



Forty years of editorship of psychiatry research

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ABSTRACT

The astonishing 20 fold growth of the yearly published psychiatric research literature over the past four decades has been paralleled and facilitated by the internet application of electronic publishing. This personal history highlights the decade by decade 1978–2018 augmentation and erosion of this interrelationship from the founding of *Psychiatry Research* to the present day.

1. Introduction

Forty years ago in 1978 at the invitation of Patrick Jackson of Elsevier, Fred Goodwin and I founded *Psychiatry Research*. At that time I was Chief of the Section on Clinical Psychophysiology of the Biological Psychiatry Branch of the Intramural Research Program (IRP) and Fred was Chief, Clinical Psychobiology Branch, IRP, at the NIH Clinical Center in Bethesda, Maryland. The Biological Psychiatry Branch, newly under Dr. William Bunney, was the brand new 1978 name for the Adult Psychiatry Branch reflecting the rapid reorientation of the field. My office in the Clinical Center had no computer at the desk as the ubiquitous PC was still in the future (Fig. 1). My research had focused on relating EEG evoked potential changes to psychopharmacological challenges, genetics, perception and individual differences in patients with schizophrenia and bipolar disorder. During this time, I had just developed software for creating color images of the brain surface EEG and evoked brain activity with my colleague Richard Coppola (Buchsbaum et al., 1982a,b). A positron emission tomography scanner had been delivered to the NIH Clinical Center and installed in what had been the Radiology Department library and I was chosen to do the imaging of psychiatric patients. This melange of research activities stimulated the emergence of our new journal *Psychiatry Research* (later expanded to include *Psychiatry Research: Neuroimaging*). Our mission was to chose articles of interest to researchers. We not only focused on research about the newly emerging clinical characteristics and biology of dysfunctional behavior and the underlying mechanisms of psychiatric disorders but also on new topics of specific researcher interest: imaging, research methods, scale development, and behavioral and biological abnormalities in non-clinical and spectrum diagnosis

samples. After announcements and personal letters to key players in the fall of 1978, the first reports were submitted in February 1979. The first issue contained reports as diverse as the first dopamine ligand positron emission tomography study of schizophrenia (Comar et al., 1979) and an article providing objective, quantifiable content analysis scales for verbal samples subsequently highly used (Gottschalk et al., 1979). Now after selecting and publishing 12,400 reports, I have an opportunity to consider the changes over these decades. This historical view derives from personal experience with *Psychiatry Research*, changing electronic and computing environments, and research assignments in a major Government institution, at a private university hospital, and a public university.

In the 1970s through the 2010s, research psychiatry became more objective, quantified, and controlled as methods from psychology, statistics, and neurobiology were integrated into an approach that had been more subjective and anecdotal than in some other fields. Detailed reviews by the National Institute of Mental Health Study Sections of grants and whole review committee visits to the research location (site visits) brought unique expertise to critique weak diagnostic and psychiatric scale methods, sample recruitment, and statistics. The distribution of larger numbers of scientific grants and peer-reviewed reports raised standards dramatically. The availability of PubMed on-line in 1996 brought the world literature to the desk of every researcher. Lastly, the increasing availability of user-friendly statistical programs made sophisticated and rigorous methods widely available.

During the same period, psychiatry research expanded in geographic sites and volume of publications. *Psychiatry Research* has grown from several hundred submissions per year to over 2200, and submissions that were once largely from North America, Australia and Western

