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Research Without Borders: How to Identify and Overcome Potential Pitfalls in International Large-Team Online Research Projects

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Abstract

This case study is based on experiences with an international meta-scientific project across different fields of research, assessing the use of Open Science (OS) practices in these fields as well as individual researchers' reasons for not engaging in OS practices. The project was conducted by a cross-cultural and diverse group of researchers. In the case, we share insights into potential pitfalls when conducting an international study, as well as possible solutions to overcome them. Specifically, we highlight various issues by focusing on two key phases, namely, designing an online survey with a focus on cross-cultural data collection and recruiting a cross-cultural online sample of researchers.

Learning Outcomes

By the end of this case study, students should be able to:

- Be aware of best practices for designing cross-culturally appropriate items and recognize the relevance of defining terminology in an international study
- Know potential pitfalls when designing an online survey for a cross-cultural research project
- Coordinate different approaches to recruit an adequate sample and know how to maximize outreach
- Consider different approaches to recruit an adequate and diverse sample and know how to maximize outreach

Project Overview and Context

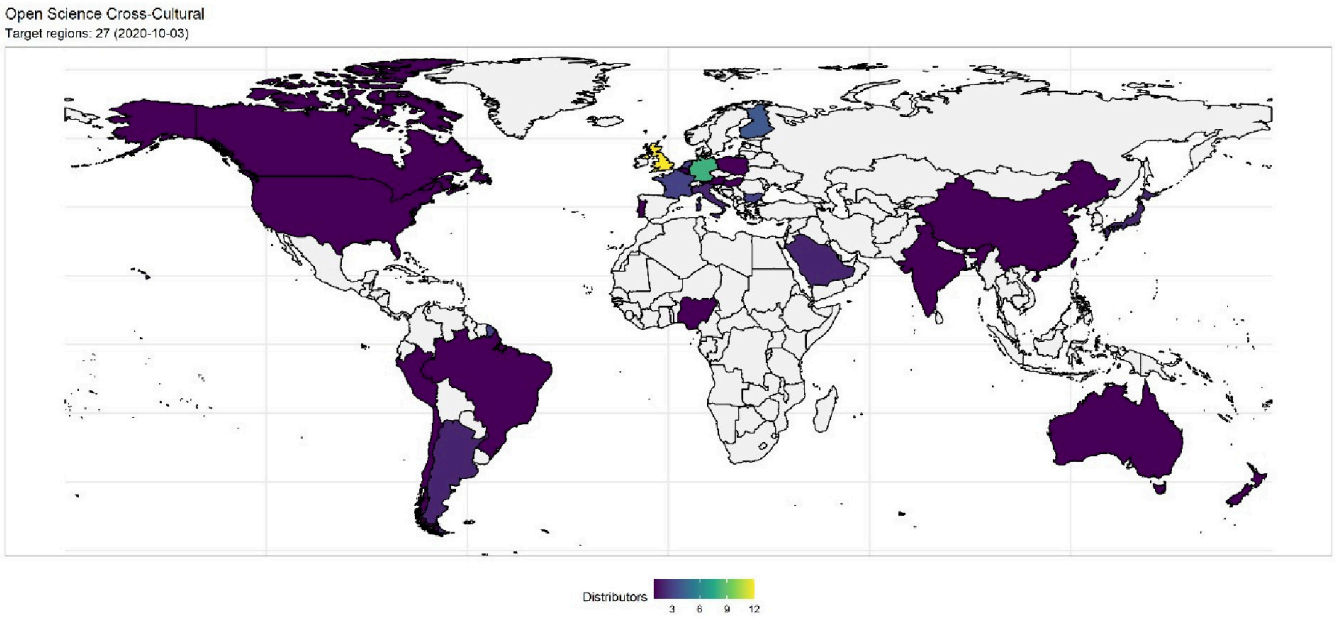
This case study refers to the Open Science Cross-Cultural (OSCC) project. The ongoing project investigates the frequency of using so-called Open Science (OS) practices among scientists and obstacles that might prevent the adoption of OS practices across the globe.

