Psychological Science Accelerator: A Promising Resource for Clinical Psychological Science

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The authors of this article are all members of the Psychological Science Accelerator (PSA) network and many have served in administrative roles. As of December 2020, Biljana Gjoneska is a Language-wise Coordinator on several ongoing PSA studies, Kathleen Schmidt is Assistant Director of Study Selection, Gerit Pfuhl is a member of the Ethics Committee, William H.B. McAuliffe is a member of the Data and Methods Committee, Crystal N. Steltenpohl is Assistant Director of Community Building and Network Expansion, Christopher R. Chartier is Director of the PSA, Natalia B. Dutra is Assistant Director of Community Building and Network Expansion, and Hannah Moshontz is Assistant Director of Project Monitoring. The content of this article does not necessarily represent the official views of the PSA network.

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Psychological science benefits society to the extent that it produces reliable and generalizable knowledge about human behavior and mental processes. Valid and broadly generalizable empirical evidence for a claim must come from large, geographically broad, and culturally diverse samples (Simons et al., 2017). Yet, even in high-impact journals, researchers often make universal claims based on convenience samples from Western, educated, industrialized, rich, and democratic (WEIRD; Henrich et al., 2010; Rad et al., 2018) populations. Typically, participants are White American (Cheon et al., 2020) undergraduate students (Sears, 1986).

This general tendency for psychology research to rely on samples from a single geographic and cultural context particularly characterizes the clinical specialty. Many clinical psychologists study phenomena and experiences that are uncommon and must recruit participants from small populations. Obtaining large, appropriately diverse samples from these hard to reach populations can be further challenging because participation in clinical psychology research may require people in target populations (e.g., people in crisis or experiencing clinical depression) to share personal, stigmatized information or engage in other tasks they may find uncomfortable. Additionally, inclusion criteria for clinical psychology research (e.g., participants cannot have certain comorbid diagnoses) further restrict the pool of potential participants in order to achieve internal validity or diminish the potential harm to participants. Because of these factors, sample sizes in clinical psychology research are often small (e.g., the median sample size in top clinical psychology journals is 179; Reardon et al., 2019). Thus, most clinical psychology studies are unable to provide sufficiently precise estimates of correlation coefficients (e.g., accurately estimating an $r = .10$ requires a sample of about 250 participants; Schönbrodt &

Perugini, 2013), let alone produce sufficiently precise estimates of the low-probability outcomes that clinical psychology research often seeks to predict and understand (Davison & Lazarus, 2012).

Recent methodological reforms have succeeded in improving the rigor, accessibility, and transparency of psychological science (Christensen et al., 2020; Nelson et al., 2018), but these advances have not successfully proliferated certain subfields, including clinical psychology (Hopwood & Vazire, 2020; Nutu et al., 2019; Tackett et al., 2019; Tackett & Miller, 2019). The relative lack of methodological reform can have detrimental downstream effects on clinical practice and, ultimately, negatively affect mental health outcomes (Suliman et al., 2019; Tackett et al., 2017). For example, insufficient description of study procedures and the use of study materials that are not or cannot be publicly shared prevents other researchers from building on or appropriately applying interventions (Premachandra & Lewis, 2020). Questionable research practices, like failing to report all tested outcomes, can produce false positive findings (Simmons et al., 2011) which can cause harm when they motivate the implementation of less effective treatments (Sakaluk et al., 2019; Tajika et al., 2015). Practical constraints explain much of the slow progress towards improved methodology. For example, in clinical psychology research with sampling constraints, obtaining samples that provide 95% power to detect hypothesized effects (e.g., as is currently required for Registered Reports at Nature Human Behavior) can take an impractically long time for small research groups using even simple research designs.

Large-scale, crowdsourced collaborations offer clinical psychological scientists a way to conduct rigorous research on a scale not otherwise accessible to most researchers (Uhlmann et al., 2019). Individual research teams wanting to conduct a study in a sample that generalizes beyond a single context might not have the knowledge or resources to conduct language or cultural translation of study materials and measures, know how and where to recruit participants at every research site, or know how best to model the resulting data (Leong & Kalibatseva, 2013). By pooling research resources together, clinical psychologists can accomplish what no single research group could alone without significant outside grant funding.