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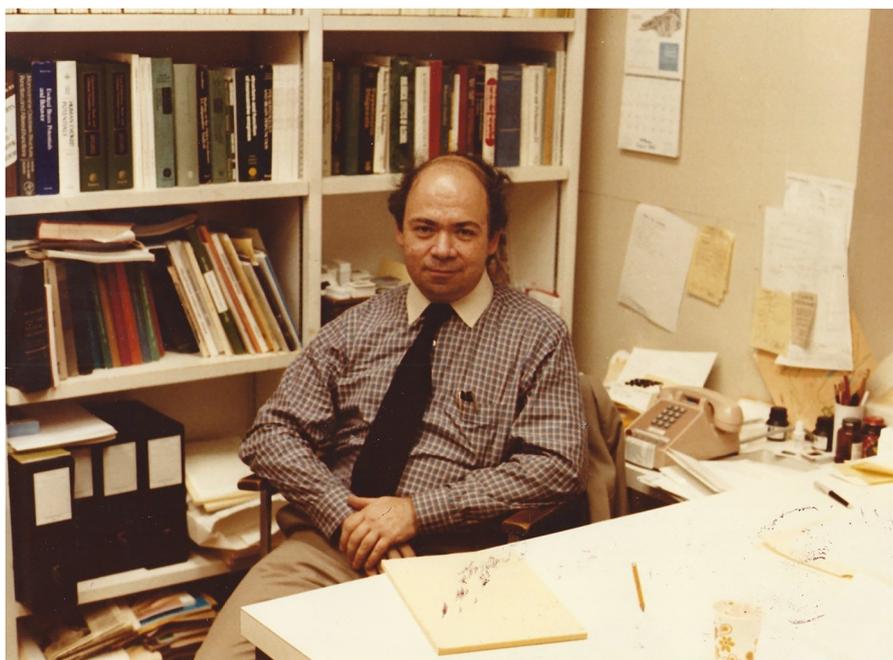


Fig. 1. The Editor in his NIMH Clinical Center office about 1978. Note historical relics: tablet of paper and pencil on desk, boxes for reprint storage, paper calendar on wall, cardex file, and bottle of ink for fountain pen in shirt pocket. London's Jermyn Street shirts are still extant.



Fig. 2. Monte and Sherry Buchsbaum at a scientific meeting dinner in early years of their 40 years partnership for the journal.

Europe now encompass manuscripts from more than 60 countries. PubMed reveals that in 1979–1988 there were 43,920 publications (search on “Psychiatry”) which expanded to 251,691 for 2009–2018. A comparison field, Anthropology (searched on EBSCO), yielded 54,840 for 1978–1987) and 39,786 for 2009–2018. In 1978, submissions to *Psychiatry Research* were almost entirely from the USA and Northern Europe. In the first year (partial 1979), of the 43 reports published, 32 were from the USA, and the remainder were from Sweden (3), Finland (2), and one each from Canada, Denmark, France, Hungary, Netherlands, and Switzerland. In the last year (2018), of the first 43 (43 chosen for comparison with the 43 of 1979) reports, the USA still led with 7, followed by China with 5, and 3 from France, Germany, Italy, and Japan, 2 from Taiwan and Turkey, and 1 each from Canada, England, India, Iran, Korea, Spain, Sweden, and Poland, plus seven multi-country reports (Brazil/Canada, England/Wales, France/Belgium, New Zealand/USA, Spain/Argentina, Switzerland/Germany/Australia, and USA/India). The country of the author (“Author identification”) is not provided in PubMed in articles from the 1970s (even in the footnote about the author affiliation available only by downloading

the PDF, the country of the author was often not mentioned). Everyone apparently tended to think they knew everyone at this time.

The impact of internet and electronic website submission greatly speeded the dissemination of scientific information. When *Psychiatry Research* began publication in 1979, we used Telex to send Elsevier the order of the papers in each issue, speaking with an operator and reading her the information. Later advances in communication would bring the equivalent of a 1970 centralized teletype station to the home, office, and shirt pocket of every scientist in the world, enabling far easier international communication and joint work across country borders, the instantaneous distribution of manuscripts to reviewers, and the rapid interchange of communication between Editor and author. Second and even third revisions and reviewer comments, impossibly burdensome in the days of copying and mailing brown paper envelopes, now became feasible and sometimes could be accomplished in hours. The publication process has become more of a dialogue and even symposium question period. In 2018, continuous flow electronic publishing obliterated the volume concept and each paper floated to the top as it was processed.

2. Last half century

2.1. Decade of the 1970s

The late 1970s were an inflection point in the growth of scientific reports in Psychiatry. In the 2 years before the first issue of *Psychiatry Research* was published, reports on schizophrenia increased from 301 to 417 (39% increase from 1976 to 1978) while the number of manuscripts actually fell slightly in the same years (1966 to 1968) compared with a decade earlier (237–172, a 27% decrease). The numbers in 1988, 1998, 2008 and 2018 were 628, 3108, 6664, and 8762, a 20-fold increase since publication of *Psychiatry Research* began.

