

## Chapter 8

# Text Recycling in Chemistry Research: The Need for Clear and Consistent Guidelines

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Like most scientists, chemists frequently have reason to reuse some materials from their own published articles in new ones, especially when producing a series of closely related papers. Text recycling, the reuse of material from one's own works, has become a source of considerable confusion and frustration for researchers and editors alike. While text recycling does not pose the same level of ethical concern as matters such as data fabrication or plagiarism, it is much more common and complicated. Much of the confusion stems from a lack of clarity and consistency in publisher guidelines and publishing contracts. Matters are even more complicated when manuscripts are coauthored by researchers residing in different countries. This chapter demonstrates the nature of these problems through an analysis of a set of documents from a single publisher, the American Chemical Society (ACS). The ACS was chosen because it is a leading publisher of chemistry research and because its guidelines and publishing contracts address text recycling in unusual detail. The present analysis takes advantage of this detail to show both the importance of clear, thoughtfully designed text recycling policies and the problems that can arise when publishers fail to bring their various documents into close alignment.

[S]how off your writing skills by rewriting every single part of your manuscript each time you submit your work. This is not only a suggestion; it is a requirement.

—Editorial, *Analytical Chemistry* (2012)

As it is difficult to create unique ways to describe procedures and equipment, it is acceptable to reproduce language for these items in the experimental section.

—Editorial, *Journal of Medicinal Chemistry* (2013)

Consider these epigraphs (1, 2), both written by editors of ACS journals. That they are in disagreement is readily apparent. Less apparent is what they have in common: an understanding that

chemists, like most other scientists, frequently need to reuse content from their prior publications in new ones. This need is so widely recognized that organizations such as the Committee on Publishing Ethics (COPE, of which the ACS is a member (3)) and major publishers of scientific research such as Wiley (4) offer formal guidance on how to reuse material appropriately.

These editorials focus on how researchers use material from their published research articles in new articles. In fact, researchers reuse material in a variety of situations. Research articles frequently incorporate material from conference posters. Dissertations in the sciences are often assembled using ones' previously published papers. Even translations of research from one language into another are a kind of reuse. These practices are all types of text recycling.

The confusion surrounding text recycling ethics is evident in the single paragraph of the ACS's "Ethical Guidelines to Publication of Chemical Research" that addresses plagiarism.

On the one hand, we see that text recycling is a matter of considerable importance since the majority of this paragraph is devoted to "self-plagiarism" (5). On the other hand, while text recycling is widely considered acceptable under certain conditions according to leading publisher organizations such as COPE (6), the ACS Ethical Guidelines discuss it *only* as a type of plagiarism.

As a matter of research ethics, text recycling does not pose the same level of concern as matters such as data fabrication or plagiarism, but it is much more common. A recent study by Anson and Moskovitz (7) of text recycling in published research articles suggests that the inclusion of some amount of recycled material may be more the rule than the exception.

Text recycling is also more intrinsically complex than data fabrication or plagiarism. Whether any particular case of text recycling is ethical or legal depends on a number of inter-related factors. Some of these are characteristics of the recycled material itself, such as the quantity of material and its rhetorical nature (e.g., whether it describes methods or presents findings). Others are external to the content of the work itself, such as publisher policies and copyright laws. And unlike data fabrication or plagiarism, text recycling may sometimes be considered desirable. These complexities are further compounded when we consider the practice internationally. Copyright laws applying to text recycling vary by country; and since no country's laws address text recycling directly, they all must be interpreted with a sound knowledge of the legal issues involved. When manuscripts are coauthored by researchers residing in different countries, things are more complicated still (8).

These complicating factors would pose serious challenges to both editors and authors even if uniform international standards on text recycling existed. Instead, text recycling (typically referred to as "self-plagiarism") is governed by a dizzying variety of guidelines and policies. Many of these documents are written in language that is ambiguous or confusing; in some cases, different documents from the same publisher are explicitly or implicitly contradictory.

