

## Planning, implementing and reporting. Increasing transparency, replicability and credibility in qualitative political science research<sup>1</sup>

As an editor of a major European political science journal and practitioner in qualitative political science research, I have noticed that some qualitative research submitted could be much more rigorous as to the standards applied when planning, implementing, and reporting the research. This does not mean changing the epistemological and/or methodological foundations of qualitative research, but rather to *unveil more explicitly how research is conducted*. Nor does it mean mechanically accepting the standards established for experimental and quantitative research, but instead to profit from those aspects which can be adapted to qualitative research. Certainly, the lack of recognition and reward for transparency within qualitative research is not an incentive to investing in the highly demanding and time consuming requirements of transparency. There are good reasons, however, to suggest that the benefits from this type of research could be greater if better standards were applied (Kapiszewski, Elman and Lupia, 2018: 43-44). On the one hand, qualitative researchers could demonstrate the power and rigor of their work more clearly and empower a much larger audience to understand and interpret their research on its own terms. On the other hand, the growth of alternative (unreliable) sources of information creates a challenge for the credibility of research findings: better standards for reporting 'how we know what we know and whether and how our insights apply more widely' enhance credibility.

Replicability, accessibility, and transparency have become cornerstones to calls for increasing the scientific quality of political science. Setting the trend, the APSA Ad Hoc Committee on Data Access and Research Transparency (DA-RT) introduced into the APSA Ethics Guide (APSA, 2012; Lupia and Elman, 2014) three main modalities for transparency: *production transparency*, *analytic transparency*, and *data access* (see also Kapiszewski, Elman and Lupia, 2018). Of these three pillars of transparency, data access is significantly more advanced. Accordingly, the 2014 Joint Statement by Political Science Journal Editors (initially subscribed to by 26 journals) commits them to require authors to submit original datasets.<sup>2</sup> Within the European Consortium for Political Research (ECPR), the Publications sub-committee has sponsored the parallel ECPR statement on Data Access and Research Transparency (DA-RT)<sup>3</sup> which also calls for making data accessible, even though exceptions for qualitative research are identified. The second pillar, *analytical transparency* ('clearly explaining the links connecting data to conclusions'),<sup>4</sup> involves deeper methodological and epistemological issues, including causal inference, and refers to an ongoing conversation which exceeds by far the more modest objectives of this paper. I will focus instead on 'production transparency' which the APSA Ethics Guidelines (2012: 10) define as '*a full account of the procedures used to collect or generate the data*'. In line with previous scholarship (Elman and Kapiszewski, 2014; Kapiszewski, Elman and Lupia, 2018), I will argue that revealing explicitly the planning and implementation of research can greatly improve the transparency and replicability of qualitative political science and, therefore, its credibility. A proper reporting strategy complements this process.

---

<sup>1</sup> I would like to thank two anonymous reviewers for their helpful comments. Giovanni Agostinis, Roberta Perna and Felipe González de León provided generous observations on the draft. This paper originated in a conversation with Monika Sus on how to improve qualitative research. I thank her for prompting me to write this piece.

<sup>2</sup> Data Access and Research Transparency (DA-RT): A Joint Statement by Political Science Journal Editors, *Political Science Research and Methods* Volume 3, Issue 3 September 2015 p. 421 DOI: <https://doi.org/10.1017/psrm.2015.44>.

<sup>3</sup> ECPR Statement on Data Access and Research Transparency, available at <https://ecpr.eu/ContentPage.aspx?ID=450>.

<sup>4</sup> In the qualitative tradition, analytic transparency typically means making verbally explicit the logical steps or interpretive processes linking observations to conclusions or understandings (Bleich and Pekkanen; 2015a).

Increasing production transparency has become a requirement for experimental political science, and recording and revealing the process of empirical engagement has become the gold standard for it (Druckman, 2010; Lupia, 2010; Leeper, 2011). Researchers are expected to present explicitly *how the particular interactions, observations and measures upon which a piece of research rests might have been shaped by the way in which empirical information was sought or gathered* (Lupia and Alter, 2014).