At the inception of *Psychiatry Research* in 1979, I had published 139 reports, beginning in 1962 with an article on mouse behavior; the senior author was my father, Ralph Buchsbaum (Buchsbaum and Buchsbaum, 1962). The receipt of the reviews of this and other early manuscripts evoked intense emotional moments as the envelope was opened to see the journal response. The mouse paper reported the effect

of ether anesthesia on mice from age 2 weeks to 3 years, mice that were part of my father's grant on aging in mouse tissue cultures. I used a bell jar sitting on a heating plate. Ether was injected into the jar and I recorded the time for the mouse to fall over and then when the jar was removed to allow the mouse to right itself. Data were plotted with age on a log scale since a mouse 2 weeks of age was very different from a mouse of 1 month or 1 year. Only one reviewer was used by the journal and this reviewer felt the statistical significance of the age-regression line was only due to the log age scale and would be non-significant otherwise. Despite rebuttal aided by an internationally known statistician colleague of my father, the paper was rejected but published quickly elsewhere. Over the first 16 years between this initial 1962 experience and 1978 when I became an Editor myself, I had experienced about several hundred personal reviewer comments on my 139 reports, with great individual variation in length, quality, and enthusiasm. This personal experience was critical in interpreting the first blizzard of reviews submitted to *Psychiatry Research*. From the first several hundred manuscript reviews of other people's work, I learned that the diversity of opinion on individual reports was not unique to my own reports. With diminished emotional tension, I saw the accept-revise-reject combination so frequently that it strengthened my plan to obtain as many reviews as possible. I also realized that an Editor could not just count the accept/reject score, but needed to read the reviews and papers in detail. Reasons given for recommendations of rejection ranged from "spelling 'agression' incorrectly in a paper on aggression" to "open trial with no control group." Review copies went out by mail and the paper reviews were returned by mail. From my own experience, I knew that one's own papers are like children and loved. Non-collegial remarks sometimes had to be excised with a scissors before being communicated to the author.

In the 1970s, reviewers were recruited both from our Editorial Board and initially from the reference lists of papers, Index Medicus, and the Permuterm index of the Institute for Scientific Information (ISI, now Web of Science) pioneered by Eugene Garfield. This index listed every significant three-word combination drawn from titles and/or keywords and was the forerunner of PubMed searching. Permuterm was invented by Herbert Ohlman for the Lincoln Laboratory, but adopted by ISI for medical literature. *Psychiatry Research* had its own index in the last volume at the end of each year. I emulated the Permuterm method with a BASIC computer program which created the full set of permutations of the three at a time words selected as key for each article...."schizophrenia cortisol haloperidol", "schizophrenia haloperidol cortisol", "cortisol schizophrenia haloperidol", "cortisol haloperidol schizophrenia"....The advent of Internet searches and PubMed, with their broader scope and efficiency, lessened the need for subject indexes in individual journals.

The 1970s was the era of a much smaller data base and investigator pool than we have today. I had the opportunity to meet Eugene Garfield who was manning the ISI booth at the APA in about 1969. Dr. Garfield looked at my name badge and effortlessly said that he knew about my doing schizophrenia research at the Intramural Program of the NIMH in Bethesda and also that he knew my father Ralph and his invertebrate textbook. The 20-fold growth in publications makes this kind of personal knowledge unobtainable, but the availability of PubMed, Scopus, and other indexing methods brings computer algorithm processing power to every investigator, not just the preternatural mnemonist.

With the advent of PubMed searching, it became easier and easier to find reviewers with ever greater precision. This more efficient process, however, revealed the omission of citations of literature reports directly salient or greatly overlapping with the current submission. Introductions with pronouncements such as "Cognitive deficits in schizophrenia have been widely reported (e.g. Someone et al., current year)" was just picking a representative publication to stand in for a number of related reports. This ahistorical trend increased as the wealth of specifically relevant publications appeared to intimidate, overwhelm, or upstage authors.

2.2. Decade of the 1980s

In the 1980s the grown of manuscript submissions brought prominent trends that fell in and out of fashion, sometimes for no discernible reason...cortisol, prolactin, computed tomography, and with succeeding decades, emotional faces, alexithymia, post-traumatic stress disorder. The term Alexithymia retrieves no *Psychiatry Research* PubMed reports for 1978–1988 but a remarkable 551 for 2008–2018. Of the 464 reports on cortisol, for example, there were 155 in our first decade, but 102 in 2008–2018 with a much larger number of manuscripts published. Are fundamental biological measures actually fully explored in their 15 minutes of peak fame? As new genetic and neurochemical assays arise, do these measures need reassessment? Or are they so out-of-fashion, antediluvian, and superannuated that they should never be assessed again?

