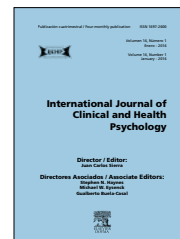


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THEORETICAL ARTICLE

Where to look for information when planning scientific research in Psychology: Sources and channels

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Abstract It is imperative that researchers invest time in the planning of their research, and it is certainly essential to stop and seek information before making any kind of decision. The present work sets out to guide psychologists in this crucial task. To this end we begin by suggesting a visit to the APA website, where a great deal of relevant information on most topics can be found, whether it pertains to new and controversial issues or to those on which there is greater consensus. In this regard we shall consider at length the meanings of the expressions “evidence-based practice” and “scientific evidence” and their inherent methodological aspects, from “scientific evidence” contributed by systematic reviews to the way it can be obtained using handbooks and guidelines of inestimable value for the successful completion of our research. All such resources will help researchers to set out their hypotheses correctly, to test them adequately and to analyze the data in the most appropriate and rigorous fashion. In this way, the quality of the research will undoubtedly improve.

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PALABRAS CLAVE

Calidad;
Planificación;
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Estudio teórico

Resumen Es imperativo que los investigadores inviertan tiempo en la planificación de su investigación, y sin duda alguna, detenerse para buscar información es esencial antes de tomar ninguna decisión. Este trabajo está dedicado a orientar a los psicólogos en esta gran tarea. Para ello comenzamos sugiriendo visitar la página de la APA y desde ella abundar en los aspectos sustantivos del tema que nos ocupa, tanto en lo más novedoso y más debatido como en aquello que disfruta de mayor consenso. En este punto abundaremos en el significado de las expresiones “práctica centrada en la evidencia” y “evidencia científica” y en los aspectos metodológicos inherentes que conllevan, desde la “evidencia científica” aportada por las revisiones sistemáticas, hasta el modo de obtenerla utilizando guías de valor inestimable para concluir con éxito

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nuestras investigaciones. Todos estos recursos ayudarán al investigador a plantear sus hipótesis correctamente, a ponerlas a prueba de modo satisfactorio y a analizar los datos del modo más conveniente y correcto. Por lo tanto, aumentará la calidad de su investigación.
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As though it were a routine exercise, many scientific journals, mainly the most prestigious ones, frequently *take a good look at themselves* to appraise what they have published and how the research was carried out. The perspective from which they do so is kaleidoscopic (e.g., research methodology used, assessment of the application and/or effect of the intervention, quality of the analysis, etc.). The results are unsurprising. Unfortunately, the analysis of research quality shows that it is not high. And this assertion applies, quite *democratically*, to all the natural and social sciences, including Physics, Medicine, Ecology, Psychology and even Jurisprudence. The examination of quality has revealed the weaknesses of published research in multiple aspects, and highlighted the need for publishers, researchers, reviewers, scientific organizations, etc., to coordinate with one another to solve this problem and introduce some common sense. In this regard, the *International Journal of Clinical and Health Psychology* is an excellent reference (see, for example, Chacón, Sanduvete, Portel, & Anguera, 2013; Fernández-Ríos & Buela-Casal, 2009; Hartley, 2012).

There is no research manual that fails to include a paragraph warning that one of the first steps to be taken in a scientific study is that of “*seeking information*”. Doing so correctly is a significant *vaccine* against errors in the planning of what we set out to do. It helps us to know what we must take into account, what difficulties have been encountered by others doing similar studies, which research methods are optimal for studying the topic in question, what systematic reviews have been carried out on our chosen topic, and so on. Our objective here, then, is to identify some information channels we psychologists have at our disposal for learning about and assessing all these substantive and methodological aspects that will help us to set out our hypotheses correctly and test them in the most satisfactory way possible, to analyze the data correctly, and in sum, to properly PLAN our research.

In the following sections we shall learn how to look for information using the American Psychological Association (APA) as a beacon. In the APA sources we shall take initial stock of our subject of interest (which aspects are currently most topical, who is doing research on it, etc.). We shall note how extremely often the term evidence appears and deal in depth with this concept and how to achieve it, bearing in mind the CONSORT and TREND declarations. We shall consider it important not to begin our work without knowledge of the best scientific evidence on our topic, and we shall look into the Cochrane and Campbell organizations. Finally, we shall consider the EQUATOR platform, so as not to lose sight of other (multiple) roads that permit us to do science.

