

Copyright Infringement, Fair Use, and Plagiarism

The use of relatively short direct quotes from a published work does not usually require permission from the copyright holder as it typically falls under the “fair use” provision. However, extensive quoting of text from a copyrighted source can constitute copyright infringement, whether the appropriated text is properly enclosed in quotation marks or correctly paraphrased, even if a citation is provided according to established scholarly conventions. Obviously, the same applies if the material is plagiarized outright. Moreover, the reader should note that intellectual or artistic work does not need to be published in order to be copyrighted. In fact, the moment the work becomes final it is automatically copyrighted. Thus, instances of plagiarism, whether from a published article or even an unpublished manuscript, can also constitute copyright infringement, though, of course, copyright infringement does not always constitute plagiarism. For example, if I were to quote extensively and with proper citation beyond the limit dictated by the publisher of the work from which I quoted, I would be in violation of that publisher’s copyright, but the infraction would not constitute plagiarism as I am letting the reader know, by my use of quotations and a citation, that the material being used is not mine.

Iverson, et al., (2007) cautions the reader that the amount of text that can be taken from a copyrighted source without permission depends on its proportion to the entire work. However, the reader should also note that some publishers, such as the APA, have established word limits for borrowing text. Given the above considerations, it should then be clear that extensive plagiarism and self-plagiarism may also qualify as copyright infringement because the copyright of the plagiarized or self-plagiarized content may be held by the publisher; not by the author. This would certainly be the case if the original article were published in a journal owned by one publisher and the second article were to appear in a journal owned by a different publisher both of which require that authors transfer the copyright of their papers to the publishers. One should note that not all publishers require that authors transfer their copyright to them.

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Lesser Crimes of Writing: Other Questionable Writing Practices

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Zigmond and Fischer (2002) have called attention to what they refer as the “misdemeanors” of science: ethically inappropriate practices in the conduct of scientific research. These authors explain that, whereas fabrication, falsification, and plagiarism are considered to be the “high crimes” of science, many other questionable practices frequently take place and that these lesser crimes should command more attention. Evidence for their position was verified in a study by Martison et al., (2005) who reported have shown that 33% of US scientists surveyed admitted to engage in some form of questionable research practices. Some examples of common misdemeanors are, neglecting to indicate one’s source of funding, failing to identify possible conflicts of interest, and establishing honorary authorship (assigning authorship to an individual whose contributions to the work do not earn him/her such status).

We can apply the high crimes vs. misdemeanors classification in the area of writing. In our previous discussion of plagiarism and self-plagiarism, we described a variety of practices, some of which would undoubtedly be classified as high crimes (e.g., appropriating the ideas or data of someone else without attribution), while others would fall under the misdemeanor category (e.g., inadequate paraphrasing and substantial text recycling). In this section, we turn our attention to other questionable practices that violate the spirit of ethical writing and that mostly fall under Zigmond & Fischer’s (2002) misdemeanor category.

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Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing Miguel Roig, Ph.D.

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MOST RELEVANT PORTIONS OF ROIG'S ESSAY ARE GIVEN BELOW:

On ethical writing

A general principle underlying ethical writing is the notion that the written work of an author, be it a manuscript for a magazine or scientific journal, a research paper submitted for a course, or a grant proposal submitted to a funding agency, represents an implicit contract between the author of that work and his/her readers. Accordingly, the reader assumes that the author is the sole originator of the written work and that any material, text, data, or ideas borrowed from others is clearly identified as such by established scholarly conventions, such as footnotes, block-indented text, and quotations marks. The reader also assumes that all information conveyed therein is accurately represented to the best of the author's abilities. In sum, as Kolin (2015) points out, "Ethical writing is clear, accurate, fair, and honest" (p. 29) and its promotion conveys to readers a commitment to ethical practice in other aspects of the author's work.