In this chapter, I show how such language might confuse members of the chemistry research community by analyzing documents produced under the umbrella of a single organization: the American Chemical Society (ACS). While my analysis reveals a number of problems in the way ACS addresses text recycling, this should not be taken as criticism of the ACS in particular. The issues I raise are common if not ubiquitous among scientific publishers, and the ACS's documents are distinguished by the comparatively high level of care they take and detail they provide. If these issues can arise even in the thoughtful and well-intentioned materials published by the ACS, they are certainly more problematic among the many publishers that address the topic superficially if at all.

Prior to my analysis of these documents, I define some key terms and present the specific documents to be considered. I then address three areas of concern—authorship, ambiguity, and problematic requirements—and conclude with recommendations.

## Definitions

The Text Recycling Research Project defines *text recycling* as follows (9):

Text recycling is the reuse of textual material (prose, visuals, or equations) in a new document where (1) the material in the new document is identical to that of the source (or substantively equivalent in both form and content), (2) the material is not presented in the new document as a quotation (via quotation marks or block indentation), and (3) at least one author of the new document is also an author of the prior document.

I will use the terms *text* or *textual material* to refer to the matter being reused and *document* to refer to the entity in which material is located. Thus, *documents* contain *text*. As text recycling always involves two documents, I will use *source* when referring to the document from which recycled material is taken and *destination* for the document in which recycled material is placed.

## The ACS Documents

Authors can find ACS guidance and other information regarding text recycling in a number of places: in ACS books; on the main ACS website (author guidelines, etc.), on the websites of individual ACS journals, and even an editorial published in an ACS journal. To fully understand how the ACS addresses text recycling, we need to examine not only what such documents say in isolation but also in relation to one another. In the analysis that follows, I draw on five ACS documents: Ethical Guidelines to Publication of Chemical Research [10]; the ACS *Guide to Scholarly Communication* (11); ACS Journals Policies on Preprints, Prior Publication, Scholarly Sharing & Posting (12); the ACS Standard Journal Publishing Agreement (13); and the ACS Policy on Theses and Dissertations (14). To show how editorial expectations at the individual level can differ from those of the umbrella organization, I also include an editorial published in the ACS's *Journal of Medicinal Chemistry* (2) from which I drew one of my epigraphs. Note that for block quotations from these sources used in my analysis below, all bolded words are emphases which I have added.

## Overlapping Authorship

By definition, text recycling involves the reuse of “one’s own” work rather than material written by others. In chemistry, as in most scientific research, the vast majority of publications are coauthored. (A glance at the most recent issue of *JACS* as of this writing shows only five of forty-four papers with fewer than four authors and none with less than three.) When the authors of the source and destination documents are identical, co-authorship adds no complications for text recycling ethics. But when the authors of the source and destination documents overlap but are not identical, as is typical (15), determining what constitutes “one’s own” prior work raises important questions about author rights and responsibilities.

From a legal perspective, all listed authors of a work hold equal copyright under U.S. copyright law unless some other arrangement is made prior to publication; the same is generally true for other countries. If the authors have not transferred the rights to their work, each author can legally reuse material from jointly authored works without the permission of the others. But what about the ethics? Which authors of the source do or should have recycling rights? All of those listed? Only those who actually drafted some of the manuscript? Only those who drafted the specific material being recycled? Should permission be given by those who are not authors of the destination

document? These matters are not, to my knowledge, addressed in any ACS documents. In fact, even though solo authorship is exceedingly rare, its most important documents related to text recycling refer to authors in singular form:

Authors should not engage in self-plagiarism (also known as duplicate publication)—unacceptably close replication of **the author’s own** previously published text or results

—ACS Ethical Guidelines to Publication of Chemical Research (10)

“Text recycling”, or “self-plagiarism”, occurs when **an author** publishes the same material verbatim in two publications, neither of which references the other.

—ACS Guide to Scholarly Communication (11)

Authors may reuse figures, tables, artwork, illustrations, text extracts of up to 400 words, and data from **the Author’s** Submitted, Accepted, or Published Work

—ACS Journals Policies on Preprints, Prior Publication, Scholarly Sharing & Posting (12)

ACS is not an exception in this regard. To the contrary, in examining dozens of such documents across multiple scientific fields and organizations, I have yet to find any which address this matter of multiple authorship.

