Explaining under- and overconfidence: A fundamental account based on prior beliefs.

A Data Management Plan created using DMPonline.be

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Project abstract:

As humans are constantly making decisions, it is crucial to be able to evaluate the accuracy of our decision. This metacognitive capacity of estimating our decision confidence is commonly explained by assuming that a decision-maker computes the objective probability that their choice was correct. However, in practice we see that confidence often deviates from objective accuracy. Two striking examples of this are under- and overconfidence: The phenomenon that some humans are less confident in their decisions than their objective accuracy warrants, while others are more confident than warranted. To fundamentally explain these two biases, I propose an account in which underand overconfidence arise from distorted prior beliefs, which influence the confidence computation.
The current project seeks to formally establish prior beliefs as a fundamental explanation of underand overconfidence by investigating the underlying mechanisms. In a first stage, I want to look at the generalizability of prior beliefs – and thus, persistence of under- and overconfidence – over time and tasks. Next, I will explore the link between under- and overconfidence and the willingness to share information. In a final stage, I will test the proposed neural mechanisms of my account using fMRI. Together, the results from this project will deepen our theoretical understanding of under- and overconfidence, providing valuable information for both the field of metacognition and clinical practice.

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Explaining under- and overconfidence: A fundamental account based on prior beliefs. Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

In the all work packages, I will collect behavioral data of healthy adult individuals. In a series of computerised laboratory tasks, subjects will make decisions about perceptual stimuli while indicating their confidence in their decisions. In the first study of WP1, subjects will also indicate their global confidence. Apart from these variables (choices, decision time and both confidence types) and specific demographics (age, gender, handedness), no further information will be collected. In the last work package, I will additionally collect (f)MRI-data (both anatomical and functional images). All data is fully anonymised: participants are only identified with a unique, chronological participant number, so that data can never be traced back to the participant. In keeping with KUL practice, I will apply for ethical approval of each study prior to data collection.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

1. I (Hélène Van Marcke) will be responsible for preserving the data up to at least 5 years after the research.
2. All data will be saved on the KUL OneDrive (encrypted and password protected), which is automatically backed-up. In addition, after publication of a manuscript, the data will be published on an open repository (e.g., osf.io) allowing reuse by other researchers. Importantly, when signing the informed consent participants will have to agree that their (anonymized) data can be shared openly.

What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

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Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

/

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

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Explaining under- and overconfidence: A fundamental account based on prior beliefs. DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- Not applicable

Explaining under- and overconfidence: A fundamental account based on prior beliefs.
GDPR

GDPR

Have you registered personal data processing activities for this project?

- Not applicable

Explaining under- and overconfidence: A fundamental account based on prior beliefs. FWO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .cvs,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
WP1A	Local and Global confidence Study. Participants make perceptual choices about stimuli (binary choice) while indicating both their confidence in each choice, and their confidence in their abilities (both 6-point Likert scales). For each participant, the resulting output is a csv-file with one row of data per trial. Apart from handedness, age and gender, no personal data is collected. Each participant is identified only by their unique, chronological participant number.	Generate new data	Digital	Experimental	.csv	<100MB	
WP1B	Generalisability of prior beliefs over tasks. Participants make perceptual choices about stimuli (binary choice) while indicating their confidence in each choice (6-point Likert scales). For each participant, the resulting output is a csv-file with one row of data per trial. Apart from handedness, age and gender, no personal data is collected. Each participant is identified only by their unique, chronological participant number.	Generate new data	Digital	Experimental	.csv	<100MB	
WP2	Prior beliefs and information sharing. Participants make perceptual choices about stimuli (binary choice) while indicating their confidence in each choice (6-point Likert scales). For each participant, the resulting output is a csv-file with one row of data per trial. Apart from handedness, age and gender, no personal data is collected. Each participant is identified only by their unique, chronological participant number.	Generate new data	Digital	Experimental	.csv	<100MB	
WP3: behavioural data	fMRI study on prior beliefs. Participants make perceptual choices about stimuli (binary choice) while indicating their confidence in each choice (6-point Likert scales). They perform this task while in the scanner. For each participant, the resulting behavioural output is a csv-file with one row of data per trial.	Generate new data	Digital	Experimental	.csv	<100 MB	
WP3: neurological data	fMRI study on prior beliefs. Participants make perceptual choices about stimuli (binary choice) while indicating their confidence in each choice (6-point Likert scales). They perform this task while in the scanner. MRI data is organized in images containing a header of metadata about the image (such as orientation, dimensions and voxel size). Those images will be organized according to BIDS standard. For each subject, both, anatomical and functional images will be collected.	Generate new data	Digital	Experimental	.dcm, .nii.gz	<1TB	
Analysis scripts	Scripts to analyse the data	Generate new data	Digital	Other	.R	<100MB	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