Despite the claim by quantitative and experimental scholars that transparency applies equally to qualitative research, scholars in the latter tradition have not enthusiastically adhered to transparency. In 2015 the American Political Science Association Organized Section for Qualitative and Multi-Method Research published a symposium on *Transparency in Qualitative and Multi-Method Research* (Büthe and Jacobs, 2015a). The symposium included several different qualitative methodology modalities. Unsurprisingly, the conclusions recorded agreement on the principles but differences on their practical implications: *there is relatively broad agreement on the importance of being transparent about the procedures used to collect or generate data. However, contributors give production transparency differing operational meanings, resulting from differences in the practical and ethical constraints under which different forms of research operate* (Büthe and Jacobs, 2015b). This conclusion confirms the assumption advanced in the introduction (Büthe and Jacobs, 2015a), which we share: given that different qualitative methods use different sources, not to mention analytical procedures, it is debatable whether transparency can be subject to a common definition and implemented in a standard way in qualitative and multi-method (QMM) research. Accordingly, while the methodological and epistemological value given to interpretation may be a common element for qualitative methods, any method should still be able to separately meet the requirements for increased transparency according to explicitly formulated standards.

Transparency and replicability are pressing requirements for *empirical qualitative research* whose self-created credibility crisis stems, above all, from a failure to impose firm standards of replicability (Moravcsik, 2010). Now, transparency is an even more stringent condition for replicability in qualitative research because of the nature of qualitative data: these are both observational (a trait that qualitative research can share with non-experimental quantitative research) and, crucially, interpretative (i.e. the researcher intervenes to give meaning to the data). Interpretation requires a degree of unavoidable subjective intervention, which of course can also underlie quantitative data. Moreover, a significant part of qualitative research produces its own data and full disclosure of how this is done increases credibility while facilitating replicability.

Increasing transparency and replicability means unveiling each and every decision made during the research process, particularly in relation to data. When investigating, researchers take decisions about specific situations and dilemmas, some of which can be predicted whereas others cannot. These decisions happen in two successive stages. Before commencing research, a researcher must draw up their research design, which involves initial decisions about cases, data sources, sample sizes, etc. Many of these decisions will later be spelled out as part of the written presentation of results. Crucial decisions must also be taken during implementation of the research. These refer to practically implementing what was initially designed and, within this, tackling unexpected, unanticipated situations and problems. Increasing research transparency and replicability thus means clearly documenting the decisions made to plan and implement research, in addition to providing access to data. Finally, a third stage concerns reporting the findings but also the decisions and events during the implementation stage.

Advocates of reporting in experimental political science often combine the three stages within the same instrument. Thus, Lupia's (2010) proposal for a *lab book* and Leeper's (2011: 6) notion of a *quality protocol* combine, in a single document, information related to two different stages in the research process: planning and implementation. I argue instead that there are good reasons for separating them. Planning and implementation are different stages of the research process which require different logical operations (planning *ex ante* requires anticipating what

will happen, while implementation requires a faithful recording of what happens on-the-spot) and are subject to different requirements, both material and ethical (see below). Separating them permits independent assessment of the quality of each and, consequently, their separate validation, increasing the validity of the overall process and final results. Separating these two stages also allows the researcher to gain control over their own process. The most appropriate approach to organizing reporting in these two stages is via two different instruments: *research protocols* and *research notebooks*. Additionally, the practical and ethical limitations which could affect the use of these instruments require the submission, at the publication stage, of a third document: a *Research Implementation Record* (RIR). The next three sections describe the features of each of these three instruments.

### Planning research: research protocols in empirical qualitative political science

Experimental and quantitative scholars have called for the introduction of Pre-Analysis Plans (PAPs) (Olken, 2015; Findley et al., 2016; Piñeiro and Rosenblatt, 2016; Kern and Gleditsch, 2017). The notion of “pre-analysis plans” is limited to economics and political science whilst other sciences, in turn, use the notion of “research protocol”. Even if similarities exist between PAPs and Research Protocols, they are not exactly the same thing. Three arguments support adopting the later: firstly, the term “research protocol” contributes to scientific homologation of political science as it is the notion used in medical sciences,<sup>5</sup> biology,<sup>6</sup> chemistry,<sup>7</sup> psychology (Purcell and Gero, 1998), or pedagogy (Holloway and Mooney, 2004).<sup>8</sup> Although the contents of protocols diverge among disciplines, adopting a specific “political science term” questions the objective of attaining scientific recognition.

Secondly, the scope of PAPs and research protocols do not fully coincide. Even though some authors interpret the notion of pre-analysis in a way that goes well beyond data analysis, its explicit connotation is much more restricted: it implies a focus on how the analysis (of data) will be performed.<sup>9</sup> In turn, the notion of research (protocol) encompasses also the broader research design (and, moreover, ethical issues). Given that the aim, in both cases, is pre-registration and transparency, a more encompassing understanding enhances the transparency (and hence, credibility) of the whole process and the eventual results.

