ACTIVITY: Case Study on Authorship
Mary, a graduate student, has been working as a research assistant with Dr. S on her ethnographic study of conflict among residents in retirement communities. While in the field observing interactions, Mary noticed that resident conflicts seemed to occur near the community mailboxes. Mary hypothesized that conflicts occurred when residents became angry if the mail delivery was late, or if no parcels arrived for them. Mary wrote up her findings and submitted as a conference abstract and was preparing a manuscript when Dr. S. told Mary that not only did Mary not have a right to do so but that Dr. S. was to be first author on all publications and abstracts.

What are Mary’s rights to authorship? What are Dr. S’s rights to determine publications and/or authorship order?

All forms of publication should present:
- A full and fair description of the work undertaken,
- An accurate report of the results, and
- An honest and open assessment of the findings

In assessing the completeness of any publications, researchers should ask whether they have described:
- What they did (methods)
- What they discovered (results), and
- What they make of their discovery (discussion)

9a. Authorship
Contribution. Authorship is generally limited to individuals who make significant contributions to the work that is reported. This includes anyone who:
- Was intimately involved in the conception and design of the research,
- Assumed responsibility for data collection and interpretation,
- Participated in drafting the publication, and
- Approved the final version of the publication

9b. Elements of a responsible publication
- Abstracts
- Methods
- Results
- Discussion
- Notes, bibliography, and acknowledgements

9c. Practices that should be avoided

Honorary authorship.
Salami publications.
Duplicate publications.
Premature public statements.

ACTIVITY: Critique different recommendations for establishing authorship and identify the criteria with which you are most comfortable.
Scripps Gerontology Center Guidelines
Oberlander & Spencer (2006)

Questions for Discussion
1. What are the accepted criteria for authorship in your field of research? If there are none, what should they be?
2. Should researchers be allowed to omit some details from the methods section of their publications until they have had time to patent their methods?
3. What should a researcher do if the journal that has accepted a publication will not let the research publish the method or results in as much detail as the research feels is necessary?
4. What should a researcher do if an undeserving author in a position of some authority demands authorship status on a paper?
5. What factors should be considered when making a decision to publish the results of a study in one article versus several articles?
**PEER REVIEW**

Many important decisions about research depend on advice from peers, including:
- Which projects to fund (grant reviews)
- Which research findings to publish (manuscript reviews)
- Which scholars to hire and promote (personnel reviews) and
- Which research is reliable (literature reviews and expert testimony)

Case Study (Steneck, n.d.)
Dr. Sung L. is struggling with the decision whether to agree to review the work of an advanced graduate student at another university for publication in the major journal in his field. He is familiar with the student’s work and attended a session several months ago at which she presented a brief report on her work. It clearly overlaps with his research in a number of ways, which is one reason she has been asked to serve as a reviewer.

Dr. L. knows he is qualified to do the review and is confident he can provide an objective, constructive judgment of the student’s work. However, since his students are working on similar problems, he is concerned about the appearance of a conflict of interest. In addition, he is not sure he wants to learn more about the work in question until he published his own work, to avoid later charges that he unfairly used some of the student’s ideas. Finally, there is the matter of yet another lost weekend doing the review, when his department chair has already told him to cut down on unpaid professional service.

- Should Dr. L. agree to do the review?
- If he is uncertain about his responsibilities, where can he get advice?
- Would the situation be different if he had been asked to review the student’s work for an appointment or promotion decision?

For peer review to work, it must be:
- Timely
- Thorough
- Constructive
- Free from personal bias, and
- Respectful of the need for confidentiality

10a. Meeting deadlines

10b. Assessing quality
Making judgments about the quality of a project includes:
- Assessing whether the research methods are appropriate;
- Checking calculations and/or confirming the logic of important arguments;
- Making sure the conclusions are supported by the evidence presented; and
- Confirming that the relevant literature has been consulted and cited

Research quality can be compromised by:

- Careless mistakes made in reporting data and/or listing citations;
- The deliberate fabrication and falsification of data;
- Improper use of material by others (plagiarism);
- Inaccurate reporting of conflicts of interest, contributors/authors; and
- The failure to mention important prior work, either by others or by the researcher submitting a paper for publication

10c. Judging importance

Peer reviewers are also asked to answer questions such as:

- Has a researcher made a researcher could carry out a proposed research project, is it important to do so?
- Are these research results important enough to publish?
- Important contributions to a field of study?
- Is this evidence important enough to be used in setting policy?

Peer reviewers do not always make judgments about importance with an open mind.

Studies have shown that they can be swayed by:

- The stature of the researcher who conducted the research or the institution at which the research was conducted;
- Country of origin;
- A preference for one research method over another; e.g., a clinical versus a laboratory approach; and
- The outcome of the studies under review

10d. Preserving confidentiality

Confidentiality is generally required during:

- Grant reviews,
- Manuscript reviews, and
- Personnel reviews

Although researchers sometimes do, it is not acceptable to do any of the following without getting permission:

- Ask students or anyone else to conduct a review you were asked to do;
- Use an idea or information contained in a grant proposal or unpublished manuscript before it becomes publicly available;
- Discuss grant proposals or manuscripts you are reviewing with colleagues in your department or at a professional meeting;
- Retain a copy of the reviewed material (generally manuscripts and grant proposals should be shredded or returned after the review is complete); and
- Discuss personnel and hiring decisions with colleagues who are not part of the review process
ACTIVITY: Review several strategies for reviewing a manuscript and identify the strategy that you find most useful.

Academic Skills and Learning Center (https://academicskills.anu.edu.au)
Provenzale & Stanley (2006)
Rockwell (no date)

Questions for Discussion
1. What should researchers or students do if a colleague or mentor asks them to take a look at a manuscript they have not been authorized to review?
2. What information contained in a manuscript or proposal should reviewers be expected to check?
3. Should peer review be anonymous?
4. How can researchers who sit on committees that advise on research directions separate their own interests from the best interests of the field they are helping shape?
5. What would happen if the public lost confidence in peer review and looked for other mechanisms to judge the quality and importance of research?
1. Authorship and acknowledgements (when applicable) should always be explicitly negotiated at the start of a project. Negotiation of authorship and acknowledgements (when applicable) should occur prior to the preparation of the first draft of a report or manuscript. Authors should not be listed (or excluding from the list) on the draft manuscript without a discussion about who should be authors/acknowledged and the order of authorship.

2. Generally, contributions to the conception, design, data analysis, interpretation, and writing of a report are reflected in authorship. Contributions to the layout, graphics, editing, and formatting could be reflected in acknowledgements. Authorship is based on “significant intellectual contribution”.


4. Consideration of weights assigned to activities associated with creating a manuscript should be determined on a case by case basis and by the type of methodology used for gathering data. Generally, greater weight is given to activities that include conceptualization and guidance, activities that make a unique contribution (i.e. without the input from this individual the article or presentation would look quite different), and activities that involve significant discretion and decision-making. Winston’s model is meant to be a guide to considering the balance between authorship and acknowledgements, not a rulebook.

5. When redrafting and revision results in a different amount of effort than originally anticipated, discussions about order of authorship may need to happen again. Significant revision or conceptual reframing of the manuscript may result in a different order of authorship.

6. Authorship discussions and decisions should be based on a balance among inclusiveness, ethics, and fairness.

A Suggested Procedure for Determining Order of Authorship In Research Publications

ROGER B. WINSTON, JR.

A schema for analyzing contributions to data-based professional publications, assigning relative weights, and thereby determining the appropriate order of listing authors and identifying ancillary contributions is suggested. An example application of the procedure is also presented.

A recurring problem for those who write with others for publication in professional journals is the determination of whose name should be listed first, that is, who is to be designated as the senior author. Journal editors sometimes are confronted with claims from writers, especially young professionals, that older practitioners or teachers seek authorship credit that is unjustified. Some established professionals seem to believe that by virtue of their position and tenure in the field, they are entitled to senior authorship on any joint publication activity in which they are involved. Likewise, some professionals in supervisory positions maintain that if they give substantial support (e.g., providing an assistantship or institutional funds to cover costs such as postage) or offer suggestions during a research project, then they are entitled to be listed as authors. Such contentions create both ethical and professional dilemmas for which there are presently few agreed-upon ways of addressing.

The American Association for Counseling and Development (AACC) Ethical Standards give only vague, general guidance in this matter:

D-12. The member must give due credit through joint authorship, acknowledgement, footnote statements or other appropriate means to those who have contributed significantly to the research and or publication, in accordance with such contributions. (Callis, Pope, & DePauw, 1982, p. 12)


F-8. Members acknowledge major contributions to research projects and professional writings through joint authorship, listing the author who made the principal contribution first. Minor contributions of a professional or technical nature are acknowledged in footnotes or introductory statements.

F-9. Members do not demand co-authorship of publications when their involvement has been ancillary. Teachers and/or supervisors exercise caution when working with students and/or subordinate staff so as not to unduly pressure them for joint authorship.

Because of the pressures some faculty members feel to accumulate long lists of publications in order to meet the competition for promotion and tenure, there seems to be an increased number of complaints from students that their professors are demanding unjustified co-authorships of publications. Gladding (1984) analyzed the contents of the Personnel and Guidance Journal (1971–1982) and found that there was a substantial increase in the number of multiple authors of articles—from an author/article ratio of 1.2+ in the 1970s to 1.6+ in the early 1980s. A similar trend was detected by Strahan (1982) in the Journal of Counseling Psychology.

The American Psychological Association (APA) Ethics Committee has adopted a policy statement designed to guide its journal editors in considering complaints involving dissertations. Important points in that statement include: (a) dissertation supervisors may be only second authors; (b) second authorship is obligatory if the supervisor designates the primary variables, makes major interpretive contributions, or provides the data base; (c) second authorship may be extended as a courtesy if the supervisor is substantially involved in developing the research design or measurement techniques/data collection, or if the supervisor substantially contributes to the writing of the publication; and (d) authorship is not acceptable if the supervisor only gives or provides encouragement, facilities, financial support, critiques, or editorial assistance (Fields, 1983).

Spiegel and Keith-Spiegel (1970) sampled a large group of psychologists, presenting them with a number of vignettes and asking them to whom authorship credit should be extended. They concluded that the "creative aspects" of research warranted greater credit. There were, however, many differing opinions on how to determine authorship credit.

In a survey of academic psychologists, Bridgewater, Bornstein, and Walkenbach (1981) found that those who responded ranked research design and report writing as the activities that most justified authorship recognition. The respondents, however, indicated that performing statistical analyses and collecting data (even when professional skills were required, such as in projective techniques) warranted only footnote recognition. It was widely held that time invested in the research was not a sufficient gauge for determining order of authorship. Both of the two mentioned studies found that psychologists overwhelmingly believed that power and status should never enter into the determination of authorship credits.

Even if the APA, AACC, and ACPA guidelines are accepted and applied in good faith, conscientious, ethical professionals still have a problem when they are required to make a determination of what constitutes "ancillary involvement" and who made the "principal contribution" in publications not involving dissertations. What is needed are guidelines or "rules of thumb" that can be used to help resolve these questions.

The following schema is proposed to help address these issues. It is intended to help identify clearly the contributions
made and to aid in decision making, but it is not a substitute for sound judgment and personal and professional integrity.

The schema uses a weighted point system to aid in the decision-making process. In Table 1, 11 activities or processes are identified that are often involved in the planning, conducting, and reporting of a data-based research study that culminates in a journal article or book chapter. (Activities are presented in the order that they are generally encountered in the research process.) Persons involved in the research should, as a group and through consensus seeking processes, assign points to each person.

Some tasks, although critically important to the success of the project, require less skill, knowledge, and research sophistication than do others. Examples include searching of the professional literature, clerical tasks (e.g., duplicating and preparing instruments for mailing), and data collection and preparation when using standardized instruments. Contribution in these areas is reflected most accurately by the proportion of time that each researcher spent in what is sometimes called the "scullery work" of research. Contribution to other tasks (e.g., research design or conceptualization of the research problem) can be judged most appropriately by considering the quality of the contribution and how essential it was to the successful accomplishment of the task. This is basically a subjective process that requires the assignment of relative value to each contribution. One approach might be to have each researcher independently assign a percentage value to each qualitatively based category and then compare results. The group can then reach a consensus about assigning points. Weights (points in each category) were assigned based on the author's judgment of how critical each category of activities typically is to successful research studies.

**EXPLANATION AND EXAMPLE OF APPLICATION**

In order to assist the reader in understanding the proposed schema, an example application of the procedure involving the author and three others is presented in Table 2 and explained below.

**Conceptualizing and Refining the Research Idea**

Points should be assigned to each participant according to the contribution he or she made in the formative conceptualization process. Most studies originate when a person notices a gap in the literature, becomes puzzled by something associated with his or her job, or becomes interested in explaining or testing a proposition suggested by some theory. Although one person may first propose the study, collaborators often take the germinal idea and develop it to the point that a feasible research study emerges. Discussion among participants can generally produce agreement about an equitable allocation of the 50 points. *Example: Student A* proposed the research problem and, with Professor B, determined the basic approach to the research and variables to be investigated. Thirty points are assigned to A and 20 points to B, reflecting their relative contributions.

**Literature Search**

Once the research ideas begin to take shape, it is important to search the literature to determine what has been reported about the topic and related areas, to identify research strategies and techniques, to identify possible data collection instruments and techniques, and to establish a theoretical framework for investigation of the problem or determine if there is really a need for further investigation. This is often very time consuming work. One may assign the 20 points in this category to researchers according to the proportion of the total time spent in the search process.

*Example: Fifteen points are assigned to A, who spent the most time in the library. Three points are assigned to B, who contributed two articles from his personal library, and two points are assigned to graduate assistant C, who volunteered to assist with the project and contributed an extensive annotated bibliography on the subject.*

**Creating Research Design**

How carefully one conceives and executes the research design will determine to a large extent how valuable the results are, and even whether conclusions can be drawn at all. Researchers should assign the 30 points available in this category after dis-

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**TABLE 1**

Activities Associated with Data-based Research Manuscript: Points and Method of Assignment

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>Points</th>
<th>Method of Assigning Point*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptualizing and refining research ideas</td>
<td>50</td>
<td>Q</td>
</tr>
<tr>
<td>Literature search</td>
<td>20</td>
<td>T</td>
</tr>
<tr>
<td>Creating research design</td>
<td>30</td>
<td>Q</td>
</tr>
<tr>
<td>Instrument selection</td>
<td>10</td>
<td>Q</td>
</tr>
<tr>
<td>Instrument construction/questionnaire design</td>
<td>40</td>
<td>Q/T</td>
</tr>
<tr>
<td>Selection of statistical tests/analyses</td>
<td>10</td>
<td>Q</td>
</tr>
<tr>
<td>Performing statistical analyses and computations (including computer work)</td>
<td>10</td>
<td>T</td>
</tr>
<tr>
<td>Interpretation of statistical analyses</td>
<td>10</td>
<td>Q</td>
</tr>
<tr>
<td>Drafting manuscripts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Draft</td>
<td>50</td>
<td>T</td>
</tr>
<tr>
<td>Second Draft</td>
<td>30</td>
<td>T</td>
</tr>
<tr>
<td>Redraft of a page (on later drafts)</td>
<td>2</td>
<td>T</td>
</tr>
<tr>
<td>Editing manuscript</td>
<td>10</td>
<td>T</td>
</tr>
</tbody>
</table>

*Q = points assigned on qualitative criteria; T = points assigned based on proportion of total time expended on the task or on proportion of total pages drafted or revised; Q/T = points assigned partly on the basis of time spent on the task and partly on qualitative criteria.

