Opinion Piece

Involving final year project students in large-scale, collaborative cognitive research: The Eyewitness Undergraduate Project Consortium

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Imagine that you are planning to conduct a study on eyewitness identification. You want to test the straightforward hypothesis that lineup decisions will be more accurate in Condition A than in Condition B. To be more precise, you hypothesise that participants in Condition A will be more likely to correctly identify the guilty perpetrator if he or she is present in a lineup, and they will be more likely to correctly reject the lineup if the guilty perpetrator is absent, than participants in Condition B. You want your study to be as informative as possible, so you conduct a power analysis. Using the pwr package for R (Champley, 2018), you calculate that the sample size needed for an 80% chance of finding a true difference between two proportions, with a modest effect size (Cohen's *h* of 0.20) and an alpha level of .05, is 393 participants *per condition*. Ouch. And let's not forget that you also want to compare the correct rejection rates between conditions; assuming the same parameters, that's another 393 participants per condition. Your power analysis tells you that your straightforward experiment requires 1,572 participants if it is to provide an informative test of your hypothesis. Yikes.

Eyewitness identification researchers are faced with something of a perfect storm when it comes to sample size requirements. The central outcome measure (identification decision) is categorical; they will likely need to use a single-trial, between-subjects design; and they will likely need to include both a culprit-present and a culprit-absent condition in addition to their independent variable(s) of interest. Furthermore, analyses such as Receiver Operating Characteristic (ROC) analyses, which require many hundreds of observations per condition, are becoming increasingly popular in eyewitness identification research (Mickes et al., 2012).

The past decade or so has seen an increasing appreciation of statistical power in psychological research, which has been reflected in greatly increased sample sizes (though often accomplished through a greater reliance on online participation platforms; Sassenberg & Ditrich, 2019). The same trends are visible in eyewitness identification research, where it is not uncommon for recently published studies to have hundreds or even thousands of participants per condition (e.g., Carlson et al., 2021; Wooten et al., 2020).

While larger samples have undoubtedly increased the informativeness and rigour of eyewitness identification research, they also present a considerable barrier for individual

researchers, few of whom have the resources to routinely conduct such large studies. Recruiting thousands of participants through online platforms such as MTurk or Prolific requires large sums of grant money, and few participant pools are large enough to support such numbers. Furthermore, these structural barriers to recruiting large samples do not affect all researchers equally, but disproportionately affect early career researchers, researchers from lower income countries, and researchers from historically marginalised groups (de Winde et al., 2021). There are also many research questions that are prohibitively difficult to pursue with such large sample size requirements, either because they necessitate elaborate or labour-intensive in-person testing paradigms (e.g., Eisen et al., 2017; Flowe et al., 2017; Hope et al., 2012), or because they concern populations that are difficult to recruit (e.g., children, older adults, or people with particular neurological or developmental diagnoses).

However, where there are challenges, there are also opportunities. Team science, in which large groups of researchers come together to share expertise and resources, has long been central in some branches of the physical science. Over the past few years, networks such as the Psychological Science Accelerator (https://psysciacc.org/) have facilitated collaboration between dozens of laboratories from across the world on multiple projects (e.g., Jones et al., 2021; Wang et al., 2021). Within specific sub-fields of psychology, laboratory networks have also been developed to conduct large-scale, highly powered research projects (e.g,.The ManyBabies Consortium, 2020; Many Primates et al., 2019).

Another opportunity for collaborative science comes from leveraging the enormous, mostly untapped, potential of undergraduate students completing their final year independent research projects. In the UK, all undergraduates enrolled on accredited Psychology degrees must complete a final year project, which usually requires them to collect data from human research participants (British Psychological Society, 2019). Time and resource constraints mean that the studies that undergraduates conduct are typically small and under-powered, even if they collect data in small groups. Button et al (2020) advocate for a consortium-based approach, whereby undergraduate students across multiple institutions collaborate on a single project, pooling their data together. This approach directly benefits the students by allowing them to contribute to real research, and by providing access to a much larger sample than they would have been able to recruit alone. To ensure that students are still able to make independent intellectual contributions, they can add measures (e.g., surveys or short tasks) to the end of the shared experimental protocol, and/or identify additional analyses that can be undertaken to answer additional research questions.

In the 2020/21 academic year, a small group of researchers from across the UK with interests in eyewitness identification came together to establish the Eyewitness Undergraduate Project Consortium. Six academics and 19 undergraduate researchers worked together to run a shared project, collecting data from more than 1000 participants. Our membership has grown significantly as we head into the 2021/22 academic year; we now count 37 academics from 25 different institutions as members. Our reach has also grown beyond the UK, with colleagues from North America, Australia, and mainland Europe joining us. We have selected two eyewitness identification studies to run this year, and anticipate that each of those studies will involve dozens of undergraduate researchers, who will collectively recruit more than 1500 participants.

A model like the one outlined here could be valuable in any field of cognitive psychology in which researchers struggle to recruit sufficiently large samples to provide adequate statistical power. This is particularly likely to be the case for applied research, which often necessitates labour intensive, in-person paradigms (e.g., deception detection; Luke, 2019). By working collaboratively, and involving our undergraduate project students in real, rigorous research projects, we can achieve far more than we can alone.

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