Thirdly, research protocols routinely contain ethical considerations and those are usually revised by Institutional Review Boards. Because of this inclusion, the implication is that protocols are more binding than plans. Notice that binding does not mean rigidity but, rather, as will be argued below, the need to justify research implementation decisions.

In any case both instruments, PAPs and research protocols, share the same objective: pre-registering research (Nyhan, 2015), and terminological differences should not blur this strategic coincidence. A *Research Protocol* can be understood as an *ex ante* instrument which

<sup>5</sup> See, inter alia, WHO Recommended format for a 'research protocol' at <https://www.who.int/ethics/review-committee/format-research-protocol/en/>; Council for International Organizations of Medical Sciences (CIOMS) International Ethical Guidelines for Biomedical Research Involving Human Subjects at <https://www.fhi360.org/sites/all/libraries/webpages/fhi-retc2/Resources/CIOMS02.pdf>.

<sup>6</sup> See, in general, the resources at the Brown University Library for Biomedical and Life Sciences at <https://libguides.brown.edu/biology/protocols>.

<sup>7</sup> See, at large, the section on methods and protocols of the Library of the University of California – San Diego at <https://ucsd.libguides.com/chemistry/protocols>.

<sup>8</sup> See also the model of Protocol of the International Consortium for Higher Education, Civic Responsibility, and Democracy at <https://www.internationalconsortium.org/guidelines-and-research-protocols/>.

<sup>9</sup> A pre-analysis plan is a step-by-step plan setting out how a researcher will analyze data that is written in advance of them seeing this data (and ideally before collecting it in cases where the researcher is collecting the data). David Mackenzie, A pre-analysis plan checklist, 28 OCTOBER 2012 at <https://blogs.worldbank.org/impactevaluations/a-pre-analysis-plan-checklist>.

Código de campo cambiado

contains both the research design and the rules for generating and treating empirical evidence plus ethical considerations on both research subjects and the research itself. The research design concerns the methodological options the researcher chooses and the justification and explanation as to how this option is applied to the context. These, in turn, derive from hypotheses and their relevant theoretical background. Without downplaying their significance, methodological choices can be presumed to be paradigmatic, in a *Kuhnian* sense (Kuhn, 1962): the kind of questions and objections which such choices will trigger are covered by general disciplinary debates. For example, choosing a case requires justifying its selection. However, the implications of opting for a particular case, the type of case, etc., are all part of the broader political science debate in which any researcher will be involved. Expecting individual researchers to reconstruct anew all the relevant epistemological and methodological questions *in every new study* is unrealistic and unfair. Rather, research protocols should be adapted to the different requirements of the various research communities (Kapiszewski, Elman and Lupia, 2018).

What any researcher needs to do for any new project and what a research protocol must contain are *ex ante* decisions on the generation and treatment of empirical evidence: how the data will be obtained and treated, and the justification for these decisions (see Leeper, 2011 in relation to experiments). A research protocol must document – before the field work (i.e. interviews) begins – decisions on how to create or obtain these data. Different models of qualitative research can require different types of protocols, but what seems beyond doubt is that any prospective research can be planned and this planning can be documented.

I include as an annex a research protocol for interviews (see an alternative example for process-tracing in Elman and Kapiszewski, 2014) which draws on the model of Kern and Gleditsch (2017) and the Open Science Foundation (OSF at [https://osf.io/registries/discover?page=2&q=institutions&sort=-date\\_updated](https://osf.io/registries/discover?page=2&q=institutions&sort=-date_updated)) registries. Protocols are useful in themselves, because they provide a useful roadmap for implementing research. They can also serve for increasing research validity: if they are disclosed and/or published, they can be discussed and confirmed or refuted. Their presentation in academic settings, prior to any findings and in conjunction with discussion of the project and its broader theoretical and methodological issues, can provide an invaluable opportunity for addressing any limitations and shortcomings in the planned research. Piñeiro and Rosenblatt (2016: 787) argue that PAPs are explicitly public and easily accessible to other researchers and this could similarly apply to research protocols. Repositories such as the Open Science Foundation (<https://osf.io/prereg/>) or the Qualitative Data Repository (QDR at <https://qdr.syr.edu/about>) offer suitable platforms for making protocols publicly accessible. Naturally, whilst disclosure or publication increases transparency and credibility and facilitates replicability, ethical and legal issues must be considered before doing so.