**TABLE 2**

Example of Use of Schema with Data-based Research Manuscript

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>Student A</th>
<th>Professor B</th>
<th>Graduate Assistant C</th>
<th>Staff Member D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POINTS</strong></td>
<td><strong>142</strong></td>
<td><strong>79</strong></td>
<td><strong>32</strong></td>
<td><strong>13</strong></td>
</tr>
<tr>
<td>Conceptualizing and refining research ideas</td>
<td>30</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Literature search</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Creating research design</td>
<td>5</td>
<td>20</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Instrument selection</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Instrument construction/questionnaire design</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Selection of statistical tests/analyses</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Collection and preparation of data</td>
<td>28</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Performing statistical analyses</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Interpreting statistical analyses</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Drafting manuscripts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First draft</td>
<td>30</td>
<td>15</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Second draft</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Editing manuscript</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
cussing the relative contributions of each; no predetermined guidelines seem adequate.

Example: Twenty points are assigned to B, who is most knowledgeable about research designs and who proposed the basic design used in the study. Five points each are assigned to A and C, who helped refine the design and shared in the decision-making process.

Instrument Selection
Finding a research instrument that can adequately measure the variables under investigation and that possesses satisfactory reliability and validity is another important part of the research process. In order to receive points from this category, the level of involvement must exceed simply suggesting an instrument. Rather, one must be involved in evaluating the appropriateness of its use in the study and its reported reliability and validity. Points (10) are apportioned according to level of participation and use of expertise in the process. Instruments are often “discovered” during the literature search. In this event, points should be assigned on the basis of time spent (a) investigating reliability and validity, (b) researching other studies using the instrument, and (c) gaining permission for use (if not commercially available).

Example: B is assigned eight points because he suggested the instrument (which he had investigated and used before), provided copies and a manual, and had already determined that it possessed appropriate reliability and validity for the study. A is assigned two points because she searched the literature for previous studies using the instrument and provided additional technical evaluations.

Instrument Construction and Questionnaire Design
Instrument construction is generally time consuming and frustrating work. If the research project requires construction of new data collection instruments beyond demographic-type questionnaires, the final outcome of the study hinges upon how well this task is accomplished (often measured in terms of reliability and validity). The 40 points in this section should be apportioned as follows: (a) 20 points assigned based on the quality and usefulness of ideas contributed, and (b) 20 points distributed based on the proportion of total time spent creating the instrument and determining its psychometric properties (e.g., writing items, collecting and analyzing reliability and validity data, creating norms). If it is unnecessary to create a new instrument, do not assign points in this category.

Example: No points are assigned in this category because no new instrument was created.

Selecting Statistical Tests and Analyses
Determining the kinds of statistical analyses to be used in testing hypotheses is an important part of the overall research design. How precisely the instruments measure and the size of the sample (and subgroups within the sample) determines which statistical procedures can be used appropriately. The 10 points in this category should be assigned based upon a determination of the quality of contribution made in the area of statistical analysis. It is not uncommon to seek expertise from a statistician whose consultation is the sole involvement in the project. When such is the case, the consultant generally will not accumulate enough points to qualify as an author, but can be recognized in a footnote.

Example: Staff member D acted as a statistical consultant to the research team and suggested a sophisticated statistical treatment for data analysis. He is assigned eight points. B receives two points because he generally knew what treatment would be appropriate, but he lacked sufficient in-depth knowledge to make use of the consultation.

Collection and Preparation of Data
Data collection, though undeniably critical to the success of any research study, is usually tedious work. The 40 points in this category should be allocated to each person according to the proportion of the total time he or she spent gathering, scoring, evaluating, coding, and keypunching the data.

Example: Twenty-eight points are assigned to A, who collected most of the data over a 2-month period. Ten points are assigned to C, who scored and coded the data for analysis, and two points are assigned to B, who gathered data from one class.

Statistical Analysis and Computations
The 10 points in this category should be awarded on the basis of the proportional amount of time each researcher spent performing the statistical analysis, including writing computer programs.

Example: C is assigned all 10 points because she entered the data into the computer and wrote the program for the statistical analyses.

Interpretation of Statistical Analysis
Once the statistical analysis has been performed, care must be exercised so as to ensure that unwarranted conclusions are not drawn and that all technical restrictions and assumptions associated with the tests are respected. A background in statistics and detailed knowledge of the data collection tools is required. Points in this section should be apportioned according to the quality of the contribution. Sometimes a statistical expert may be used for this purpose; if so, he or she should be assigned the points.

Example: Five points are assigned to D, the statistician, who provided assistance in interpreting the results. Three points are assigned to B and two to A, who are knowledgeable about the research instrument and can best interpret the results in light of that knowledge.

Drafting Manuscripts
Generally, articles require at least two drafts before submission to a journal and then at least a third draft after receiving suggestions from the reviewers and editor. Often each author, after deciding upon an outline, will draft sections of the manuscript. One person frequently will assemble the sections and write the second draft in order to assure continuity, consistency of style, and accurate references. If the article is “accepted with revisions” (the general rule for articles that are accepted for publication), a third draft of the article will be necessary. This final draft may be completed either by the second-draft author or by all of the authors. Points (50 for the first draft, 30 for the second draft, and 2 for redraft of each page in subsequent drafts) should be apportioned on the basis of the amount of writing (number of pages) done by each author.

Example: For the first draft, 30 points are assigned to A, 15 to B, and 5 to C, who prepared the tables. The 30 points for the second draft are assigned to A, who took the others’ contributions and produced a complete manuscript.

Editing the Manuscript
Often manuscripts, even after the second draft, need technical editing by someone other than the principal author, who is frequently too close to recognize lapses in logic, grammatical errors, reference style mistakes, and unclear wording. If this step is not performed by the author of the second draft, up to 10 points may be assigned an editor, depending on the quantity of changes required. If the editing is performed by the second-draft author, assign no points because the editing can be incorporated during the redrafting process.

Example: B was assigned six points for editing the manuscript. The full points were not assigned because only a moderate number of technical and grammatical corrections were necessary.
Determining Order of Authors’ Names

The collaborators as a group should assign points in each applicable category. Once consensus has been achieved in assigning points, each participant’s points can be summed. The researcher with the most points is designated senior author and lists his or her name first, the researcher with the next highest total is listed second, and so forth. (In the event of ties, a coin toss can decide the order.) Any contributor who does not amass at least 50 points is viewed as having made an ancillary contribution and is not entitled to be listed as author; his or her contribution should be acknowledged in a footnote or other appropriate place.

Example: A accumulated 142 points, B 79, C 32, and D 13. Consequently, A’s name will be listed first, followed by B. The contributions of C and D will be acknowledged in a footnote.

CONCLUSION

As a means of determining the usefulness of the proposed schema, the author interviewed three colleagues—two faculty members and a student affairs practitioner. Together they applied the procedure to recently published research articles in which either students or subordinate staff members were co-authors with faculty or supervisors. Of the six articles analyzed, the order of authorship would have been unaffected by the analysis of three studies. Two articles would have had a different order of authors—one with the subordinate listed first, the other with the senior professional being listed first. One article would not have listed a third person as an author, because his contribution would have been deemed “ancillary” through application of the proposed schema. All of those interviewed reported that the procedure was helpful in directly addressing the sometimes delicate issues of order and merit of authorship.

The schema presented here is designed to help counselors, student affairs practitioners, faculty members, and other helping professionals who wish to act responsibly and ethically, to make decisions about joint authorship of research publications. The weights assigned to the various categories were established a priori, based on this author’s experience in publishing professional articles. Groups of authors by mutual agreement may wish to adjust point values for categories before beginning the assignment of points to individuals. (The weights for categories are much less important than is the careful, systematic, and unemotional examination of the contributions of all involved.) Professional ethics require that appropriate credit be given to all to whom it is due. This schema provides a framework that can encourage professionals to analyze carefully all of the contributions made to research and writing projects and to act in a professional and ethical manner.

REFERENCES


Roger B. Winston, Jr. is an associate professor in the Department of Counseling and Human Development Services, University of Georgia, Athens. The author is indebted to his colleagues Warren C. Bonney and Theodore K. Miller for reviewing the manuscript and for their helpful suggestions.
Graduate Students and the Culture of Authorship

Sarah E. Oberlander and Robert J. Spencer

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University of Maryland, Baltimore County

In the last 50 years, multiauthored publications have become more prevalent, given the increasing number of collaborative, interdisciplinary, multicenter research studies. The determination of authorship credit and order is a difficult process, especially for graduate students, whose disadvantaged power position in research settings increases their vulnerability to exploitation. The American Psychological Association has published ethical standards for determining authorship credit, but the power difference inherent in the student–faculty relationship may complicate this ethical dilemma. The authors reviewed a number of previously recommended strategies and proposed that determining authorship credit is most effectively facilitated through professional development.

Keywords: authorship credit, author, graduate student, ethics

Peer-reviewed publications serve as a record of scholarly activity, the quantity and quality of which inform decisions regarding career advancement, tenure, and funding. For students, such as the writers of this article, authorship can lead to more competitive internships, postdoctoral fellowships, and employment. The misattribution of authorship credit has been widely discussed in the scientific literature, but the problems specific to the power differential between students and faculty have received scant consideration, particularly from a student perspective. There are a few notable examples of student researchers claiming that their intellectual contributions were misappropriated by supervisors and faculty. The more common situation involves students receiving less credit than they expected (e.g.,
Costa & Gatz, 1992), which can lead to feelings of powerlessness, bitterness, and disenchantment with the scientific process. Determining authorship credit is difficult for established researchers, and the power differential inherent in student–advisor relationships complicates matters and deserves further exploration. The purpose of this contribution is to direct needed attention toward the ethical issues involved in student authorship and provide relevant suggestions for faculty and graduate students.

AUTHORSHIP CREDIT

Until 1955, most scientific papers were sole authored (Rennie, Yank, & Emanuel, 1997). In the last 50 years, multiauthored publications have become more prevalent, given that many issues are best investigated using a multidisciplinary approach. In addition to the rise in truly collaborative projects, authorship is sought as a form of academic currency, which may lead researchers to maximize authorship credit (Bennett & Taylor, 2003). In a notable example, the *New England Journal of Medicine* published a 10-page article with 972 authors (GUSTO investigators, 1993). Although multiauthored publications have become particularly common in medicine, a growing number of multicenter, interdisciplinary projects have been noted across fields (Biagioli, 1998). The increase in multicenter projects and the rewards of publication have led to two main abuses of authorship: honorary authorship and ghost authorship (Bennett & Taylor, 2003).

HONORARY AUTHORSHIP

Honorary authorship refers to those individuals receiving authorship credit without substantially contributing to a project (Rennie et al., 1997). A survey of published articles suggested that almost 20% of publications include such authors (Flanagin et al., 1998). Honorary authorship is an ethical transgression because it dilutes the credit for the authors who made legitimate and substantive scientific contributions (Bennett & Taylor, 2003). Graduate students may not often receive honorary authorship, so their legitimate contributions to a manuscript are at risk to be minimized by the inclusion of numerous authors. Authors have given honorary credit to individuals for many reasons, some voluntary and some potentially coercive. Honorary authors may be credited to associate the legitimate authors with a prestigious individual. Other reasons include payment for favors (e.g., for referring participants) and reward. For example, a faculty member may give authorship credit to a graduate student whose duties included mainly administrative or technical tasks in an attempt to further the student’s academic endeavors.
On the other hand, senior faculty in positions of authority may become honorary authors as the result of interpersonal pressure, ranging in severity from subtle expectations to outright demands. Informal institutional “policies” may also dictate that certain individuals (e.g., department chairs, owners of laboratory space) be included among the authors even when their direct contributions to the paper are minimal or nonexistent. Although most professionals would agree that writers should not give authorship credit to individuals who have not contributed to the project, this can be difficult, as the social and political pressures to do so can be overwhelming.

In 1981, cardiologist John Darsee was found to have fabricated data throughout his career. Prestigious department chairs were included as honorary authors on Darsee’s publications. Although these individuals were eventually cleared of any involvement in the fabrication of data, they will be forever linked to these instances of scientific misconduct (J. Smith, 1994).

GHOST AUTHORSHIP

Ghost authors are individuals who have made contributions worthy of authorship but are not credited as authors (Flanagin et al., 1998). In a survey of published authors, 11% reported the presence of a ghost author (Flanagin et al., 1998). Withholding credit is unethical because deserving authors go unrecognized for legitimate scientific contributions. Ghost authors are often not revealed in an attempt to hide conflicts of interest or the use of professional editing services (Kempers, 2002). Individuals who have substantially contributed to the project may or may not desire authorship credit. For example, individuals may intentionally remove their names from an author list in an attempt to reduce the perceived impact of negative findings (Bennett & Taylor, 2003). Graduate students, on the other hand, may be more likely to make significant contributions to a manuscript and be denied authorship credit.

In 1989, Carolyn Phinney was a research psychologist at the University of Michigan’s Gerontology Institute under the supervision of Marion Perlmutter, PhD. Perlmutter allegedly incorporated Phinney’s research into a grant application and accessed Phinney’s previous research and grant proposals without permission. Phinney filed suit, and in accordance with a 1993 jury ruling, the University of Michigan awarded Phinney $1.6 million in punitive damages (Zarko, 1996).

GRADUATE STUDENT AUTHORS

Graduate students represent a special population within the research community. They differ widely in level of experience, familiarity with the research landscape,
and understanding of the formal and informal customs in the culture of authorship. Students may be in fragile psychological positions, as they often undergo relocation, isolation, and distress due to the strain of their graduate education (Schneider, 1987). Issues specific to graduate education receive limited attention in psychology’s professional literature, and graduate students are rarely polled about ethical and career-related issues. A 2005 survey of authorship credit in faculty–student publications included only four graduate student responses out of a sample of 604 (Sandler & Russell, 2005). A survey of graduate teaching assistants suggested that many receive little or no training or supervision, and most will engage in some form of unethical behavior (Branstetter & Handelsman, 2000). More than 90% of students and faculty report witnessing unethical behavior, such as failure to maintain confidentiality, by psychology graduate students (Fly, van Bark, Weinman, Kitchener, & Long, 1997).

Graduate students enter relationships of unequal power with faculty advisors and research supervisors, creating the possibility for exploitation (Costa & Gatz, 1992). Training practices in psychology are based on the mentorship model, and students are highly dependent on faculty for mentoring, research and teaching experience, and career advancement (Schneider, 1987). Graduate students often work closely with faculty supervisors in multiple and overlapping relationships, and a power differential exists in each. Given this power differential, students may be reluctant to assert themselves when determining authorship credit out of fear that the other relationships will be affected (Rose & Fischer, 1998).

Students’ disadvantaged power position, lack of knowledge, and relative inexperience in the research setting all increase their vulnerability to exploitation. Faculty members, as those in the advantaged power position, are ultimately responsible to prevent student exploitation (Arthur et al., 2004; Goodyear, Crego, & Johnston, 1992; Kolbert, Morgan, & Brendel, 2002). Ethical and professional development lessons learned during graduate school will likely influence one’s conduct as a professional. Faculty members must also protect their own due credit as supervisors, and little guidance has been offered to assist in this effort (Arthur et al., 2004).

