIML) to deal with missing data. For scale responses, when necessary, we will replace the FIML approach with multiple imputation by chained equations (MICE). To account for missingness issues before conducting the analyses described above, we will report the proportion of non-respondents to all items and non-respondents to some items. We will report and visualize the missingness pattern and the difference between respondents and non-respondents. We will analyze skip patterns at the item-level, assessing whether patterns are monotone or arbitrary, and identify the main variables associated with missing items (using LASSO regressions). If meaningful and consistent predictors are identified, we will control for these predictors in the following analyses. We will retain all participants who completed at least 80% of the measures at a given stage for further analyses.

***Risk Mitigation and Feasibility***

In developing our project management and risk mitigation strategy, we have drawn on insights from other large-scale collaborative projects. First, we have strategically assembled a large, highly experienced team of experts in decision-making, natural-language processing and computational social science, measurement and psychometrics, as well as cultural psychology. Our approach leverages the division of labor amongst team members, each bringing a wealth of expertise and experience in leading substantial interdisciplinary projects. Second, for each project, we will start with careful qualitative pilot-testing of materials, including survey prompts and presentation of stimuli in experiments, in consultation with local team members, and by seeking input from further local experts in social sciences (anthropology, psychology, and economics). The semi-structured cognitive interviews will ensure clear understanding of the materials across culturally and socio-economically diverse contexts of our samples. For religion-related questions, we will also seek input from our colleagues–leading experts at the intersection of psychology and religion, including Drs. Adam Cohen, Joni Sasaki, and David DeSteno. Third , we have built in substantial capability for parallelization. Although certain elements are sequentially dependent (e.g., Project 1 laying the foundational groundwork essential for subsequent phases, and Project 3 being a prerequisite for Project 4), most components can progress concurrently, optimizing efficiency and resource utilization. This structured approach, combined with our team's track record in large-scale cross-cultural interdisciplinary endeavors (e.g., the Project Leader is the chief architect behind the Forecasting Collaborative and the primary advisor of the [Geography of Philosophy](https://www.geographyofphilosophy.com/) project, having coordinated three main projects from the latter endeavour), significantly mitigates risk and enhances the feasibility of achieving our comprehensive research objectives. Finally, we will include buffers and safety checks, allowing our team to optimize and adjust timelines for deliverables based on pragmatic constraints at each site. Through close rapport and team coordination via online communication on the designated project page (e.g., on Slack), designated project manager, coordination between the project manager and the PDFs, and regular check-ins with the team leader (e.g., on zoom), we will mitigate unexpected risks and adjust the schedule if challenges arise, using our built-in capacity for parallelizing sub-projects to minimize disruption to the overall timeline. For longitudinal samples of participants, we will aim to prevent excessive attrition via progressive increase in payment for later segments, while keeping all sessions within a reasonable short time window (e.g., 2 weeks in Project 4).

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**Experience Sharing Research Output**

Our team members are strong supporters of open science practices of transparency and sharing research outputs. We have enthusiastically shared our data and codes from most of our studies and persuaded the data owner collaborators to share their data publicly.

All of Project Director’s articles include a freely accessible preprint on PsyArXiv or have been published in open access journals (e.g., *Science Advances*). Most projects are reproducible, the shared materials include raw data and open access code either on OSF or GitHub.

Our team's commitment to sharing research output is also reflected in several high-impact projects. For instance, the Forecasting Collaborative, involving over 120 global teams, produced significant findings published in *Nature Human Behaviour* (<https://www.nature.com/articles/s41562-022-01517-1>). The project's data and results are openly available on GitHub (https://github.com/grossmania/Forecasting-Tournament). Moreover, we have written about this project in The Conversation (https://theconversation.com/the-limits-of-expert-judgment-lessons-from-social-science-forecasting-during-the-pandemic-201130).

The World after COVID project, another major initiative, offered insightful visualizations and findings on the award-winning multimedia site (https://worldaftercovid.info) and supplementary visualizations on the [Project Leader’s website](https://igorgrossmann.com/projects/world-after-covid/) ([https://igorgrossmann.com/projects/world-after-covid](https://igorgrossmann.com/projects/world-after-covid/)), with an accessible summary presented in another Conversation article (https://theconversation.com/words-of-wisdom-4-tips-from-experts-on-how-to-endure-until-the-covid-19-pandemic-ends-152162). The Toronto Wisdom Task Force’s work culminated in the influential Common Wisdom Model, advancing experimental philosophy and moral psychology, and was published in *Psychological Inquiry* (DOI: [10.1080/1047840X.2020.1750920](https://doi.org/10.1080/1047840X.2020.1750920)), with an accessible summary for the general public written up for the AEON (https://aeon.co/essays/how-psychological-scientists-found-the-empirical-path-to-wisdom). These examples underscore our team's dedication to making scientific research accessible and collaborative.