As is the case with most other human activities, inadvertent errors may occur in the process of writing that end up violating the spirit of the contract. For example, in proposing a new idea or presenting new data, an author may sincerely consider a certain line of evidence as unimportant or irrelevant, and thus ignore other existing data or evidence that fail to support, or outright contradict, his/her own ideas. In other cases, an author may fail to give credit to a unique theoretical position or a fundamental methodological step that is necessary for an experiment to work as described. An example of the latter situation that eventually led to a correction of a published article (i.e., Anastasia, Deinhardt, Chao, Will, Irmady, Lee, Hempstead, & Bracken, 2014) is described by Marcus (2014). Judging by some of the reader commentary appearing in various emerging outlets, such as PubPeer and Retraction Watch., these types of oversights occur relatively frequently in the sciences, particularly when dealing with controversial topics.

Other errors include situations in which an idea claimed to be completely original by its author/s may have actually been articulated earlier by someone else. Such "rediscovery" of ideas is a relatively well-known

phenomenon in the sciences, often occurring within a relatively close timeframe. In some cases, these “new” discoveries are completely independent in that it is possible for the new proponents to appear to have no knowledge of the original discovery. In other instances, it is possible for the new proponents to have been actually exposed to these ideas at some point but to have genuinely forgotten. A recent example of a rediscovery of an old phenomenon occurred when Dieter, Hu, Knill, Blake, and Tadin (2013) claimed to have discovered that moving one’s hand from side to side in front of one’s covered eyes causes visual sensations of motion. However, as a subsequent correction points out (Dieter, et al., 2014), these authors were apparently unaware that reports of this phenomenon had been published earlier, starting with the work of Hofstetter (1970) and followed by the work of Brosgole & Neylon (1973) and Brosgole & Roig (1983). The latter study reported at least one experiment with similar methodology and results as one of those reported later by Dieter, et al. Cognitive psychologists have provided considerable evidence for the existence of cryptomnesia, or unconscious plagiarism, which refers to the notion that individuals previously exposed to others’ ideas will often remember the idea, but not its source, and mistakenly misattribute the idea to them (see Brown & Murphy, 1989; Brown & Halliday, 1991; Marsh & Bower, 1993). Unfortunately, it is often difficult to establish whether prior exposure to ideas has occurred.

Other unintentional errors occur, such as when authors borrow heavily from a source and, in careless oversight, fail to fully credit the source. These and other types of inadvertent lapses are thought to occur with some frequency in the sciences. Unfortunately, in some cases, such lapses are thought to be intentional and therefore constitute instances of unethical writing and quite possibly constitute research misconduct. Without a doubt, plagiarism is the most widely recognized and one of the most serious violations of the contract between the reader and the writer. Moreover, plagiarism is one of the three major types of scientific misconduct as defined by the Public Health Service, the other two being falsification and fabrication (U. S. Public Health Service, 1989). Most often, individuals found to have committed substantial plagiarism pay a steep price. Plagiarists have been demoted, dismissed from their schools, from their jobs, and their degrees and honors have been rescinded as a result of their misdeeds (Standler, 2000). Let us take a closer look at this type of misconduct.

PLAGIARISM

"Taking over the ideas, methods, or written words of another, without acknowledgment and with the intention that they be taken as the work of the deceiver." American Association of University Professors (September/October,1989).

As the above quotation shows, plagiarism has been traditionally defined as the taking of words, images, processes, structure and design elements, ideas, etc. of others and presenting them as one’s own. It is often

associated with phrases such as kidnapping of words, kidnapping of ideas, fraud, and literary theft. Plagiarism can manifest itself in a variety of ways and is not just confined to student papers or published articles or books. For example, consider a scientist who makes a presentation at a conference and discusses at length an idea or concept that had already been proposed by someone else yet not considered common knowledge. During his presentation, he fails to fully acknowledge the specific source of the idea and, consequently, misleads the audience into believing that he was the originator of that idea. This, too, may constitute an instance of plagiarism. The fact is that plagiarism manifests itself in a variety of situations and the following examples are just a small sample of the many ways in which it occurs and of the types of consequences that can follow as a result.