The field of mental health is particularly concerned with attending to power differences and preventing exploitation (Oberlander & Barnett, 2005). The assignment and order of authorship credit is an ethical concern in the field of psychology, and in a recent survey of members of the American Psychological Association (APA), nearly one third of respondents believed they had been or may have been involved in the unfair or unethical assignment of authorship credit (Sandler & Russell, 2005). In an attempt to prevent harm, the field of psychology has developed an evolving series of ethical codes and licensure standards.
In the 1951 APA code of ethics, assignment of authorship credit was identified as the most common ethical dilemma in publication. Standard 5.12 read,

Difficulties often arise in the method of apportioning and indicating credit for work done by co-authors, senior and junior staff members, or by faculty members and students. These problems are complicated by the varying roles and contributions of the participants, which do not always coincide with their ranks. (APA, 1951, p. 444)

Although the terms “senior” and “junior” may serve to reinforce power differentials, the APA did attend to the potential disparities between rank and level of contribution to a manuscript. The ethics code included several vignettes and described many possible collaborative relationships between students and faculty. Subsequent editions of the APA ethical standards have become less specific regarding these issues, stating that authors include only those who have made professional contributions to a paper, authors should be listed in relative order of contribution, and minor contributors should be acknowledged (APA, 1959, 1968, 1992).

The most recent 2002 APA ethical standard regarding publication credit (8.12a) reads, “Psychologists take responsibility and credit, including authorship credit, only for work they have actually performed or to which they have substantially contributed” (APA, 2002, p. 1070). The word substantially was added in the 2002 revision to clarify that an intellectual contribution to the publication was required for authorship and to remind authors that they are ultimately responsible for the content of the publication (Fisher, 2003). Standard 8.12b states,

Principal authorship and other publication credits accurately reflect the relative scientific or professional contributions of the individuals involved, regardless of their relative status. Mere possession of an institutional position, such as department chair, does not justify authorship credit. Minor contributions to the research or to the writing for publications are acknowledged appropriately, such as in footnotes or in an introductory statement. (APA, 2002, p. 1070)

The goal of this standard is to protect those deserving of authorship from exploitation, particularly students, nontenured faculty, researchers, and others in disadvantaged power positions (Fisher, 2003).

The standard regarding student publications was dramatically revised for APA's 2002 ethics code. In 1992, this section (6.23c) read, “A student is usually listed as principal author on any multiple-authored article that is substantially based on the student’s dissertation or thesis” (APA, 1992, p. 1609). In the 2002 revision, 8.12c was updated to read,
Except under exceptional circumstances, a student is listed as principal author on any multiple-authored article that is substantially based on the student’s doctoral dissertation. Faculty advisors discuss publication credit with students as early as feasible and throughout the research and publication process as appropriate. (APA, 2002, p. 1070)

The word thesis was removed from the standard due to concern about the level of contribution implied by the term (Fisher, 2003). Although the typical apprentice–mentor model includes undergraduate and master’s level theses requiring significant faculty assistance, this standard does not prevent students making primary contributions on theses projects from being the first author on resulting publications (Fisher, 2003).

Although some guidance is provided regarding authorship credit, much of the terminology included in the code (e.g., “usually,” “substantially”) remains open to interpretation. Since the 2002 revision, perceived incidents of unethical or unfair authorship assignment continue to be reported at high rates (e.g., Sandler & Russell, 2005). The increased specificity of the 2002 code will likely reduce instances of students receiving less authorship than deserved on dissertations. However, it does not address the difficulties that may arise when determining authorship credit on other research projects (Arthur et al., 2004).

With significantly more authors per paper in medical journals than counseling and psychology journals (Holaday & Yost, 1994), the field of medicine has led the effort to control the abuse of authorship. The International Committee of Medical Journal Editors (ICMJE) has recommended the following authorship criteria: (a) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; (b) drafting the article or revising it critically for important intellectual content; and (c) final approval of the version to be published. Authors should meet conditions a, b, and c (ICMJE, 2004). The ICMJE also implores authors to list all other contributors in an acknowledgments section (e.g., technicians, writing assistants, the department chair, and financial and material supporters; ICMJE, 2004).

Despite these recommendations, variability continues to exist in the authorship practices across medical journals (Bates, Antić, Marušić, & Marušić, 2004). For example, British Medical Journal editors require authors to describe contributions in their own words. Authors submitting manuscripts to the Annals of Internal Medicine must identify their contributions from among a list of possible contributions. Editors of the Journal of the American Medical Association require authors to complete a structured checklist indicating which contributions meet ICMJE criteria.

Bates et al. (2004) proposed 11 categories of contribution involved in authorship: (a) conception and design of the study; (b) analysis and interpretation of data; (c) collection or assembly of data; (d) statistical expertise; (e) provision of study
material or patients; (f) drafting of the article or part of the article; (g) critical revision of the article for important intellectual content; (h) obtaining funding; (i) administrative, technical, or logistic support; (j) guarantor of the study; and (k) study supervision or coordination. Categories a through e combine to address the first ICMJE criterion and categories f and g meet ICMJE’s second criterion. The third criterion would be met on approval of the final manuscript.

PROPOSED SOLUTIONS

Given the subjective nature of authorship and the inevitable power differentials between authors, several solutions have been proposed to illuminate the difficult process of assigning credit.

Use of Scoring Strategies in Determining Authorship

Winston (1985) proposed a scoring system for assigning authorship credits. Twelve tasks are awarded point values ranging from 2 (redraft of a page) to 50 (conceptualizing and refining research ideas). Points are totaled for each individual involved in the project. All individuals with 50 or more points are declared authors (and listed in descending point order), and all individuals with less than 50 points are listed in the acknowledgments section. Even though scoring procedures have been in existence for nearly 20 years, they have not been widely implemented, and psychologists continue to identify the assignment of authorship credit as an ethical dilemma (Pope & Vetter, 1992).

Point systems have the advantage of adding objectivity to the art of ethical decision making, but may not allow the flexibility needed to adapt to each project. For example, although data analysis and interpretation may be relatively simple in a correlational, cross-sectional design, they may require extensive time and expertise in a data-driven, exploratory, longitudinal study. Winston (1985) argued that a numerical approach can be made flexible by means such as weighting points by professional competence. Adding flexibility through weighting, as agreed on by a research team, may improve the objectivity of authorship assignment. These points may need to be revisited for every research project. It is important to be mindful of the inherent power differences between members of a research team while establishing and negotiating a point system.

Specification of Author Contributions

An often-cited method to prevent authorship abuse is to specify research contributions in footnotes (Rennie et al., 1997). This system specifies the allocation of duties, which allows readers to contact specific contributors with relevant questions.
Another suggestion is to list credits (e.g., writer, statistician) for each contributor (R. Smith, 1997). This system would increase flexibility because individuals can be included as contributors who may not qualify as “authors” in the traditional sense (Kempers, 2002). One radical proposal is to forgo traditional authorship completely and list the institution as an author and include a footnote with the researchers names (Fortney, 1998).

These suggestions would allow for more contributors to be listed with each work, but critics argue that limited journal space precludes extensive listings of contributions and committees. The credits may also be uninteresting (e.g., wrote third draft) and vague (e.g., developed content), making it more difficult for the reader to discern which individuals deserve credit for each manuscript (Greenfield, 1998). Footnotes would vary across manuscripts, given that various sections of a manuscript require different amounts of time and effort on different projects (Gunsalus & Tessman, 1997). These recommendations may also limit what readers believe an individual contributed to the project, and contributors may be less likely to take responsibility for the findings (DeBakey & DeBakey, 1995). It seems unlikely that professionals are going to limit authorship to one guarantor and be content with listed contributions, given that footnotes, acknowledgments, and introductory sentences are not listed on one’s curriculum vitae. Ultimately, these specification systems may only encourage authors to be creative when describing their contributions (DeBakey & DeBakey, 1995).

Increased Editor Responsibilities

Editors have also taken on increased responsibility to reduce authorship abuses. Several journals require authors to sign a declaration stating that they are responsible for the content within the article (Edwards & Babor, 2000). Journal editors cannot police author contributions to each submitted manuscript or settle disputes, and they are forced to ask researchers to report on themselves (Biagioli, 1998; Louw & Fouche, 1999). These signed declarations serve as a concrete record that cannot be refuted after publication (Rennie et al., 1997), but authors may perceive few potential ramifications from untruthfully signing this declaration.

Other suggestions have been made to include all authors in alphabetical order. Although various journals have implemented this suggestion, it is not surprising that individuals with last names in the latter half of the alphabet tend not to submit manuscripts to these journals (Rennie et al., 1997). Finally, it has been proposed that journals accept only a certain number of authors. This may discourage honorary authorship, but it would also punish collaborations and multisite trials (Erlen, Siminoff, Sereika, & Sutton, 1997).

Increased Professional Organization Responsibilities

Professional organizations have been identified as a possible source for improvement in the authorship system, and professional associations should certainly ad-
dress the assignment of authorship credit and make their expectations clear (Edwards & Babor, 2000). Although ethical guidelines will probably never be precise and specific enough to prevent all transgressions (Holaday & Yost, 1995), governing bodies should continue to attempt to improve the current system, just as laws remain in place even though they cannot prevent all crimes (Rennie, 2001).

Schoolwide Regulations

Universities, rather than professional organizations, can create regulations regarding authorship credit. Few colleges and universities use such regulations (Louw & Fouche, 1999). Although this may help standardize authorship credit assignment within schools, there would likely be variability between schools. In addition, it is unclear whether different professions within one university should be operating under the same set of authorship guidelines. On the other hand, university regulations and policies are widely distributed and easily accessible. Regulations regarding the ethical assignment of authorship credit should be included in faculty handbooks and student orientation manuals (Arthur et al., 2004).

Changes to the Vitae Review Process

Slone (1996) advocated revising the vitae review process by limiting the number of publications submitted for review. For example, applicants would submit no more than 10 publications for review, forcing them to weigh quality, quantity, and authorship credit. This reduces the incentive for researchers seeking authorship credit for minimal contributions. Another suggestion is to encourage potential employers to use a standardized scoring system for each publication (Hemenway, 1998). This system would grant equal credit to all secondary authors and twice that amount to the first author. Although this may help reduce the number of authors per paper, this is not an optimal solution for disciplines hoping to encourage interdisciplinary collaborations and multisite trials.

Professional Development

All of the solutions described may facilitate the process of assigning authorship credit or reduce the number of authors on any given publication. Although various authorship guidelines have already been implemented and are widely distributed and understood, they are seldom followed (Bennett & Taylor, 2003; Biagioli, 1998, Rennie et al., 1997). These suggestions fail to address the inherent power disparity between students and faculty that creates opportunities for exploitation (Fine & Kurdek, 1993; Kolbert et al., 2002). Shadish (1994, p. 1096) argued that “only a small percentage of students quarrel with not being principal author on resulting publications, at least as long as authorship issues are discussed openly at the start,” yet he did not acknowledge that students are forever linked profession-
ally to advisors and may be fearful of real or imagined consequences of question-
ing authorship practices. As students, many individuals are grateful for any level of authorship on a publication. Although students likely have the problem solving ability to decide authorship credit (Fine & Kurdek, 1993), this power differential can lead students to be reluctant to address authorship credit issues in fear of possible damage to the relationship or retribution (Murray, 2002).

One rarely suggested possibility for reforming the authorship assignment sys-
tem is building students’ professional development skills. Surveys of students sug-
gest that they overestimate supervisor authorship credit and underestimate student credit compared to their own supervisors’ estimates, indicating that education of students and future scientists is needed (Costa & Gatz, 1992; Edwards & Babor, 2000).

Students’ professional competence can be viewed as being on a continuum. Most students enter graduate programs with limited experience in research and publishing, and few are sophisticated in the culture of authorship assignment. Mentors should be invested in providing students with a learning experience and guiding students toward independence, regardless of their competence (Barres, 2002; Kee, 1994). Students may underestimate the importance of mentorship in the process of identifying meaningful research questions, collecting data, writing the paper in a professional style, responding to reviewer’s comments, and other tasks associated with manuscript preparation and publication. Students are transitory, and may move on or lose interest in projects after fulfilling degree requirements, whereas professors are more invested both personally and professionally in what is often an ongoing program of research.

Ultimately, each individual has his or her own philosophy about authorship credit. Supervisors should evaluate their own position and situational factors (e.g., would I change the author list if I were not under tenure review this year?) that lead them to make decisions regarding authorship. Supervisors should explicitly inform students about their philosophy and attitudes toward authorship credit, given that the traditional apprentice model of learning informally from faculty does not seem to be adequate to prevent ethical transgressions (Folse, 1991). Both parties should discuss abilities, tasks, supervision required, and appropriate expectations to decide what contributions merit authorship. This discussion is similar to obtaining informed consent, and signed agreements may be helpful (Fine & Kurdek, 1993). In addition to simply deciding between author and nonauthor, supervisors should openly discuss and negotiate the order of authors. Although there is some consistency in the contributions of first authors, great variability exists in the contributions of middle authors (Shapiro, Wenger, & Shapiro, 1994).

Previous research in the area of authorship credit has been largely based on sur-
evys including short vignettes. Although vignettes can be helpful as a teaching tool and encourage thought about the difficulties involved in the assignment of authorship, they have limited utility when exploring the complexities of collaborative re-
search projects. Short examples do not allow the reader to understand the varying amounts of effort and expertise involved in given tasks. For example, a vignette reporting “Student A collects the data for the study, and Supervisor X writes the manuscript” do not express how much work each task entailed (e.g., Was data collection completed in one day or three years? Is the manuscript a brief report or a book?). Lengthier vignettes may be useful when exploring these issues in future research. Other research has surveyed authors and students to assess which duties are perceived as important for authorship credit and how many published documents have incorrectly credited authors. Low response rates raise questions about the representative nature of respondents, and any self-report responses are subject to bias.

Reviewing the previous suggestions to prevent the misappropriation of authorship credit, we offer the following recommendations.

Recommendations

• *Look to guidelines from professional organizations and journals.* Existing standards provide basic guidance and structure for resolving authorship disputes. Those professions without authorship guidelines should critically examine the process of assigning credit within their disciplines and look to existing guidelines from other organizations. Unfortunately, no one set of guidelines, however specific, will be able to address all of the factors involved in the assignment of authorship credit.

• *Mentors should understand and explore their own professional development beliefs and convey these to students.* Consider whether authorship decisions should be based on contributors’ relative contributions or status, such as paid staff, volunteers, undergraduates, or graduate students. A recent survey of students and faculty revealed that each group is most concerned about their own exploitation with regard to the assignment and order of authorship credit (Kolbert et al., 2002). An open discussion may lead both groups to be more sensitive to the other’s views and concerns.

• *Discuss authorship early and often.* Supervisors should engage individuals in a dialogue about authorship before projects get started and before individuals have vested interests (Erlen et al., 1997). Research teams are encouraged to openly debate these issues and come to a consensus about what contributions merit authorship. Authorship credit outlined on a manuscript proposal form should be flexible and negotiable. These discussions need to take place within the entire research team, not just between each faculty member–student dyad. For example, Arthur et al. (2004) described a working group formed within a multisite project team to define and negotiate intellectual ownership.

• *Clarify roles.* The use of a written document is encouraged (e.g., Hopko, Hopko, & Morris, 1999). This document prospectively identifies a first author,
coauthors, and their respective roles at the start of a project. A manuscript proposal form also outlines the objectives of the study, leading to less overlap in projects and fewer disagreements. This document should be revisited throughout the publication process, with attention to the power differentials present (Arthur et al., 2004).