The Psychological Science Accelerator (PSA) is an international collaborative network of psychological scientists that facilitates rigorous and generalizable research (Moshontz et al., 2018). In this chapter, we describe how the PSA can help clinical psychologists and clinical psychological science more broadly. We first describe the PSA and outline how individual clinical psychologists can use the PSA as a helpful resource in numerous capacities: leading or contributing to clinical research or research with clinical relevance; building collaborative relationships; obtaining experience and expertise; and learning about systems and tools, particularly those related to open science practices, that they can adapt to their own research. We then describe how the PSA supports rigor and transparency at each stage of the research process. Finally, we discuss challenges of the PSA's large, collaborative approach to research.

About the PSA

The PSA was formed in 2017 as a proactive response to critical issues facing psychological science such as replicability and generalizability (John et al., 2012; Nelson et al., 2018; Open Science Collaboration, 2015; Simons, 2014; Simons et al., 2017; Uhlmann et al., 2019). The PSA's strategy of pooling the resources of individual labs together in order to conduct sufficiently powered, geographically distributed research was inspired by crowdsourced collaborations, including the Emerging Adulthood Measured at Multiple Institutions project (EAMMI; Reifman & Grahe, 2016) and the Reproducibility Project: Psychology (Open Science Collaboration, 2015). Outside of psychology, the European Organization for Nuclear Research

(CERN) inspired the conception of the PSA as a standing collaborative network of researchers from different nations committed to conducting ambitious, novel research rather than specific projects. Within weeks of a blog post inviting psychology researchers to join a standing collaborative network that would later become the PSA, dozens around the world had joined (Chartier, 2017a). These early members began formalizing an organizational structure and procedures that were later detailed in a paper introducing the network (Moshontz et al., 2018).

As of December, 2020, the PSA is a large, active organization. The network contains over 1,400 individual researchers, including undergraduate students, graduate students, professors of all ranks, staff scientists, and people in nonacademic roles (e.g., in industry or government). PSA members are based in over 70 countries spread across all six populated continents. Just under 25% of researchers in the PSA network are based in North America and about 40% are based in Western Europe (Paris et al., 2020). Currently, clinical psychology is the reported specialty for 145 members (~6%), relatively fewer than those who specialize in social and personality psychology (~20%), experimental psychology (~14%), cognitive psychology (~14%), and quantitative psychology (~10%).

The members of the PSA network collaboratively and transparently select, design, and conduct research as guided by five core principles: *diversity and inclusion, decentralized authority, transparency, rigor, and openness to criticism*. These principles shape the policies and procedures of the PSA. *Diversity and inclusion* are reflected in both the collaborating researchers and the studied participants, and are central to the plans for the future of the PSA. The network members who help propose, select, design, translate, and conduct research represent a diverse collection of geographic regions, research institutions, academic positions, and training areas. Additionally, the PSA recruits socioculturally and geographically diverse research samples.

Although member labs in the network are globally distributed, they mostly have access to already well-represented samples, like undergraduate university students and people who live in densely populated areas. With funding, the PSA can better promote the principle of diversity and inclusion by supporting labs to broaden their sampling approach into local communities and more rural areas.

The *decentralized authority* principle is reflected in the governance structure of the PSA; specifically, stages of the research process are managed by different committees and decisions are made democratically, either by the entire network or by committee. *Transparency* finds expression with respect to both the internal workings of the PSA (e.g., network members can view all committee meeting notes) and to its research products. The PSA shares policy documents (e.g., Forscher, Aczel, et al., 2019) and the materials, analysis code, and data from all studies that it conducts to the extent allowable (e.g., by ethics considerations; Meyer, 2018).

The core principle of *rigor* shapes the PSA research process. Proposed studies are selected on the basis of their rigor, and the primary purpose of a key PSA committee, the Data and Methods Committee, is to ensure the quality of study protocols and analyses. Finally, the PSA strives to function with an *openness to criticism.* PSA procedures involve soliciting and incorporating critical feedback from within and outside the network on aspects of both research projects and the PSA's processes for selecting and conducting research.