Research protocols for qualitative research must reflect its specificity and, first and foremost, epistemological and methodological issues (Laitin 2013: 43; Ansell and Samuels 2016; Findley et al., 2016: 1690; Piñeiro and Rosenblatt, 2016: 790). Epistemologically, the interpretative tradition gives a role to the researcher subjectivity in generating knowledge. Methodologically, qualitative researchers interact with empirical evidence: researcher involvement gives meaning to data. Thus, researcher involvement mediates the interaction between data and theory. On this background, pre-commitment strategies can lead to the abandonment of important research areas for the fear of not obtaining meaningful results (Kapiszewski, Elman and Lupia, 2018: 43). Thirdly, many elements of the research design and analytical problems cannot be anticipated before implementing the research (Olken, 2015: 70; Ansell and Samuels, 2016). Finally, research protocols face replicability obstacles due to changing social conditions (Laitin, 2013: 43). All these are valid objections and indicate that qualitative research protocols do not necessarily need to follow the same requirements as quantitative research ones, including less stringent publication requirements. The proper

documentation of the next stage – the implementation of research – using research notebooks immediately helps to reduce these potential shortcomings and increase transparency.

### **Implementing research: research notebooks in empirical qualitative research**

Notebooks or, more precisely, lab books, are extensively used in natural and physical sciences. They serve to document dilemmas, decisions, changes, unforeseen circumstances, and the unintended consequences of the implementation stage once planning has been concluded. In a nutshell, the notebook forces researchers to be explicit and therefore deliberate in taking decisions when implementing research.

Research notebooks serve at least partially to correct the limitations of the protocols or PAPs mentioned above. First, recording precisely the interpretative choices made in relation to the empirical evidence also permits them to be explained (Piñeiro and Rosenblatt, 2016: 787), including the subjective weighing of evidence. It also permits the inferential path drawn from the empirical evidence to be described, thus helping others understand how we know what we claim to know (Kapisweski et al., 2018: 34). Registering the iterations between the theory and the empirical work permits any changes in theoretical understanding to be detailed and the subsequent changes made to the theoretical section to be recorded (Piñeiro and Rosenblatt, 2016: 790). Second, as regards difficulties with operationalization and with anticipating analytical problems, the whole point of research notebooks is precisely to deal with unforeseen circumstances during implementation. Protocols are not immovable contracts, since researchers need to be able to adapt to unforeseen and changing circumstances. More pragmatically, research notebooks facilitate the integration of different researchers working on the same paper/project as the meticulous recording of activities permit all of them to keep track of the evolution of the research.

Research notebooks, however, do not offer easy solutions to correct a crucial objection levelled against protocols: the selection of research themes and their design according to publication bias (i.e. the ease with which positive results rather than important problems can be published). This problem affects political science in general and perhaps requires a change in the dominant paradigm for how academic careers are constructed. Nor do research notebooks respond to another objection against protocols: replicability. This, again, generally affects qualitative political science research (there is only partial commitment to replication as a mechanism for establishing validity; Elman and Kapiszewski, 2014:45), though it is certainly easier to replicate research which follows a protocol than otherwise.

Researchers usually create their notebooks on the spot in the course of conducting their research. It is a condition *sine qua non* that researchers must not attempt to *reconstruct notebooks from memory in later months or years* (Lupia, 2010). The moment of creation of a notebook also determines its structure: while the research protocol must follow a logical, thematic structure, the notebook follows a temporal structure (i.e. it records one event after another, regardless of its content). It looks more like a diary.

Typically, a research notebook should include each and every item of note (observation/decision) pertaining to the implementation of research and, especially, departures from the research protocol *whose record and justification is the only way to fully communicate what choices were made by experimenters and why* (Leeper, 2011). Considering again the case of interview research, some examples of the information that a notebook should contain include:

- Recording the conduct of the interview process – how the sample was selected; whether all the interviewees were ultimately available; when, where, and by whom were the interviews conducted and for how long, etc.
- Unforeseen events during the process of collecting evidence (e.g. an interviewee brings an assistant to the interview who provides supplementary information, or an unexpected political event occurs and transforms and/or influences the perceptions of

some interviewees). Events can be particularly important in ethnographic research, for instance.