- **Authorship should be based on relative contribution.** Giving honorary authorship to students may falsely represent their scholarly expertise, provide them with an unfair professional advantage, or raise expectations of others in the future (Fine & Kurdek, 1993). On the other hand, both students and faculty can make minor contributions to projects that do not warrant authorship (Crespi, 1994). Students should generally be first authors on dissertations, but it is difficult to make concrete rules about theses and dissertations because each may vary in level of student and supervisor involvement. First authorship should be granted to the individual who has contributed most substantially to a project, and subsequent authors should be listed in order of descending contribution.

- **Use acknowledgments appropriately.** Unfortunately, acknowledgments have little value for promotion and tenure. Individuals contributing to your project as nonauthors should still be acknowledged. Examples of tasks worthy of acknowledgment include obtaining funding, referral of funding, collecting or providing data, writing assistance, or general supervision (Hare, 2001). Authors should obtain permission from those whose contributions they wish to formally acknowledge in a publication.

- **Give students time and flexibility to be innovative and creative** (Lawrence, 2002). The goal of mentorship is to help individuals develop their professional competence, and students should be allowed to initiate projects with an appropriate degree of supervision. Mentors should find a balance between allowing students to take initiative with research opportunities and identifying realistic, achievable endeavors appropriate to students’ level of training and expertise.

- **Motivate students to pursue publication.** Faculty should encourage students to publish meaningful research findings. Situations may arise where students lack apparent motivation or incentive to publish findings from completed projects, and in such cases, explicit timelines should be used. If supervisors feel compelled to publish the findings, this should take place after the student has been given a final opportunity to pursue publication. Supervisors should take first authorship only if the manuscript needs extensive rewriting or further analyses before submission.

- **Clearly outline the appropriate course of action for any individual with questions or concerns about authorship assignment.** Students and faculty should discuss options for resolving complaints. For example, discuss issues with other authors, the principal investigator, the department chair, the dean, a third-party arbitrator, or an ethics committee. Those in the advantaged power position must be aware of this as disputes are managed (Arthur et al., 2004; Goodyear et al., 1992; Kolbert et al., 2002).
• *Attend to the power differential between students and faculty.* Students are often dependent on advisors for research experience, theses and dissertations, course grades, and letters of recommendation. Students may be unlikely to complain about perceived injustices for fear that it will have a negative effect on multiple relationships with supervisors. Supervisors should work to reduce the power differential by creating a forum for discussion, and should consult frequently with impartial colleagues.

**CONCLUSIONS**

Contributors take numerous complex factors into account when assigning authorship credit (Bartle, Fink, & Hayes, 2000). Actually writing the paper and conceiving the idea were the most important perceived contributions of surveyed authors from the *Journal of Consulting and Clinical Psychology* (Wagner, Dodds, & Bundy, 1994). However, there was wide variability for most remaining categories, particularly for data collection and data analysis–interpretation, underscoring the disparity of authorship credit within each project. In 2000, psychology faculty and students were surveyed using vignettes similar to those employed by Spiegel and Keith-Spiegel (1970). Results suggest that faculty members are more likely to report that students deserve authorship credit (both author vs. nonauthor and first vs. other) than they were 30 years ago (Bartle et al., 2000). However, the current culture of scientific reward, which is based on number of publications, journal impact factor, and rank of authorship, may encourage faculty to usurp authorship credit from those in disadvantaged power positions (Lawrence, 2002). Abolishing the authorship system or assigning credit based on a complex scoring strategy may curb some authorship abuses. However, even these strategies are subjective and therefore open to interpretation and error. It is unclear when, if ever, authors will create and adopt a generalizable set of principles to determine authorship credit and order.

Education of future scientists may be the optimal strategy to discourage inappropriate assignment of authorship credit that may exploit both faculty and students. Unfortunately, there is a relative lack of training regarding ethical issues that are related to professional advancement in current graduate school curricula. It is imperative that ethics courses address the power disparities that exist between students and faculty, as well as authorship credit negotiation strategies. These courses should be offered as early in graduate training as possible, before students have spent months or years as a research assistant and advisee (Oberlander & Barnett, 2005). However, courses in ethics are insufficient to address all topics psychologists are likely to face throughout their careers, and these concerns should be addressed in other courses and mentoring situations (Sell, Gottlieb, & Schoenfeld, 1986). Supervisors should collaborate with students to examine the difficulties in-
olved in the assignment of authorship credit and continue to develop and test strategies that promote positive research experiences and the advancement of science.

REFERENCES


You may be asked to write a journal article review. Although this may be an unfamiliar exercise, it is not as complex a task as writing an essay requiring a lot of library research, and not the same as a review in *The Canberra Times* which is written for the general reader.

Your journal article review is written for a reader (e.g., your supervisor, lecturer or tutor) who is knowledgeable in the discipline and is interested not just in the coverage and content of the article being reviewed, but also in your critical assessment of the ideas and argument that are being presented by the author.

Your review might therefore be guided by the following questions:

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**So how can you begin to meet these demands?**

**Step 1**: Get to know the article you are reviewing:

Look at the title, the table of contents, the abstract and the introduction. These should give you some idea of the central focus and the coverage of the article and the author’s reasons for writing the article.

Skim quickly through the whole article, running your eye over opening sentences of paragraphs and glancing at any tables, illustrations or other graphic materials.

Read more closely the first section, which should tell you the main issues to be discussed and indicate the theoretical or conceptual framework within which the author proposes to work.

Read closely the final section, which should cover the author’s conclusions and summarise the main reasons why these conclusions have been reached.
Now that you are familiar with the text, read the whole text thoroughly to develop a basis on which to critically review it.

**Step 2:** Decide which aspects of the article you wish to discuss in detail in your review: the theoretical approach? the content or case studies? the selection and interpretation of evidence? the range of coverage? the style of presentation?

Usually you will discuss the main issues which the author has specifically examined. Sometimes you may choose a particular issue because it has importance for you and the course you are studying, even if it is not the main issue for the author.

**Step 3:** Now, on the basis of your overall knowledge of the article and your decision about which issues you will discuss, read in closer detail the sections which are relevant to these issues. Make notes of the main points and key quotations.

If necessary, read other articles or books which are relevant to your topic, possibly to provide supporting evidence or alternative theoretical models or interpretations of data.

You may also want to glance at other reviews of the article in recent academic journals in order to get a feel for the way the article has been received within the discipline. However only use these reviews to support your own evaluation; don’t merely copy or imitate them.

**Now you are ready to start drafting and writing your review.**

The structure of your review should include:

- an initial identification of the article (author, title of article, title of journal, year of publication, and other details that seem important, eg, it is originally a French edition, etc), and an indication of the major aspects of the article you will be discussing.

- a brief summary of the range, contents and argument of the article. Occasionally you may summarise section by section, but in a short review (1,000–1,500 words) you usually pick up the main themes only. This section should not normally take up more than a third of the total review.

- a critical discussion of 2–3 key issues raised in the article. This section is the core of your review. You need to make clear the author’s own argument before you criticise and evaluate it. Also you must support your criticisms with evidence from the text or from other writings. You may also want to indicate gaps in the author’s treatment of a topic; but it is seldom useful to criticise a writer for not doing something they never intended to do.

- a final evaluation of the overall contribution that the article has made to your understanding of the topic (and maybe its importance to the development of knowledge in this particular area or discipline, setting it in the context of other writings in the field).

**Checklist for your final draft:**

- Have you identified the article clearly, right at the start?
- Is the author’s argument clearly and objectively summarised so that your reader can recognise the theoretical approach and the range of material covered? (About a third of a short review.)
- Are the 2–3 key issues raised in this article clearly identified and discussed? (About 50–60% of the review.)
- Have you given reasons for your criticism and your approval of the article?
- Is there a final evaluation of the article’s importance, based on your earlier discussion?
A Systematic Guide to Reviewing a Manuscript*

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OBJECTIVE. In this article, we provide a step-by-step guide to reviewing a manuscript that we hope will improve the quality of reviews for the AJR. CONCLUSION. We have provided a detailed series of guidelines for providing excellent reviews of manuscripts. The template we have provided can be used to serve as a checklist for important questions to ask about manuscripts during the review process. Finally, the principles presented here also can be used as a guide for authors by providing a list of important features to include during manuscript preparation and thereby prospectively address questions that good reviewers are likely to ask.

The process of properly reviewing a manuscript is not intuitive but instead requires training and experience, which are not easily acquired. Journal editors depend on high-quality reviews and are often faced with reviews that do not quite achieve that desired level. A question the authors of this article asked is, “How is this experience gained?” The answer seemed to be, “By trial and error,” which is not the easiest or most systematic method.

In light of these facts, we decided to create a primer on reviewing manuscripts and to disseminate it to our growing team of reviewers by publishing it in the AJR and sending it by e-mail to AJR reviewers. We have also included a template (Appendix 1) that reviewers can use while reviewing a manuscript. The template provides a basic format from which reviewers can systematically proceed through a manuscript and answer important questions. In fact, we encourage reviewers to type their review on the template itself and send their review as an attachment when they submit their review electronically. In addition, the template also serves as a good model for composing a manuscript. In other words, by following this template, authors should be able to compose a well-written manuscript that prospectively addresses the questions good reviewers are likely to ask.

Although we provide this primer at risk of insulting our very-well-qualified reviewers, we designed it to be informative for reviewers at any point in their reviewing career. We hope the primer will serve as a good introduction to the review process for new reviewers and also will reinforce subtleties of the review process for experienced reviewers. In doing so, we hope to bring all reviews up to a high standard that is helpful to editors and instructive for authors.

THE ROLE OF THE REVIEWER

The role of the reviewer is a very important one for any journal. The journal places its confidence in reviewers as the arbiters of quality in submitted manuscripts. Essentially, the reviewer serves two major functions. The first function is to judge whether the manuscript merits publication (usually after revisions) by providing a global rating—that is, “Accept,” “Accept Pending Revisions,” “Reconsider After Major Revisions,” or “Reject.” The second role is to provide constructive criticisms for the authors, regardless of whether the manuscript is deemed acceptable for eventual publication. Many reviewers capably fulfill the first task but could perform more ably in the second capacity—that is, to also serve as an advisor. As one author stated it, the task of the reviewer is to see what the authors have not seen: “The reviewer can be fully as helpful as an involved laboratory colleague or a visiting professor” [1]. The purpose of this primer is to provide suggestions for ways in which reviewers can excel in both roles.

COMMON SENSE RULES FOR REVIEWERS

A few rules exist for reviewers that, although based on common sense, deserve to be stated explicitly. The overriding theme is that reviewers should treat the manuscripts they review as they would like their own to be treated [2]. For instance, because most reviewers would like their manuscripts to be treated with respect and criticisms to be levied in a polite manner, so should they handle others’ manuscripts. The reviewer should avoid statements that are demeaning or insulting and should avoid sarcasm. It is also appropriate for the reviewer to direct all statements about the manuscript (e.g., “This manuscript suffers from a lack of attention to detail”) rather than about the authors (e.g., “The authors should have paid more attention to detail”).

REASONS REVIEWERS DECIDE TO ACCEPT OR REJECT MANUSCRIPTS

As one might expect, many different reasons exist why reviewers accept or reject manuscripts. It is worthwhile to
b brief review these reasons because it is instructive with regard to how reviewers approach manuscripts and the common issues with which they must deal. Furthermore, this information is helpful to authors, especially those who are relatively new to the field of manuscript preparation.

One recent review of the reasons why reviewers accepted manuscripts for publication examined reviewers’ comments on 151 research manuscripts submitted to the 1997 and 1998 Research in Medical Education Conference Proceedings. The three reasons cited most often by reviewers for acceptance of a manuscript (which accounted for approximately 50% of positive comments) were, first, the manuscript was considered timely and relevant to a current problem; second, the manuscript was considered well written, logical, and easy to comprehend; and third, the study was well designed and had appropriate methodology [3]. These points are important ones that prospective authors (and not solely reviewers) should keep in mind. The same study indicated that the six most commonly cited reasons for rejection of a manuscript (which accounted for 40% of negative comments) were, first, incomplete or insufficiently described statistics; second, overinterpretation of the results; third, a suboptimal or insufficiently described means of measuring data; fourth, a sample population that was too small or was biased; fifth, text difficult to follow; and sixth, an insufficient problem statement [3]. As the author of the study noted, many of these flaws can usually be adequately addressed by the authors (thereby potentially allowing the manuscript to be salvaged).

Some manuscripts exhibit only one or two of these flaws, while others exhibit many. One of the issues the reviewer must address is whether the sum total of these deficits, if present in a manuscript, allows the manuscript to still be considered a viable candidate for publication or whether the cumulative effect is to render the manuscript unsuitable for publication or require substantial revision before publication can be considered. One factor that is hardest to address is difficulty in following the logical flow of the manuscript. Poor writing cannot be fixed with suggestions by the reviewer; instead, the manuscript often needs to be rewritten. When faced with a manuscript in which logical flow is difficult to follow, an exasperated reviewer may throw up his or her hands and simply recommend rejection. On the other hand, the same reviewer might well have offered an opportunity for revision if the writing had simply been clearer.

**A SYSTEMATIC APPROACH TO MANUSCRIPT REVIEW**

In this section, we provide a systematic method for manuscript review that reflects the review template, which is included at the end of this article in Appendix 1, that is an amalgam of our opinions about the most important questions to ask during a manuscript review. Interestingly, we subsequently searched the medical literature and found previously published suggested methods for reviewing that were quite similar to ours [2, 4].

**Before Reviewing the Manuscript**

An initial question that the reviewer should answer is, To what manuscript category used by the journal does this manuscript conform? It is incumbent on the journal to clearly provide this information to the reviewer but, when the authors do not clearly specify which category is appropriate, the issue can be difficult to settle.

The issue of potential reviewer bias is also one with which the reviewer must deal [5]. Bias can be either positive (i.e., unfairly favoring the manuscript for publication) or negative (i.e., unfairly favoring rejection) [6]. The problem becomes more complex in the absence of double-blinded reviews. Reviewers who recognize, at the time of rendering an “Accept for Review” or “Decline to Review” decision that they are strongly biased in either direction should decline to review out of fairness to the authors.

Another issue with which reviewers must deal is whether they have sufficient scientific background to perform a substantive review of the manuscript. A good review requires an awareness of the medical literature and a mastery of the underlying science [1]. If the reviewer believes that the topic of the manuscript is outside his or her area of expertise, then the prospective reviewer should decline to review the manuscript.

**Approaches to Reading the Manuscript**

Clearly, the first step to reviewing a manuscript is reading it. Hidden in that simple statement is the fact that various approaches exist for performing the initial reading, and there is no one clear-cut best method. Instead, individual reviewers will find a style that suits them best. Some individuals prefer a quick and superficial initial reading of the entire manuscript from which the reviewer can determine the type of manuscript (e.g., Original Research, Case Report, and so on) and the type of study (e.g., prospective cross-sectional study, retrospective case study, and so on) [7]. Some initial questions one might ask during the short overview are, What were the authors intending to study? Does this manuscript address a topic that will be of interest to readers? and Does this study attempt to provide answers to important, previously unanswered questions? Alternatively, the reviewer may take the approach of reading through the manuscript in a detailed manner and asking important questions as one goes along. Whichever method is chosen, many reviewers opt to allow time to pass between detailed reading of the manuscript and writing the review, to allow maturation of initial impressions.