The 1980s brought the spread of Word Perfect, Microsoft Word, Brief, Latex, spellcheck, and submission of manuscripts on floppy disks rather than on paper. Neater manuscripts appeared, but cut-and-paste errors and symbol misrepresentation abounded. Spellcheck left its signature with the cingulate (Latin, girdle) gyrus spelled "cingulated gyrus" zero times in 1978–1980 but arising spuriously in 1998–2008 a total of 104 times. However misspellings of aggressive as 'agressive' dropped to 64 out of 52,238 and "cingulated" has been corrected in current Word versions.

The 1980s brought brain imaging, with CT, MRI and PET becoming widely available in research institutions. Journal interest was high in our team's reports and international meetings replete with imaging symposia were easily organized. The pharmaceutical industry was interested in supporting basic studies of the regional functional effects of each class of drugs and this became an important direction of my PET research at Intramural and then at the new PET center at UC Irvine (Fig. 3). Psychiatry was still transitioning to a brain-based discipline and the drug imaging studies gave a new salience to functional neuroanatomical systems that were demonstrated in real individual patients and not animal electrophysiology or histological sections.

Authorship became an additional issue due to two historical shifts. Last authorship, which in the 1940s, 1950s and 1960s tended to signify an administrative position, became identified with the active chief scientific leader. Large collaborative studies, especially in genetics, spawned reports with 100 or more authors. These two trends collided with the opinion that author lists were growing too long and should be limited to a fixed number such as six. I had always felt that all substantive contributors to a manuscript should be listed as authors. This was reinforced in the journal's first volume with the publication of one of our most highly cited articles (Davis et al., 1979), "Chronic Parkinsonism secondary to intravenous injection of meperidine analogues." This report featured a wide variety of clinical, neuroanatomical, and neuropharmacological explorations of the brain of an individual who synthesized his own drugs and died in an area on the NIH campus near the Clinical Center. Seven scientists made substantive contributions: Davis, Williams, Markery, Ebert, Caine, Reichert and Kopin. Two high-profile journals rigidly kept to the six author standard, and so we acquired this citation classic. This policy of listing all authors was further dramatized in an incident with the *Archives of General Psychiatry* and my paper reporting the first FDG-PET scans in schizophrenia (Buchsbaum et al., 1982a,b). At that time the *Archives* only listed the first three authors, followed by "et al." One earlier blood flow paper in schizophrenia had six authors, but only the first three were listed. After publication one of the unlisted authors wrote to Dr. Daniel X. Freedman, Editor at the time, saying that he was distraught that his name had not been listed as an important pioneer. (Ironically, the omitted scientist was himself the editor of a journal with a policy of subsuming co-authors under "et al."). Dr. Freedman then changed the policy to list all authors, although current perusal of the 1983 bibliographies shows varied formats. The juggernaut of standardization of reference formats nevertheless advanced and 2018 saw the advent of our publisher's six-person limitation for *Psychiatry Research*.



Fig. 3. Sherry Buchsbaum about 1990 at the transition between paper and electronics.



Fig. 4. With few cyclotrons available for the manufacture of the short half-life isotopes (110 minutes for F18) for positron emission tomography, our initial effort at Irvine in 1983 required FDG to be flown in by chartered plane from UC Davis. Here the Editor accompanies the pilot to supervise the logistics on an early flight.

2.3. Decade of the 1990s

The 1990s brought PubMed from the National Library of Medicine. PubMed was available starting in 1997 on the internet, free and unlimited, like the great library of ancient Alexandria at every desk. Most records with abstracts go back to 1966, 2 years before I arrived at the Intramural Research Program in Bethesda; my first paper from 1962 is present but without abstract or text: it is available electronically from the journal website, apparatus photo with sleeping mice and all. My parents, Ralph and Mildred Buchsbaum's *Science* paper of 1934 (Buchsbaum and Buchsbaum, 1934) is also there, without an abstract

but with the University of California link to *Science* and full text. My grandfather Maurice's 1913 report in the *Journal of the American Medical Association* (Buchsbaum, 1913) is invisible on PubMed but can be seen in full in the journal website in seconds. However, you would have to know the specific journal or search one journal at a time for “celloidin staining” to find the 1913 paper. My son Bradley's papers, including the father-son tradition (e.g. Buchsbaum et al., 2007), are all instantly available in full text.