Because the accumulation of scientific knowledge occurs when researchers can rely on each other's work, the reproducibility of scientific findings can be adversely impacted by the lack of transparency or the presence of biases, which can include the manipulation in the analyses or reporting of findings and the flexibility of design, definition, and analytical modes (Ioannidis, 2005). As there have been recent reproducibility crises across several disciplines, in which many research findings proved difficult or impossible to replicate (Reed, 2018), a considerable number of researchers have been rethinking formerly accepted reporting standards (e.g., Simmons et al., 2011). As a result, several (interdisciplinary) initiatives have set the goal of disseminating OS practices, such as registering hypotheses, analyses, and methods before conducting a study, literature review, or making materials and data openly available (e.g., Nosek et al., 2018; Pownall et al., 2021). For more information on OS practices and incorporating them in teaching, the Framework for Open and Reproducible Research Training (FORRT) provides free educational resources around this topic for students and educators (https://forrt.org/).

However, the adoption of OS practices still varies across researchers, disciplines, and countries (e.g., Nosek, 2019, June). The reasons for such local and global differences remain poorly understood. Examining the occurrence of these hidden obstacles (e.g., country-specific legislation) is crucial to direct future efforts within the OS community. It is important to understand the unique barriers that researchers encounter across countries and disciplines to provide more appropriate and effective incentives to encourage open and transparent research (Nosek et al., 2012).

To uncover such differences across the globe, 47 researchers from different countries have started the OSCC project and aim to investigate the situation in more than 20 countries from all over the world (Figure 1). While the majority of researchers conducting the project are rooted in psychology, neither participating in the project nor in the survey is restricted to a certain discipline. The target sample consists of researchers from various disciplines, career stages, and countries, with the aim of providing insights into the current state of OS dissemination. At the moment of writing this case study, the project is in its ongoing data collection phase.

Figure 1. Targeted regions.



As this study is conducted in an international sample of researchers not restricted to a single discipline, there are several methodological aspects that need to be considered. Not every researcher might be familiar with OS practices, for example, due to local peculiarities pertaining to the rationale of the survey itself, such as having no access to educational materials concerning OS practices. In this vein, this case study focuses on two main stages of the data collection phase: (I) designing the online survey and (II) recruiting a cross-cultural online sample of researchers from diverse disciplines and countries. By doing so, we highlight accompanying obstacles and present potential solutions to overcome them.

Section Summary

- The OSCC project aims to investigate the knowledge, frequency of use, and barriers to OS practices.

- The project gathers an international sample of researchers from different disciplines using an online survey.

Research Design

The first step of the project comprised of the survey creation. With the help of about 100 volunteers at an international OS conference, we gathered ideas for potential obstacles and survey questions. In the next step, the OSCC team proposed and defined core OS practices, rated their relevance to the OS, and outlined potential barriers to their usage. We used a published definition of OS as "an umbrella term used to refer to the concepts of openness, transparency, rigor, reproducibility, replicability, and accumulation of knowledge, all of which are considered fundamental features of the scientific endeavor" (Crüwell et al., 2019, p. 237). The principal investigators created survey items based on the suggestions gathered at the conference, and the research team extensively edited them over several iterations to ensure different research fields, OS practices, and cultural perspectives were considered. A longer survey version was piloted with 136 participants, and a final shorter version was then developed to encourage study efficiency and higher participation rates. In the final survey version, the participants were asked about their level of familiarity with one randomly drawn research practice, out of 19 such, and their plans for future engagement, as well as reasons that prevent them from engaging in this practice more often. Participants completed a study questionnaire including demographic information (e.g., "What is your current career stage?"), and beliefs and attitudes on OS practices (e.g., "When Open Science practices are used in a paper, I believe that results are more credible."). More information on the survey can be found on https://osfio/mey43/.

Finally, the project team started to distribute the finalized survey via an online link at OS groups, conferences, research institutes, university departments, research associations, and via personal connections. To prevent duplicate sharing and ensure wide distribution, a Google sheet is used to record where the survey was disseminated. Data are collected anonymously and participants are recruited through social media, universities, and mailing lists. As of November 2021, most participants are from Canada (28.8%), Austria (13.0%), Switzerland (11.7%), or Germany (10.6%).