**The Abstract**

The abstract is the portion of the manuscript where the authors provide a summary that presents the manuscript’s most important features. Full abstracts accompany Original Research papers; abbreviated abstracts with only an Objective and Conclusion are used with all other type manuscripts, except Case Reports, Radiologic–Pathologic Conferences, and On the AJR Viewbox, all three of which have no abstract.
This portion of the manuscript is the one that readers most often read if the manuscript is published because subsequent investigators often initially (or only) read it when preparing their manuscripts. Therefore, the abstract should be able to stand alone from the manuscript and be understood without reading the manuscript. In the Abstract, the authors should explain the major objective of the study in an Objective section, explain how the study was done in a Methods section, describe the findings in a Results section, and report whether the major goal was met in a Conclusion. In general, the reviewer should ask, If I could not read the entire manuscript, would the abstract adequately summarize it? Some common ways in which authors fail to do this are as follows.

Providing an abstract that does not adequately represent the manuscript—The reviewer should assess whether there are major discrepancies between the abstract and the remainder of the manuscript (e.g., differences between the methods as outlined in each) and differences in factual statements between the two sections (e.g., differences in numbers of patients).

Providing an objective that is unnecessarily vague—For instance, if the authors had a hypothesis, such as “We hypothesized that MDCT would be more sensitive for the detection of renal calculi than single-detector CT,” it is appropriate to state it here rather than replace it with vague phrases, such as “The objective of our study was to assess the reliability of MDCT for evaluation of renal calculi.”

The Introduction

It is easy for authors to develop a form of tunnel vision and write the manuscript as if the readers were involved in the study and understand all the reasons for performing the study, the assumptions underlying the methodology, and the nuances of the performance of the study. The Introduction of a well-written manuscript is free of this bias and clearly explains why the authors went to all the trouble of performing the study and writing a manuscript. The purposes of the Introduction are, first, to provide the rationale for the study and, second, to explain the study’s goals. The Introduction should include a problem statement that conveys the important issues and provides the context for the study [8]. The authors need to provide a rationale to address the two most important questions on the reviewers’ mind: Does this manuscript cover an important topic? and Has the research question previously been answered (or the topic of the manuscript previously been well covered)? The answers to these questions may allow the reviewer to decide whether the manuscript is likely to provide a true contribution to the medical literature.

The authors can provide a rationale in the Introduction by showing both that an important problem exists and that previous investigators have failed to adequately address the problem. Both tasks usually require a succinct review of the pertinent literature. Sometimes authors exceed this mandate by attempting to provide a lengthy and detailed review of the medical literature, which is inappropriate for the Introduction. The reviewer should then suggest which portions of the Introduction should be moved to the Discussion section and which portions can be safely deleted without detracting from the manuscript.

The Methods Section

The Methods section is the portion of the manuscript in which the authors outline how they performed their study. In many cases, the Methods section is the most important portion of the manuscript because poor methodology can only lead to results that are suspect, thereby seriously impairing the credibility of the manuscript. On the other hand, if the methods are scientifically sound, even uninteresting results can have merit.

In a sense, the Methods section represents a blueprint by which another investigator could reproduce the study, quite similar to the manner in which a recipe outlines the steps by which a cook can prepare a culinary dish. From a practical standpoint, if another investigator tries to reproduce the study results and fails, the failure could potentially be due to lack of clarity in the Methods section. This factor should be carefully considered by reviewers and commented on in the review. In other words, if the reader could not use the Methods section as a guide to replicate the study, then the Methods section is lacking.

In the Methods section of most manuscripts, the authors should provide a rationale for specific methodologic choices. For instance, if there are alternative techniques that could have been used but were not performed, the authors should justify the choice of the technique they did use. The Methods section is also the appropriate site to explain various other study design choices, such as entry criteria for their study population, specific imaging techniques, and methods of data analysis.

One potential flaw in a scientific manuscript in which the authors have framed a hypothesis is failure to design methods that can adequately test the hypothesis. For instance, if the authors hypothesize that MDCT is more sensitive for the detection of renal calculi than single-detector CT, then they should design a study that uses comparable parameters on both types of scanners, assess the same size of calculi in all patients, and hopefully study the same patients in close temporal proximity on both systems. Failing to follow these guidelines would result in biases that skew the results and either fail to show a difference that really exists or falsely show a difference when none exist.

The Results Section

In the Results section, the reviewer should examine whether the authors systematically and clearly announce the study findings. If the results are unclear, the reviewer must decide whether the analysis of the data was poorly executed or whether the Results section is poorly organized. The latter need not be a fatal flaw, whereas the former usually indicates that the manuscript is unacceptable for publication [9]. Therefore, the organization of the
Results section is an important consideration for authors and reviewer alike. If the authors outline a sequence of steps in the Methods section, presenting the results of each step separately will help the reader and reviewer place the findings in perspective.

**The Discussion Section**

The Discussion section is the part of the manuscript in which the authors should state whether their hypotheses were verified or proven untrue or, if no hypotheses were given, whether their research questions were answered. The authors should also comment on their results in light of previous studies and explain what differences (if any) exist between their findings and those reported by others and attempt to provide an explanation for the discrepancies.

The Discussion section should be long enough to discuss the findings against the background of previous work and explain discrepancies with previously published reports. However, it should not be lengthy to the point of appearing rambling or unfocused, which can substantially detract from the merits of an otherwise good manuscript. Many authors tend to reiterate the results in the Discussion section, which is an unnecessary step that distracts the reader from the more important points of the discussion. Another problem to which some authors succumb is to use the Discussion section to review the entire medical literature surrounding a problem rather than simply reviewing the portion that is relevant to their study. Finally, on occasion, authors become lost in the myriad details of discussing their findings without actually stating basic information, such as whether their findings support their hypothesis or whether their research question was answered. A good reviewer will note the authors’ performance on all these points.

In a good manuscript, the authors will attempt to explain unexpected findings rather than ignore them. This process is especially important for findings that are not supportive of the authors’ claims or that do not serve as evidence in favor of their hypothesis. To fail to do this is to risk unjustifiably emphasizing only some of the results and reaching inappropriate conclusions. The reviewer can provide a valuable service to the journal by commenting on these possible problems.

One important feature on which reviewers should also concentrate is whether the authors have noted limitations to their study. It is a rare study that does not make fundamental assumptions that may be erroneous or impose limitations that alter the manner in which data are collected and analyzed. This factor can be something as simple as the choice of patient entry criteria or, alternatively, as complicated as the use of an analysis program. Therefore, the lack of a limitations statement suggests that the authors did not prospectively take these factors into account when they designed the study or did not retrospectively assess these features when they reviewed their data.

Reviewers are also requested to assess whether the authors’ conclusions are justified by their results. In other words, the reviewer should ask the question, Based on the findings presented in this manuscript, are the authors’ claims reasonable? For instance, if the authors have conducted a study that showed that MDCT is more sensitive than routine CT for the detection of small renal calculi, then a claim that MDCT is the preferred technique for evaluation of the entire urinary system is overly broad and cannot reasonably be stated on the basis of this study.

**The Figures and Graphs**

The figures and graphs should illustrate the important features of the methods and results. The reviewer can help in the review process by deciding whether the figures and graphs are of high quality, appropriately serve their intended purpose, and have figure legends that adequately explain their meaning. The figure legends should allow the reader to understand the figure or graph without having to refer back to the text of the manuscript. Common mistakes made by inexperienced authors are failing to include figures that best depict their findings, writing unclear figure legends, and making poor use of arrows. For instance, it is easy for the authors, who are familiar with the images used in the manuscript, to erroneously believe that all readers will readily see the findings in figures without the need for arrows. The reviewer can be helpful by pointing out the need, if it exists, to improve the figures and graphs and suggesting the means to do so.

**The Tables**

The purpose of tables is to summarize the data, make the data more easily understandable, and point out important comparisons. The reviewer can assist by commenting whether the number of tables is appropriate and whether the tables adequately summarize the data. Because tables take up valuable journal space, it is important that journals publish tables in a judicious manner, and the reviewers can assist the editor in deciding whether duplication of data is found in the text and in the tables. Authors should use one or the other, not both. Description of the data in the text, if possible, is preferable to the use of a space-consuming table.

**The References**

The quality of the references often reflects the quality of the manuscript as a whole. Poorly written manuscripts frequently have a References section filled with mistakes indicating lack of citation accuracy, incorrectness of abbreviations and punctuation, and failure to adopt the journal’s citation format.

Reviewers do not generally have the time or inclination to review every citation for correctness. However, as a first step reviewers can perform a spot check to determine whether references are cited correctly [7]. The reviewer can rapidly scan the reference list to determine whether important articles were not included and whether appropriate format was followed.

Another important characteristic on which reviewers may comment is whether the authors have misinterpreted
articles to buttress their own arguments or to support their results. This problem can be difficult to detect and, in general, the reviewer must depend on his or her knowledge of the medical literature to detect it. In an age when published articles are often relatively accessible via electronic sources, a quick reading of the article in question can answer any questions the reviewer may have.

**Summary Opinion**

After assessing the various components of the manuscript, the reviewer can perform a useful service by providing a summary statement. In this statement, the reviewer should determine if the manuscript is a substantial addition to the medical literature or if it simply substantiates previously reported studies. The reviewer should also decide whether the manuscript has overall value given its flaws, if any. However, the reviewer should not provide the global rating for the manuscript in this summary. AJR reviewers should instead simply choose the rating in the separate portion of the review form provided to them.

**BEYOND THE REVIEW: TIPS FOR PROVIDING THE EDITOR WITH THE MOST INFORMATIVE REVIEW**

**Deciding on a Global Rating**

After writing a review of the strengths and weaknesses of the manuscript, the reviewer is asked to provide a global rating (i.e., a recommendation for the manuscript). It is important that the reviewer be familiar with the possible global ratings because they can differ from one journal to another. AJR reviewers are provided with four possible global ratings: Accept, Accept Pending Revisions, Reconsider After Major Revisions, and Reject.

The global rating of Accept is clear-cut and unambiguous; this rating implies that the reviewer does not see any need for revision of the manuscript and that it is suitable for publication “as is.” In fact, because most reviewers (with good reason) suggest changes to any manuscript, the Accept rating is granted to few manuscripts on initial review. Given that it is a rare manuscript that cannot be improved in some way, sometimes the Accept rating is an indication that the reviewer has not looked at the manuscript with an eye toward improvement. When revisions are suggested, the decision category always should be Accept Pending Revisions rather than Accept.

The Accept Pending Revisions rating indicates that the reviewer finds some ways in which the manuscript should be changed before final acceptance. The suggested changes may include items such as a request for clarification of the methods (e.g., details regarding study design, entry criteria, whether film readers were blinded to information that might produce a biased reading, and so on). However, it is implied in this rating that the authors can reasonably make these changes and that doing so will more or less result in publication of the revised version of the original manuscript. For instance, it is not appropriate for the reviewer to provide the rating of Accept Pending Revisions if the reviewer is suggesting one or more major changes in study design. As an example, occasionally a reviewer will recommend that the manuscript be accepted pending revisions but request major changes in the methodology. Even if this suggestion is warranted, adopting it would necessitate performing the study over in a manner different from the first version of the study. In essence, this rating is a Reject operating under the guise of an Accept Pending Revisions. On a related note, the judgment as to whether the appropriate rating should be that of Accept Pending Revisions, rather than that of Reconsider After Major Revisions, does not rest on how many changes are suggested, but in the degree to which the sum of the changes alters the manuscript.

A rating of Reconsider After Major Revisions indicates that the reviewers believe that considerable changes are needed but that a reasonable possibility exists for the manuscript to proceed to publication. Examples of indications for providing this rating include a belief that, first, the reported data need to be analyzed in a different manner; second, additional data are needed; third, the authors have failed to appropriately take certain study factors into account; or fourth, the authors have not appropriately discussed their results against the background of previous studies. This rating is probably underused by many reviewers who instead recommend Accept Pending Revisions for a manuscript that needs substantial rewriting or reorganization before acceptance. In such instances, reviewers often request substantive changes but for one reason or another are reluctant to place a manuscript that has potential for publication in a category other than Accept Pending Revisions. It may be that reviewers believe that providing a rating of Reconsider After Major Revisions means that the manuscript is unlikely to be accepted for publication, but that is not, in fact, the case. Most manuscripts that receive a Reconsider After Major Revisions recommendation are ultimately published, with many of them published in the AJR [10].

The Reject rating is provided when the reviewer is of the opinion that no amount of revision will make the manuscript suitable for the journal to which it was submitted. It is worth emphasizing that, in some cases, the rating is based not on the opinion that the manuscript is poorly written or an inadequate study. Instead, sometimes a reviewer recommends rejection on the belief that the manuscript was submitted to the inappropriate journal.

After receiving manuscript reviews, the journal editor must decide the outcome of a manuscript. It is important that the reviewer provide a clear explanation as to whether he or she deems the manuscript to be worth publishing. Although that statement may seem obvious, in a substantial number of manuscripts the reviewer’s overall assessment is less than definitive. For example, sometimes the written review leads the reviewer toward one decision but the numeric rating provided by the reviewer indicates a different decision. It is not rare for a reviewer to offer comments that are strongly negative but to then recommend that the
manuscript be accepted pending revisions. Such a review requires that the editor make a difficult choice: Either accept a manuscript that the reviewer appears to say is not worthy of publication or fail to accept a manuscript that the reviewer has technically asked to be accepted.

The Informative Review

The type of review that is most helpful to the editor is one that shows that the reviewer performed a close reading of the manuscript, thought carefully about the most important sections of the manuscript, provided constructive criticisms for the authors, and assigned a rating that is commensurate with the remainder of the review. An abbreviated version of such a review for the purposes of illustration (and for contrast with other versions of the same review) follows.

This manuscript describes a new method for use of 16-MDCT for increasing the sensitivity of diagnosis of renal calculi. The authors appropriately noted some of the limitations of conventional CT for this purpose in the Introduction. However, they should also note the study by Stanley and Provenzale (J Irreproducible Results, 2003) in which the authors performed a similar study but with different results. Also, the study does not have a hypothesis but has a “look and see” quality. The study design as outlined in the Methods section suffers insufficient detail regarding how patients were chosen, lack of description whether film readers were blinded to clinical symptoms, and no detail whether the film readings were performed by consensus review or by independent readings. The Results section is unclear. The authors state that all calculi with attenuation coefficients greater than 300 H were smaller than 2 mm, but Table 1 indicates that only calculi larger than 2 mm had attenuation coefficients greater than 300 H. In the Discussion, the authors fail to account for why 20% of calculi seen on MDCT are not seen on single-detector CT. Finally, the references do not take into account many recently published articles on this topic. Confidential Note to the Editor: This manuscript should be rejected.

The Noninformative Review

Although the majority of reviews provided by AJR reviewers are of high quality and helpful in deciding the outcome of the manuscript, on occasion reviews are less than helpful. This circumstance is unfortunate because the reviewer may have spent considerable time reviewing the manuscript but with little yield for the purposes of the journal. We provide some examples of the types of reviews that would benefit from closer attention to our proposed format.

The snapshot verdict—This type of review basically solely indicates that the reviewer has read the manuscript and whether he or she liked it or did not. To use our previous example, this type of review simply states something like the following:

I read the manuscript on renal calculi that you sent me. I found no problems with it. I think it is the first time that this work has been done. This manuscript should be published. Recommendation: Accept.