**Capacity for Success**

**Project Leader**

*Igor Grossmann* is one of the most highly cited scholars at the intersection of philosophy, cultural psychology, and experimental psychology, with fundamental contributions to the role of sociocultural factors for wise reasoning and sound judgment, as well as methodological contributions to the use of NLP for studying cultural diversity and change. Grossmann has also published numerous papers at the intersection of mixed methods, cultural psychology, and psychological anthropology, as well as the role of religious factors for human psychology. Grossmann also taught graduate courses about the range of complex methods outlined in the present proposal. He is the Editor-in-Chief of *Psychological Inquiry*—one of the top theory journals in the psychological sciences. He is the founder of the Behavioral and Social Science Forecasting Collaborative (<https://predictions.uwaterloo.ca/>) and the World after Covid project ([www.worldaftercovid.info](http://www.worldaftercovid.info)), relying on large-scale collaborative projects among diverse teams of stakeholders in psychology, economics, anthropology, and related fields to advance culture-appropriate psychometric modelling and computational linguistics for understanding socio-cognitive processes underlying expert judgment. His contributions have been recognized through numerous awards, including being elected as a Member of the College of the Royal Society of Canada, SAGE Young Scholar award from the Society for Personality and Social Psychology, Rising Star Award from the Association for Psychological Science, APA Dissertation Award, the USERN Prize for Social Sciences, and the Joseph B. Gittler Award from the American Psychological Foundation, which recognizes the most scholarly contribution to the philosophical foundations of psychological knowledge. His interdisciplinary work is funded by a series of grants from the Social Sciences and Humanities Research Council of Canada (SSHRC), John Templeton Foundation, Templeton World Charity Foundation, and an Early Researcher Award from the Ministry of Research and Innovation in Ontario.

**Team members**

*Thomas Hills* is a Professor of Psychology at the University of Warwick, UK. He has held fellowships with the Alan Turing Institute and The Royal Society. He initiated and currently directs the Behavioural and Data Science MSc, which focuses on bringing computational approaches to the social sciences. He is also the former director of the Bridges-Leverhulme Doctoral Training Centre focusing on bridging the mathematical and social sciences. His research focuses on topics associated with optimal and adaptive uses of information in complex environments, information search, and the structure and change of information over the lifespan and across cultures. His research uses methods involving experimental psychology, network science, natural language processing, and computational modeling.

*Cendri Hutcherson* is the director of the Toronto Decision Neuroscience Lab, with appointments as an Associate Professor in the Department of Psychology at the University of Toronto, a cross-appointment in the Rotman School of Management, and associate membership in the Graduate Department of Clinical Studies at the University of Toronto Scarborough. She holds a Tier II Canada Research Chair in Decision Neuroscience, has received grants from the Social Sciences and Humanities Research Council of Canada (SSHRC), Natural Sciences and Engineering Research Council of Canada (NSERC), Canada Foundation for Innovation (CFI), and National Institute of Mental Health (NIMH), and recently received an Early Career Research Award from the Society for Neuroeconomics. Her research focuses on developing neurally-informed computational models of decision making in self-control across a broad range of domains, including dietary decision making, risky behavior, altruism, and moral behaviour. It uses a variety of approaches, including neuroimaging (fMRI and EEG), eye tracking, machine learning, and computational modeling.

*Sam Johnson* is an Assistant Professor of Psychology at the University of Waterloo, where he directs the Decision, Inference, and Cognitive Economics (DICE) Lab. After completing his PhD in Cognitive Psychology at Yale and post-doctoral training in Behavioural Economics at University College London, Johnson served on the faculty of the University of Warwick (Psychology) and University of Bath (Marketing). Johnson’s research looks at how people explain the world, how those explanations shape our choices, and how those choices influence society. Recent topics of interest include moral psychology, mental models of economic institutions, decisions under uncertainty, and strategies for prioritizing tasks. Johnson’s dissertation research was recognized by the American Psychological Association and the Cognitive Science Society (Glushko Prize), and his current work is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and Natural Sciences and Engineering Research Council of Canada (NSERC).