We consider as *good* information that which permits us to see the positive, the negative and the nuances of the topic

under study, as *prolific* that which awakens our curiosity, which gives us the power not only to see, but to look, and as *optimal* that which makes it possible not only to maintain a distance in observation, but also to maintain it throughout the entire process. We shall try to make sure the information contributed here can be defined with these three adjectives.

Where to find information

From the American Psychological Association

It is essential for any psychological professional – in the academic, clinical or research field (or all of them), or any other field, or indeed any combination of these – to make regular visits to the website of the American Psychological Association (APA) <http://www.apa.org/>. “The APA is the biggest scientific and professional psychological association in the world” (Buela-Casal, Olivas-Avila, Musi-Lechuga, & Zych, 2011, p. 96). This organization was founded in July 1892 at Clark University (Massachusetts) by G. Stanley Hall, who was its first President. It was initially made up of 31 members interested in what they called the new psychology, and although making slow progress at first and in the early part of the twentieth century, after 1945 it began a period of strong growth and diversification.

Enormous quantities of information can be accessed from its website, all of it valuable and interesting, though we would highlight that referring to its divisions, <http://www.apa.org/about/division/>. There are 54 of these divisions, relating to different disciplines in psychology, research areas, methodological aspects, and so on. Each division has its own staff, publications (including both journal and books), activities, conferences, etc., as well as its own website.

On the APA's publications webpage, <http://www.apa.org/pubs/>, one can find books, videos, databases, and 69 scientific journals published by the Association. It goes without saying that all of these are of great relevance and interest. However, the Association's official journal, *American Psychologist*, merits special mention. This journal, as well as being an outlet for publications on the theory and practice of psychology and on the APA's contributions to political affairs, announces the changes occurring in the organization itself or in some of its thematic areas, new regulations, updates of existing regulations, and so on. For example, all the changes and novelties documented in one of its flagship publications, *The Publication Manual of the American Psychological Association*, are first announced in *American Psychologist*.

There is no scientific journal in psychology that does not urge its authors, collaborators and reviewers to produce

articles that are in line with the publication guidelines of the APA. The Publication Manual is a style handbook replete with recommendations on how to write and present scientific publications correctly. July 2009 saw the launching of the 6th and most recent edition of a manual (American Psychological Association, 2009) first published in 1952 as a supplement to the Psychological Bulletin (American Psychological Association, Council of Editors, 1952). That supplement included some brief recommendations about the Abstract, Problem, Method, Results and Discussion sections. Since then, each new edition has covered these aspects in more detail and included new guidelines. Between the first and the sixth editions there were two turning points that heralded the publication of the 5th and 6th editions, respectively.

First, in the 1990s the debate on the application of significance tests, which had been brewing for some years, took on a new ferocity. Indeed, the 4th edition of the APA manual included, albeit timidly, an important change in its editorial policy, encouraging researchers to provide the Effect Size (ES) together with the *p* values:

Neither of the two types of [statistical significance] probability values reflects the importance or magnitude of an effect because both depend on sample size... You are encouraged to provide effect-size information (American Psychological Association, 1994, p. 18).

In that same year Cohen's article *The Earth is Round* ($p < .05$) (Cohen, 1994) caused a considerable stir on exposing bad practice in the use of significance tests, calling at the same time for researchers to "always" choose inferential statistics on the basis of exploratory analysis of the data and emphasizing the need to calculate ESs and confidence intervals. The commotion continued as publications appeared which indicated the extent to which APA recommendations were being ignored in scientific articles (Kirk, 1996; Thompson & Snyder, 1997, 1998). All of this led to the APA Board of Scientific Affairs setting up the Task Force on Statistical Inference (TFSI) in 1996 to sort out these problems. The work of the TFSI bore fruit three years later in the publication of an article in *American Psychologist* (Wilkinson & the Task Force on Statistical Inference, 1999) presenting the guidelines for correct practice in the planning of research, the analysis of data, statistical inference and reporting of results. These recommendations were incorporated into the 5th edition of the Manual in 2001.