Section Summary

- An online self-report survey assessed usage of and barriers to OS practices.
- Survey design was an iterative process to balance questions that were representative yet brief.
- Unlike most studies, this study required extensive recruitment of researchers to run the project as well as researchers to participate in the final survey.

Designing an Online Survey With a Focus on Cross-Cultural Data Collection

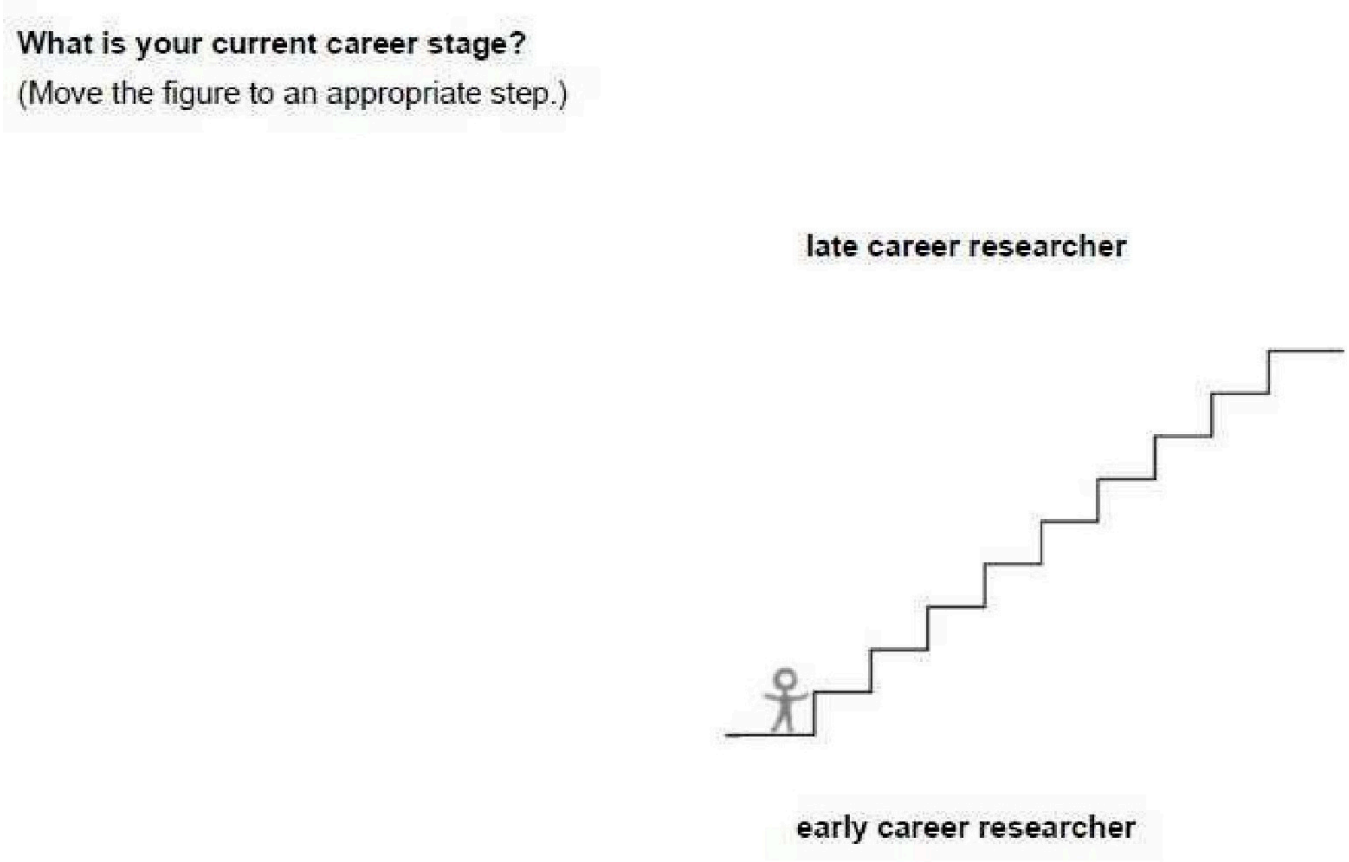
Initial Research Practicalities

In the survey, we were interested in conclusive and comparable information about OS practices. Consequently, we had to pay attention to three issues when designing our survey that were particularly distinctive for international remote studies.