As ludicrous as these comments sound because of their brevity and superficial nature, reviews of this type are not rare. This review is not helpful for a number of reasons. First, it is generic, rather than specific, and noninformative. It could have been sent by any reviewer about any manuscript. For instance, one cannot ascertain that the reviewer actually read this manuscript. Second, the reviewer failed to provide a critical analysis. The editor is not left with the belief that the reviewer fully assessed the manuscript and may wish to send the manuscript to an additional reviewer for an in-depth evaluation. Such a process wastes a valuable resource: the journal’s reviewers’ time. Finally, the reviewer is not providing a fundamental component of the review—that is, a means for the authors to improve their manuscript.

The mixed-signals review—In this type of review, to which we have alluded earlier, the reviewer provides mixed signals by virtue of a discordance between the written review, the numeric ratings, and the “Recommendation” selected from the drop-down list. In other words, the narrative summary leads to one conclusion, but the reviewer provides a Recommendation counter to the expected one. Most commonly, the reviewer is highly critical in the narrative summary but then provides a Recommendation of Accept Pending Revisions, indicating that the manuscript should proceed along the path to publication essentially unimpeded. Again, an example follows:

This manuscript has a number of major shortcomings: The authors have not adequately reviewed the medical literature on renal calculi, they provide insufficient detail regarding how patients were chosen for the study, and the Results section has many inconsistencies. Recommendation: Accept Pending Revisions.

In this type of review, it is as if the reviewer is reluctant to actually reach the natural conclusion of his or her argument—that is, to reject the manuscript. As one author noted [11]:

[This reluctance is understandable from the perspective of the reviewer, who is likely to have had his or her own share of negative publication decisions and is quite familiar with the angst such decision letters cause.

The hidden-agenda review—On occasion, the reviewer will provide opinions in the section of the review that is labeled “Confidential Note to the Editor.” When the opinions in the confidential note substantially differ from those
expressed in the portion of the review available to the authors, problems arise and the editor is sometimes left in an awkward position with regard to determining the outcome of the manuscript.

For instance, the reviewer may offer relatively benign comments in the portion of the review available to authors but then provide negative comments in the Confidential Note to the Editor section of the review form and recommend rejection. In essence, this type of review is a variant of the mixed-signals review but with the disparity being between two types of written comments (rather than solely between the written comments and the final Recommendation). The editor is faced with the difficult task of having to either include confidential information, with the permission of the reviewer, in a rejection letter to the authors (to justify the rejection) or disregard the confidential information. Using our previous example, we provide a sample of this type of review:

This study is a good comparison between conventional CT and 16-MDCT for evaluation of renal calculi. The manuscript could be improved by better documentation of the previous medical literature, a clearer explanation of how readers scored the images and of the selection criteria, clarification of some inconsistencies between the stated results and Table 1, and a better explanation of how the CT scan parameters affect the sensitivity of MDCT. Recommendation: Accept Pending Revisions. Confidential Note to the Editor: There are some serious flaws here. The authors show a lack of understanding of the factors that come into play in renal calculus detection by CT. The Methods section needs a lot of work.

As this example shows, this type of review puts the editor in an awkward position. The review would be more helpful if the statements in the confidential note accurately reflected those that have been provided for the authors’ viewing.

SUMMARY

We hope that new reviewers and experienced reviewers alike benefit from this brief primer and make use of the accompanying review template. Although the primary beneficiaries will be new reviewers, we hope that even experienced reviewers will gain insights into what journal editors need from a review. We also hope that this article will be used by senior reviewers to advise young academic faculty on the review process. To expedite this process, we not only are publishing this primer in the AJR but also will send this document by e-mail to all of our current reviewers to ensure better dissemination of its content.

REFERENCES

10. Chew FS. Fate of manuscripts rejected for publication in the AJR. AJR 1991; 156:627–632

APPENDIX 1: A SYSTEMATIC GUIDE TO REVIEWING A MANUSCRIPT

Before Writing the Review

- To which manuscript category does this manuscript best conform?
- Are there any potential biases in reviewing this manuscript?
- Does the manuscript address an important problem?
- Has the manuscript been previously published?

The Abstract

- Does the Abstract appropriately summarize the manuscript?
- Are there discrepancies between the Abstract and the remainder of the manuscript?
- Can the Abstract be understood without reading the manuscript?

The Introduction

- Is the Introduction concise?
- Is the purpose of the study clearly defined?
- Do the authors provide a rationale for performing the study based on a review of the medical literature? If so, is it of the appropriate length?
- Do the authors define terms used in the remainder of the manuscript?
- If this manuscript is Original Research, is there a well-defined hypothesis?

The Methods Section

- Could another investigator reproduce the study using the methods as outlined or are the methods unclear?
- Do the authors justify any choices available to them in their study design (e.g., choices of imaging techniques, analytic tools, or statistical methods)?
- If the authors have stated a hypothesis, have they designed methods that could reasonably allow their hypothesis to be tested?
The Results Section
- Are the results clearly explained?
- Does the order of presentation of the results parallel the order of presentation of the methods?
- Are the results reasonable and expected, or are they unexpected?
- Are there results that are introduced that are not preceded by an appropriate discussion in the Methods section?

The Discussion Section
- Is the discussion concise? If not, how should it be shortened?
- If a hypothesis was proposed, do the authors state whether it was verified or falsified? Alternatively, if no hypothesis was proposed, do the authors state whether their research question was answered?
- Are the authors’ conclusions justified by the results found in the study?
- If there are unexpected results, do the authors adequately account for them?
- Do the authors note limitations of the study? Are there additional limitations that should be noted?

Figures and Graphs
- Are the figures and graphs appropriate and are they appropriately labeled? Would a different figure better illustrate the findings?
- Do the figures and graphs adequately show the important results?
- Do arrows need to be added to depict important or subtle findings?
- Do the figure legends provide a clear explanation that allows the figures and graphs to be understood without referring to the remainder of the manuscript?

Tables
- If there are tables, do they appropriately describe the results? Should one or more tables be added?

The References Section
- Does the reference list follow the format for the journal?
- Does the reference list contain errors?
- Have the authors appropriately represented the salient points in the articles in the reference list? Alternatively, have the authors misquoted the references?
- Are there important references that are not mentioned that should be noted?
- Are there more references than are necessary?

Summary Opinion
The reviewer should provide a short paragraph that summarizes the strengths and weaknesses of the manuscript. The actual Recommendation (e.g., recommend to Accept, Accept Pending Revisions, Reconsider After Major Revisions, or Reject) should not be stated in this paragraph, which is sent to the authors, but should be indicated separately in the drop-down list. It may also be stated in the separate box called “Confidential Note to the Editor.” However, the overall tenor of this paragraph should support the reviewer’s recommendation.
Ethics of Peer Review: A Guide for Manuscript Reviewers

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Abstract

The peer review of scientific manuscripts is a cornerstone of modern science and medicine. Peer reviewed journals rely on expert and objective review by knowledgeable researchers to ensure the quality of the papers they publish. Moreover, the recommendations the reviewers make concerning publication and the advice they give to authors set the scientific standards of the discipline. In addition, their critiques set subtler standards of collegiality, behavior, and ethics, not only through their recommendations concerning which papers should be published and which should be rejected, but also through the tone and wording of their reviews and through the thought that they give to their scientific and ethical responsibilities as reviewers. The review of manuscripts for peer reviewed journals raises many ethical issues and problems. The reviewer should be aware of these when deciding whether to review a specific paper, throughout the process of handling the manuscript and writing the review, and even after the review is completed and submitted. This paper describes some of the ethical issues that can arise during the peer review process and discusses their implications.
INTRODUCTION

The peer review of scientific manuscripts is a cornerstone of modern science and medicine. Peer reviewed journals rely on expert and objective review by knowledgeable researchers to ensure the quality of the papers they publish. Moreover, the collective activities of the investigators who review manuscripts in a scientific discipline serve to set the standards of that field. This body of unpaid, and often unidentified, volunteers offers a collective opinion on the expected standards of scientific rigor for the discipline. Their opinions on such matters as which techniques are current, valid and appropriate; how data should be analyzed and presented; and how rigorous authors must be or how speculative they can be in interpreting their data become de facto standards of the field. In addition, their critiques set subtler standards of collegiality, behavior, and ethics - not only through their recommendations concerning which papers should be published and which should be rejected, but also through the tone and wording of their reviews and through the thought that they give to their scientific and ethical responsibilities as reviewers.

For most young investigators, their first experience with the peer review system comes when they submit their first manuscript for publication and receive their first critiques and editorial decision. The process is a “black box” - journals and mentors alike generally provide few insights into the workings of the peer review process or into the reasoning of the reviewers. A young researcher’s first experience as a reviewer is often just as haphazard: he or she is suddenly given a manuscript to review. Fortunate young researchers are asked by their advisor or mentor to review a manuscript and are offered assistance. Many, however, are suddenly thrown into the process when a journal sends them a paper to be reviewed. All too often, new reviewers are given little guidance as they approach this task. The journal may send a set of instructions to reviewers that provides information on such specifics as the format for the review and the date when the journal wants the review, but there is often little guidance on the overall review process or on the related ethical issues the reviewer should be considering. This paper considers and discusses some of these ethical issues. As we will see, they can be vexing, and some issues are complex and may offer no clear right or wrong pathway to follow.

THE PEER REVIEW PROCESS – A GLIMPSE BEHIND THE SCENES

To be a good reviewer, one must understand the peer review process and the role the reviewer is expected to play in that process. Most scholarly journals, whether they are not-for-profit journals owned by professional societies or for-profit journals owned by a publishing company, are backed by a professional staff that manages the “business” of publishing. This staff oversees the receipt of manuscripts, manages communications with authors and reviewers, and processes accepted manuscripts for publication. These staff members generally are not scientists, although many develop an excellent working knowledge of the science in the area of their journals. Each journal also has one or more scientific editors who make the final decision as to whether a specific manuscript will be accepted for publication, returned to the author for revisions, or rejected. These editors are usually researchers with deep expertise in the area of the journal. These senior editors are often assisted by an editorial board; the members of this board are drawn from the research community served by the journal and have been selected for their expertise and skills. Members of the editorial board read the manuscripts they handle for the journal and they
may prepare and provide critiques. They often select additional reviewers, solicit reviews from
them, and monitor the quality of the reviews. The editorial board members make
recommendations to the senior editor concerning publication of the manuscripts. While the
authors generally communicate with the non-scientists who staff the journal office, the scientific
editors work behind the scenes to oversee the scientific and intellectual quality of the peer review
process.

How do these editors find reviewers? They use all the tools and grapevines at their disposal.
They usually will consider, and sometimes will request, suggestions for reviewers from authors.
They may examine the references cited in submitted manuscripts to identify researchers working
in related areas. They may perform literature searches looking for related papers or may consider
authors who have submitted solid papers in related areas to the journal. They may recall people
they have heard give good seminars or good talks or posters at meetings. They use their networks
of colleagues and people they know from scientific meetings, study sections, and professional
societies. They often keep files of past reviewers, sometimes with data that provide information
on the expertise of these reviewers, the timeliness of receiving their reviews, and the quality of
their comments. They also ask reviewers they know and trust for names of potential new
reviewers.

What do the editors look for in reviewers? Expertise in one or more aspects of the work is of
course essential, but the qualities of a good reviewer go well beyond that. The reviewer must be
objective and must not have conflicts of interest that might compromise the objectivity or
perceived value of the review. He or she must have good judgment and must be able to think
critically and logically. The reviewer must be able to write a good critique that is accurate,
readable and helpful to both the editors and the author. The reviewer must be reliable and must
have the time to do the task, and do it well, in the time frame allotted. There are many solid
researchers, with deep scientific expertise, whose performance as reviewers is disappointing.

The advent of electronic communication has changed the review process greatly. A decade ago,
journals usually mailed manuscripts to reviewers without contacting them in advance. Today,
most editorial offices contact potential reviewers by e-mail, or decreasingly by fax or telephone,
to ask whether they can review manuscripts. The authors, title, and abstract are generally
provided so that the reviewer has an overview of the paper. After the reviewer has agreed to
review the paper, he/she receives the full manuscript, generally by e-mail or through a website,
along with review forms, information on the journal’s policies, and procedures for reviews.

The review is generally submitted electronically (by e-mail or through a website). It generally
contains one section for comments that go only to the editor (if any are needed) and another for
comments that go to the author. Ancillary materials can also be sent in the rare cases where these
are valuable (a copy of the manuscript marked to show specific suggestions or comments; a
publication the authors may find helpful).

The identity of the reviewer will be known to the editors, but most journals do not release the
names of the reviewers to the authors, the other reviewers or third parties. The blinding of
reviews is intended to protect the reviewers and to allow them to provide critical and honest
reviews. However, the reviewer should remember that no system is perfect. Authors will
sometimes identify a reviewer because of an error by the journal office or editors, because the
reviewer inadvertently discloses his/her identity in the reviews, or by deducing the reviewer’s
identity from the comments and suggestions in the review or even by the writing style. The
possibility of identification by the author and the availability of the reviewer’s identity to the
editors are among the reasons why reviewers should take care to provide constructive critiques,
written in a collegial manner, rather than using their anonymity as a cloak to allow snide or rude
comments and argumentative critiques.

After receiving the reviews and the recommendation of the editorial board member, the editor
makes a decision concerning publication. This is sent to the authors along with copies of the
“comments to authors” sections of the reviews. These may be edited if the editors feel this is
necessary. Many journals send reviewers information on the outcome of the review process and
some send them copies of the reviews sent to the authors, so they can assess how their reviews
compared with those of other reviewers.

**SOME ISSUES TO CONSIDER WHEN DECIDING WHETHER TO REVIEW A PAPER**

By agreeing to review a paper, the reviewer makes an implicit agreement to become a consultant
to the journal and to adhere to the journal’s policies and guidelines for the review of manuscripts.
The reviewer also incurs responsibility for setting the standards of the field of study. The
reviewer must be able to judge fairly and objectively the quality and significance of the work
under review. He/she is obligated to support and encourage publication of work of high quality
while appropriately challenging flawed work. Before agreeing to review a paper, the reviewer
should consider her/his ability to meet these standards.

**Do you have the expertise the editor is looking for?**

From an editor’s point of view the ideal reviewer is a researcher who is working in the same
discipline as the subject of the paper yet is not in direct competition with the authors. The ideal
reviewer will understand the hypotheses underlying the work and will be familiar with the model
systems and methods used in the project. He or she will be able to judge the quality of the data
and the analyses and assess the validity of the conclusions. The ideal reviewer will be able to
assess the significance of the work to the field.