The 1990s brought computer software for management of references. With the release of Endnote in 1988, the possibility of automating reference lists and the citation of reports in the text of the manuscripts, an automated copy-editor prosthesis for accurate reference listing became available. This development should have been expected to increase the accuracy of citations especially when the citations were downloaded from PubMed or copied from online copies of the report. The careful checking of references by examining paper copies of the journals in the library described by Buchsbaum (2018) now had the potential of being automatically accomplished (Fig. 3). Even more dramatically, the ease of finding a salient report in on-line searches and capturing the reference in perfect format for a report being written should have brought a new level of comprehensive and focused Introduction sections. However, the dramatic growth of the scientific report data base, the author's quest for novelty and uniqueness, and the surprisingly slow adaptation of new computer software diminished the impact of these powerful tools. It remained easy to find in PubMed several “mouse fecal bolus open field haloperidol” unreferenced studies in searching for reviewers of a new submission on that very same topic. Other barriers to full citation remained and still remain. First, methodology-specific limitation of literature review: a SPECT blood-flow imaging study of schizophrenia might review only SPECT studies and not related functional imaging studies with PET, topographic EEG or fMRI. Second, novel and idiosyncratic naming of psychological paradigms, so that nearly identical attention, memory, and lateralization tasks constantly receive new acronyms, impedes the current level of artificial intelligence in grouping together related topics. Third, very narrow criteria for novelty: “this is the only study of exclusively employed men over 60 with a history of PTSD of less than 3 years.” These problems appeared less marked in the 1960s when researchers in a particular area all knew each other and all received paper copies of a small number of journals on their desk each month.

2.4. Decade of the 2000s

The 2000s brought electronic submission over the internet with entirely electronic flow of manuscripts to the journal, reviewers, authors, and publisher. Controversial papers could have six or more reviewers assigned, and author or reviewer queries answered promptly. Consultation on the nuances of conflict of interest, authorship, reviewer bias and other issues became easier. However, the increase in number of submissions, number of practicing researchers, and number of institutions made maintaining a personal and individualized relationship with authors more tenuous. Interpersonal quarrels, divorces, and reviewer idiosyncrasies became more difficult to manage or anticipate.

In the 2000s, globalization of research was in a nascent stage. The United Nations was concerned about the lack of access of “developing countries,” and the Hinari Access to Research for Health Programme was introduced by United Nations’ Secretary Kofi Annan in 2000. Elsevier and five other major publishers developed the program to share scientific journals over the internet at low cost with selected countries. The World Health Organization saw an additional aspect... publication of scientific reports by “low and middle income countries.” Dr. S. Saxena of WHO organized a meeting in Geneva to bring together the Editors of psychiatric journals to discuss the limited publication of research done in developing countries. Saxena et al. (2003) emphasized the lack of fully international membership of the editorial board of psychiatric journals in a letter to *Lancet*. Participants in the 2003 Geneva meeting included myself and the editors of journals from the US, England, Europe and India among others, including one open access journal (a relatively new trend at the time). Strong feelings of reviewer bias against accepting papers from authors from “developing” countries were expressed by all representatives from these countries. Editors from Scandinavian countries expressed pride in having a more global reach and proudly counted the countries they had published papers from. In a follow-up report, Pike et al. (2017) still note that some editorial boards are weak on international representation. The editorial board of *Psychiatry Research* in 2018 included members from China, Hong Kong, Hungary, India, Poland, Singapore, Taiwan, and Thailand in addition to USA, Canada, France, Germany, Israel, Italy, Netherlands, Japan, Spain, and Switzerland; it should be noted that the distinction between these categories of countries has considerably blurred since 2003.