Although the PSA produces research projects similar to other crowdsourced, large-scale collaborations in psychology (Ebersole et al., 2016; Klein et al., 2018), it differs from these efforts in several key ways. First, rather than existing for the purpose of completing a particular project, the PSA is an ongoing network that runs multiple projects simultaneously. Second, anyone can contribute to research at the PSA. Membership in the network is not contingent upon professional connections, training, background, job title, or geographic location. Third, the PSA is flexible; rather than conducting research in a specific content area or population, the PSA selects studies that range in their focus and population of interest. Studies are not selected on the basis of their psychological research area or the prestige of the study proposers, whose identities are concealed during the review and selection process. However, resource availability does constrain what projects are feasible. As described in calls for study submissions, feasibility constraints have resulted in preference for studies with samples that are fairly small and easy to reach (e.g., requiring fewer than 150 participants per collection site), protocols that are rather short (e.g., less than 90 minutes per session), and equipment that is readily available (e.g., using open source software and no specialized hardware) and does not pose a risk to participant health. Such parameters have changed over time, and, given the growing membership and resources of the PSA, research that targets harder-to-reach populations or uses longer, more complex procedures may soon be feasible.

The ten completed and ongoing PSA studies use large and often international samples to investigate a broad range of research questions. For example, the first completed PSA study assessed the global generalizability of a model of face perception in 11,570 participants in 41 countries and 11 world regions (Jones et al., in press). One study that has yet to begin data collection will assess different operationalizations of stereotype threat among Black college students in the United States with an anticipated sample of 2,700 students across 27 geographically distributed schools (Forscher, Taylor, et al., 2019). In 2021, the PSA anticipates collecting data from a minimum of 20,000 participants in total (Paris et al., 2020). Although most PSA studies follow a standard process and were proposed in response to open calls, special-topic projects with different foci have also been implemented; for example, a teaching-focused replication project invited undergraduate students in member labs to e collect data, conduct analyses, and contribute to the final manuscript (Hall et al., 2018; Wagge et al., 2019). The PSA has also successfully collected data for three particularly accelerated projects related to COVID-19 (Dorison et al., 2020; Legate et al., 2020; Wang et al., 2020). For these projects, which were run in a bundled protocol, PSA members selected and revised studies, translated materials into 43 languages and dialects, and collected data from over 44,000 participants around the world, all within only 8 months. PSA studies have been led by people at different career stages, including graduate students (i.e., Hall et al., 2018; Wang et al., 2020).

How Individual Clinical Psychological Scientists Can Benefit From the PSA

Clinical psychological scientists aiming to produce rigorous and generalizable research can use the PSA in several ways. First, they can lead or contribute to rigorous research with potential clinical relevance; in fact, the PSA just completed a study on the effectiveness of brief cognitive reappraisal interventions for reducing people’s negative emotions during the COVID-19 pandemic (Wang et al., 2020). As of December 2020, the relatively small number of PSA network researchers specializing in clinical psychology would restrict clinical psychologists from leading studies at the PSA that require specialized equipment or clinically-trained experimenters. Consequently, clinical psychologists could not currently conduct research involving screening or treating participants with psychopathology as a PSA project, but they could conduct research on more easily recruited populations using widely-available equipment. Within these constraints, the PSA enables researchers without external funding to lead studies that would otherwise require large grants and specialized training (e.g., the ability to translate materials) to conduct. One particularly important area of clinical psychology research that is well-suited to the PSA is research establishing the properties of clinical measures across cultures (i.e., assessing measurement equivalence; Leong & Kalibatseva, 2013). Additionally, clinical psychological scientists could perform secondary analysis on any of the datasets collected by the PSA or use translated materials from completed and ongoing PSA studies for their own research.