In 2007 the Publications division of the APA decided to set up a working group for drawing up standards for what should be considered and included in each of the parts making up a scientific article. The working group *Journal Article Reporting Standards* (JARS) took on this project, absorbing all the developments in relation to method and its efficiency that had occurred in research areas such as medicine and in social sciences such as education. The project was driven by both political-practical and methodological concerns.

Evidence-based practice

It could not be further from the truth that political-practical concerns are unrelated to scientific research. Few terms

have been (and it continues to be) so crucial to scientific development and the use of its findings in the solving of practical problems as Evidence-Based. The year 1995 saw the founding of the Centre for Evidence-Based Medicine (CEBM) in Oxford, but it was an editorial article in the *British Medical Journal* entitled *Evidence-based medicine: what it is and what it isn't*. It's about integrating individual clinical expertise and the best external evidence (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996) that really brought popularity to the term. The article and some replies to it can be found at <http://www.ncbi.nlm.nih.gov/pubmed/8555924>. Although the text is short, it was sufficient to promote two ideas, one, that decision-making at a practical level must be based on research in which precautions have been taken at all stages of its process, and two, that it is absolutely essential to have transparency in the transmission of information, so that users of the results can make a reasoned judgement on the consequences of their application.

This approach, which had gestated in the medical domain, was taken up by the educational field when in 2001 the federal No Child Left Behind Act was passed. Following this legislation, education professionals were required to make use of scientific research whenever they had to make decisions about which intervention to implement. The philosophy was simple, if professionals had the appropriate tools for identifying evidence-based interventions, substantial improvements could be achieved in schools, and in US education in general. Access to all information on "evidence-based practice" in education is gained through The National Center for Education Evaluation and Regional Assistance of the Institute of Education Sciences at http://ies.ed.gov/ncee/pubs/evidence_based/evidence_based.asp.

The Council of Representatives of the APA took up a firm position on evidence-based practice in Psychology at its meeting in August 2005. In 2006, and once again using as a platform *American Psychologist* (APA Presidential Task Force on Evidence-Based Practice, 2006), it published the following by way of a definition "...evidence-based practice to mean the integration of the best available research with clinical expertise in the context of patient characteristics, culture and preferences..." adding "...evidence-based practice requires that psychologists recognize the strengths and limitations of evidence obtained from different types of research..." (pp. 273-275). Full information can be obtained at <http://www.apa.org/practice/resources/evidence/index.aspx>.

How to obtain scientific evidence with our research

There are no exceptions, whether the research is on physical health, education or psychological health, the most valuable evidence is that obtained with intervention studies using randomized and non-randomized designs (preferably, between other useful and essential types of research, according to circumstances). Thus, and once appropriately informed about our research topic, we should find the most suitable way of performing our study and disseminating its results, and we certainly have the necessary resources for this. Aware that transparency in the transmission of information is crucial for evaluating the validity and efficacy of research with intervention, the American Psychological

Association Working Group on Journal Article Reporting Standards (JARSgroup) looked at other progress made in the medical field. We are referring to the development of standards for improving the quality of not only reports on randomized and non-randomized studies but also quantitative reviews or meta-analyses. Let us look more closely at this.

In December 1994, and independently in two medical journals, *The Journal of the American Medical Association (JAMA)* and *The Annals of Internal Medicine (Ann Intern Med)*, working groups made up of editors, researchers and methodologists (The Standards of Reporting Trials Group in the JAMA and Working Group on Recommendations for Reporting of Clinical Trials in the Biomedical Literature in *Ann Intern Med*) published recommendations for carrying out and reporting on research involving randomized controlled trials (RCT). The aim was to avoid the transmission of biased information about the effects of the intervention, and especially its benefits. Drummond Fennie, deputy editor of the JAMA, convinced that a single recommendation would be more likely to be accepted by the editorial boards of the journals, brought the two groups together, in Chicago in 1995, with a view to their making a concerted effort in this direction. From this meeting there emerged the CONSORT Declaration (Consolidated Standards of Reporting Trials), which was published in the JAMA (Begg et al., 1996). Subsequent meetings of the group produced a revised declaration five years later, which was published in three journals, the JAMA, *Annals of Internal Medicine* and *The Lancet* (e.g., Moher, Schulz, & Altman, for the CONSORT Group, 2001). The latest revision was in 2010, as reflected in a total of 10 journals (e.g., Schulz, Altman, & Moher, for the CONSORT Group, 2010).

