

DATA MANAGEMENT PLAN

Title of the Coordinated Project:

Precursors, Mechanisms, and Individual Differences in Contextual Control (PMIDCC)

Title of SP1 (coordinator):

Prediction Error as Precursor of Contextual Control (PEPCC)

Title of SP2:

Extinction, Inhibition, and Representational Changes in Contextual Control (EIRCCC)

Authors

Juan M. Rosas¹, José E. Callejas-Aguilera¹, James B. Nelson², and María C. Sanjuan²

ORCID IDs

[0000-0002-5383-9876](https://orcid.org/0000-0002-5383-9876) (JM Rosas)

[0000-0003-2903-2578](https://orcid.org/0000-0003-2903-2578) (JE Callejas-Aguilera)

[0000-0001-7225-725X](https://orcid.org/0000-0001-7225-725X) (JB Nelson)

[0000-0002-3380-5919](https://orcid.org/0000-0002-3380-5919) (MC Sanjuan)

Affiliation

¹ University of Jaén

² University of the Basque Country / Euskal Herriko Unibertsitatea

Funding

Ministry of Science, Innovation, and Universities (pending)

Abstract

When facing a situation of uncertainty, whether because we learn different things about the same predictor or because the information is not yet consolidated, this information becomes context-dependent, making transfer between the place (context) where it was learned and a different one challenging. Understanding when and how this contextual dependence of information develops has important theoretical and practical implications. For example, psychological treatments necessarily involve learning something new about situations that produce unwanted, cognitions, emotions or behaviors that the individual brings to the consultation. The new information provided by the treatment creates uncertainty about those situations. In other words, psychological treatments generate a prediction error between prior and new expectations that, according to Rosas and Nelson (2019), raises attention to the context and leads to the retrieval of information learned in those circumstances becoming context-dependent, thus, being one mechanism of relapse.

This project focuses on answering two fundamental questions with respect to contextual control:

Q1. Under what conditions do contexts acquire a role in controlling behavior? This question is intimately related with the question of when contexts control behavior. Determining the precursors of contextual control should lead us to understanding when contextual control appears. Emphasis is placed on the role of prediction error in raising attention to the learning contexts. Although this idea is supported by indirect evidence, it is crucial to confirm that attention to contexts is not influenced by the measurement system, and to establish, more precisely, the relationships among prediction error, attention, and contextual control.

Q2. How do contexts control behavior? This question is intimately related with the question of whether there are individual differences in the mechanism underlying contextual control. Answering Q2 will allow us to discover whether the mechanisms differ between individuals, a question that has not been addressed in the associative learning literature. Individuals can process information either globally (configurational) or elementally, and among these general approaches there are variations in the potential mechanisms. The project will focus on determining the contribution of contextual inhibition, occasion setting, and changes on the representation of predictive cues to contextual control, as well as the motivation to perform well and general demographic characteristics to mechanisms of renewal.

This project utilizes procedures and techniques previously developed by the research team to study associative learning and memory in humans. Additionally, a newly developed technique—an immersive virtual reality video game—is incorporated to assess how these processes interact with attention and spatial navigation, along with other procedures allowing the exploration of these phenomena and the underlying mechanisms in a more ecological setting than is provided by the typical laboratory. The results of this project will help establish when and how contextual control occurs in interference situations such as those involved in psychological treatments, providing a body of knowledge that will help understand factors influencing relapse and how they are modulated based on individual differences in information processing.

Purpose of this Data Management Plan (DMP)

This DMP aims to make the data from the studies conducted in the research project "*Precursors, Mechanisms, and Individual Differences in Contextual Control (PMIDCC)*" with Ref.: 2709149399-149399-4-823, available to the public for reuse with scientific purposes. The data access is open. In general terms, this DMP aligns with the "FAIR" principles, meaning that the data is Findable, Accessible, Interoperable, and Reusable.

Type and Format of Data

The data will be stored in a free-text CSV format, easily retrievable by other programs for data processing and analysis that also use open-source software. The data capture the recorded response(s) for each participant in different training trials and phases of testing, grouped by experimental conditions, all properly labeled according to the specific design of the study (one or more columns specifying different participant groups and/or experimental conditions, one participant per row with independently indicated responses, etc.).

Nature of the Data

The data is described in numerical terms, clearly identifying what they refer to, and the numerical scale used. The data result from participants' performance in a specific task used to achieve a particular objective, detailed in each case. Depending on the task, the recorded response(s) can vary, such as the number of key presses, mouse button clicks, predictive judgments to a specific stimulus, reaction time, movements within a virtual scenario, time to reach a goal, or eye gazing, among other responses. Data originating from any prior processing will be identified when applicable (e.g., filtered data based on certain thresholds).

Additional Information

In addition to the data, the file will contain a description of the task, methodology, objectives, hypotheses, procedure, and design that led to the data. The data will be organized with descriptive labels based on the above, facilitating understanding and promoting reuse. The information is expressed in standard technical terms recognizable by the scientific community working in this knowledge area.

Ethical and Legal Aspects of the Data

The data will include demographic information linked to each participant, such as gender and age, without connecting them to any other personal identifiable information, making them completely anonymous.

Location, Availability, and Maintenance of the Data

For each study, an independent data file will be generated, identified by a persistent identifier, such as a DOI.

The storage and availability of the data will be sequentially conducted as the various planned studies in the project are completed. For each study, two moments regarding availability are established: an initial period when the data will not be publicly available until they have been exploited through dissemination in specialized scientific reports, and a subsequent period when they will be openly accessible for reuse by the scientific community.

The data files will be stored in the designated space at the institutional repositories of the University of Jaén and the University of the Basque Country, and provided as supplementary material to the publication. Both universities, provided a secure maintenance system from which the data will be available to the community, facilitating access without restrictions.

Stakeholders

Any researcher with expertise in the field of behavioral sciences and/or neuroscience.