### Confusing Expectations

Publisher guidelines and policies for text recycling are both inconsistent and ambiguous about the acceptability of text recycling in general as well as what might constitute acceptable practice. These problems are evident in the ACS documents under consideration here—both internally (within documents), and comparatively (in relation to one another).

To illustrate the problems that appear within the scope of a single document, I begin with the most central ACS document: their *Ethical Guidelines* (10). Here, we find this sentence:

Authors **should not** engage in self-plagiarism (also known as duplicate publication) — unacceptably close replication of the author’s own previously published text or results **without acknowledgement of the source.**

Given how *self-plagiarism* is defined here, this passage says that text recycling is unacceptable if the source document is not cited. But it also implies its converse: that recycling with attribution is acceptable. Otherwise, why include the caveat about acknowledgement? However, a different passage in this document appears to contradict that interpretation:

Material quoted verbatim from the author’s previously published work **must be** placed in quotation marks.

Clearly, *quoted* here does not mean “placed in quotation marks” since that would be tautological; the only plausible meaning of *quoted* here is “reproduced.” Thus, this statement seems to say that authors *cannot* recycle text at all and instead must treat their own reused material just as they would for other authors—as formal quotations. (Furthermore, how often do we find *any*

quotations within ACS research documents? This requirement seems to require a practice, quoting, that is almost entirely absent from chemistry research papers.) Adding further to this confusion is a statement about actual ACS editorial practices:

ACS applies a “reasonable person” standard when deciding whether a submission constitutes self-plagiarism/duplicate publication.

If there is a decision to be made about when recycling constitutes self-plagiarism, then recycling cannot be inherently unacceptable. Thus, this statement implies that text recycling is allowed (and thus ethical?) when any particular editor believes the instance to be “reasonable.” (16)

For a second example of ambiguity within a single document, consider the editorial from ACS’s *Journal of Medicinal Chemistry* (2). The editorial is interesting because it reveals how the ideas about appropriate practice of an individual editor may differ from those at the organizational level, making it yet more difficult for authors to know precisely what is allowed. This editorial offers a set of guidelines for reusing text, of which the first two are these:

- (1) Wherever possible, new language should be used to present material rather than copying from previous publications.
- (2) *Partial or whole sentences taken from a prior publication should be placed in quotes and the reference given.* This does not mean that large amounts of information should be repeated from other publications. [emphasis in the original]

According to these two guidelines, authors who have reason to reuse material from their prior works should either (1) reword it or (2) quote themselves. But we also find this:

- (4) As it is difficult to create unique ways to describe procedures and equipment, it is acceptable to reproduce language for these items in the experimental section.

Authors can, of course, “reproduce language” either with quotation marks or without them. Considering this fourth guideline in relation to the first two raises an important question: Can authors reuse extensive passages from the methods sections of their prior papers as an exception to #1, but only if they place those passages in quotes per guideline #2; or is this an exception to guideline #2, telling authors that they can actually recycle their descriptions verbatim without quotation marks?

Consider the example of a chemist looking to either the *Ethical Guidelines* or this editorial for guidance about text recycling. Neither guideline by itself defines precisely what is and isn’t allowed. Perhaps she will then look to other ACS documents for clarity, starting with the *Guide to Scholarly Communications* (11). That document says that text recycling is inherently unacceptable: “[T]he reuse of words verbatim in multiple locations constitutes dual publication, which is ethically inappropriate.” However, if this chemist happened to have published her prior paper in an ACS journal such as *JACS*, she will find explicit legal permission regarding recycling from that source in the ACS Journals Policies on Preprints (12). That document grants authors who have published with ACS permission to “reuse figures, tables, artwork, illustrations, text extracts of up to 400 words...from the Author’s Submitted, Accepted, or Published Work in which the ACS holds copyright...in subsequent scholarly publications of which they are an Author.” This is odd. Why would the ACS explicitly grant legal permission for authors to engage in an unethical practice? (The ACS Contract raises other thorny questions as well: Can authors reuse any number of text “extracts”

as long as none of these exceeds 400 words, or a single passage of 400 words, or 400 words in total? And given the central role that figures and tables play in chemical publications, what is the ethical principle behind limiting the reuse of prose but allowing unlimited reuse of visuals?)