Second, by joining the PSA network or contributing to a PSA study, clinical psychological scientists can build collaborative connections with other researchers. The PSA network is a community; members share research, conference and grant calls, and other opportunities. Members have developed collaborative projects beyond the primary studies selected and run by the PSA. For example, several member labs collaborated on a study of the perceived efficacy of COVID-19 restrictions and their effect on mental health that collected data from over 2,000 participants in six countries (Mækelæ et al., 2020). PSA projects have also resulted in secondary analysis collaborations (Adkins et al., 2020; Batres, 2020; Chandrashekar, 2020; Durkee & Ayers, 2020; Hester & Hehman, 2020; Martin et al., 2020; Oh & Todorov, 2020; Xie & Hehman, 2020). Further, the PSA also supports collaborative discussions outside of empirical projects. Network members often discuss and debate issues in psychological science more broadly, in informal and formal outlets (IJzerman et al., 2020; Onie, 2020).

Third, scientists in the PSA can use the PSA to gain experience and develop expertise. Many roles on PSA projects can serve as experiential learning for experienced clinical psychological scientists. For example, membership in the Data and Methodology Committee offers opportunities to work with and learn from methodological experts. Members of the Project Monitoring Committee can learn about how to manage research projects with hundreds of research sites and thousands of participants. By becoming more involved in any capacity, PSA members are given additional opportunities to contribute to and benefit from PSA resources.

Finally, clinical psychologists can use the PSA to learn systems and tools that support rigorous, transparent, collaborative research. Methodological reforms evolve, and researchers who do not adopt reforms may simply not know about them or know how to implement them (Washburn et al., 2018). For example, some researchers may not know that failing to report all study outcomes can severely undermine a study's evidentiary value (Nelson et al., 2018; Simmons et al., 2011). PSA membership can be a means by which clinical psychologists can learn about the need for particular methodological reforms and ways to implement them. Further, the PSA organizes and collaboratively produces projects using tools (e.g., collaboration agreements, translation protocols, project tracking templates) that can also benefit small groups. Many of the challenges of working in large international collaborations are present in other group contexts. Members can prevent and overcome problems in their outside collaborations by using the solutions that the PSA has devised and tested over time.

How the PSA Supports Rigor and Transparency at Each Stage of the Research Process

By design, the PSA supports rigor and transparency at every stage of the research process. Some challenges of conducting rigorous, transparent clinical psychological research are inherent to a clinical research question (e.g., researchers cannot randomly assign participants to experience trauma to see what factors predict who develops PTSD. The PSA's practices and procedures cannot eliminate these challenges, although they can in some cases lessen the impact of unavoidable challenges on the quality of the final research product. In this section we describe the PSA's current research processes, which are similar to those described in Moshontz et al. (2018), but reflect improvements made as the PSA has grown in membership and experience.

Selecting a Research Project

Research questions at the PSA are selected from a pool of masked protocols submitted in response to an open call for proposals from all areas of psychology. Proposed studies may be confirmatory or exploratory, test a novel research question or propose a replication, or explore the validity of measures or stimuli. When study proposals are submitted for consideration, authors are asked to explicitly address feasibility, implementation, and ethics concerns. Submissions requiring specialized samples are asked to explain and justify this requirement and elaborate on risk mitigation steps taken for any vulnerable populations. The study selection committee reviews masked submissions for quality (e.g., whether the proposal is complete and well-considered), feasibility (e.g., if the PSA has the capacity and resources to support the research), and appropriateness (e.g., whether the project necessitates a lab network). Submissions that pass this initial phase are sent to expert reviewers both in and outside of the PSA. Reviewers evaluate study-specific threats to inference (e.g., a confound unique to the paradigm), and threats to inference common to all cross-cultural research (e.g., measurement invariance). Submissions that reach the second round are also made available to the full network for members to evaluate. After feedback from reviewers and the network are compiled and synthesized, the committee votes and decides whether to provisionally accept the proposal, request proposal revisions, or reject the submission.