Due to possible legal issues related to data protection law differences in each country, we first had to consider how data storage would comply with the regulations in each distribution country. The following also had to be taken into account: recording IP addresses for the purposes of avoiding duplicate responses, the platform server location, and whether ethical approval was required from an ethics body in each target country. Foreseeable technical issues were restrictions of access to the platform (e.g., limitations in power supply or internet connection) from some countries, formatting difficulties due to direction of text display/reading, or errors due to display of non-latin text and symbols.

Second, to facilitate understanding of the items, we display definitions for all OS terms in the survey. This is in line with our research goal, as we do not focus on how different researchers define the same terms, but rather on the actual implementation of practices defined a priori. Related to this point and in the course of the project, the suggestion was raised to translate the questionnaire into different languages. However, as the project progressed and a few collaborators happened to leave the project, it became clear that we could not strike a balance between prioritizing those ideas and keeping a reasonable timeline. Some collaborators left the project due to work on other commitments, lack of time, or personal reasons. A rationale for this could be that OSCC is a non-funded project that has grown on the shoulders of volunteers, instead of having recourse to a dedicated staff. Consequently, while we generated momentum and excitement during the kick-off at a conference, over time, the project had to deal with other obligations becoming more relevant for some of its members or members leaving due to different preferences on the project development. Moreover, for some languages, terms may not yet exist, so we would have to use a direct phonetic transliteration of the English term, or even the borrowed English term itself (spelled in English). This is why it is crucially important to define all new or rather unknown terms as simply as possible. In addition, we implemented culture-fair items to standardize answering questions that we anticipated would vary between countries. For example, the definition of early-career researcher varies internationally (e.g., number of years for and after a PhD), so we coded this response using a figure that represents the career continuum visually (see Figure 2).

Figure 2. Culture-fair item assessing the career stage of the participant.



Third, because the study provided no incentive for participating in the survey, a major concern was mid-survey attrition. We therefore implemented a branching scheme that displayed only relevant information. We further try to motivate participants by a clear introduction on how the topic of study contributed to scientific development.

During the development, collaborators were invited to provide their opinions and feedback on all aspects of study design, and the feedback was shared with the research team. This procedure resulted in an ongoing feedback loop of giving and implementing feedback several times, producing several survey iterations.

Section Summary

- There might be country-specific data protection laws that have to be considered.
- Definitions of crucial terms should be provided in the survey and be as simple as possible.
- When participation cannot be incentivized, one should be mindful of participant burden and how participants can remain motivated to complete the survey.

Method in Action

The first version of the survey asked participants to respond to 27 items for at least 16 different OS practices. For key OS terms, we used definitions acquired from The Open Scholarship Survey project (Mellor, 2021) that provides a modular standardized survey assessing attitudes toward OS practices. Since attitudes were not the main concern of our data collection, we did not adopt items and instead focused on questions pertaining

to familiarity with and obstacles to the adoption of OS practices. Working with a large and diverse group of researchers helped gain insight into the state of OS from different countries, cultures, and fields. Based on this knowledge, we designed items that we deemed clearly comprehensible for participants from different cultures and backgrounds.

During within-team initial trials, this first version took about 20 min to complete the survey. However, when the survey was shared with our participants, they informed us that they needed between 30 and 50 min to complete the survey.

After an inspection of the metadata, it was found that the survey also showed a completion rate of only 8% for those who clicked on the survey link. Most participants did not drop out during the completion of the OS-related items, instead, 87% of the participants did not begin the questionnaire, and about 13% of the remaining participants refrained from further participation during the preliminary demographic questions (e.g., nationality).

Following these observations and a group meeting, we decided to shorten the survey, using the first version as a pilot, as we concluded that participants may have discontinued sharing OS-related opinions as a result of the survey being longer than 20 min. Therefore, for the final version, we ask about one randomly drawn OS practice per participant, while omitting several optional questions. We also reduced the information on the first page informing the participants about the relationale and importance of the survey and instead provided a link to supplemental information. This not only shortened the completion time to 5 min but also improved participant retention, nearly doubling the rate of participants who complete the survey from 8.0% to 14.3%.

