Guidelines: Term paper

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Please write the document in Rmarkdown: Check out [this template](https://osf.io/k8jhx/)!

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Below you find some guidelines and evaluation criteria for a term paper that focuses on a causal or predictive research question. If certain aspects only apply to one of the two it’s indicated in the text.

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# 1 Term paper for a causal and predictive research questions

In terms of structure, the paper should follow the classical structure of an empirical quantitative study:

* **Introduction**,
* **Theory & hypotheses (causal paper) OR Previous research (predictive paper)**
* **Methods: Data & Measures & Models**
* **Empirical results**
* **Discussion & conclusion (+ References** and **possibly an Appendix)**

Below are some of the elements I am normally looking for in these single parts. These points go along with the “[Guidelines: Research design](https://docs.google.com/document/d/1GmpBUGNiLFpnIAsCGMtp4UI7GZBzs4HqNopwWA5J_9A/edit?usp=sharing)” for the research design that you handed in first.

I need to be able to reproduce the results of your paper on my own quasi “out of the box”.[[1]](#footnote-0) Hence, I need a .zip folder “Surname(s).zip” that contains the following files:

* + Term paper: “Surname\_Firstname\_paper.pdf”
  + Code to reproduce the analyses: “Surname\_Firstname\_code.R” and/or “Surname\_Firstname\_code.do” [or “.rmd” if you use R Markdown]
  + One or several files with the raw data in any format: “data.csv”

**1 Introduction**

The introduction consists of a research question (ending with a “?”) and arguments why this question is relevant, i.e. how your study contributes to current scholarship/knowledge.[[2]](#footnote-1)

Examples could be…

* What is the causal effect of education on income? (causal)
* Can we use Google Trends to predict election outcomes? (predictive)
* How can we predict whether politicians’ tweets are populist (predictive)

Relevance arguments are often made in terms of a research gap (e.g. “this hypothesis was never tested” or “no one tried to predict electoral outcomes using Google trends/populism in tweets”) and/or in terms of methodology (e.g. “this hypothesis was only tested with data from the U.S.”, “previous studies relied on a bad measure/bad machine learning model”; “previous studies only predicted a single election” etc.).

A guiding question you might ask yourself is: “[Whose mind are you going to change about what?](https://gking.harvard.edu/papers)”. Naturally, counterintuitive findings or findings that go against current knowledge may be more interesting both when it comes to causal and predictive questions. Hence, if you present such findings you could shortly allude to that in the introduction. Another good starting point is debates between scholars, i.e. you have two camps within scholarship (e.g. a debate between proponents of two contradicting hypotheses or a debate between proponents of different measures of a concept) and you are contributing to this debate.

* Evaluation criteria: Does the author...
  + ... have an explicit, clear research question?
  + ... make a good job in arguing for the relevance of this question?
  + ... clarify to which scholarly literature he/she is contributing?
  + ...clarify which contributions he/she is making?

Depending on whether you write a causal or a predictive paper the introduction is followed by a theory/hypotheses or a previous research section.

**2 Theory and Hypotheses (causal paper)**

The theory section should place your hypotheses in a broader theoretical background, i.e. what theoretical traditions do you draw on. Second, you are testing a “causal hypotheses”, i.e. that there is a causal effect of D on Y (or not).

You will normally test one or max. two hypotheses in your paper. For any hypotheses (e.g. “H1: The higher D the higher Y/D has a positive effect on Y”) there is a counter hypothesis (H0) and you should outline that one as well (e.g. “D has no or a negative effect on Y”).[[3]](#footnote-2) Hence, in this section, you should also outline some process that would connect D with Y. For instance, if you investigate the impact of education on the income you could describe how an individual A’s choice to go to university (D = 1) changed the jobs that A was eligible for and how this affects A income later on as opposed to the counterfactual where A did not go to university (D = 0). In other words, pick out an ideal-typical unit and discuss the causal process that connects D with Y. If you are unable to provide a “credible” causal story that connects D and Y and should operate for a significant share of units in your sample, other researchers will question your conclusion.

* Evaluation criteria: Does the author...
  + ... properly embed his hypothesis(ses) in a larger theoretical literature?
  + ... formulate clear and precise hypotheses?
    - If possible embed hypotheses in the text (no bullet points).
  + ... also mention the respective counter hypotheses in a footnote (to have clarity what quantity the hypotheses is about)?
  + ... provide a credible (even if abstract) causal story how values on D are linked to values on Y or not?

**2 Previous predictive research (predictive paper)**

The “previous research” section should place your paper and research question within the broader literature. When writing a predictive paper there normally are two options.

(1) There is already a body of research that attempts to predict the same outcomes as you. Then you would summarise that research, summarise the corresponding methodology (e.g., what ML models they are using) and point to possible shortcoming in that body of research.

(2) There is no work that tries to predict the exact same outcomes as you (e.g., populism in tweets). Then this section would summarise predictive work in the social sciences more generally. For instance, you might find work that tried to predict outcomes that are closely related to yours. If you classify tweets there might be other work that classified tweets (just on another dimension, e.g., racism instead of populism). Again, you would summarise this work and any insights it produces.