- A historian resigns from the Pulitzer board after allegations that she had appropriated text from other sources in one of her books.
- A writer for a newspaper who was found to have plagiarized material for some of his articles ended up resigning his position.
- A biochemist resigns from a prestigious clinic after accusations that a book he wrote contained appropriated portions of text from a National Academy of Sciences report.
- A famous musician is found guilty of unconscious plagiarism by including elements of another musical group's previously recorded song in one of his new songs which then becomes a hit. The musician is forced to pay compensation for the infraction.
- A college president is forced to resign after allegations that he failed to attribute the source of material that was part of a college convocation speech.
- A U.S. Senator has his Master's degree rescinded after findings of plagiarism in one of his academic papers; he withdraws from the Senate race.
- An education minister resigns her government position after a university rescinds her doctoral degree for plagiarism.
- A psychologist has his doctoral degree rescinded after the university finds that portions of his doctoral dissertation had been plagiarized.

In sum, plagiarism can be a very serious form of ethical misconduct. For this reason, the concept of plagiarism is universally addressed in all scholarly, artistic, and scientific disciplines. In the humanities and the sciences, for example, a plethora of writing guides for students and professionals exist to provide guidance to authors on discipline-specific procedures for acknowledging the contributions of others.

While instruction on proper attribution, a key concept in avoiding plagiarism, is almost always provided, coverage of this important topic often fails to go beyond the most common forms: plagiarism of ideas and plagiarism of text.

Plagiarism of ideas

Appropriating someone else's idea (e.g., an explanation, a theory, a conclusion, a hypothesis, a metaphor) in whole or in part, or with superficial modifications without giving credit to its originator.

In the sciences, as in most other scholarly endeavors, ethical writing demands that any ideas, data, and conclusions borrowed from others and used as the foundation of one's own contributions to the literature, be properly acknowledged. The specific manner in which we make such acknowledgement may vary depending on the context and even on the discipline, but it often takes the form of either a footnote or a reference citation.

Acknowledging the source of our ideas

Just about every scholarly or scientific paper contains several footnotes or references documenting the source of the facts, ideas, or evidence used in support of arguments, hypotheses, etc. In some cases, as in those papers that review the literature in a specific area of research, the reference section listing the sources cited in the paper can be quite extensive, sometimes taking up more than a third of the published article (see, for example, Logan, Walker, Cole, & Leukefeld, 2002). Most often, the contributions we rely upon come from the published work or personal observations of other scientists or scholars. On occasion, however, we may derive an important insight about a phenomenon or process that we are studying, through a casual interaction with an individual not at all connected with scholarly or scientific work. But, even in such cases, we still have a moral obligation to credit the source of our ideas. A good illustrative example of the latter point was reported by Alan Gilchrist in a 1979 *Scientific American* article on color perception. In a section of the article which describes the perception of rooms uniformly painted in one color, Gilchrist states: "We now have a promising lead to how the visual system determines the shade of gray in these rooms, although we do not yet have a complete explanation. (John Robinson helped me develop this lead.)" (p. 122; Gilchrist, 1979). The reader might assume that Mr. Robinson is another scientist working in the field of visual perception, or perhaps an academic colleague or an advanced graduate student of Gilchrist's. Not so. John Robinson was a local plumber and an acquaintance of Gilchrist in the town where the author spent his summers. During a casual discussion between Gilchrist and Robinson over the former's work, Robinson provided insights into the problem that Gilchrist had been working on that were sufficiently important to the development of his theory of lightness perception that Gilchrist felt ethically obligated to credit Robinson's contribution.

Unconscious plagiarism of ideas.

Even the most ethical authors can fall prey to the inadvertent appropriation of others' ideas, concepts, or metaphors. Here we are again referring to the phenomenon of unconscious plagiarism (i.e., cryptomnesia), which, as noted earlier, takes place when an author generates an idea that s/he believes to be original, but which in reality had been encountered at an earlier time. Given the free and frequent exchange of ideas in science and other scholarly disciplines, it is not unreasonable to expect instances in which earlier exposure to an idea that lies dormant in someone's unconscious emerges into consciousness at a later point, but in a context different from the one in which the idea had originally occurred. Presumably, this is exactly what happened in the case of former Beatle George Harrison, whose song "My Sweet Lord" was found to have musical elements of the song "He's So Fine," which had been released years earlier by The Chiffons (see *Bright Tunes Music Corp. v. Harrisongs Music, Ltd.*, 1976). One has to wonder how many other John Robinsons, as well as other accomplished scientists, scholars, and artists, now forgotten, contributed original ideas without acknowledgement.