The CONSORT group's objective has been and continues to be that of orienting those who decide to perform RCTs in the planning, implementation and exposition of the research so that it is thorough, clear and transparent. The Declaration includes 25 items (in the latest revised version) referring to aspects relating to the internal and external validity of the experiments (design, analysis and interpretation) and a flow diagram indicating the order in which they should be approached. The first version focused exclusively on simple randomized designs for independent groups, but subsequent versions have been extended to cover more complex designs (e.g., factorial, cluster and crossover).

Today, the CONSORT group has its website <http://www.consort-statement.org/home/> where we can find the different initiatives it has launched for alleviating the problems deriving from inadequate information in relation to experimental designs. From that page one can gain access to its principal product, the CONSORT Declaration, but also, and more importantly, to an explanation of how it was developed and why each item was included, together with ad hoc illustrative examples (at http://www.bmj.com/cgi/content/full/340/mar23_1/c869, see also, Moher et al., 2010). At <http://www.consort-statement.org/extensions/> one can learn about its extension to other types of design (e.g., cluster), other types of intervention (e.g., acupuncture, homeopathic treatment) and other types of data (e.g., harm, abstracts). Numerous examples of correct procedure can be found at <http://www.consort-statement.org/consort-library/>.

Sooner or later since the publication of the CONSORT Declaration in 1996, different editorial groups have adopted it, including The International Committee of Medical Journal Editors, The World Association of Medical Editors and The Council of Science Editors. The APA did so in 2008 (American Psychological Association Working Group on Journal Article Reporting Standards [JARS Group], 2008). This has led to an extraordinary level of acceptance in scientific journals (Altman, 2005), and today over 400 support this initiative, though not all of them with the same intensity. For example, journals with high impact factor (IF) are more likely to refer to the CONSORT Declaration than those with lower IF (Ziogas & Zintzaras, 2009). Furthermore, the zealotry with which researchers are encouraged to take it into account is not the same in all the journals with high IF (Hopewell, Altman, Moher, & Schulz, 2008), and it also varies according to speciality (Meerpohl, Wolf, Niemeyer, Antes, & von Elm, 2010) and region of the world (Li et al., 2012). Many authors think that journal editors should be more explicit in recommending the CONSORT Declaration and its extensions, and not only to authors, but also to reviewers and all members of the editorial board (see, for example, Agha, Cooper, & Muir, 2007, and Hopewell et al., 2008).

What does seem to be clear is that those journals which have adopted the CONSORT Declaration have shown an improvement in the quality of the articles involving RCTs (Egger, Jüni, & Bartlett, 2001; Hopewell, Dutton, Yu, Chan, & Altman, 2010; Plint et al., 2006). In spite of this, however, the reporting of such research is still deficient (Agha et al., 2007; Li et al., 2012; Uetani, Nakayama, Ikai, Yonemoto, & Moher, 2009).

Let us look in another direction. Under the auspices of The American Public Health Association and its Centers for Disease Control and Prevention (CDC) division, as well as the editorial team of its official mouthpiece, the *American Journal of Public Health (AJPH)*, the TREND group (Transparent Reporting of Evaluations with Nonrandomized Designs) was formed, with the aim of drawing up guidelines for correct procedure in the design, analysis and exposition of research involving an intervention, but in which the participants (or groups of participants) had not been randomly assigned to treatment levels. The proposal was to follow the CONSORT Declaration, but owing to the problems of these types of study for maintaining internal and external validity, the recommendation is to consider in detail some specific points and highlight certain aspects of them. The TREND Declaration was published in the AJPH (Des Jarlais, Lyles, Crepaz, & TREND Group, 2004) and comprises a list of 22 items that authors, reviewers and editors should consider when choosing to use a non-randomized design in their data collection or to review such a design.

CDC is the platform on which they present their website <http://www.cdc.gov/trendstatement/>. There we can see the journals or organizations that have published an editorial or comment about the TREND Declaration, as well as mention of other working groups making efforts to improve the quality of these studies and who support their use as essential resources for obtaining scientific evidence.