*Falk Lieder* is an Assistant Professor of Psychology at the University of California, Los Angeles. He completed his Ph.D. at UC Berkeley under the mentorship of Tom Griffiths in 2018. Then, he became an independent research group leader at the Max Planck Institute for Intelligent Systems in Tübingen, Germany (2018-2023). He was awarded the Glushko Dissertation Prize, and his research has been funded by the National Science Foundation, the German Federal Ministry of Education and Research, and the Cyber Valley Research Fund, among others. Dr. Lieder has published 50 peer-reviewed articles that have collectively been cited more than 5 ,0 00 times (h-index: 29). His most influential contributions thus far include the development of a new cognitive modeling paradigm known as resource-rational analysis and formal computational models of decision strategies and the adaptive control of decision-making. His Rational Altruism Lab at UCLA extends these lines of research to moral, altruistic, and societal decision-making.

*Maksim Rudnev* is a researcher at the University of Waterloo, specializing in the study of human values, moral attitudes, and wisdom perceptions through a quantitative social science approach. Holding an MA in Psychology and a PhD in Sociology, with substantial training in statistics and psychometrics, his work is at the intersection of diverse academic disciplines. Dr. Rudnev has published numerous papers on the role of religion for basic values and other psychological processes. Over the past decade, he published 29 papers, including in the *British Journal of Psychology*, *Journal of Research in Personality*, *Journal of Happiness Studies*, *Journal of Cross-Cultural Psychology*, *Sociological Methods and Research, Social Science Research*, *European Sociological Review*, and other top journals. Maksim's research focuses on the development of values and worldviews across different cultures. Rudnev is particularly noted for his methodological contributions in cross-cultural studies. He has significantly advanced the field of measurement invariance, developing innovative techniques and tools, including the *R* package *MIE*, which aids in identifying invariant groups. His current projects continue to refine these methods, aiming to enhance the reliability and cultural sensitivity of research in the social sciences.

*Michał Białek* is an Associate Professor, Head of the Psychology of Management Unit, and Deputy Chairman of the Disciplines Council for Pedagogics and Psychology at the Institute of Psychology, University of Wrocław, Poland. His interdisciplinary work includes judgment and decision making, behavioral economics, social group interactions, cognitive linguistics and moral psychology. He received a prestigious award for Excellent Young Scholars from the Ministry of Science and Higher Education, Poland. He has published over 90 peer-reviewed papers, in outlets including *Nature Human Behavior*, *Psychological Science*, *Cognition*, and *Psychological Bulletin*. He received two major grants from National Science Centre, Poland, to study the foreign language effect, one smaller from the same funding agency, supervised one of his PhD students, and worked on four other grants. Most of his research focuses on how people integrate contradictory cues in their decisions, such as investing in stocks of immoral companies, or deciding between immediate or delayed/uncertain payoffs.

*Lisiane Bizarro* holds the position of Full Professor of Psychology at the Instituto de Psicologia Serviço Social Ciência e Comunicação Humana at Universidade Federal do Rio Grande do Sul (UFRGS). Dr. Bizarro earned her BSc in Psychology from UFRGS in 1991, completed her MSc in Developmental Psychology at UFRGS in 1995, and obtained her PhD in Psychology from the Institute of Psychiatry, King's College London in 2000. As the coordinator of the Laboratory of Experimental Psychology, Neuroscience, and Behavior, she oversees MSc and PhD projects in Psychology, developing experimental paradigms for studying cognitive biases, reinforcement sensitivity, emotions, illusion of control, time perception, and body image/schema. Her academic experience includes serving as Head of Department (2014-2015) and Director of Graduate Courses (since 2022) at UFRGS and as Visiting Professor at the Douglas Research Centre, Department of Psychiatry, McGill University (2019-2020). She is a CNPq Researcher tier 1D and member of the National Institute of Science and Technology on Social & Affective Neuroscience (INCT-SANI). Dr. Bizarro was a member of the Board of the Brazilian Society of Psychology (2016-2023) and is a member of the Consultative Committee of the Mind in Focus Movement, of the Global Compact Brazil.