- Interpretation of interviews and coding. The generation of inductive quotation codes is an essential task when processing interview transcripts. This should be explicitly recorded.
- Running reliability tests – who were the external coders, what kind of preparation and contextual information were they provided.

Experimental political science considers access to notebooks as essential for replication of studies (Lupia 2010), although the practice rarely reflects this standard (Leeper, 2010). The same aspiration could apply to qualitative research. However, a number of objections (similar to the ones that preclude making research protocols public) can also condition publicising research notebooks. First, the way that information is recorded (i.e. following the temporal sequence of research decisions and notes) does not produce a format suitable for publication nor even an easily readable document. Second, notebooks can contain a significant amount of personal, sensitive, confidential information, alongside the researchers' private notes (for instance, personal impressions of the interviews or the interviewees). Accordingly, practical and ethical considerations impose very credible limits to publication (for a very critical view on publishing notebooks, see Cramer, 2015). The absence of publicity does not necessarily mean secrecy, and carefully designed ethical protocols could establish conditions for third-party access. To reduce the impact of a lack of access to notebooks on the transparency and validity of research, a third instrument can provide a suitable alternative: Research Implementation Records (RIRs).

#### **Reporting research in publication: Research Implementation Records and data access**

After planning and recording implementation, the researcher must report on the process. Word limits in published articles often force researchers to reduce the space dedicated to reporting on the research process. Nevertheless, journals offer the possibility to publish online appendixes which are in many cases not subject to length limitations. This offers the opportunity to publish Research Implementation Records (RIRs). These combine elements of the original Research Protocol with appropriate observations from the research notebooks to offer a fully documented research record (see for example Closa, 2019, where the RIR is however still called "protocol").

An efficient RIR should follow the structure of a Research Protocol and add the *thematically organized* information that the notebooks collected temporally. A RIR thus renders the whole process more comprehensible for the reader. RIRs also explain the set of accompanying documents: submissions for publication should comprise a set of documents containing data. In the case of interviews, and always subject to ethical limitations, this can comprise the interview list (ethical limitations may require anonymity in many cases), the codebook (list of inductive and deductive codes with explanations), the output of the quotes sorted by code (ethical limitations may apply) and, ideally, the interviews themselves or some appropriate access to a repository (Bleich and Pekkila, 2015), given that interview content is normally protected from access and even storage by very stringent legal requirements. Finally, if the original Research Protocol was not published, it should also be added to the RIR. Journals increasingly accept supplementary material such as RIRs to be published online (even though space limitations may compromise publication in some of these).

There is no particular template for reporting qualitative political science research using RIRs. RIRs precisely permit that the amount and type of information on the planning and implementation stages may be adapted to account for ethical, legal, and other kinds of limitations. A differential approach to transparency should inform writing RIRs: sharing some data and materials, even if ethical or legal constraints prevent sharing them all, is far better than sharing none. What should be included in reporting also depends on the dominant traditions

within each research community (Kapiszewski, Elman and Lupia, 2018: 44). Non-reporting, however, could become increasingly questionable as a standard approach for the reasons set out above, which will also be summarised again in the conclusion.

## Conclusion

Planning, implementing and reporting are three steps in the research process. While the modalities of these steps can vary across qualitative methods, they are unavoidable logical operations within the research process. Making them transparent, even within the significant limitations that ethical or other types of considerations can introduce, will greatly improve the replicability and credibility of qualitative political science. Each of the three stages rely on a different instrument (protocols, notebooks, and reports) logically related to each other. These instruments not only serve to increase transparency but also to provide a much clearer roadmap for any researcher.

Naturally, documenting these three stages establishes very stringent requirements which might demand a higher reporting standard from qualitative scholars than those applied by quantitative scholars. Moreover, since qualitative scholars often create their own data, increasing reporting requirements adds another time-consuming task to the schedules of scholars who are already overloaded by the pressure to publish abundantly. Even though publication urgency militates against such time-consuming exercises of transparency, the improvement in quality and, hence, the increase of publication chances provides a positive argument to counteract urgency. Increased transparency will lead to better options for replicability and this will, in turn, increase the validity of qualitative research and dispel some of the concerns about its methodological soundness. Even if the costs seem high, firmly established and adhered to standards on knowledge production will enable qualitative political science research to distinguish itself better and counter the alternative provision of knowledge coming from disinformation and even fake research.