Identifying Project Needs

Accepted proposals enter a needs assessment process, which identifies the lead (i.e., proposing) authors' needs with respect to all major aspects of conducting the study: methodology, data management, ethics, translation, logistics, adhering to PSA policies, and writing. During this process, the lead authors provide information about their study that will determine which committee members and labs they will be paired with. In addition, they meet with the PSA Director and members of PSA committees that focus on each aspect of the study to ensure that they understand how studies are run at the PSA. For example, lead authors are asked to describe any special requirements for some or all participants, whether data collection teams need specialized knowledge or equipment, and whether the submitting authors will clean and analyze the data, and if so, in what programming language. The questions asked at this stage are designed to ensure that each project is conducted rigorously and transparently and that the lead authors and network contributors have appropriate and clearly defined roles. For example, if lead authors propose a design that requires complex analyses and do not have an analytic expert on their team, after the needs assessment process, the lead authors would be matched with a PSA collaborator with relevant expertise, who would most likely join the lead author team. During this stage, the lead authors and members of the expert committees identify aspects of the PSA's standard practices and procedures that need to be adjusted for that particular project. For example, sharing data publicly is standard practice at the PSA, but if a team of clinical psychological scientists led a study that involved collecting sensitive data, the standard data sharing plan would be adjusted at this stage. Once the lead author team describes their needs, the project is matched with a member of each expert committee accordingly to further develop the proposal before Registered Report submission and study implementation.

All submitting authors on Psychological Science Accelerator projects are held to ten expectations by default if they agree to lead a collaborative project. These ten expectations align with core principles and formal policies (Moshontz et al., 2018):

1. Work collaboratively with PSA member labs and committee personnel
2. Create a collaboration agreement that describes authorship criteria
3. Obtain a demonstration video for every data collection site
4. Preregister methods, materials, and analyses
5. Obtain ethics approval (or equivalent) at every data collection site
6. Make all study materials open access (unless prohibited by copyright)

7. Make all data open access in accordance with the PSA-approved data management plan
8. Make all analysis scripts openly accessible
9. Make any final report openly accessible
10. Adhere to a code of conduct

Refining the Study Design and Analytic Approach

Regardless of the lead authors' expertise, all accepted proposals are assigned to one or more members of the Data and Methods Committee. The primary goal of the Data and Methods Committee is to provide expertise and oversight to the methodological components of PSA projects. The process of ensuring the rigor of PSA studies begins even before a study is accepted; every submitted proposal is reviewed by at least one Data and Methods Committee member or external reviewer appointed by the committee. The Data and Methods Committee member on each project collaborates with the lead authors to develop an analysis plan and write statistical analysis scripts. The committee also appoints a data manager to each project to ensure that researchers comply with the analysis plan, archive data in a public or private repository in a timely manner, and correct any analytic errors that are found in manuscripts. More informally, the committee provides technical support as needed. The committee's secondary goal is to organize or implement projects of methodological and meta-scientific interest. For example, the committee might examine the performance of a new analytic tool that has only been evaluated via simulations using PSA data; implementing a new tool will likely include many complications that routinely arise in collaborative projects but are glossed over in the initial vetting of a method.

Submitting a Registered Report and Preregistering the Study

Once the study design and analysis plan has been refined, that plan is submitted as part of a Registered Report or preregistration. Registered Reports, which share similarities with registered clinical trials, allow studies to be considered for publication before they have been conducted. Registered Reports support rigorous methodology (Scheel et al., 2020; Soderberg et al., 2020) and help ensure researcher resources and participant time are well-spent. Such concerns are critical in clinical research settings given the high opportunity cost of resources and the potential to influence practitioner behavior (Tackett et al., 2017; Cristea & Naudet, 2019). Because Registered Reports are submitted before data collection or analysis, studies are reviewed on the basis of their rationale, writing, methods, measures, analysis plans, and contingent conclusions. The evaluation of studies at this stage, rather than after results are known, protects against publication biases that result in the overrepresentation of positive results in the published literature and the inflation of effect size estimates (Fanelli, 2010; Ferguson & Heene, 2012; Kühberger et al., 2014; Simonsohn et al., 2014). Once a Registered Report is accepted in principle (i.e., as a Stage 1 Registered Report), the described methods and analytic approach are preregistered. Accepted Stage 1 Registered Reports can provide lead authors, data collection labs, and other contributors peace of mind knowing that as long as they execute the project as described, they will be rewarded with what is still the most important professional incentive for most psychological scientists: a publication.