However, this website has not been developed, and nor has this group grown in the same way as CONSORT. Despite

the fact that Des Jarlais et al. (2004) presented the TREND Declaration as an initial version "We present the initial version of ...TREND statement" (p. 361), to date they have produced no revision of it. Nevertheless, in the same journal, in 2008, Des Jarlais himself, one of the signatories to the TREND Declaration, co-wrote an excellent article entitled *Alternatives to the Randomized Controlled Trial* (West et al., 2008). With a clearly pedagogical approach, it indicates the two principal problems with non-experimental research (dropout and non-adherence to treatment) and how they might be solved (using regression discontinuity designs, taking several pre- and several post-measures, employing more appropriate analysis alternatives when randomization is not possible or suitable, etc.). And in 2009, AJPH Editor Roger D. Vaughan was still reminding us about the TREND Declaration, stressing the crucial importance of whether participants are assigned to intervention groups randomly or non-randomly, and the extraordinary care that must be taken in the latter case (Vaughan, 2009).

If we put into practice the recommendations from CONSORT and TREND, our article may perhaps (because this in itself is not sufficient) be selected for its excellent methodological quality to form part of a meta-analytical review seeking to better explain, for example, a basic, behavioural or social psychological process. The meta-analysis is nothing more – and nothing less – than a quantitative synthesis providing reliable conclusions about a particular issue, and which begins with the integration of data from a wide variety of sources, proceeding to distil information about whatever we are looking for (Cooper, 2010). The best scientific evidence that can be used in clinical practice is that provided by meta-analyses based on studies of good methodological quality (Perestelo-Pérez, 2013). The JARS Group (American Psychological Association Working Group on Journal Article Reporting Standards [JARS Group], 2008), once again in *American Psychologist*, in addition to gathering together the previous declarations, also made some recommendations about the requirements studies should meet for their inclusion in meta-analyses. The latest edition of the APA manual incorporates all of these contributions.

Where to find the best scientific evidence

We have found information about the topic of interest by searching the APA website, and making a critical reading of it. CONSORT and TRENDS have helped us not to read just anything, and not to believe everything we read. We also know that our research should follow those guidelines, but we may still need more information to plan it correctly (to ascertain whether research similar to our own has formed part of a meta-analysis, if there are meta-analyses on our specific topic, etc.). It is time to pay a visit to two independent organizations, The Cochrane Collaboration and The Campbell Collaboration.

The first focuses on the health sector, and the second on the field of the social sciences. Their objective is to help people (those responsible for government policy, medical doctors, teachers, etc.) to make informed decisions about interventions carried out in the different areas of health and social welfare, respectively. Both perform systematic

reviews with data from studies carried out with the maximum scientific rigour, revise their own results incorporating updated information, and provide us with reliable data. This is why we think their reviews are probably those which contribute the most scientific evidence about the beneficial or prejudicial effects of the interventions analyzed. Let us look at each of them in more detail.

The Cochrane Collaboration was founded in the United Kingdom in 1993, and today constitutes an international network devoted to carrying out systematic reviews in the health field in over 100 countries. From their main page (<http://www.cochrane.org/>) we can access a wide diversity of information, including that related to evidence-based healthcare, evidence-based clinical practice and evidence-based medicine. Of special interest is the organization's own handbook (Higgins & Green, 2011). On reading it one becomes aware of the rigour demanded of publications for their consideration as useful for these systematic reviews. At The Cochrane Library (<http://www.cochrane.org/cochrane-reviews>) one can find all the reviews they have carried out, those that are underway, and those which are at the planning stage or that they intend to repeat. Their official bulletin on methodological issues, *Cochrane Methods* (<http://www.thecochranelibrary.com/view/0/CochraneMethods.html>), is also worth a look.

The idea for The Campbell Collaboration came up at a meeting held in London in 1999, where those attending, many of them linked to the Cochrane Collaboration, saw the need to form an organization equipped for a similar task to that of Cochrane, but in the social sciences. The idea was widely supported by social and behavioural scientists, and the year 2000 saw the founding of The Campbell Collaboration. The Nordic Campbell Centre was launched in 2001, and this has been followed by the founding of associations in several countries.

