Enhancing creativity performance through priming

A Data Management Plan created using DMPonline

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Template: DCC Template

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Project abstract:

Creativity is a primary driver for career success, but it is an under-represented skill in current education curricula. Popular techniques to foster or enhance creativity are often complicated, profit-seeking, and even contradictory. There is a small body of research that points to priming as an effective tool to boost creativity (e.g., thinking about creative concepts can improve scores on creativity assessments); however, results are often modest, focused on a single form of priming, and are not informed by knowledge of education or industry needs. It is important to test the efficacy of creativity priming using rigorous scientific methods and addressing the limitations of previous research. In three experiments, we will measure creativity – using a combination of an established assessment and a promising, newly validated technique – before and after different priming and control conditions. We will determine the robustness and generalizability of priming as an accessible tool to boost creativity in a university student sample, discuss our results with education and industry partners, and adapt our methodology for future use in schools and the work place.

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Copyright information:

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Data Collection

What data will you collect or create?

This will be primary data, collected specifically for this project. There is no existing dataset available.

We will recruit a total of 104 students of Edge Hill University evenly distributed among the 4 conditions of Experiment 1, and 78 students each in Experiments 2 and 3. We conducted a power analysis in G*Power (Faul et al., 2007) using data previously collected for the PhD study to determine the current sample size.

Specifically, we conducted an a priori two-independent sample analysis on the effect size of subject-level differences in pre-pedagogy creativity scores between art and science students (d = 1.49), and between art and English students (d = 0.59), with alpha set at 0.05. The Science students were learning rote memorization at the time of testing, and it is possible that the larger effect size is due to an opposite priming effect in these students. We therefore decided to take a sample size estimate between the two produced by the power analysis for each subject. This gave us an estimate of 11-62 participants per group, so we calculated that we would need the middle value to achieve 90% power for the comparison between creativity priming and control (25.5, rounded up = 26 participants per group; Cohen, 1992).

These will be behavioural data on the order of KB (per individual) to MB (total dataset). Data will be stored on a password-protected computer and anonymized data will be uploaded to the Open Science Framework (OSF) once the manuscript is under review. There will be no challenges posed to storing data of this size.

Data will be stored in .csv format, which is an open and universal format for conducting analyses in JASP and Python.

How will the data be collected or created?

All data will be collected digitally online, and stored as CSV (readable tabular format). Data
collection will be performed automatically as part of the experiment protocol after every experimental run. Files will be saved in parallel to a local drive and a secured institute-approved cloud drive (OneDrive) with read-only permission so that the data cannot be tampered with. File names will be timestamped so that files cannot be overwritten (e.g., if the same participant number is accidentally used twice: e.g., "participant#_timestamp_exp#.csv"). Files will also be uploaded to the cloud immediately following an experimental session. The goal of this method is to make data collection as hands-off as possible to maximally reduce human error. Quality assurance will also be an automated part of the experiment. For the experiment to continue to the next run, there cannot be any unacceptable missing datapoints (e.g., empty lists) or missing files. Unacceptable missing data will throw an error message and pause the experiment until the the error is fixed. Data folders will be labelled for each experiment separately, within

which there will be a folder for raw data, and a folder for data input into analysis. JASP and Python output files will be saved in a dedicated folder for each experiment. Finally, the analysis pipeline will be created before experimentation begins so that results can be determined automatically by the experimenter at the click of a button. All anonymized data and analysis materials will be uploaded to OSF once the manuscript is under review.

Documentation and Metadata

What documentation and metadata will accompany the data?

The main "data" folder for the project will contain a README.txt file specifying the data folder structure, file naming conventions, and a short description of the different kinds of data and analysis materials available. Once all data are collected, anonymized data, analysis scripts and materials, outputs, and a manuscript draft will be uploaded to OSF along with the README file.

Ethics and Legal Compliance

How will you manage any ethical issues?

This research involves collecting data from adult (18+) human participants from the Edge Hill University student community. All participants will be required to provide legal consent prior to participating in any experiment. Participants will be assigned a unique participant ID than does not personally identify them, which they will be asked to quote back to the experimenters should they wish to have their data destroyed within 2 weeks of data collection. All participants will receive a Participant Information Sheet and consent statements prior to experimentation; they will receive a Debrief Form and Data Consent Withdrawal Form immediately following experimentation, as per Edge Hill University ethical guidelines.

There are no special ethical requirements for this project. The experiments will involve minimal stress to the participants. The experiments involve performing a test of creativity and taking part in a priming condition. Priming conditions include viewing images of art, sitting in a familiar art space, or being in a digital art space. Participants will be compensated for their time via monetary reimbursement (university at large) or optionally via psychology course credit (only psychology students).

Participants will be allowed to terminate the experiment at any time without giving any reason, and at no personal penalty. Participants will be told exactly how their data will be used and stored, and data will be kept indefinitely.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Data will be uploaded to OSF under a Creative Commons - By Attribution - Non-Commercial (CC-BY-NC) license:

"This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format for noncommercial purposes only, and only so long as attribution is given to the creator." About CC Licenses - Creative Commons

Storage and Backup

How will the data be stored and backed up during the research?

Data will be stored in parallel to a local data drive on the experimenters' password-protected personal computers and backed up on OneDrive under an institutional license. Data will be backed up after every experimental session.

How will you manage access and security?

We will not save any personal identifying information of participants (names, e-mail addresses) with the raw data. Names and e-mail addresses linked to the unique participant ID will be stored separately on OneDrive only. All collaborators will be given explicit access to the OneDrive folder.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

All anonymized data will be stored indefinitely on OneDrive and will be made public on OSF. No data will be destroyed unless a participant sends a Data Consent Withdrawal Form within 2 weeks of experiment participation.

What is the long-term preservation plan for the dataset?

The dataset will be stored long-term on a dedicated project page on the Open Science Framework (OSF).There are no costs to storing the data in this repository. The process of uploading the materials and data to OSF is given dedicated time in the proposal timeline.

Data Sharing

How will you share the data?

Anonymized data will be shared on OSF once the manuscript is under review. The same data will additionally be uploaded to the UK Data Service. All project materials uploaded to OSF are provided a unique ID and URL.

This project has already been pre-registered on OSF:

OSF | Enhancing creativity performance through priming

The record of previous effective data sharing from the lead investigator (Reshanne Reeder):

OSF | Ganzflicker

OSF | Supplemental materials for publication: Anomalous visual experience is linked to perceptual uncertainty and visual imagery vividness

Are any restrictions on data sharing required?

We will only upload the data and pre-print once the manuscript is under review at an international, peer-review journal. This will ensure that the data are complete as of manuscript submission. We do not anticipate any difficulties in sharing the data in this manner.

Responsibilities and Resources

Who will be responsible for data management?

Those responsible for implementing and revising the data management plan are Dr Reshanne Reeder and Dr Bridget Mawtus.

Research Assistants may be involved in data collection, but they will not have the capability to download the data to their personal computers. Dr Reshanne Reeder and Dr Bridget Mawtus will be responsible for all aspects of data management, including secure storage and public upload.

What resources will you require to deliver your plan?

Technical expertise is required to code the creativity data for analysis. This will be done by Dr Bridget Mawtus, who has expertise scoring and coding creativity data. The scoring and coding will be double checked by Dr Reshanne Reeder, and run through a quality assurance script created in Python. All steps of this process will be uploaded to OSF so that they can be replicated.