The PSA process is particularly well-aligned with the Registered Report format. Lead authors submit proposals in the format of Registered Reports. Further, many requirements for PSA proposals are also requirements of Registered Reports, including the requirement to conduct a priori power analyses (Moshontz et al., 2018). Due to the similarity in formatting and content of PSA proposals and Registered Reports, many completed and ongoing PSA studies have been submitted as Registered Reports (Bago et al., 2019; Chen et al., 2018; Forscher, Taylor, et al., 2019; Jones et al., in press; Wang et al., 2020) or Registered Replication Reports (Hall et al., 2018), which are Registered Reports focused on replication.

Translating the Study Protocol

If an accepted study needs materials to be translated, the Translation and Cultural Diversity Committee provides expertise in and oversight of the translation process. Most PSA studies are conducted in different geographic regions, where participants speak different languages and the meaning and impact of study procedures might differ as a function of culture. Thus, material translation is a challenging but essential aspect of the research process.

The PSA uses a standard translation protocol, adapted from Brislin (1970), to standardize the translation process for all languages. A translation coordinator oversees the entire process and a language-wise coordinator oversees the process for each target language. Language-wise coordinators work closely with the translation coordinator to ensure efficient and high-quality translations. To begin the translation process, the source material is first translated into the target language by two independent translators. Then, these translators and language-wise coordinators compare and discuss the translations to create a single forward translation (Version A). Two independent translators then translate Version A back to the source language (i.e., back-translate). The two back-translators and language-wise coordinators discuss discrepancies and create a single back-translation (Version B). The translation coordinator and language-wise coordinators compare Version B and Version A, identifying and discussing discrepancies with input from the lead authors. The language-wise coordinator then creates a new version of the translated materials (Version C), which is sent to at least two external readers who evaluate the wording and clarity.

Language-wise coordinators discuss the need for cultural adjustments with the data collection labs that will use the translated material. These cultural considerations are particularly important in clinical contexts because they help establish *linguistic* (related to translation of words), *functional* (related to translation of behaviors), *conceptual* (related to translation of constructs) and *metric equivalence* (related to psychometric properties of instruments) across cultures (Leong & Kalibatseva, 2013). Psychopathology can be culturally-specific in its expression and effect (Henrich et al., 2010; Patel & Sumathipala, 2001), so clinical research that fails to use culturally heterogeneous samples or account for cultural context cannot ensure clinical relevance or broad generalizability and may be of limited value (Nagayama Hall, 2006). In the final step of the translation process, the language-wise coordinators (and participating labs) construct a final version of the materials with attention to cultural considerations and feedback from the external readers. All the translation materials - including all versions and notes - are stored publicly to allow interested researchers to investigate or otherwise make use of these materials.

Ethics Review

Prior to data collection, the study protocol is subjected to ethics review, first at the PSA and then by ethics review boards. Every data collection site must obtain ethics review exemption or approval before they begin data collection. The involvement of local ethics review, when possible, is most appropriate when the risks associated with a particular study procedure may differ as a function of culture. For example, whereas many clinical studies pose some risk to participants (e.g., by collecting sensitive data; Cristea & Naudet, 2019; Meyer, 2018), the risk and data sensitivity of a protocol may also vary by data collection site, as a function of cultural norms and stigma associated with the focal topic. Revisions to the study procedure based on ethics review at a data collection site are not common; thus far, ethics reviews at each data collection site have not resulted in any major revisions to study procedures.