Some instances of misappropriation of ideas suggest intentionality on the part of the perpetrators. For example, according to Resnik (e.g., Shamoo and Resnik, 2009; Resnik 2012), many instances exist in which professors take ideas from their students but fail to give them credit for their contributions. Ferguson (2014) describes a case of this type in which a mathematics paper published in 2013 was retracted the following year because it been determined that the work had been largely derived from a student's Master's thesis without any acknowledged of her contributions.

In other cases the misappropriation of an idea can be a subtle process. Consider the famous case of Albert Schatz who, as a graduate student working under Selman Waksman at Rutgers, discovered the antibiotic streptomycin. Even though the first publications describing his discovery identified Schatz as primary author (Martin, 1997), it was Wakman who, over a period of time, began to take sole credit for the discovery, ultimately earning him the Nobel prize in 1952 (see, for example, Shatz, 1993; Mistiaen, 2002 for a fuller description of this case).

The confidential peer review process is thought to be a common source of plagiarism. Consider the scenario where the offender is a journal or conference referee, or a member of a review panel for a funding agency. He reads a paper or a grant proposal describing a promising new methodology in an area of research directly related to his own work. The grant fails to get funded based perhaps on his negative evaluation of the protocol. He then goes back to his lab and prepares a grant proposal using the methodology stolen from the proposal that he refereed earlier and submits his proposal to a different granting agency. Cases similar to the

above scenario have been documented in the research misconduct literature (see Price, 2006)

Most of us would deem the behavior depicted in the above scenario as downright despicable. Unfortunately, similar situations have occurred. In fact, elements of the above scenario are based on actual cases of scientific misconduct investigated by ORI. The notion that the peer review context appears to be sufficiently susceptible to the appropriation of ideas was likely the impetus behind the 1999 Federal Office of Science and Technology Policy's expansion of their definition of plagiarism, which states:

“Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others' research proposals and manuscripts.” (Office of Science and Technology Policy, 1999).

And, even small-scale plagiarism of ideas may lead to very negative consequences. (See, for example, Abbott, 2009).

[GUIDELINES FOR AVOIDING PLAGIARISM]

Guideline 1: An ethical writer ALWAYS acknowledges the contributions of others to his/her work.

Plagiarism of text

Copying a portion of text from another source without giving appropriate credit to its author.

When it comes to using others' word-for-word (i.e., verbatim) text in our writing the universally accepted rule is to enclose that information in quotations and to indicate the specific source of that text. When quoting text from other sources, a writer must provide a reference citation and, depending on the style manual that guides the work (e.g., Turabian, American Psychological Association [APA], American Medical Association [AMA]), the page number indicating where the quoted text is located in the original.

Although the use of direct quotes appears to be uncommon in biomedical literature, in some instances it may be warranted. The material quoted earlier from Gilchrist (1979) serves as a good example of when to use quotations. Some writing style manuals require that larger portions of text that are borrowed be block-indented. For example quoting directly from Iverson, et al (2007; p. 361):

Block Quotations. – If material quoted from texts or speeches is longer than 4 typewritten lines. The material should be set off in a block, i.e., in reduced type and without the quotation mark. Paragraph

indents are generally not used unless the quoted material is known to begin a paragraph. Space is often added both above and below these longer quotations.

Although the evidence indicates that most authors, including college students, are aware of rules regarding the use of quotation marks, plagiarism of text is probably the most common type of plagiarism. For example, some authors seem to believe that as long as a citation is provided, it is acceptable to use verbatim text from another source without needing to enclose the borrowed material in quotation marks (Julliard, 1993). However, plagiarism of text can occur in a variety of forms. The following review will familiarize the reader with the various subtle forms of plagiarism of text.

Guideline 2: Any verbatim text taken from another source must be enclosed in quotation marks and be accompanied by a citation to indicate its origin.

Let's consider the following variety:

Copying portions of text from one or more sources, inserting and/or deleting some of the words, or substituting some words with synonyms, but never giving credit to its author nor enclosing the verbatim material in quotation marks.

The above form of plagiarism is relatively well known and has been given names, such as patchwriting (Howard, 1999) and paraphragiarism (Levin & Marshall, 1993).