Section Summary

- If the study cannot be provided in the participant's native language, items should be formulated as concisely and clearly as possible.
- If the completion rate is too low for sampling to be efficient, shortening the questionnaire or reworking problematic sections should be considered.

Practical Lessons Learned

At the beginning of the questionnaire design phase, we were using internal feedback surveys (e.g., a short form to rate the comprehensibility of items) that helped to develop the project in a fast and structured way. In addition, results from these internal surveys were easy to summarize for the research team. As we switched to qualitative feedback, contradictory viewpoints became more difficult to incorporate and increased the burden on the principal investigators. The response rate within the research team also was much lower compared to the structured surveys. Based on this experience, we recommend relying on closed feedback options for an extended amount of time, for example, by letting the team members rate paragraphs and item versions on comprehensibility.

Regarding the main survey, a big advantage of using online surveys as opposed to paper-and-pencil versions

was the possibility of easily adapting the questionnaire content to the participants (only showing follow-up questions relevant to the respondents' previous answers), question randomization, and adaptability of the survey in a later stage of the project. The pilot version of the survey allowed us to ask detailed questions of practices depending on the participants' familiarity with them. In the shorter version, asking the participants of only one but randomly selected practice ensures that all practices have an equal chance of being selected for responses.

An important lesson was that the completion rate improved when the time demands on the participants were lowered from 30 to 50 min to an average of 5 min. This should be taken into account depending on the needs of the project. If the priority is to gain information about individual topics across many participants, then a short survey seems more appropriate. In contrast, if the goal is to investigate the links between multiple answers within the same participant, then completion rate would have to be improved via other means (e.g., payments, raffles, or course credits).

Moreover, we received no negative feedback on questionnaire items or content, and had positive feedback on the culture-fair items so far. An advantage of our project was using a diverse team for item generation and evaluation, combining different nationalities, disciplines, and career stages. In this way, we could pretest any stage of the survey with a sample of the intended population (i.e., an international and diverse group of researchers) and also estimate whether the meaning of the English version of the survey items would be understood by non-native speakers. The diverse team allowed us to integrate many different views and allowed us to estimate, for example, how a mid-career linguist perceived the survey compared to a late-career psychologist. Other projects might be able to obtain similar benefits by piloting within the target population.

Section Summary

- Online questionnaires can be used for more than just collecting data from the target sample. They can also be used to communicate with the team, such as collecting feedback from collaborators on the questionnaire being designed.
- The main advantages of online surveys are the ease of using randomized question presentation, branching and adaptive testing, as well as updating the survey in response to poor completion rates.

Recruiting a Cross-Cultural Sample of Past or Currently Practicing Researchers Online From Diverse Disciplines

Initial Research Practicalities

The final challenge was to recruit a sufficiently diverse sample of researchers as participants. To better coordinate the distribution of the questionnaire during the recruitment phase, in advance, we created different sub-channels in the project's Slack. Slack is a chat software that can help organize teams. We used Slack to coordinate actions across different time zones, stay in touch with all collaborators asynchronously, and provide separate messaging channels for organizing specific tasks, such as distributing the survey in a

specific country. These channels were country-specific, so that the different team members of a given country could coordinate and discuss distributing strategies with each other.

In addition, a link to a "dissemination sheet" (see, e.g., Figure 3)—documented in an online spreadsheet—was distributed among all team members to avoid duplicate sharing and ensure each target country would have enough shares.

Figure 3. Example of a dissemination sheet.

	A	B	C	D	E	F
1	Name of network, channel, institution etc.	Date	Country	Status	Your name(s) / abbreviation(s)	Link or contact
2	Sample network	08/18/2021	UK	done	Mahmoud Elsherif	www.sample-network.de
3	Sample institution	08/18/2021	Germany	pending	Alexander Hart	mr.smith@sample-institution.de
4						
5						
6						
7						
8						
9						
10						

In preparation for the recruitment phase, an invitation template was provided to all researchers sharing the survey. It was used to convey key points consistently in the recruitment messages. In addition, a pdf-version of the questionnaire was provided as a possible attachment for emails, so that disseminators could also review the questionnaire.