Data Collection

Data collection labs are matched with studies based on expressed interest and the match with study needs. Collaboration agreements written before data collection begins describe authorship criteria and expectations. After obtaining ethics review exemption or approval at their institution, if applicable, data collection labs practice the study procedure and record demonstration videos. In the videos, one researcher typically plays the role of a participant while another conducts the study procedure. Recording demonstration videos serves multiple purposes. First, demonstration videos help ensure procedural fidelity at every site. Lead authors can review the demonstration videos, identify discrepancies between the protocol as written and the protocol as administered, and give labs feedback as needed before data collection. Second, recording demonstration videos documents aspects of the data collection context that can be examined or otherwise used in the future. Demonstration videos serve as a record of fidelity and of data collection site features (e.g., the physical space where the study was conducted). Demonstrations videos can also be used by data collection labs to train research assistants. When data collection sites have completed all requirements specified in the collaboration agreement (e.g., ethics review exemption or approval, demonstration video submission), they can begin collecting data.

Data Analysis and Final Manuscript Submission

After data collection at all sites is complete, data are cleaned and analyzed in accordance with the study preregistration. The submitting author team then drafts the final manuscript (e.g., a Stage 2 Registered Report) for submission with help from other members of the collaboration team (e.g., the Data and Methods Committee member who works on the project). People who meet the authorship criteria defined in the collaboration agreement provide feedback on the manuscript draft and approve the final version prior to submission.

Challenges

The PSA's introductory paper outlines six challenges the PSA faces in conducting research (Moshontz, et al., 2018). These challenges include resource management, linguistic and cultural translation, inclusivity, research ethics, funding, and crediting contributions. Many of these challenges are particularly relevant to clinical research, and the increasing membership of clinicians in the PSA will proportionally increase the likelihood of finding suitable solutions.

A persistent challenge for the PSA is drawing on and distributing research resources effectively. Not all studies require large, international samples or are equally deserving of the participant hours and researcher time required to conduct a PSA study. The first fully completed PSA project collected data from 11,570 participants and took three years to conclude from initial proposal (in October 2017; Chartier, 2017b) to finalized publication as a Stage 2 Registered Report (in October 2020; Jones et al., in press). The appropriate use of research resources is a challenge that affects individual labs and the PSA as a whole. Individual labs decide on a study-by-study basis what they will contribute to, ensuring no lab will spend their resources on projects that they do not deem valuable. PSA studies are often more efficient and scientifically valuable than the typical single-lab or small collaborative projects to which lead authors and data collection labs might otherwise contribute. The PSA carefully considers different perspectives in deciding which studies to conduct. Conducting research that addresses trivial scientific questions at the scale of a PSA project would contribute to, rather than detract from, research waste, but the scientific value of research questions is often subjective. The PSA therefore considers the perspective of the lead authors, who are asked to justify the required resources in their proposals, and from the data collection labs, who provide feedback on proposals during the study selection process. In addition, for accepted studies submitted as Registered Reports, editors and peer-reviewers evaluate and improve the evidentiary value of PSA studies and reduce the risk of wasted resources.

A second challenge is of particular relevance to clinical psychology: any international, cross-cultural study requires the translation of stimuli and instructions to dozens of languages, dialects, and cultures. As described previously, PSA procedures aim to address this challenge, but a perfect solution for translation often does not exist. For example, translating questions about mental health and psychopathology requires great care, as do seemingly simple questions, like demographic questions about gender, sexuality, race, and ethnicity that are not defined or publicly discussed in the same way across cultures. The PSA cannot avoid translation challenges for its international studies but is well positioned to make thoughtful and culturally contextualized translation decisions.

A third challenge for the PSA, inclusion, remains the most difficult to address. Although the PSA has been successful in recruiting members across the globe, not all regions are equally represented in the network; over 60% of member labs are based in Europe and the United States (Paris et al., 2020). Because minimum sample sizes are needed to conduct cross-cultural comparisons in PSA studies, undue pressure is placed on contributing labs from areas with low membership to provide sufficient sample sizes. Sociocultural diversity is likewise lacking among the leadership of the PSA, and a minority of members have been directly involved in formulating the PSA’s policies and procedures. Though many decisions are made democratically, participation is not equally accessible to all members (e.g., all formal PSA communication is in English). Further, decision-making processes are most influenced by people who voice their opinions and argue on behalf of their preferences. Parallelling trends in psychological science more broadly, participation in the decision-making processes at the PSA can be inaccessible to certain PSA members, such as members of traditionally marginalized groups and researchers at institutions without research infrastructure or support; those who would likely benefit the most from participation in the PSA and whose involvement would advance the PSA's mission may be the least likely to join or seek out leadership roles. However, the PSA, through the Community Building and Network Expansion Committee and other means, focuses on identifying and addressing barriers to inclusion (e.g., Chartier, 2020).