*Suzan Ceylan-Batur* currently serves as an Assistant Professor at TOBB University of Economics and Technology in Turkey. She completed her PhD in Social Psychology at Middle East Technical University and underwent post-doctoral training at the University of Kent, UK. She is a social psychologist with a profound interest in and an established citation record of investigating how cultural and religious practices influence human behavior, emotions, and cognition. Dr. Ceylan-Batur’s research adopts a multifaceted approach, integrating experimental, survey, and qualitative methodologies to gain deeper insights into the impact of socio-cultural factors on critical issues related to decision-making, such as violence against women, retaliation, and forgiveness. Her research focus, centered on decision-making within honour cultures and reputation-based cooperation, aligns with the objectives of the proposed project.

*Melody Manchi Chao* is an Associate Professor at the Department of Management and Associate Director of Undergraduate Studies at the HKUST Business School, the Hong Kong University of Science and Technology. She received her Ph.D. and M.A. degree in Social Psychology at the University of Illinois, Urbana-Champaign and B.A. degree in Psychology at the University of California, Berkeley. She is a fellow of the Society for Personality and Social Psychology (SPSP) and Association for Psychological Science (APS). She has published in outlets like *Nature Communications*, *Psychological Science*, *Journal of Personality and Social Psychology*, *Journal of Experimental Psychology: General,* and *Personnel Psychology*. Prior to pursuing her graduate degrees, she worked in a community-based mental health and substance abuse treatment agency in the San Francisco Bay Area. She is also an accredited mediator. Her research interests include diversity, culture, dispute resolution, intergroup relations, and well-being.

*Zarema Khon* is a postdoctoral scholar at Nazarbayev University Graduate School of Business, Astana, Kazakhstan. She has received her doctoral degree in Management (Marketing) from the University of Bath, UK. Dr. Khon’s research interests lie at the intersection of marketing and psychology, where she derives various ideas from cognitive and social psychology and applies them in the business context of consumers in the marketplace. Her research looks at how consumers explain various phenomena using their intuitions and how those explanations shape their attitudes and behavior. Current topics of interest include lay theories of marketing manipulation, beliefs about big businesses and advertising, and psychological factors of algorithm aversion. Her doctoral dissertation was recognized by the Worshipful Company of Marketors (UK) in 2020.

*Juan Moreno-Cruz* is an Associate Professor at the School of Environment, Enterprise and Development and the Tier 2 Canada Research Chair in Energy Transitions at the University of Waterloo. He is also a CESifo Research Affiliate. He earned his PhD in Economics from the University of Calgary in Canada in 2010 and his B.Sc. (2003) and M.Sc. (2004) in electrical engineering from the Universidad de Los Andes in Colombia. Before his current position, he was an Associate Professor in the School of Economics at the Georgia Institute of Technology (2011–2017). He has been a Visiting Researcher in the Department of Global Ecology of the Carnegie Institution for Science at Stanford University, an Advisor for Carnegie Energy Innovation (since 2017), and a Research Associate of Harvard University’s Solar Geoengineering Research Program. Dr. Moreno-Cruz’s research focuses on the interaction of energy systems, technological change, and climate policy. Dr. Moreno-Cruz has investigated how technologies designed to modify the climate affect the strategic interaction among nations. His work on climate geoengineering economics has been published in top journals in his field and presented at venues across the United States, Canada, and Europe. Dr. Moreno-Cruz’s work is at the intersection of applied theory and public policy.

*Charles Yaw Okyere* holds a Doctor of Agricultural Sciences (Dr. Agr.) degree from the University of Bonn, Germany. Charles is an Agricultural Economist and Senior Lecturer at the Department of Agricultural Economics and Agribusiness, University of Ghana, Legon. Dr. Okyere has over 10 years of experience working on impact evaluations in Ghana, particularly Northern Ghana. His research interest areas include the application of behavioral, experimental and quasi-experimental economic techniques to health, education, agriculture, and welfare. In July 2021, Dr. Okyere was selected as a DAAD climapAfrica Postdoc Fellow and he was a Visiting Guest Researcher at the Center for Development Research (ZEF), Bonn from May to July 2022. Since 2017, he has volunteered as Ghana’s representative for the Society for the Advancement of Behavioral Economics (SABE) and was selected as part of ten fellows for the inaugural EIB-GDN Program in Applied Development Finance. Since December 2021, Dr. Okyere has also worked as a Research Associate at the International Centre for Evaluation and Development (ICED), Ghana’s Office.