

Preregistration: Psychological factors underlying the perception of cooperation in a smart-charging scenario

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Human-Agent-Cooperation in Smart Charging Study

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Study Information

Hypotheses

The following hypotheses should be researched: 1) A lower degree of automation of the SCA should increase perceived human-agent-cooperation. 2) A higher amount of shared information from the SCA should increase the human-agent-cooperation. 3) An increase in perceived human-agent-cooperation should also lead to higher reports in user experience.

Design Plan

Study type

Experiment - A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

Blinding

For studies that involve human subjects, they will not know the treatment group to which they have been assigned.

Is there any additional blinding in this study?

No response

Study design

We conduct a vignette study via the platform LimeSurvey. The experiment is a 2x2 between subjects design in which we present the participants an interaction with a smart charging agent. The vignettes vary in degree of automation (low vs. high) and degree of information shared by the agent (low vs. high). We ask participants how they would interact with the agent and measure manifestations of successful cooperation on a behavioral, motivational and cognitive level using Scales from the Human-Machine-Interaction-Interdependence-Questionnaire (HMII) (Woide et al., 2021) and Subjective Information Processing Awareness (SIPA) Scale (Schrills et al., 2021). Additionally we also assess participants perceived user experience with the User Experience Questionnaire (UEQ) by Schrepp et al. (2017).

No files selected

Randomization

Participants are randomly assigned to one of four groups. The randomization is simple and automatically done via the Lime Survey tool.

Sampling Plan

Existing Data

Registration prior to any human observation of the data

Explanation of existing data

At point of the preregistration, the data is in the process of being collected/has already been collected. The only data visible to the researcher is the number of partially or completely filled out questionnaires. For more insights into the data, it would have to be downloaded, which has not happened yet.

Data collection procedures

Participants are being recruited over various channels. These include university and institute mailing lists and social media. Participants must be at least 18 years old and speak German fluently.

No files selected

Sample size

We try to obtain a sample size of at least 20 people per group ($4 \times 20 = 80$).

Sample size rationale

A higher sample size is unrealistic to obtain due to time and money constraints

Stopping rule

No response

Variables

Manipulated variables

Degree of automation of the Smart Charging Agent (low vs. high) Degree of shared information by the Smart Charging Agent (low vs. high)

No files selected

Measured variables

Preferred charging end point Perceived goal alignment Information certainty (Human to System and System to Human) Subjective information processing awareness Perceived cooperativeness of the agent Perceived User Experience

No files selected

Indices

No response

No files selected

Analysis Plan

Statistical models

In case conditions are met, we plan to test all our hypothesis via multiple regression analyses.

No files selected

Transformations

At point of the preregistration, no data transformations are planned.

Inference criteria

For the analysis, results with p-values < 0.05 are considered to be significant.

Data exclusion

We will exclude participants - with no variation in the Likert-scale-items (e.g. always 1) - who took exceptionally longer or shorter than other participants to answer the questionnaire - who remarked that they had problems understanding the presented vignette

Missing data

If an observation is missing one data point for a specific analysis, the whole observation will be excluded for this specific analysis.

Exploratory analysis

Further connections between the independent variables, perceived cooperation and user experience might be examined which are not specified in the hypothesis.

Other

Cited Literature: Schrepp, M.; Hinderks, A. & Thomaschewski, J. (2017). Construction of a benchmark for the User Experience Questionnaire (UEQ). Schrills, T. P. P., Kargl, S., Bickel, M., & Franke, T. (2022). Perceive, Understand & Predict-Empirical Indication for Facets in Subjective Information Processing Awareness. Woide, M., Stiegemeier, D., Pfattheicher, S., & Baumann, M. (2021). Measuring driver-vehicle cooperation: development and

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