* Evaluation criteria: Does the author...
  + ... properly embed his/her predictive model in a larger corresponding literature (either literature on predicting the same outcome or literature on prediction in general)?
  + ... formulate clear and precisely what was predicted in different studies?
  + ...provide a good overview of what the challenges in building predictive models in this area are?

**3 Data, Methods, and Models**

This section meticulously describes the data, the methods, and the models you are relying on. It’s all about transparency. Describe exactly what measures you are using, what data you are using, what models you are estimating. In other words describe what your identification strategy is, what the underlying assumptions are, and if you are using any techniques of what Keele [(2015)](https://paperpile.com/c/xLx5cI/sjej/?noauthor=1) calls the design-based approach (e.g. some sort of sensitivity analysis).

* Evaluation criteria: Does the author...
  + ...indicate when the data was collected? Who collected it? Where he/she got it from?
  + ...indicate how/when all the variables have been measured? What their measurement level is?
  + ...provide a summary table for all variables? (Mean, Standard deviation, Min, Max, N)?
  + ….provide a description of how all the variables in the analysis have been (re-)coded? (either in the text or in a table)
  + …indicate what the unit of analysis is? (e.g., individuals, tweets etc.)
  + ...discuss any relevant problems in terms of measurement/measurement error?
  + ...provide an ideal experiment as a benchmark? (causal paper)
  + … discuss the principal identification strategy used in the study? (causal paper)
  + ...discuss the assumptions necessary for that particular type of identification strategy? (causal paper)
  + ...explicitly describe the models that are estimated? (provide an equation if possible)
  + ...estimate the right models?
  + …describe how the predictive accuracy of the model is evaluated? (predictive paper)
  + …explain how the predictive model works, e.g., random forests? (predictive paper)

**4 Empirical results**

This section summarizes the results of your empirical analysis and discusses them in relation to the hypotheses. Importantly, every table/figure should stand for itself meaning that another researcher can quickly read the introduction, the conclusion, and flick through the tables/figures to grasp what findings you got. Hence, for every table/figure you should provide notes that give additional information (e.g. number of observations that underlie a model, what the figure shows, etc.).

* Evaluation criteria: Does the author...
  + ...number all models/figures (M1, M2, M3, Figure 1, Figure 2, Table 1, Table 2) and cleanly refer to them in the text using those identifiers?
    - e.g., if there are 19 Models in your paper make sure to name them M1 to M19
  + ...interpret the results in the right way?
  + ...provide reproduction files so that I can easily replicate/reproduce the analysis (all results and graphs)?
  + …properly evaluate the accuracy of the predictive models? (predictive paper)

**5 Discussion and Conclusion**

This section shortly summarises the results, relates them to previous research, discusses the limitations of the study, and provides possible avenues for future research. Often the latter are linked to the limitations of the study.

* Evaluation criteria: Does the author...
  + ...repeat the research question/hypotheses?
  + ...shortly summarise the main results?
  + ...discuss the limitations of the study?
  + ...provide rationales/venues for future results?
  + ...discuss his/her findings in light of the relevant literature, i.e., to what extent it is aligned or contradicts previous knowledge?

# 2 More general criteria

**References**

* Evaluation criteria: Does the author...
  + ...provide references that are consistent in style and complete?

**Format & files**

* Try to produce a reproducible document that looks like a proper working paper in terms of font and style (new August 2020)
* Use the following rmd file as a template for the term paper…
* Provide a fully replicable \*.rmd file that fully reproduces your “surname\_term\_paper.pdf”
* Use single-line spacing.

**Graphs**

* Use large enough font size for labels of axes etc.
* Avoid abbreviations if possible
* Ideally, the graph can be read/understood on its own (sometimes figure notes are necessary)
* Label the axis, e.g., at least endpoints of scales (0 - low trust, 1,2,3,4 - high trust)

**Some criteria of writing “style” for both text and code**

Think of your writing style in terms of [cognitive load](https://en.wikipedia.org/wiki/Cognitive_load).

* Avoid repeating the same sections of text
  + Beware sometimes repetitions, e.g., repeating the name of a concept can help to reduce cognitive load because it might link different sections with each other (see below)
* Avoid using several terms for one and the same thing (e.g. don’t use both “generalized trust” and “social trust” to describe the same concept)
* Avoid ambiguity
* Avoid long sentences if possible
* Consider if your sentences/language are “logically” sound
* Think of how sentences relate to each other (sometimes repeating a certain term is helpful if it helps the reader)
* Use variable names that are consistent and comprehensible, e.g., don’t use "brncntrNo" or "Bildungyhoch:gndrFemale" but names that can be understood
* Use a font that is readable (also in graphs)
* Use simple examples
* Use variable names that can be understood without context even if you have to type more, e.g., “mental\_health” instead of “mcs”

1. Test the reproducibility yourself, i.e. whether you can reproduce the results with the files you send me. [↑](#footnote-ref-0)
2. Some authors don’t provide an explicit research question in their papers. I think you should. An explicit research question guides the reader through your study. [↑](#footnote-ref-1)
3. In principle we might formulate precises hypotheses, e.g: “The effect of D on Y is bigger than 0.7” vs. “The effect of D on Y is smaller or equal to 0.7”). However, in sociology we rather rarely possess such precise quantifiable expectations. [↑](#footnote-ref-2)