Many young researchers are reluctant to review manuscripts, because they fear they do not have
enough experience or expertise to be good reviewers. Perhaps ironically, surveys show that
journal editors often feel that junior researchers generally provide reviews superior to those of
senior scientists. This may be in part because younger researchers spend more time, effort, and
care on their reviews. Young reviewers tend to underrate their expertise and to forget that they
often have more intensive hands-on experience with new techniques and technologies than do
their senior colleagues who are no longer at the bench. They also fail to realize that they are only
one of 2, 3 or perhaps even more reviewers, each of whom was selected to provide a different
area of expertise and a different perspective. For example, an editor looking for reviewers to
critique a paper reporting the first phase I clinical trial of a new investigational anticancer drug
might seek a physician who has performed clinical trials with patients having the similar tumors,
a laboratory scientist who has performed preclinical studies with the agent, and a statistician who can assess the design of the trial and the analysis of the data. Each of these reviewers will provide expertise in an important area of the paper and each will find areas in which he/she lacks expertise and cannot provide assistance. If in doubt, the potential reviewer should contact the editor and discuss his/her concerns. This allows the editor to decide if the reviewer does have the expertise he/she is seeking, and also allows the editor to add an additional reviewer if there is an area that requires expert review and is not covered by the first set of reviewers. During the review process, reviewers often find that they have questions or concerns about an area outside their expertise (e.g. questions concerning the statistical analyses); this is not a problem. Review forms have a section for comments to the editors, where the recommendation for additional reviews can be stated, so that the editor can assess whether they have been addressed by one of the other reviewers or whether an additional review is needed.

Is the work too close to your own?

Sometimes a potential reviewer is presented with a very awkward problem when he/she is asked to review a paper that is very close to his/her own work. As will be discussed below, manuscripts under review are considered confidential documents. By agreeing to review a manuscript, the reviewer assumes an obligation to keep the data in confidence and not to use it for his/her own benefit. This can raise a problem when a reviewer receives a request to review a paper which reports experiments that overlap with studies that the reviewer is already performing, planning to perform, or preparing for publication.

The potential reviewer should not review this paper: doing so presents a “no-win” situation even if the reviewer acts with the utmost integrity. If the paper is good and the reviewer were to review it rapidly and recommend acceptance, he/she might well compromise his/her own ability to publish his/her own work – this knowledge creates an immediate, significant conflict of interest. On the other hand, if the paper proves to be flawed and the reviewer (with all integrity) were to recommend extensive revisions or rejection, the perception of misconduct could arise in the editor’s mind when the reviewer’s own studies were submitted or published.

The reviewer is therefore in an unfortunate situation in which even totally ethical actions could produce unpleasant outcomes, and should take immediate steps to minimize the potential for adverse effects. The potential reviewer should contact the editor immediately, inform the editor of the problem, and decline to review the paper. If at all possible, this should be done when the reviewer has seen only the title and abstract; the reviewer should make every effort to ensure that he/she does not receive the complete paper. The procedures now being used for electronic reviews are helpful in this regard – but there is still a possibility that a colleague or an editor will give a potential reviewer a complete manuscript along with a request for a review, in which case an immediate discussion of the problem and return of the manuscript are essential.

Do you have any real or apparent conflicts of interest?

This is an issue that the reviewer must consider carefully. Most journals have policies that require that potential reviewers recuse themselves from reviewing manuscripts if they have a real
or apparent conflict of interest that might compromise the objectivity of the review or that might appear to compromise its objectivity. Editors attempt to avoid selecting reviewers with obvious conflicts of interest but mistakes do happen: most seasoned reviewers have at some point been asked to review a paper on which they were a co-author or in which they were thanked for their help with the paper or the project. These conflicts can be readily identified by the potential reviewer and are easily resolved by declining to review the paper. Other conflicts may be less obvious or more difficult to handle.

The ethical standards, rules, and regulations concerning conflicts of interest are evolving and changing. Different journals and different organizations have markedly different standards for determining when a conflict of interest has reached the level of “significance” where it presents a problem. The reviewer therefore will not have the comfort of having definitive, universal guidelines that provide clear “yes” or “no” answers, but instead must consider each situation carefully and assess whether there is a potential conflict of interest that a) would or could compromise his/her objectivity and judgment, b) would or could appear to compromise his/her objectivity and judgment, and therefore compromise the value of the review, or c) would or could appear to compromise his/her objectivity and might place his/her reputation at risk if this conflict were discovered and questioned after the review. Potential reviewers are therefore put into the somewhat disconcerting position of having to analyze not only their own biases and conflicts of interest but also problems that could result from assumptions of bias made on the basis of the appearance of a possible conflict of interest. There are two prudent rules of thumb: 1) when in doubt, discuss the potential conflict of interest with the editor and 2) when in doubt, err on the side of caution.

Institutional affiliations: Are any of the authors from your institution? If so, you should not review the paper. Even if you do not know the person and could be totally objective, there are perceptions that could create problems. Someone may assume that you do know the authors or should know them because their work is close enough to your own that you have been asked to review it. The possibility of pressure will also be perceived: are there senior faculty at your institution who could/would pressure you to report in favor of publication if they knew you were the reviewer or who might retaliate if they later found you had written an unfavorable review? Others may think this could occur even if you dismiss the possibility.

Other institutional affiliations may create more subtle conflicts of interest. Are you negotiating for a job at the author’s institution? Did you just leave that institution? Are you a consultant to a grant, contract, or program that supports the author or the author’s department? Are there other hidden conflicts? For example, does your sister work in the author’s department? If the authors are from a pharmaceutical or a biotech company, does that company fund any of your research or support it by providing free compounds or reagents? Do the authors or their institution control access to a critical and difficult-to-obtain reagent that you use or are trying to obtain for use in your own research? The reviewer sometimes will be the only person able to identify and think about such potential conflicts of interest.

Collaborators and colleagues: Is any author of the paper a present collaborator, your mentor, or someone you have collaborated with or published with in the past? Ongoing collaborations raise both real and apparent conflicts of interest. You should decline to review the papers that list your
present collaborators as authors. In general, you should not review papers written by people you have collaborated with or published with in the recent past. Beyond this there is a gray area, where you will need to assess whether you can be objective and can be perceived as objective. As your career progresses you will accumulate co-authors of past papers – some of whom are linked to you only through a common collaborator and some of whom you will never have met. When the papers are old enough and the connections tenuous enough, the real and apparent conflicts of interest can become insignificant. Such associations need to be considered on a case-by-case basis. Remember, however, that although the problems raised by apparent conflicts of interest are different from those raised by actual conflicts of interest that truly cloud one’s judgment, the problems they raise are real and merit thoughtful consideration. If in doubt, contact the editor, disclose and discuss the potential conflict of interest, and seek guidance on whether to perform the review.

Other relationships: Institutional affiliations and collaborations are not the only relationships that may create conflicts of interest. Other relationships, which may be more difficult for the editors to discern, can also be important. Papers from close personal friends or family members present obvious conflicts. So do papers from people you detest; declining such papers without making negative comments about the person can present a challenge in diplomacy. A junior researcher may feel uncomfortable reviewing a paper from a very senior member of the field, because he/she would feel uncomfortable about giving a negative review to this influential person. You should think about this in advance. What if the paper is truly awful? Would you be willing and able to give it the review it deserved?

Financial conflicts of interest: Problems with financial conflicts of interest have recently received considerable attention, not only in the scientific community but also in Congress, the courts, and the popular press. Some financial relationships create obvious conflicts of interest, but there is a large gray area where the impact and importance of such conflicts are being actively debated. Different agencies and different journals have very different definitions of the level at which financial conflicts rise to a level where they are “significant” and must be disclosed and managed or where they would preclude performing the review.

The most obvious financial conflicts of interest involve research related to a product or process that is owned or marketed by a for-profit entity. Examples receiving recent media attention have included phase III clinical trials in which the efficacies or toxicities of drugs are being evaluated and phase I studies of potential gene therapy agents. In some cases, many different companies might be involved, e.g. in studies of the effects of smoking, alcohol consumption, cell phones, or general classes of drugs (e.g. Cox 2 inhibitors or specific classes of psychoactive medications). In the latter case the reviewer’s financial relationships with any of the companies involved may need to be considered.

Financial conflicts of interest can take many forms. A potential reviewer who works for the company that owns the product being tested has an obvious conflict of interest. However, a university faculty member who is consulting or has consulted for the company may also have a conflict, depending on the nature of the consulting relationship and the magnitude of the financial rewards. A medical consultant who received a $50,000 for providing opinions on the commercial value of a specific drug would almost certainly be considered conflicted and unable
to review papers on that drug. In contrast a researcher who served in an unrelated clinical trial as a member of the data and safety monitoring board (the members of which are chosen to provide impartial oversight of the welfare of the subjects) or a scientist who served previously on a scientific advisory board for a different agent and received a token honorarium may not be viewed as having significant conflicts. Fiduciary responsibilities (e.g. membership on the company’s board of directors; service as an officer of the company), even without compensation, present conflicts of interest because they are accompanied by inherent obligations to work for the success the company. Patent agreements and licensing agreements between the potential reviewer and the company likewise create an arrangement for mutual financial benefit and therefore a conflict of interest.

Receiving funding (grants, contracts, or gifts) for research projects or clinical trials from the company whose product is being examined presents obvious conflicts of interest. Even if direct funding is not provided, conflicts of interest can arise from other relationships. For example, a company may provide, at no cost, expensive or hard-to-obtain drugs or reagents for use in research and therefore provide critical non-monetary support for a research project.

Alternatively, a potential reviewer may hold equity (stock or stock options) in a company. There is significant debate as to how large such holdings must be to represent a significant conflict. Ownership of very large amounts of equity or stock in a small startup company whose value would be changed dramatically by the success or failure of a single product presents obvious conflicts. A small stock holding in a very large, established, publicly traded company presents a less clear cut conflict, as the reviewer’s actions would be unlikely to impact the value of the holding. Nevertheless, some journals would consider this to be an unacceptable conflict. Investments held as part of mutual funds or in retirement accounts such as TIAA/CREF are generally considered insignificant because the portfolios of the accounts are highly diversified, are managed by investment managers, and are not under the control of the participants.

Conflicts of interest can reach beyond the income and holdings of the reviewer: the employment, income and investments of the reviewer’s spouse, partner or dependent children are also viewed as relevant in considering conflicts of interest. There is also increasing concern about “institutional conflicts of interest.” These could arise, for example, when a University has financial or research affiliations with a commercial entity that are sufficiently robust that they raise the question of whether the institution’s conflicts of interest compromise or appear to compromise the ability of its staff and faculty to act with absolute objectivity. This could also apply on a more local level: e.g. a young investigator who does not have significant conflicts of interest of his/her own but who is working in the laboratory of a senior investigator with significant conflicts of interest related to the review may be considered to be conflicted.

The reviewer must also remember that issues of conflict of interest can extend well beyond connections to a specific commercial enterprise, to include relationships with other companies that could potentially benefit or be harmed by the reviewer’s actions. Thus, a relationship with a company marketing a technology competing with that being tested in the paper could pose a conflict of interest. Alternatively, an individual who has spoken or testified frequently either for or against new restrictions on smoking in public places could be viewed as having a conflict that would preclude reviewing a paper on the effects of exposure to secondhand smoke.
Personal beliefs. A strongly held personal belief or a vocal public position in a scientific argument could raise problems if it compromises or appears to compromise the objectivity of a review. For example, a strong religious belief excluding the possibility of evolution could present a problem in the review of a paper describing a fossil presented as being important to the development of Homo sapiens. Other emotionally charged topics (e.g. human stem cells, abortion, marriage laws) may raise similar problems if the reviewer’s ability to provide an objective review is or may appear to be compromised by strongly held views. Even in issues of pure science (e.g. a heated debate over the validity of a specific scientific method or an observation), emotions can occasionally rise to a level where objectivity can be, or appear to be, compromised.

Scientific conflicts of interest. Last, we should return to the issue of scientific conflicts of interests, discussed above. A researcher whose work is too closely related to the work presented in the paper may well have a conflict of interest which precludes her/him from reviewing the manuscript. Similarly if the researcher’s laboratory and the authors’ laboratory have been actively competing in a general area of research, there may be an apparent conflict of interest, and the researcher would be wise to decline to review.

The issues related to conflicts of interest in peer review, as in other areas of research, are complex. There has been increased sensitivity, and sometimes hypersensitivity, to these issues in recent years. The threshold at which a conflict of interest is viewed as “significant” varies from agency to agency and journal to journal. Some have announced “zero tolerance” policies; others set very high thresholds for “significance.” While it might seem that science would be best served by completely avoiding all potential conflicts of interest during the peer review process, rigorous implementation of this standard would also have negative effects. It could, for example, in some cases preclude all those who have been involved in preclinical studies or clinical trials with a new agent from reviewing all future papers on that agent. Similarly, it could preclude many of those who have deep experience using an existing drug to treat a disease from reviewing papers reporting on new (competing) compounds that are being developed to treat the same disease. Journals and reviewers therefore must strive to ensure that both appropriate expertise and appropriate objectivity are brought into the review process.

Do you have the time to review the article within the time frame requested by the editor?

Most journals request that reviewers read and critique manuscripts within a relatively short time. The exact time frame varies with the journal and the category of paper. In some cases it is as short as 48 hours; it is often 2-3 weeks. It is unfair to both the author and the journal to accept a paper for review if you know you cannot review it rapidly. It is also unethical to give the paper only a cursory reading and then provide a superficial and careless review. In agreeing to review a paper, you are contracting to provide the journal with a thorough and incisive review. The review need not be long: indeed in the case of the very best and very worst papers the written critiques may be very short. However, even these very short reviews require time, reflection, and thought.

Reviewing manuscripts does take time. Most reviewers estimate that they spend 1-2 hours on a typical manuscript review. Some reviews prove difficult, and require much longer. Participation
in the peer review process is one of the unfunded and largely unrewarded tasks that researchers perform because they are “good citizens” of the scientific community. Peer review is critical to maintaining the quality of science; there is therefore an ethical imperative for scientists to participate in this process when they are able to do so. However, even the most conscientious scientist will have times when he or she is simply unable to take on an additional task. In such cases the invited reviewer should decline to review – this is preferable to agreeing to do the review when one cannot do a good job within the required time.

SOME ISSUES TO CONSIDER ONCE YOU HAVE RECEIVED THE PAPER

When most editorial offices contact potential reviewers they provide the authors, title, and abstract so that the reviewer has an overview of the paper. Only after the potential reviewer has agreed to review the paper, does he/she receive the full manuscript. At this point the reviewer will have additional ethical issues to consider.

Does seeing the full manuscript change your thoughts about your ability to review it?

It is not uncommon for new ethical or logistical problems to arise when the potential reviewer sees the actual manuscript. For example, the reviewer may find that the abstract did not describe accurately the contents of the paper and may feel uncomfortable with some areas of the review. The reviewer may also become aware of potential conflicts of interest that were not obvious from the abstract. Again, the basic rule of thumb is to contact the editor as soon as possible to discuss and resolve such problems.

How do you handle the paper?

Manuscripts under review are confidential documents, and should be treated as such. They contain unpublished data and ideas that must be kept confidential. You cannot share the paper or its contents with your colleagues. Manuscripts that you are reviewing should be kept in a secure place, where they will not be readily accessible to the curious or unscrupulous.

Moreover, you cannot use the information in the paper in your own research or cite it in your own publications. This can raise serious ethical issues if the work provides insights or data that could benefit your own thinking and studies. An especially difficult situation is that in which you receive a manuscript which has serious flaws, causing that you recommend rejection or major revisions that will require time and new experiments to address, but also contains an element that you find exciting and would like to explore yourself. Such cases can become ethical quagmires.

The outcome and content of the review are confidential. You should not discuss the review or its outcome with your colleagues. Scientific reputations and egos are fragile, and the release of information concerning a negative review could be injurious. On the other hand, leaking information on your positive review could lead to false expectations if other reviews prove to be unfavorable and the paper is ultimately rejected.

Lapses in the confidentiality undermine the review process, betray the trust of the authors and the editors and can create serious problems for everyone involved in the reviews.
Can you pass the paper on to someone else to review?