Another challenge of conducting research at the PSA is ensuring participant protection. Guidelines for ethical human subjects research vary considerably across nations and institutions. The PSA's Ethics Review Committee is well-equipped to help coordinate the ethics review process and ensure compliance with requirements at each data collection site. The PSA has so far conducted research that does not involve vulnerable populations or the collection of identified, sensitive data. However, PSA policies were designed to accommodate sensitive data (Moshontz et al., 2018), for example, by specifying that research be shared to the extent allowable due to legal (e.g., proprietary measures) or ethical constraints.

The biggest challenge facing the PSA is providing sufficient material and administrative support to research. The PSA largely relies on volunteering which takes a heavy toll on people who carry the biggest load of responsibilities. This reliance on volunteer work can create project delays and workload asymmetries, inequalities, and tensions between collaborators. However, without outside funding, the PSA has no alternative means of viability. A recent internal report estimated that the administrative support provided by members of PSA committees is equivalent to at least 200,000 US dollars per year (Paris et al., 2020). The administrative support required for complex studies like clinical trials is even greater than for simple surveys. Complex clinical psychology research conducted at the PSA would likely strain its volunteer workforce and exacerbate the issues that reliance causes. However, the PSA's continued growth helps mitigate this challenge. As the PSA grows, the number of people who can share administrative duties grows, and the burden on individual people lessens.

A final challenge of the PSA's crowdsourced approach to research is properly crediting all contributors within an authorship system that is not designed for projects with hundreds of collaborators. Large authorship lists pose logistical challenges. It takes time and care to keep track of information about hundreds of contributing researchers and to communicate with them during the process of writing, revising, and submitting a manuscript. In addition, it can be hard to provide meaningful credit to all of a project's contributors when so many people have made contributions. Manuscripts describing PSA projects report how each author contributed to the research, but often, labels describing the kind of work that a person did on a project inadequately captures the scale or impact of the administrative work required to conduct a large-scale collaboration.

Conclusion

By joining the PSA, clinical psychologists can take part in conducting rigorous research and in the process can develop experience and expertise, learn about new systems and tools, and contribute to the accelerated improvement of clinical psychological science more broadly. Clinical psychology is not a common specialization at the PSA; only 145 network members report expertise in clinical psychology (Paris, et al., 2020). As of December 2020, the PSA has conducted studies using simple procedures that need large power to detect effects (Forscher, Taylor, et al., 2019) or assess heterogeneity of effects (Jones et al., in press). Although the PSA has conducted a simple intervention study with clinical relevance (Wang et al., 2020), it has not yet conducted studies proposed by clinical psychological scientists.

However, the PSA could conduct clinical psychological research and welcomes submissions from clinical psychological scientists. Currently, submissions to the PSA from clinical psychological scientists are most likely to be successful if they use simple protocols (e.g., surveys administered with a computer). The PSA could easily support measurement research that involves translating and assessing the properties of clinical psychological surveys. Such research is both easy to administer and important (Flake & Fried, 2019). Looking ahead, the more researchers with clinical training who join the network, the more able the PSA is to support more complex, resource-intensive clinical research protocols.

Clinical psychological scientists who join the network can shape it in ways that can affect the field at large. By voting for studies and in leadership elections, providing feedback on submitted studies, and otherwise taking part in the PSA's decentralized decision-making processes, clinical psychological scientists can broaden the PSA and better tailor it to the critical questions that drive clinical psychological research. More rigorous, international, collaborative clinical psychological science both at the PSA and beyond it can accelerate the discovery and refinement of treatments that improve people's lives.

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