Furthermore, the survey was designed with a focus on accessibility for researchers across the globe. The online format of the survey ensured that it was easily shareable, accessible, and could be completed at a time that was convenient for the participant.

Section Summary

- There are a variety of free-to-use online tools that can be helpful in planning and conducting data collection.
- The use of online tools in cross-cultural projects also offers the possibility of asynchronous communication, so that issues of time difference between countries becomes less important.

Method in Action

To maximize outreach, we decentralized recruitment and had each team member or smaller groups of people from the same country distribute the survey individually. Multiple channels of communication are used (e.g., social media, emails of the organizations, personal contacts, and mailing lists). The disseminators are encouraged to personalize the recruitment messages to the specific group or individuals, using the invitation template shared with them. This has been shown to improve response rate (Heerwegh et al., 2005; Joinson et al., 2007). In some cases, recruitment messages are also translated to increase visibility and accessibility. Potential participants are encouraged to further share the survey with their own contacts and organizations. In addition, the survey was shared in OS communities, other grassroot movements (e.g., ReproducibiliTea), and at conferences (e.g., Society for Improving Psychological Science, SIPS).

One of the issues faced during participant recruitment so far has been that it could not be determined whether all team members involved in sharing the survey were updating the Google Sheet. As a result, during recruitment, we do not know whether certain groups of potential participants are being over-targeted or not (e.g., targeting psychologists in the UK).

Section Summary

- A decentralized recruitment strategy and a method of tracking the distribution of the survey to individuals, groups, and organizations can improve coordinating sampling across several countries and institutions.
- Providing wording and communication templates facilitates the dissemination processes.
- All team members should be encouraged to track their recruiting efforts in a way that is transparent to all.

Practical Lessons Learned

The planning strategies implemented before data collection (e.g., dissemination sheet, recruitment message templates, decentralized recruitment) result in an effective dissemination. The researchers can coordinate their efforts and avoid contacting the same organizations on multiple occasions. The consistent message to invite the participants ensures that all potential respondents are aware that the survey is anonymous and that we are interested in a variety of opinions on OS practices, which improves the quality of the data.

The potential issue regarding over-targeting certain groups due to noncompliance with reporting in the Google Sheet could be addressed by utilizing more sophisticated project management software (e.g., collecting timestamps of logins). However, this lay beyond the financial scope of this project.

Section Summary

- It is beneficial to plan recruitment in advance and consider the collaborators' ideas in these plans.
- If the use of professional project management software is possible, it can support project coordination and data collection.

Conclusion

This case study aimed at providing valuable insights into two main phases of conducting a cross-cultural online survey: designing the survey and recruiting the participants. Our case study of a large-scale international research project revealed several challenges and possible solutions. We described key aspects of designing an online questionnaire with a focus on cross-cultural data collection, as well as recruiting a cross-cultural online sample of researchers. Although there are numerous challenges in conducting a cross-cultural research project, several strategies can be used to improve the success of the project. Due to increasing globalization of research, it will be important to consider the discussed challenges as more researchers will encounter them. We recommend careful consideration of these challenges to optimize

resources and contribute to the cross-cultural literature that is necessary to understand human behavior and cognitive diversity on a global scale.

Classroom Discussion Questions

1. Imagine you were planning a large multi-site online study. How could you use online software/tools to help organize an international team?
2. How could you check the comprehensibility of the questionnaire for cross-cultural data collection? How would you do this without a team of international researchers conducting the project?
3. How can you ensure that underrepresented participant groups are invited to the survey? How could you check they are involved in the sample without infringing privacy?

Further Reading

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Web Resources

SurveyMonkey: https://www.surveymonkey.com/

DeepL Translate: https://www.deepl.com/translator

Slack: https://slack.com

Google Hangouts: https://hangouts.google.com/

Google Sheets: https://docs.google.com/spreadsheets/u/0/

Conceptualization

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