This can only be done with the permission of the editor. The cover letters some journals send to senior scientists with requests to review often invite these researchers to suggest names of alternate reviewers or give them permission to assign the manuscript to another person for review. In this case, the reviewer is free to give the paper to a colleague for review – this is often the way that young researchers are initiated into the review process. If such permission is not granted in the cover letter, the editor should be contacted with the request. In my experience, it is unusual for such requests to be denied.

In either case, the reviewer initially contacted by the journal should let the editor know that the manuscript has been given to another reviewer. This information is important for the journal records. With some web-based review systems, access to the paper and review system is granted to specific individuals, and the information will be necessary so that the journal office can configure a web portal for the new reviewer. The journal staff also needs to know the identity of the reviewer so they can follow up if there are questions concerning the review and so that they can send the reviewer any revised manuscripts requiring re-review. This information also allows the journal to contact this reviewer directly for future reviews.

Identifying the reviewer to the editor is also important to the reviewer, especially if she/he is a junior investigator, because it allows her/him to develop a track record in the peer review process. Editors and editorial board members are always on the lookout for good reviewers to add to their reviewer pool. Editors and journals keep files of past reviews and data on their reviewers, often with notes on the timeliness and quality of the review. Journals often thank their reviewers in the printed journal or on the journal or society website. In addition, journal editors and editorial board members are routinely asked for names of potential committee members for professional societies, study section members, and speakers and are frequently asked to comment on proposed promotions. A solid track record of performance in the peer review process will increase the visibility of a young investigator and enhance the development of his/her career. Mentors and mentees therefore should both ensure that young researchers receive appropriate credit for their reviews.

SOME ETHICAL ISSUES TO CONSIDER AS YOU READ AND REVIEW THE PAPER

Can you contact the author about the work or the paper?

You generally cannot contact the author about the manuscript during the review process. Most journals regard the review as a confidential process and wish the authors to remain blinded to the identity of the reviewers and often to the identity of the editorial board member handling the manuscript.

Sometimes a reviewer will need information from the authors (e.g. a copy of a related manuscript which contains data critical to the paper under review but which is still in press or is published in a venue that the reviewer cannot access.) In such cases, the reviewer should contact the journal staff, who will communicate with the reviewer.
In very rare cases, a reviewer may feel that he/she needs to communicate directly with an author about a specific issue in a paper. In these rare cases, the reviewer should contact the editor of the journal and discuss the reasons for the request, the importance and advisability of direct contact between the author and reviewer, and the conditions and time at which such contact would be appropriate.

**Can you seek help with your review?**

Sometimes a reviewer may wish to seek advice or information from a colleague during the course of a review. In some cases, simple questions can be asked without compromising the confidentiality of the review process. For example, the reviewer could ask a colleague who had extensive experience with a specific cell line (or mouse substrain) whether that cell line (or mouse substrain) had a specific biological characteristic assumed by the author without discussing the paper under review. Similarly, the reviewer could ask a colleague whether a specified statistical technique were appropriate for use with a specific class of data, without discussing the data or the paper.

Before going beyond such anonymized questions, the reviewer should contact the editor. If permission is granted, the reviewer should remember that this consultation is still part of a confidential process: the consultation should be made with appropriate discretion and the consultant also becomes committed to handling the paper and its contents in confidence. The review should note in the comments to the editor that the colleague has seen the paper and assisted with a review. This is important for the journal records and also assures that the colleague gets appropriate credit for her/his contribution to the review.

**You are the agent of the journal, not the friend of the author**

New reviewers often empathize with the authors of the manuscripts they review. The day-to-day activities of young researchers usually involve collegial interactions within a group of researchers and trainees, where an atmosphere of mutual assistance is dominant. It is sometimes difficult for them to adjust their focus to the more institutional perspective and to realize that their primary role in the review process is to advise the journal, not to assist the author. They must make this shift to be effective reviewers. A reviewer may feel bad about rejecting a paper and empathize with the authors of the paper, but she/he must be able to make such a recommendation when it is the appropriate one.

The reviewer must remember that it is unethical to allow a badly flawed paper to pass unchallenged into the peer reviewed literature, where it will be a trap to the unsophisticated reader who will read the manuscript (or perhaps only the abstract) superficially and will simply accept the flawed conclusions at face value. Articles in peer reviewed journals are trusted by readers who would be skeptical of claims made in non peer reviewed sources. The peer review process is viewed as a process that provides a scientific stamp of approval to the paper and its contents. The reviewer therefore has an obligation to support work of high quality while appropriately challenging flawed papers.
As a reviewer, you are helping to set the standards of the journal and of the field

In making recommendations for acceptance, revision, or rejection of manuscripts, reviewers are helping to set the standards of the journal. Moreover, the collective activities of the investigators who review manuscripts in a scientific discipline set the standards of that field. Their opinions on such matters as which techniques are current, valid and appropriate, how data should be analyzed and presented, and how rigorous authors must be or how or speculative authors can be in interpreting their data, become de facto standards for the field.

The reviewer therefore must consider the manuscript from the perspective of the journal and the field of science. This is often the first time that a scientist must work from such a perspective. It probably will not be the last, as similar detached, objective viewpoints will be needed when the investigator begins grading students, reviewing grants, and commenting on proposed promotions.

Reviewers must also be aware of some subtle biases that can influence their judgment and recommendations. For example, many studies have shown a bias by reviewers and editors alike in favor of the publication of papers which present positive findings, rather than negative findings. Thus, a paper reporting a beneficial effect of a new drug in preclinical studies or in a clinical trial is more likely to be published than an equally well performed and well presented study showing that the drug is not effective. In contrast, once a drug is marketed, a clinical trial confirming that the drug is safe and effective in the same or an additional population may be viewed as an uninteresting negative result, and is less likely to be published than a study showing that the drug had an unexpected toxicity. Similarly a paper showing that an environmental pollutant is associated with a toxic effect is more likely to be published than one not showing an effect. This systematic bias in favor of publishing positive results has had unfortunate impacts in many areas in which risk/benefit ratios are considered by scientists, physicians, regulatory agencies, and the public. The reviewer should be prepared to recommend and encourage publication of a well performed study presenting important negative results.

Conversely, papers that challenge existing dogma or that present surprising findings may be dismissed too readily during the review process. Many scientists who have revolutionized their fields with new ideas or new techniques later describe with amusement their difficulty in publishing their first papers on the subject. Papers that purport to break new ground and cause rethinking of previous assumptions, models and data require careful scrutiny during the review process, but the potential importance of such papers makes it important that they be reviewed thoughtfully, carefully, and objectively.

The journal needs your scientific expertise, not your editorial assistance

Journals rely on their reviewers to evaluate the quality, importance, and novelty of the science presented in the manuscript. Perhaps surprisingly, editors frequently receive reviews that focus completely on minor editorial problems (typographical errors, misspellings) and do not comment on the science in the paper. Such reviews have limited value as they do not advise the editor on the value and validity of the science and do not help the editor to make an informed decision concerning publication. If the findings in the paper are not worthy of publication, the detailed
editorial comments are of no value to the journal. If the paper is processed for publication, such errors generally will be found and corrected by the journal staff. There are cases where reviewers should make editorial comments. They should, for example, identify sentences or paragraphs where the wording is sufficiently erroneous or ambiguous that the science is unclear. They should also point out editorial errors that result in scientific misstatements. They should point out errors in referencing. A note to the editor that a manuscript requires major editorial assistance, perhaps because the author is not fluent in English, or a warning that a manuscript is so carelessly prepared that the science cannot be rigorously reviewed is always in order. However, the reviewer should not waste inordinate amounts of time correcting minor problems with spelling, grammar, or punctuation.

Instead the review should focus on the science. The reviewer should consider and comment on a variety of issues, including the importance and novelty of the work; the appropriateness of the materials, methods and experimental model systems; the rigor of the experimental design (including the inclusion of appropriate controls); the quality of the data; the appropriateness of the statistical analyses; the rigor of the interpretation of the data; and the validity of the conclusions drawn in the paper. The reviewer may have comments on the length of the paper, the writing quality; the clarity, accuracy, and completeness of the figures and tables; the accuracy and adequacy of the introduction which frames the area of the research, the discussions of prior and related work, and the citations to the literature. The comments made in the review should present clearly the reviewer’s analysis of the quality, novelty, and importance of the science and the effectiveness and appropriateness of its presentation in the manuscript.

You should consider the appropriateness of the paper for the journal

The job a reviewer agrees to perform is to advise the journal on whether the paper he/she has been sent should be published in that journal.

In making this recommendation, the reviewer should consider not only the quality of the work, but also its appropriateness for the specific journal. A journal with a broad reader base, such as Science or Nature, wants to publish articles of wide general interest, written so that they can be understood and appreciated by scientists in other fields. A specialty journal, such as Radiation Research or Annals of Emergency Medicine, will be interested in a much narrower range of subjects and will publish some highly specialized papers written for experts in a narrow area. Papers presenting solid science and having high potential impact therefore may be unsuitable for publication in a specific journal simply because of the mismatch between the journal and the paper. The reviewer should therefore consider the focus and needs of the journal as he/she reviews the paper. It is sometimes perfectly appropriate to return a review which states that a paper is of very high quality and worthy of publication but that it is inappropriate for publication in the journal to which it was submitted. In such cases, it may be valuable to the author to suggest a more appropriate journal.

The reviewer must also consider whether the paper meets the standards of the journal. The journal generally will provide some guidance on the points the journal considers critical, and
may ask some specific questions on the review form. Some journals set a higher standard than others; some require more and some want less methodology detail in the papers they publish.

**Ethical concerns may arise during a review**

During the review of a paper, a reviewer may discover ethical issues that must be considered and addressed. These may be relatively minor problems, which simply require additional information. For example, if the protocols for a study with human subjects seem appropriate, but the methods make no statement that the study had been reviewed by an IRB, the author may only need to add information on the IRB review.

The reviewer may have more serious ethical concerns. He/she may raise ethical questions about the protocols used for experimental animals and ask whether the procedures were appropriate and met the guidelines in place to protect the welfare of experimental animals. A reviewer may have similar concerns about the procedures used to protect the welfare and privacy of human subjects. Such concerns should be raised in both the comments to the authors and the comments to the editor. The reviewer should cite the specific aspects of the studies that lead to these concerns, and should cite the guidelines or regulations relevant to the concerns. Most journals have explicit policies and ethical expectations for studies using animals or human subjects, and assessing whether papers meet these standards is an important part of the review process.

Similarly, the reviewer may know of or notice a potential conflict of interest on the part of the authors which has not been disclosed in the paper. For example, no funding source may be provided for a study which appears likely to have been funded by the company owning a drug being tested. Most journals have explicit policies stating when the authors’ conflicts of interest must be disclosed to the readers and to the editor. The reviewer should note the problem in the review.

Sometimes the reviewer may discover more serious ethical breaches. The reviewer may recognize much or all of the paper, because it has been published previously by the same authors. Alternatively, the reviewer may find text or ideas which have been copied without permission or appropriate attribution from the works of others. The reviewer may feel that the data cannot possibly be correct as presented and may suspect that some data have been fabricated or falsified. Alternatively, the reviewer may feel that the data are sound but that the data have been manipulated or analyzed inappropriately, so that the conclusions drawn from them are deliberately misleading.

Instances of possible misconduct require thought and wisdom on the part of the reviewer and the editors. On one hand, reviewers and editors must take all appropriate steps to preclude publication of duplicate, plagiarized or fraudulent papers. On the other hand, the suspicion of scientific misconduct can have a devastating impact on a scientific career, even if deliberate malevolence is eventually disproved. Because of this, the reviewer should carefully review the facts underlying his/her concerns. In the case of suspected duplicative publication or plagiarism, the reviewer should obtain and carefully examine copies of the original documents to confirm his/her initial impression. The reviewer should then contact the editor in confidence to discuss the problem, and should provide the editor with copies of the original papers. Both the reviewer
and the editor should be extremely discreet, thorough, and thoughtful in their discussions, deliberations and actions related to the paper, recognizing the potential seriousness of the situation for the authors, the journal, and science in general.

Writing the review

Reviews can be difficult to write. They must be clear, concise, and accurate. Although their primary purpose is to advise the editor, the comments to the author frequently are of value in guiding revision of the paper for the same journal or a different journal and in suggesting ways to improve the project by the inclusion of additional data or experiments. Comments to the author may be very brief, especially in the case of an excellent, well prepared paper. They may be extensive if the reviewer feels the paper has valuable elements but requires many revisions and corrections to present the findings effectively. There is therefore an element of mentoring and collegial advising inherent in the review process.

When writing the review, the reviewer should remember that the review will be sent to the authors and that it should be written in a constructive and collegial tone. The content should be constructive and informative. Comments and recommendations should be clear and should be supported with citations to specific figures, tables, or sections of text. When the reviewer’s criticisms rely on or are supported by data in the literature, the reviewer should provide citations to the relevant papers. A good review should help the authors to think more clearly about their work and its design, execution, presentation and significance.

Some reviewers, hiding behind the mask of anonymity, submit critiques that are so rude, snide, sarcastic, argumentative, or even obscene that they must be censored before being sent to the authors. Some are not transmitted to the authors, depriving the author of any beneficial insights the reviewer might have been able to provide. Gratuitous rudeness, personal criticism and locker room humor are never appropriate. Even the most serious scientific criticisms can be worded and presented in such a way as to be constructive and collegial. Reviewers should write critiques using a style and tone that they would want to see in reviews that they, or their most insecure student, were to receive.

Reviewers should remember that they are setting the standards of behavior and collegiality for their field, as well as the standards of science.

AFTER THE REVIEW

When the review is finished, it is sent to the journal. Because most reviewers prefer to read hard copies rather than electronic text, the reviewer will probably have a paper copy of the manuscript. This should be destroyed immediately in a way that ensures confidentiality. The reviewer should keep a copy of the review itself until she/he is certain that the review has been received by the journal office and that the editor has no questions. This review should be kept safe and confidential until it can be destroyed (the reviewer will not need it; if the journal sends a revised manuscript for re-review, it will also send copies of the initial review).
The reviewer should remember that the need for confidentiality remains even after the review is complete. Both the contents of the paper and the outcome of the review remain confidential until the paper is published.

Even after the paper is published, information on the review process should remain confidential. The reviewer should not reveal the identities of reviewers to the authors. This is especially important when there were differences of opinion between reviewers or when contentious issues were raised during the review process. Some authors remain angry about events that occurred during a review even after the paper is published.

If a reviewer anticipates being in a situation where the paper will be discussed, the reviewer should read the final published version of the paper. It is not uncommon for a paper to evolve substantially during the review process. Data may be added or deleted and the statistical analyses may be refined. It is possible that the conclusions drawn in the paper will be altered or restated more precisely. The reviewer therefore should discuss the published version of the paper, rather than the earlier version that was reviewed in confidence.

CONCLUSIONS

The review of manuscripts for peer reviewed journals raises many ethical issues and problems. The reviewer should be aware of these when deciding whether to review a paper, throughout the review process, and even after the review has been submitted. Some forethought and planning will enable the reviewer to avoid some potential problems. Others may appear without warning. When in doubt, the reviewer should discuss his/her concerns with the editor or the journal staff. The reviewer should strive to provide reviews that meet high standards of ethics as well as high standards of science.

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SUGGESTED READING

WEB RESOURCES:


BOOKS AND JOURNAL ARTICLES:


