



## Editorial

# Finding a Voice for Numerical Cognition

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It is a pleasure to start by writing emphatically and warmly: *Welcome to the Journal of Numerical Cognition*, I am delighted to be able to introduce you to the very first issue!

However, having said that, I anticipate an obvious reader response: *Thanks – but do we need yet another journal?* That is an important question. After all, it is already difficult to keep abreast of the ideas contained within current research outlets. Not only are there lots of journals available, existing journals vary widely along multiple dimensions, making scaling a complex operation. A few are highly prestigious, many are less so. A few have a long publication history, many do not. Alongside many respectable, functional journals, there now also exist “predatory journals” that seek (and oftentimes, solicit for) any submission, irrespective of quality, because their economic *modus operandi* is to levy an author publication fee for profit regardless of the scientific credibility of individual contributions or the Journal itself.

These current trends might leave many researchers cautious about the emergence of a new title. So it is important to address what the *Journal of Numerical Cognition* (JNC) seeks to do, why many people agree that its time has come, and why there are important reasons to say “*Yes, we clearly do need the Journal of Numerical Cognition!*”

## Aims and Scope of the Journal of Numerical Cognition

To summarise, the main objective of JNC is to provide a scholarly forum for the focused discussion of research into numerical cognition. The Journal aims to be inclusive, and takes numerical cognition to encompass for example all branches of mathematics (including spatial reasoning), and welcomes research for its quality, regardless of whether its origins are in (Cognitive) Psychology, Education, Anthropology, or other disciplines.

A core reason for the enthusiasm behind the *Journal of Numerical Cognition*, amongst both its Editorial Team and many other researchers in this field who have been consulted, is that there simply aren't existing specialist

Journals that cater to numerical cognition and the psychology of mathematics. This is in contrast to analogous domains, especially reading. There is a venerable tradition of investigations that study variously the development of reading proficiency, the processes that underlie reading and the extraction of meaning from text, and reading difficulties. Moreover, reading can usefully be studied alongside other language based communications and as a channel for language. A brief survey shows that currently a scholar could consider submitting a reading paper to any one of the following specialist Journals: *Annals of Dyslexia*, *Discourse Processes*, *Dyslexia*, *Journal of Psycholinguistic Research*, *Journal of Research in Reading*, *Reading and Writing*, *Reading Psychology*, *Reading Research Quarterly*, *Scientific Studies of Reading*. In addition to these nine Journals, all of which contain articles about reading (albeit not just about reading), there are overlapping Journals such as *Journal of Child Language* or *First Language* that may be an appropriate publication home.

Now, how does the situation compare for researchers who focus on numerical cognition? It is worth noting that *Mathematical Cognition* published several volumes from 1995 to 2000, but then ceased, and that there are mathematical education publications (e.g., *Journal for Research in Mathematics Education*, *Mathematics Education Research Journal*, and *Research in Mathematics Education*). Yet, despite the enormous variety and quality of research into numerical cognition, that has existed for many years and continues to flourish, the community lacks a high quality and scholarly, integrative, outlet. In my view, this can't be optimal for the discipline and the *JNC* aims to improve this situation!

Why the name "*Journal of Numerical Cognition*" and not for example "*Journal of Mathematical Cognition*"? I've mentioned the existence of maths education journals, and the temporary production *Mathematical Cognition*. It therefore seemed important to have a distinctive title. Even more relevant, the remit of the Journal is designed to be extensive. Using the term "mathematics" might potentially exclude important phenomena that are not mathematical *per se* (e.g. the SNARC effect, see [Wood, Willmes, Nuerk, & Fischer, 2008](#)). In essence *JNC* is broad in scope and welcomes contributions from a range of fields that are not exclusively numerical cognition, including for example mathematics and spatial geometry, recognising these to be eminently suitable domains for *JNC* to cover. Likewise, *JNC* very much welcomes interdisciplinary work as it can contribute greatly to the discipline as a whole. In this respect an anthropological perspective can be as enlightening as a neuropsychological one; what matters is the quality of science and its application. In other words, although the name choice is relevant, it isn't the only thing that is important, and I sincerely hope that this editorial provides the reassurance and encouragement to potential authors that their ideas will be taken seriously.

This leads naturally to the point that *JNC* has been configured so that at present it is not only an outlet for *research reports* (though these are likely to be central). *JNC* also welcomes shorter, more discursively oriented or controversial *commentaries*, *theoretical contributions*, *literature and book reviews*, and *applied perspectives*. It is worth highlighting the latter because applied perspectives are somewhat unusual for a scholarly journal. As an open access journal on a potentially applied topic, *JNC* is accessible (financially, procedurally and conceptually) to many interested individuals outside University Departments and Research Units. Thus there is the potential to disseminate ideas beyond scholarship, and to engage with "users" of research who also have a valuable role to play in assessing and contributing to impact, as well as to raising awareness of a whole variety of issues at the coal-face. Again, it should be about the quality of the work, and the way it can and is implemented, that represents a key assessment.

## Editorial Team and Community Backing

So *JNC* is specialist in the sense that it focuses on the particular domain of numerical cognition, albeit with a broad and inclusive scope. And I'm delighted to have been able to engage with and bring on board an outstanding Editorial Team, who bring not only an enthusiasm for this current publication project but also breadth of experience and expertise, world class scholarship, and transformational ideas in the area. The Editorial Team work both in Europe and North America, as well as further afield, and bring expertise for example from Neuroscience to Development, from Adult Cognition to Genetics. They will seek constructive reviews from experts whose collective expertise is also diverse. Thus, the scientific team behind *JNC* is ready and willing to consider all forms of research and applied excellence in numerical cognition, wherever it may be sourced. We want to nurture the very best ideas.

Besides its Editorial Team and reviewer pool there are other means by which *JNC* seeks to strengthen its ties to and impact on the numerical cognition community. Many of the reading-related Journals listed above are associated with a Society of some form. Being linked with a Society is neither a necessary nor sufficient condition for a Journal to be effective and successful. However, in several ways it can help. One is that Society activities – such as conferences and meetings – can be the catalyst and the fuel for article submissions. Another is that Society members may feel a greater sense of allegiance to, or identity with, the Journal (if nothing else, reading more of its contents than the average publication). And the link provides potentially both governance and assurance concerning the intellectual values of a journal.

These are some of the reasons why PsychOpen, the publishing platform for *JNC*, asks that new Journal proposals are endorsed by research groupings – they offer a community backing of the potential behind a Journal title. In this respect, I want to recognise the contribution of the European Society for Cognitive Psychology (ESCoP), who agreed to endorse *JNC*. ESCoP has an excellent tradition of supporting fledgling topics and activities, whether workshops, regular symposia or summer schools, and it has developed a healthy reputation for its flagship *Journal of Cognitive Psychology*. ESCoP has also raised the visibility of numerical cognition, through award prizes and symposia at meetings, and I hope that *JNC* will blossom as a demonstration of ESCoP's commitment to good science.

As well as ESCoP endorsement, at the time this Editorial is being written, there are plans for a new grouping, the Mathematical Cognition and Learning Society (MCLS). As MCLS becomes constituted and realised, it will undoubtedly offer an important venue for researchers to explore and discuss ideas that are core to *JNC*. Indeed, the aspiration is that in time, MCLS and *JNC* can become linked. This is welcomed by PsychOpen, and would seem to offer benefits to each. Hopefully there will be more to write about this in the not too distant future.

## Journal Features and Benefits for Authors

It is important to recognise that, complementing its remit, *JNC* expects to do journal business somewhat differently, particularly when the following features are considered in concert:

First, *JNC* is a fully open access (OA) project, published on the now established PsychOpen platform. In other words, there are no subscription barriers or paywalls restricting accessing individual articles or the journal itself by readers and other users (e. g. libraries, databases). Evidence as to whether OA leads to a larger readership

and citation update is contested (SPARC Europe, 2015). However, it is already apparent that the potential of OA can match and possibly exceed that of traditional publishing routes.

Second, on the authors' side there are no financial barriers either, no author publication fees or article processing charges (APC). Publication costs are kept low (for example by using robust and widely implemented open-source software for managing the journal workflow) and all costs are covered by the Publisher. *JNC* is published by PsychOpen, which is an initiative from the Leibniz Institute for Psychology Information (ZPID). PsychOpen is not a commercial enterprise, rather it is part of the federal and state funded German research infrastructure.

Third, as noted earlier *JNC* welcomes contributions that go beyond conventional research reports, and therefore can engage in a dialogue with users of research and their issues too.

Fourth, *JNC* invests in exciting work by new researchers. It has made a commitment that the Editorial Team will on request write a letter of recommendation for one of its authors applying for their first appointment within the research community (e.g., for a Faculty staff hire). Such a letter will address the significance and value of the paper(s) published in *JNC*. This is one of the ways *JNC* will try to recognise those who decide publish in the Journal, and support them in turn.

The last point raises an important question: Why should an author or a set of authors select *JNC* as an outlet for their research? When authors consider where to submit a manuscript for publication, they are likely to address a number of issues. A key question might be "How prestigious is this Journal?" Whilst this initially seems a very sensible question to ask, specifying an answer can be elusive, because the quality searched for is not fixed. Still, one way in which this question is sometimes quantified is with respect to a related question: "What is the Impact Factor?" Researchers should be aware of several issues associated with this particular measure.

"The Impact Factor (IF) of a journal" usually denotes a proprietary measure reported by the business Thomson Reuters in its *Journal Citation Reports (JCR)*. It tries to quantify the scholarly impact and thus prestige of a journal by the "average" number of citations received by articles in that journal. The algorithms involved in calculating a Journal IF require publication for at least three years. There is an understandable logic within this – for one thing the prospective nature of calculating citations for published articles requires a sufficient lag between the initial publication and the emergence of citations. Nonetheless, it means, simply, that new journals cannot have an (JCR) IF at the time that they launch. Instead, authors can only publish in a new Journal so as to contribute to the impact factor for future users and visitors.

Not all Impact Factors are the same: besides the IF published by Thomson Reuters there are other "Impact Factors" on the market. Most of them are commercial products. Alarmingly, more and more counterfeit impact factor services exist, designed first to make a profit by charging journals for inclusion in the index and second to provide a cloak of publication glamour and respectability to predatory journals that further confuses the field (Beall, 2014).

However, traditional Impact Factors are journal (and not article) based metrics, and citations almost always form highly skewed distributions (Mutz & Daniel, 2012). Consequently the calculation of a value is driven mostly by outlying data points, and it does not capture central tendency as one might expect.

Undoubtedly, Impact Factors are widely used metrics. However their validity as estimates of article quality or Journal practice is open to dispute. Still, the science of bibliometrics is not static, and there are already a range of alternative metrics (sometimes called "Altmetrics"), more transparent and more focused. Such article-level

metrics may develop to a point where they replace IF as more useful parameters of an article's utility. *JNC* is open to these developments and will implement article-level metrics as soon as it will become technically and economically feasible. I certainly seek to reassure contributors that interesting, stimulating, high quality articles lead to considerable uptake within a field regardless of a JCR (IF).

Given the above, I suggest an author also considers other dimensions of a Journal. The author can ask if it is widely available to those doing related work? Is the publication process constructive and helpful to authors, that is, something that ultimately leads to a better quality paper? Does it have an interested and interesting audience, a readership who can perceive the value in what is published? Is the work going to be visible? And what are the publication costs?

On all these respects, I feel confident that *JNC* merits attention as a home for your best work. To take the last issue first, it has already been stated that publication in *JNC* is free. Unlike in other cases, this is not an introductory offer, nor a discount for a special issue nor a sleight-of-hand-lure (where charges are suddenly levied late in the process). Rather it is a fundamental aspect of the Publisher's mission – to be an open to view, free to publish source of scholarly work. As a result, I can be proud that there is no financial conflict of interest in the editorial process, since neither paper publication nor paper readership provides an essential revenue stream. The Journal can focus on the quality of the ideas in the work that is submitted.

Because *JNC* is online and fully OA, and (based on its state-of-the-art publishing techniques and standards) connected to indexing and archiving systems, the work is inherently visible. The Journal team will do everything it can to bring readers to the Journal. Moreover, authors retain copyright in the works they publish. That allows authors to use and distribute their articles without restrictions.

In summary, I'm delighted, less than a year after launch, to be able to introduce the first issue of the *JNC* and to have played a part in its emergence and character (and we know of exciting activities and articles that are currently behind the scenes). I hope you will be interested in the Journal, and consider contributing to it. So, on with the show...

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