If our published chemist happens to be a graduate student working on her dissertation, she'll also want to read the ACS Policy on Theses and Dissertations (14), which says this:

Reuse/Republication of the Entire Work in Theses or Collections: Authors may reuse all or part of the Submitted, Accepted or Published Work in a thesis or dissertation that the author writes and is required to submit to satisfy the criteria of degree-granting institutions. Such reuse is permitted subject to the ACS' "Ethical Guidelines to Publication of Chemical Research" (<http://pubs.acs.org/page/policy/ethics/index.html>)...

Considered in isolation, this policy appears straightforward, granting our author explicit rights to reuse material from her ACS publication in her dissertation. However, this permission requires adherence to the ACS Ethical Guidelines, which state that "[m]aterial quoted verbatim from the author's previously published work must be placed in quotation marks." Does the ACS actually intend for students to place all reused material within their dissertations in quotes? This seems implausible, given that students do not regularly, if ever, do this—and also that chemistry dissertation committees would be unlikely to accept a dissertation with such punctuation. A much more likely possibility is that those who wrote the Dissertations Policy did not consider the details of the ACS Ethical Guidelines.

Lack of careful coordination between documents places authors in an untenable position. Part of the problem here is that we cannot expect lawyers who craft legal policies and publishing contracts to understand the complex and nuanced factors associated with text recycling, nor can we expect those who draft guidelines for ethical scholarship to know the intricacies of copyright law. But the other part is that editors and journal staff typically produce their documents independently—with inadequate coordination or attention to harmonization.

We must also recognize that these challenges are only compounded when we shift our gaze from the U.S. context where these documents were created to an international context. If sorting out this tangle of legal and ethical issues is difficult for U.S.-based authors, how much more so for those with less English fluency. And if crafting clear and consistent policies on text recycling is difficult even for the ACS, which has the resources and motivation to address these issues in such detail, what can we expect of scholarly organizations and publishers in less well-resourced countries?

## Undesirable Outcomes

While ambiguity and inconsistency can make guidelines difficult to understand, some of the guidance is questionable in itself—notably asking authors to avoid text recycling by placing reused material in quotation marks or by rewriting that material.

Let us consider, first, the requirement for authors to place reused passages in quotations, which we saw in both the *Ethical Guidelines* (10) and the *Journal of Medicinal Chemistry* editorial (2). When researchers recycle material from their prior publications, they rarely do so in a single, contiguous block of text. Instead, they tend to use multiple excerpts of various lengths—most of a paragraph, complete sentences, and phrases—keeping what fits the context of the new work and replacing or editing that which does not. If authors are required to place such material in quotation marks, what would the resulting prose actually look like? Consider the example of typical text recycling in Figure 1 from a pair of chemistry papers produced by a research group developing a computational model.

The passage from the source paper is on the left; on the right is the corresponding passage from the destination paper in which I have added quotation marks to duplicated material.

The <b>second term</b> represents Coulombic interactions between pairs of ions in a <b>dielectrically uniform</b> environment characterized by the water dielectric constant $\epsilon_w$ , and the <b>third</b> term corresponds to the “image” potential experienced by ion $k$ due to the surface charge induced by ion $j$ . The fourth term corresponds to ...	“The” <b>fourth</b> “term” <b>describes</b> “Coulombic interactions between pairs of ions in” an “environment characterized by the” <b>(uniform)</b> “water dielectric constant $\epsilon_w$ , and the” <b>fifth</b> “term corresponds to the image potential experienced by ion $k$ due to the surface charge induced by ion $j$ .” Calculation of the image potential...
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Figure 1. Use of quotation marks to indicate recycled text.

Since the passage is not a verbatim reproduction in its entirety, this cannot be legitimately treated as a single quotation. I imagine that few editors of chemistry journals would actually prefer or even accept the punctuation on the right ¥ their journals; and even if they did, readers would undoubtedly find these quotation marks confusing and annoying.