## References

- Ansell, B. and Samuels, D. (2016) 'Journal Editors and "Results Free" Research: A Cautionary Note' *Comparative Political Studies* 49:13 1809-1815.
- Bleich, E. and Pekkanen, R.J. (2015) 'Data Access, Research Transparency, and Interviews: The Interview Methods Appendix' *Qualitative & Multi-Method Research* 13:1 8-13.
- Büthe, T. and Jacobs, A. M. (2015a) 'Introduction to the Symposium Transparency in Qualitative and Multi-Method Research' *Qualitative & Multi-Method Research* 13: 1 2-8.
- Büthe, T. and Jacobs, A. M. (2015b) 'Conclusion: Research Transparency for a Diverse Discipline' *Qualitative & Multi-Method Research* 13: 1 52-64.
- Closa, C. (2020) 'Inter-institutional cooperation and intergroup unity in the shadow of veto: the construction of the EP's institutional role in the Brexit negotiations' *Journal of European Public Policy*, 27:4, 630-648, DOI: 10.1080/13501763.2019.1603249.
- Cramer, K. (2015) 'Transparent Explanations, Yes. Public Transcripts and Field-notes, No: Ethnographic Research on Public Opinion' *Qualitative & Multi-Method Research* 13 17-20.

Druckman, J. N. (2010) 'Experimental Myths' The Experimental Political Scientist Newsletter of the APSA Experimental Section 1:1.

Elman, C. and Kapiszewski, D. (2014) 'Data Access and Research Transparency in the Qualitative Tradition. Symposium: Openness in Political Science' PS: Political Science and Politics, 47:1 43-47.

Findley, M. G., Jensen, N. M., Malesky, E. J. and Pepinsky, T. B. (2016) 'Can Results-Free Review Reduce Publication Bias? The Results and Implications of a Pilot Study' Comparative Political Studies 49(13) 1667–1703.

Holloway, P. J. and Mooney, J. A (2004) 'What's a research protocol?' Health Education Journal 63:4, 374-384 <https://doi.org/10.1177/001789690406300408>.

Kapiszewski, D., Elman, C. and Lupia, A. (2018) 'Transparent Social Inquiry' Annual Review of Political Science, 21: 29-47.

Kern, F. G. and Gleditsch, K. S. (2017) Exploring Pre-registration and Pre-analysis Plans for Qualitative Inference: 15 available at [https://www.researchgate.net/profile/Florian\\_Kern4/publication/319141144\\_Exploring\\_Pre-registration\\_and\\_Pre-analysis\\_Plans\\_for\\_Qualitative\\_Inference](https://www.researchgate.net/profile/Florian_Kern4/publication/319141144_Exploring_Pre-registration_and_Pre-analysis_Plans_for_Qualitative_Inference).

Kuhn, T. S. (1962) The Structure of Scientific Revolutions (1st ed.). University of Chicago Press.

Leeper, T. J. (2011) 'The Role of Protocol in the Design and Reporting of Experiments' The Experimental Political Scientist Newsletter of the APSA Experimental Section 2:1.

Lupia, A. (2010) 'Procedural Transparency, Experiments and the Credibility of Political Science' The Experimental Political Scientist Newsletter of the APSA Experimental Section 1: 1.

Laitin, D. D. (2013) 'Fisheries Management' Political Analysis 21:42–47.

Lupia, A. and Alter, G. (2014) 'Openness in Political Science: Data Access and Research Transparency' PS: Political Science and Politics 47: 1, 19–42  
DOI: <https://doi.org/10.1017/S1049096513001716>.

Moravcsik, A. (2010) 'Active Citation: A Precondition for Replicable Qualitative Research' PS: Political Science and Politics 43: 29-35.

Nyhan, B. (2015) 'Increasing the Credibility of Political Science Research: A Proposal for Journal Reforms' PS: Political Science and Politics 48:S1 78-83.

Olken, B. A. (2015) 'Promises and Perils of Pre-Analysis Plans' Journal of Economic Perspectives 29:3 61–80.

Piñeiro, R. and Rosenblatt, F. (2016) 'Pre-analysis plans for qualitative research' Revista de Ciencia Política 36:3 785-796.

Purcell, A.T. and Gero, J.S. (1998) 'Drawings and the design process: A review of protocol studies in design and other disciplines and related research in cognitive psychology' Design Studies 19: 4, 389-430 [https://doi.org/10.1016/S0142-694X\(98\)00015-5](https://doi.org/10.1016/S0142-694X(98)00015-5).