/

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes, human subject data

The studies I plan to execute all involve human participants. Furthermore, I use manipulated feedback to induce feelings of over- and underconfidence, so therefore I must obtain ethical approval from SMEC to use this manipulation.
I have already obtained pivacy approval for the first study in my plan (described above as "WP1A") from PRET with enclosed ethical approval from SMEC: G-2020-2609-R2(AMD). The amendment refers to the change from a prior study a did to WP1A: in WP1A, I also ask participants to indicate their global confidence on a task ("how am I doing at this task") instead of only their local confidence ("how confident am I in the choice I just made").
For all future studies, I will obtain new privacy and ethical approval from PRET and SMEC prior to data collection.

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes

In all of my studies, participants will be asked to indicate age, handedness and gender. When publishing or presenting results, I will never present individual responses to these quesions, but only mean/standard deviation of age, and the frequencies of each gender catagory and handedness. Importantly, upon making the data available online (osf), I will make the data fully anonymised by permanently removing these three variables from the data.
Furthermore, I never ask for participant's names, email-adresses, etc., and participants execute the experiments on KUL computers. I assign each participant a unique, chronological participant number. This way, there is no link between a participantnumber and an actual participant, not even for me.

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

All files and documents related to a single project will be stored in meaningfully named folders and subfolders, following a logical structure. The same folder structure will be followed throughout different projects. At the level of the main folder, a README.txt file will be included. Within datafiles throughout different projects, variables will be given consistent and self-explanatory names where possible. For the MRI data, I will implement the Brain Imaging Data Structure (BIDS) standard. This will disclose
important parameters of the data that are necessary to understand and analyze the data.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- Yes

BIDS will be used for neuroimaging data. It is a standard for organizing and describing MRI datasets. The BIDS standard uses file formats compatible with existing software, unifies the majority of practices already common in the field, and captures the metadata necessary for most common data processing operations (Gorgolewski, Auer, Calhoun, V. et al.). This facilitates data sharing with other researchers.

3. Data storage & back-up during the research project

Where will the data be stored?

All data will be saved on KU Leuven's OneDrive. In addition, after publication of a
manuscript, the data will be published on an open repository (e.g., osf.io) allowing reuse by other researchers. Importantly, when signing the informed consent participants will have to agree that their (anonymized) data can be shared openly.

How will the data be backed up?

All data will be saved on KU Leuven's OneDrive, which is automatically backed up.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely.
If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

All data will be saved on KU Leuven's OneDrive, which is encrypted and password protected.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

None

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All data will be preserved for 10 years.

Where will these data be archived (stored and curated for the long-term)?

All data will be saved locally on an encrypted hard-disk. In addition, after publication of a
manuscript, the data will be published on an open repository (e.g., osf.io) allowing reuse by other researchers. Importantly, when signing the informed consent participants will have to agree that their (anonymized) data can be shared openly.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

None

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository

For all planned studies, all data will be made available in an open access repository.

If access is restricted, please specify who will be able to access the data and under what conditions.

NA

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- No

Where will the data be made available? If already known, please provide a repository per dataset or data type.

osf.io - for all projecs.

When will the data be made available?

Upon publication of the research results.

Which data usage licenses are you going to provide? If none, please explain why.

CC-BY-NC-ND-4.0

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

DOI

What are the expected costs for data sharing? How will these costs be covered?

None

6. Responsibilities

Who will manage data documentation and metadata during the research project?

I (Hélène Van Marcke) will.

Who will manage data storage and backup during the research project?

I (Hélène Van Marcke) will manage storage during the project. Backups (KUL OneDrive) are implemented by the ICT department.

Who will manage data preservation and sharing?

I (Hélène Van Marcke) will. Upon leaving the department, this responsibility will be handed over to Kobe Desender (PI).

Who will update and implement this DMP?

I (Hélène Van Marcke) will.