If quotation is not generally a good alternative to recycling, what about “rewording” or “rewriting”? We see this frequently-offered guidance in the *Journal of Medicinal Chemistry* editorial: “If you are in doubt as to whether or not material would be considered self-plagiarism, it is best to reword the text.” But, just as for quoting, this alternative is less attractive in practice than in the abstract. At the sentence level, actual “rewording” tends to look like this (Figure 2):

<b>Samples were randomly assigned to assay plates, except</b> that the <b>initial and post-injection samples from the same sparrow</b> <b>were assayed on the same plate.</b>	For all assays, <b>we randomly assigned samples to assay plates but such</b> that the <b>three samples collected from given bird</b> <b>were assayed on the same plate.</b>
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Figure 2. Rewording to avoid text recycling (sentence-level changes).

In attempting to communicate the same content in a different way, authors inevitably resort to superficial alterations: substituting synonyms, rearranging clauses, changing active to passive voice, and so on. At the paragraph level, we also see a larger-scale shuffling of sentences, as shown in Figure 3.

Is disguising recycled material in this way truly more ethical? Does the resulting text make for better communication between authors and readers? It is hard to imagine most editors of chemistry journals answering either question in the affirmative. (In the field of writing studies, plagiarism scholars call this sort of “rewording” *patchwriting*. It is ironic that while professors of writing regularly teach students not to patchwrite, editors of scientific journals are encouraging the practice.) Rewording as an alternative to recycling is even more problematic from both the ethical and communications perspectives if we consider the demands it places on the many chemists for whom English is not their first language but who need to publish in English. For these researchers, rewriting may involve considerable additional labor and will likely result in less effective prose.



<p>To elicit an acute stress response, we then confined birds to individual breathable cloth bags. After 30 min of confinement, we collected a second blood sample (110 <math>\mu</math>l) to determine stress-induced plasma hormones and metabolite concentrations. We caught sparrows using a mist net and conspecific SPB. Depending on the study, in addition to the SPB, some birds were also exposed to conspecific STI (see below). Within two minutes of capture, we collected a first blood sample from each bird to determine initial levels of plasma hormones or metabolites (see below). Blood samples were collected from the right jugular vein using a heparinized syringe. Immediately after collection, they were placed on ice until centrifuged later the same day. Plasma was harvested using a Hamilton glass syringe and frozen until assayed for T, CORT, glucose, and uric acid (see below).</p>	<p>We collected all blood samples (75 <math>\mu</math>l) from the right jugular vein using a heparinized syringe. Within two minutes of capture, we collected a first blood sample (initial) to quantify pre-stress levels of plasma hormones and metabolites (see below). To elicit an acute stress response, we then confined birds to individual breathable cloth bags, which we kept in the shade. Ten and 30 min after capture, we collected a second and a third blood sample, respectively, to characterize the plasma hormone and metabolite responses to acute stress. All blood samples were immediately placed on ice until they were centrifuged and the plasma separated later the same day. Plasma was frozen at <math>-80^{\circ}\text{C}</math> until assayed for CORT, T, UA, and GLU (see below).</p>
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Figure 3. Rewording to avoid text recycling (paragraph-level changes).

## Conclusion

My analysis of the ACS documents reveals the lack of clear and consistent norms regarding text recycling. While these concerns are important for the ACS to address, they are more important in revealing the need for better policies and publishing contracts in general. Having examined policies, guidelines, publishing contracts, and editorials from dozens of STEM journals from many publishers, I know that the issues identified here are widespread.

One lesson that might be learned from my analysis is that crafting guidelines and policies for text recycling is inherently difficult. I suspect that many editors lack both sufficient knowledge of the many issues I have discussed here and the time to develop that understanding and then parse their documents with the level of scrutiny required to eliminate ambiguities and inconsistencies within and across them.