From its main page (<http://www.campbellcollaboration.org/>) we can access diverse information of the utmost interest for researchers in the social sciences (coordination groups, meetings, events, methodological resources, etc.). In its library (<http://www.campbellcollaboration.org/library.php>) one can find the most popular topics, the latest reviews, and so on. Documents and guides on methodological best practice and specific guidelines for authors and reviewers on research design and statistical analysis can be found at http://www.campbellcollaboration.org/resources/research/Methods_Policy_Briefs.php.

The EQUATOR Network

The needs of a researcher may undoubtedly be other than pursuing final causality by means of randomized studies (experimental) or non-randomized studies (quasi-experimental and causal-comparative), the purpose may be simply descriptive, or perhaps explanatory. We may intend to carry out a qualitative study or a mixed one (part qualitative, part quantitative), or wish to know how to design a study to diagnose a problem, or the best way of identifying the adverse effects of our research. Therefore, we refer readers to a platform where they will certainly find all the appropriate help in such matters: the EQUATOR Network (Enhancing the QUALity and Transparency Of health

Research), <http://www.equator-network.org/>. Let us look briefly at this platform.

Funded initially by The Institute for Health and Clinical Excellence, EQUATOR was formed in 2006 by the CONSORT group and other groups responsible for drawing up guidelines, editors, reviewers, and so on, with the aim of creating a platform where scientists in different health-related areas could find guidance for the presentation of all kinds of scientific reports (method, design, etc.), so that the quality of research would improve. Aimed also at reviewers and editors, it was officially launched in June 2008 in London. Today, the EQUATOR Network is run by an international executive group that includes prestigious experts in health research methodology, in statistics, in presentation of reports and in editorial and publishing work. On its website one can find a wide range of regularly updated resources, from specific guides for each type of study, to guidelines for particular sections of the scientific report (how to use the narrative, employ graphics, structure the discussion, etc.), to how to present the method, perform the statistical analysis and avoid research bias, and much more. At <http://www.equator-network.org/about-equator/equator-publications0/> we can find references to all the activities of EQUATOR and an exhaustive catalogue (the latest update was in May 2011).

Conclusions

Sometimes we have made decisions and analyses, given opinions based on false or incomplete information. Sometimes we could have done things better if we had taken into account some of the points discussed here. It is true that many aspects must be considered when we undertake research, but if that is what we do, our monolithic training background on the matter in question does not exempt us from the need for horizontal knowledge (in this case, covering methodology), in any case, should we lack such horizontal training, it is imperative to employ a multidisciplinary approach.

A proper training would make it possible to be rigorous, to have clarity in our ideas, to report on our work in precise and well-documented fashion, and to present convincing arguments. But this cannot be achieved from one day to the next, training a good scientist requires hard and constant work, and therefore time. None of this actually produces science, of course, but without such investment it is impossible for science to be done. Things must not be done hastily. Improvisation and spontaneity should not take priority over systematization and order in the process, because in the planning of research we must pay attention to the details of every decision. What is urgent, therefore, it to focus on training.

The objective expressed at the beginning of this article will be met, then, when all researchers, be they novices or experienced, become aware that the core aspect of a research project is its correct planning, that in this undertaking the goal is the path, and that for starting up, for continuing and for finishing, the only way forward involves knowing what has been done, what is being done, and how to take each step along the way so as to make as few errors as possible, in relation not only to the research

question itself, but also to methodology and statistical analysis.

Undoubtedly, smart researchers will know how to handle such resources and to gather and use everything that will lead them to perform a high-quality study. They will be continually well-informed, since all such resources are available on virtual platforms, open-cast pits that are accessible to all, and which one must learn to exploit, sorting carefully that which is extracted. They will surely make regular use of these resources, because they know that they are constantly being updated.

In the second paragraph of this article we put the expression seeking information in inverted commas, because, as we have seen, on the one hand it goes far beyond contextualizing our topic of interest, and on the other, all good scientists should regard it as a maxim in the Kantian sense. It is just as indisputable that scientific work is a transitive art (which requires clarification of meaning) as it is certain that when we send our next article to a journal and it is reviewed, we will have much greater capacity for reaction in our response to the reviewer's requirements (if indeed there are any). Of that we can be certain.

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