In the years following the Geneva meeting, I have made a special diversity initiative. I provided special individualized editorial assistance, as Editor of *Psychiatry Research*, to authors of scientific papers from 40 underrepresented foreign countries, including Albania, Armenia, Bosnia, Brazil, Bulgaria, Chile, China, Croatia, Cuba, Czech Republic, Cyprus, Czech Republic, Egypt, Estonia, Hungary, India, Iran, Kenya, Latvia, Macao, Malasia, Malta, Mexico, Nigeria, Pakistan, Philippines, Poland, Romania, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, Venezuela and Vietnam. This includes foreign language editing of poorly phrased key sentences, practical statistical advice on following reviewer suggestions, clues for rewriting of introduction and discussion, and other detailed suggestions for upgrading of manuscripts to an international English language scientific standard. While not every manuscript survived re-review, a substantial number were sufficiently enhanced to win reviewer approval. More diverse illnesses and symptoms, clinical care settings, cultural issues, and varied viewpoints were added to the psychiatric literature.

2.5. Decade of the 2010s

The 2010s, brought globalization with marked increases in submissions from China,

Turkey, Iran and, to a lesser extent, Argentina, Brazil, Greece, Hong Kong, India, Poland, Singapore, Taiwan, and Thailand. Multi-country authorships became common and translations of psychiatric scales became widespread. Reports on refugee mental health, exposure to wartime

activity, large-scale earthquake PTSD, and inter-tribal differences extended the psychiatric field. Improvements in grammar checking in Word assisted non-native English speakers to prepare manuscripts that overcame many (replace “The patients is ill” with “The patients are ill), but not all grammatical problems (grammar acceptable for both “The data is relevant” and “The data are relevant”). The Elsevier service for English language editing, and similar sites of other publishers, also assisted the transition to globalization of publication of scientific reports (<http://webshop.elsevier.com/languageservices/languageediting>).

In the 2010s, as research became global and psychiatry scales were more frequently used outside the language of origin, the methodology of scale translation with back-translation, reliability, factor structure and other statistical approaches developed. Back-translation provides a copy comparable to the original language for careful assessment. The earliest Pub-Med retrieval of “back-translation” that appeared was 1975 (Heimann et al., 1975), but half of the 1600 back-translation papers have been published since 2013. Curiously, the factor structure of psychiatric scales was typically invariant across English and continental European languages and even invariant in the Middle East and Asia. The large number of scales and languages could easily lead to the publication of thousands of scale-translation articles. Reports with substantive use of the scale with the translated scale and details of validation in supplementary tables encouraged the spread of assessments of psychiatric symptoms on the same metric and unified research across borders.

In the 2010s, cross-cultural studies appeared in greater numbers and were an attractive addition possible with globalization. Such studies would have the potential to reveal unexpected effects of the psychological environment on the expression of psychiatric illness. However, samples matched on demographic, educational, and economic features proved generally difficult to recruit. Even more difficult was formulating specific cultural hypotheses since characterizing the specific cultural characteristics was a sensitive and controversial goal. Administering a scale measuring obsessive-compulsive or depressive traits and finding ethnic or religious group differences was feasible, but articulating a specific cultural feature that explained group differences often proved nearly impossible.

In the 2010s, the problem emerged of defining what type of data and what analytic approaches are most valuable from underserved countries (in United Nations terminology, “low and moderate income countries”). The key element in publication value is good data clearly and fully presented. Researchers need to know what came before they start a project and in what knowledge context their present findings belong. Clear diagnostic methods, adequate characterization of the patients and comparison groups, and appropriate scales properly translated are needed. Is this enough for publication in the trend toward “open science” and posting of reports online with post-posting volunteer comments? No, the process of curation and review is essential. Reviewers need to critique the data set and Editors are greatly needed to review format, abbreviations, units, and other features. Once the data set is present and reviewers find it valuable and adequately explained, reviewers can recommend additional statistical approaches, additional hypotheses to be tested, demographic variables to be covaried, and other salient literature to be cited. Reviewers cannot fix flawed data collection, but they can recommend enhancements and pruning of Introduction and Discussion. Publication of extensive analysis tables may provide a first example that may be replicated by the next researcher and tested $p > 0.05$ rather than with multiple testing correction or using different statistical methods to explore trends in the data that don't meet statistical significance. Lastly editorial discretion is essential to consider importance, reviewer idiosyncrasy, overlap with already published data, and underserved topics.

In the 2010s, data from underserved countries often offered unusually large patient samples, unmedicated patients, and disaster-affected individuals in a way not available from Europe and America. Often, language barriers were less severe for the more straightforward

portions of the sample description and more severe for the description of the statistical approach and Results, and still more severe for the Introduction where a clear view of many reports in a foreign language needed to be integrated. Here many Psychiatry Research reviewers made outstanding comments and raised the level of the discourse.

Should the reviewers remain blind to the names and institutions of authors of submitted manuscripts? Without this information, it is difficult for the reviewers to fully review overlap with previous work, contradictions of Results with other team publications, or artificial segmentation of projects into multiple reports. In cross-cultural studies, the parent institution and geographic location of collaborators would be significant features in understanding the study context. Low reviewer ratings because of poor English usage might be ameliorated by knowing the native languages of the authors. Careful selection of appropriate reviewers from the same geographic locations can also ameliorate bias. Comparison of periods of open (2000–2001) and blinded review (2002–2004) of meeting abstracts for the *Journal of the American Heart Association* (2000–2004) revealed only very small differences in acceptance for non-English speaking countries. For the open review period of non-US abstracts, 31.1% from English speaking countries and 20.9% from non-English speaking countries were accepted while during blinded review the percentages were 28.8% and 22.8%, a difference of only 1.8% for non-English speakers (Ross et al., 2006). This report somewhat preceded the big increases in global submissions, but it suggests that reviewer bias is not a large phenomenon. Non-significant bias in a randomized reviewer assignment study was also found for urological studies (Smith et al., 2002). Careful selection of appropriate reviewers from the same geographic locations can also ameliorate bias. Vigorous search for geographic balance in reviewers also trains a cohort of manuscript reviewers who can profit from reading the set of reviews now available electronically to all participants in the review process. This may be one of the more significant benefits of the all electronic system.

In the 2010s, a new set of statistical tools appeared with emphasis on mediation/moderation, machine learning, hierarchical regression analysis, and other new methods. Often powerful new effects were reported, with the hazard that the exact statistical methods were not sufficiently fully presented to allow replication. Reporting of the exact program reference, version and parameters has been required. For users of the R language, a flexible and very wide-ranging group of methods are available. The presentation of the actual command lines to the program and the upper left corner of the raw data set (data frame in R) helps the reader know how to apply the same methods to his or her own data.

In the 2010s, researchers read reports on line. The ability to have supplementary tables available in electronic form makes available a full page or more of computer instruction to the interested reader. Large raw data tables and even MPG movies of animal behavior, interviews, and psychophysiological recording procedures are possible to document studies. This resource is much too slowly being used, despite its great power.

When I had a few small data sets from my early studies, I was very protective and dubious about sharing data with rivals who would publish findings first or work to refute published studies. As research data sets accumulated, they became more detailed and complex and sometimes neglected as new grants set priorities. As a collector of brain images, I know that the potential for new analysis is great and more than I can ever accomplish. Raw data publication is underused as a resource for student and trainee papers, for retrospective replication, and power computations. This move toward open data will also benefit those from under-represented countries who may not have the resources to collect their own data but have new ideas.

3. Summary

Research in psychiatry has greatly expanded in volume, improved in quality, and become global over the last four decades. These changes have widened our knowledge of psychiatric illness, and contributed to understanding of physiology, neurochemistry, genetics, and functional neuroanatomy. Electronic publishing has facilitated these shifts but not replaced the need for editorial wisdom, peer review, and human proofreading.

What will come next? Individualized drug administration and other therapies based on the biology and cultural environment of the individual patient are goals for the next four decades. Psychiatric researchers must increasingly shed the belief that their work is only for research and move biomarkers and endophenotypes into the development of personalized medicine in robust randomized trials. Reviewers will need to be prepared to accommodate non-traditional patient characterizations, individual difference analyses, and global data collection. Journals will need to further facilitate the sharing and publication of raw data sets to allow novel individual difference analyses by investigators across the global space. The process of peer review has been continuously improved by the use of web literature searching for the most exactly expert opinion and the process should continue to be recognized as a benefit to both the enlightenment of the author and the reviewer.

The methodology of research and the methodology of scientific publishing have evolved a symbiotic relationship enhancing new scientific progress. It has been a lasting adventure to be part the rapidly changing flow of new data, ideas, and methods. I have had nearly 2000 co-authors all of whom helped me become a better Editor as we wrote papers together. I thank them profusely here, and they are all fittingly found electronically on PubMed with “buchsbaum ms[au]”.

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