Having recognized these challenges, the Text Recycling Research Project (TRRP) has developed a set of documents to aid the research community, all of which are available on the [TRRP website](#):

- Text Recycling: Best Practices for Researchers
- Understanding Text Recycling: A Guide for Researchers
- Understanding Text Recycling: A Guide for Editors
- TRRP Policies for Text Recycling

The two “Understanding” documents are intended to be disseminated whole without alteration. For the Best Practices and the Policies, we believe that many publishers will find these suitable in their current form, but we expect others will need to make alterations to fit their publishing context or disciplinary sensibilities. Nonetheless, we believe that working from these documents, which have been carefully developed and edited with input from key stakeholders in STEM publishing (the TRRP Advisory Board), will greatly reduce the problems I describe in this chapter. An additional and important benefit to widespread use of the documents is greater consistency of language, reducing



the challenges authors face when confronted by documents that differ in meaningless ways merely because they were developed independently of one another.

The increased attention which text recycling has received over the past two decades has revealed—and in some cases resulted in—considerable confusion and anxiety for authors and editors alike.

There is a legal component to this confusion, driven to some extent by international differences in copyright laws which make it difficult to standardize guidelines for text recycling for fear of legal repercussions. These legal differences, however, need not interfere with the development of more carefully considered and articulated ethical guidelines.

Ideally, international norms for text recycling practices in scientific writing should be determined by considerations of ethics and effective communication rather than aversion to legal risk. Publishers can make this happen by taking two steps: First, publishers should make it legal for authors to follow ethically-grounded norms by revising their publishing agreements to align with those norms. We have tried to capture those norms in our Best Practices document. Granting authors reasonably generous and consistent recycling rights in publishing contracts could make international differences in copyright laws moot, since researchers would have explicit permission to recycle within the limits of ethically determined guidelines. Second, publishers should formally and publicly commit to *not* bringing legal action for text recycling against authors or publishers when those norms have been followed. (It is highly unlikely that publishers would bring legal action anyway; since text recycling has long been common in scientific writing, any publisher that brought legal action would likely have their own text recycling cases to be concerned about.) Editors could then stop worrying about the risk of copyright infringement lawsuits for text recycling and develop policies for their journals based solely on what would be best for their authors and readers.

These are certainly ambitious aspirations. Yet I am optimistic that we are reaching the point where, with sufficient thought and care, the problems of text recycling can be mostly resolved, resulting in fewer problems for authors and editors and better scientific communication.

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8. The legal issue is complicated. In the United States, plagiarism (as distinct from rights infringement) is not usually “illegal” as such. In addition, copyright law in the United States includes a provision of “fair use” which grants authors who do not hold copyright the right to reuse published material under certain conditions. The most common uses of text recycling in scientific research reports (limited recycling of methods material, background material, or other technical details) would be considered a fair use and therefore be legal under U.S. copyright law as long as the author-publisher contract does not explicitly restrict it. In many other countries, authors rights of “paternity” are irrevocable, and the potential illegality of plagiarism is solely a matter of attribution; in these contexts, citing the source document addresses the legal concerns regarding plagiarism. Text recycling may, nonetheless, violate a signed author-publisher contract, and these very substantially with regard to what is or isn’t explicitly or implicitly allowed or forbidden regarding reuse of one’s own published materials.
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15. According to an analysis of pairs of research articles produced under the same U.S. NSF grant (Anson and Moskovitz), fewer than 7% of paper pairs had identical authors [7].
16. “Reasonable person”, while standard legal language for liability, seems out of place when setting policy about professional norms. In addition, while this standard might appear sound on its face, a TRRP interview-based study of journal editors shows that editors can have widely different personal views on what constitutes ethical recycling practice. Pemberton, M.; Hall, S.; Moskovitz, C.; Anson, C. M. Text recycling: Views of North American journal editors from an interview-based study. *Learned Publishing* **2019**, 32, 355–366. It is entirely possible that one editor might allow unlimited text recycling in a Methods and Materials section while another forbids any recycled material at all. While editors should have considerable discretion regarding the suitability and quality of work they choose to publish, we may question whether their idiosyncratic and often uniformed preferences are appropriate for determining what is ethical regarding text recycling. This policy certainly makes matters difficult for authors who have no way of anticipating what will be allowed.