Iverson, et al. (2007) in the American Medical Association's Manual of Style identify this type of unethical writing practice as mosaic plagiarism and they define it as follows:

“Mosaic: Borrowing the ideas and opinions from an original source and a few verbatim words or phrases without crediting the original author. In this case, the plagiarist intertwines his or her own ideas and opinions with those of the original author, creating a ‘confused plagiarized mass’” (p. 158).

Another, more blatant form which may also fall under the more general category of plagiarism of ideas occurs when an author takes a portion of text from another source, thoroughly paraphrases it, but never gives credit to its author. Consistent with the first guideline, we must be careful to indicate which ideas/material in our writing have been derived from which source.

Inappropriate paraphrasing

Taking portions of text from one or more sources, crediting the author/s, but only making 'cosmetic' changes to the borrowed material, such as changing one or two words, simply rearranging the order, voice (i.e., active vs. passive) and/or tense of the sentences is NOT paraphrasing.

Inappropriate paraphrasing is perhaps the most common form of plagiarism and, at the same time, the most controversial. This is because the criteria for what constitutes proper paraphrasing differ between individuals, even within the same discipline (Roig, 2001). We will discuss these issues shortly, but first let's consider the process of paraphrasing.

Paraphrasing and summarizing

Scholarly writing, including scientific writing, often involves **paraphrasing** and **summarizing** others' work. For example, in the introduction of a traditional IMRAD paper it is customary to provide a brief and concise review of the pertinent literature. Such a review is accomplished by the cogent synthesis of relevant theoretical and empirical studies that form the background and rationale for the hypotheses being tested or for the main thesis of the paper being written. Such reviews call for the synthesis (i.e., summarizing) of relatively large amounts of information.

Guideline 3: When we summarize others' work, we use our own words to condense and convey others' contributions in a shorter version of the original.

At other times, and for a variety of reasons, we may wish to restate in detail and in our own words a certain portion of another author's writing. In this case, we must rely on the process of paraphrasing. Unlike a summary, which results in a substantially shorter textual product, a paraphrase usually results in writing of roughly equivalent textual length as the original, but, of course, with different words and sentence structure. Whether paraphrasing or summarizing others' work, we must always provide proper credit.

Guideline 4: When paraphrasing others' work, not only must we use our own words, but we must also use our own syntactical structure.

Guideline 5: Whether we are paraphrasing or summarizing we must always identify the source of our information.

Paraphrasing and plagiarism: what the writing guides say

Although virtually all professional and student writing guides, including those in the sciences, provide specific instructions on the proper use of quotation marks, references, etc., some fail to offer specific details on proper paraphrasing. With some exceptions, writing guides that provide instructions for proper paraphrasing and for avoiding plagiarism tend to subscribe to a "conservative" approach to paraphrasing. That is, these guides often suggest that when paraphrasing, an author must substantially modify the original material. Consider the following examples of paraphrasing guidelines:

"Don't plagiarize. Express your own thoughts in your own words.... Note, too, that simply changing a few words here and there, or changing the order of a few words in a sentence or paragraph, is still plagiarism. Plagiarism is one of the most serious crimes in academia." (Pechenik, 2001; p.10).

"You paraphrase appropriately when you represent an idea in your own words more clearly and pointedly than the source does. But readers will think that you plagiarize if they can match your words and phrasing with those of your source." (Booth, Colomb, & Williams, 2008; p. 194).

Guideline 6: When paraphrasing and/or summarizing others' work we must ensure that we are reproducing the exact meaning of the other author's ideas or facts and that we are doing so using our own words and sentence structure.

Examples of paraphrasing: good and bad

The ethical writer takes great care to insure that any paraphrased text is sufficiently modified so as to be judged as new writing. Let's consider various paraphrased versions of the following material on the electrochemical properties of neurons (taken from Martini & Bartholomew, 1997). In acknowledging the source, we will use the footnote method commonly used in the biomedical sciences. The actual reference would appear in the reference section of the paper.

"Because the intracellular concentration of potassium ions is relatively high, potassium ions tend to diffuse out of the cell. This movement is driven by the concentration gradient for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is significantly more permeable to potassium ions than to sodium ions. As a result, potassium ions diffuse out of the cell faster than sodium ions enter the cytoplasm. The cell therefore experiences a net loss of

positive charges, and as a result the interior of the cell membrane contains an excess of negative charges, primarily from negatively charged proteins.”¹ (p. 204).

Here is an Appropriate Paraphrase of the above material:

A textbook of anatomy and physiology¹ reports that the concentration of potassium ions inside of the cell is relatively high and, consequently, some potassium tends to escape out of the cell. Just the opposite occurs with sodium ions. Their concentration outside of the cell causes sodium ions to cross the membrane into the cell, but they do so at a slower rate. According to these authors, this is because the permeability of the cell membrane is such that it favors the movement of potassium relative to sodium ions.

Because the rate of crossing for potassium ions that exit the cell is higher than that for sodium ions that enter the cell, the inside portion of the cell is left with an overload of negatively charged particles, namely, proteins that contain a negative charge.

Notice that, in addition to thoroughly changing much of the language and some of the structure of the original paragraph, the paraphrase also indicates, as per guideline 5, that the ideas contained in the rewritten version were taken from another source. When we paraphrase and/or summarize others' work we must also give them due credit, a rule not always applied by inexperienced writers.

Let's suppose that instead of paraphrasing, we decide to summarize the above paragraph from Martini and Bartholomew. Here is one summarized version of that paragraph:

The interior of a cell maintains a negative charge because more potassium ions exit the cell relative to sodium ions that enter it, leaving an over abundance of negatively charged protein inside of the cell.¹

In their attempts at paraphrasing, some authors commit “near plagiarism” (or plagiarism, depending on who is doing the judging) because they fail to sufficiently modify the original text and, thus, produce an inappropriately paraphrased version. Depending on the extent of modifications to the original, the amount of text involved, and the unique perspective of the reader about what constitutes ethical scholarship, inappropriate paraphrasing may constitute an instance of plagiarism. For example, the following versions of the Martini and Bartholomew paragraph inappropriately paraphrased-and can thus be classified as plagiarized.

Inappropriate paraphrase (version 1):

Because the intracellular concentration of potassium ions is _ high, potassium ions tend to diffuse out of the cell. This movement is triggered by the concentration gradient

for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is much more permeable to potassium ions than to it is to sodium ions. As a result, potassium ions diffuse out of the cell more rapidly than sodium ions enter the cytoplasm. The cell therefore experiences a _ loss of positive charges, and as a result the interior of the cell membrane contains a surplus of negative charges, primarily from negatively charged proteins.¹ (p. 204).

A comparison between the original version of the Martini and Bartholomew paragraph to the ‘rewritten’ version above reveals that the rewritten version is a mere copy of the original. The few modifications that were made are superficial, consisting merely of a couple of word deletions, substitutions, and additions. Even though the writer has credited Martini and Bartholomew’s ideas by the insertion of a reference note (1), most of the words and structure of the original paragraph are preserved in the rewritten version and the paragraph is, therefore, considered plagiarism. In other words, making only cosmetic modifications to others’ writing misleads the reader as to who the true author of the original writing really is.

Inappropriate paraphrase (version 2):

The concentration gradient for sodium (Na) ions tends to promote their movement into the cell. Similarly, the high intracellular concentration of potassium (K) ions is relatively high resulting in K’s tendency to diffuse out of the cell. Because the cell membrane is significantly more permeable to K than to Na, K diffuses out of the cell faster than Na enters the cytoplasm. The cell therefore experiences a net loss of positive charges and, as a result the interior of the cell membrane now has an excess of negative charges, primarily from negatively charged proteins.¹ (p. 204).

At first glance this second ‘rewritten’ version may look as if it has been significantly modified from the original but, in reality, the changes made are only superficial and the resulting paraphrase is not all that different from original. In this particular instance, the writer has made a seemingly disingenuous change by substituting the names of the atoms with their chemical symbols (e.g., sodium = Na). In addition, the order of the first two sentences was changed giving the appearance of a substantial modification. As in the previous version, however, the language and much of the rest of structure is still too close to the original.

Again, it must be emphasized that when we paraphrase we must make every effort to restate the ideas in our own voice. Obviously, certain key terms, such as specific cellular structures (e.g., membrane) and molecules (e.g., sodium) cannot be changed. This will be often the case with precise terminology of a scientific

nature for which there are no adequate substitutes. Here is another properly paraphrased version:

Appropriate paraphrase (version 2):

The relatively high concentration gradient of sodium ions outside of the cell causes them to enter into the cell's cytoplasm. In a similar fashion, the interior concentration gradient of potassium ions is also high and, therefore, potassium ions tend to scatter out of the cell through the cell's membrane. But, a notable feature of this process is that Potassium ions tend to leave the cell faster than sodium ions enter the cytoplasm. This is because of the nature of the cell membrane's permeability, which allows potassium ions to cross much more freely than sodium ions. The end result is that the interior of the cell membrane's loss of positive charges results in a greater proportion of negative charges and these are made up mostly of proteins that have acquired a negative charge.¹

Paraphrasing highly technical language

Taking a paragraph, or for that matter, even a unique sentence from another source, and using it in our own writing without enclosing the material in quotations constitutes plagiarism. Similarly, inappropriate paraphrasing may also be classified as plagiarism.

The available evidence indicates that one of the reasons writers misappropriate text is because they may be unfamiliar with the concepts and/or language with which s/he is working. The ability to properly paraphrase technical text depends in large part on an author's conceptual understanding of the material and his/her mastery and command of the language and of her knowledge of, and ability, to convey discipline-specific expressions typically used to describe relevant phenomena, laboratory processes and procedures, etc. Accordingly, it is relatively easy to thoroughly paraphrase others' work when we have a full grasp of the issues and of the language involved. For example, studies show that when asked to paraphrase a short paragraph, students (Roig, 1999; Walker, 2008) as well as university professors (Roig 2001) are more likely to appropriate and, therefore, plagiarize text when the original material to be paraphrased is made up of technical language likely to be unfamiliar to them, than when the topic is a familiar one and the original is written in plain language.

Obviously, inexperienced writers (e.g., students) have the greatest difficulty paraphrasing the advanced technical text often found in the primary scientific literature. In an effort to introduce them to primary sources of information in a given discipline, college students are often required to write a research paper from articles published in professional journals. For those students who must complete this type of assignment for

the first time, and, in particular for foreign students whose primary language is not English, writing a research paper can be a daunting task. This is because scholarly prose: 1) can be very intricate, 2) adheres to unique stylistic conventions (e.g., use of the passive voice in the biomedical sciences), and 3) relies heavily on jargon and unusual expressions that novice writers have yet to master. Consequently, students need to create an acceptable academic product that is not only grammatically correct, but also demonstrates knowledge of the concepts discussed. These circumstances force many such students to rely on close paraphrases of the original text. Unfortunately, such writing can result in a charge of plagiarism.

Guideline 7: In order to be able to make the types of substantial modifications to the original text that result in a proper paraphrase, one must have a thorough command of the language and a good understanding of the ideas and terminology being used.

An analogous situation can occur at the professional level when authors see the need to paraphrase a complex process or methodology. As indicated earlier, traditional scholarly conventions provide us with the option to re-use any material by enclosing it in quotation marks or by block-quoting it (i.e., indenting the material within both margins) with some type of indication (e.g., a footnote) as to its origin. Therefore, if the text is so technical that it would be very difficult or nearly impossible to modify substantially without altering its meaning, then perhaps it would be best to leave it in the original author's wording, enclose it in quotation marks (or block-quote it), and include a citation. However, unlike literature or philosophy, quoting in certain disciplines (e.g., biomedical sciences) is not encouraged (see Pechnick, 2001). One would be hard pressed to find an entire sentence quoted, let alone a short paragraph, in the pages of prestigious biomedical journals (e.g., *Nature*, *Science*, *New England Journal of Medicine*).

In sum, the reality is that in many instances, scientific prose and diction can be very difficult to paraphrase. To illustrate the difficulties inherent in paraphrasing highly technical language, let's consider the following paragraph from a report recently published in *Science* (Lunyak, et al., 2002).

“Mammalian histone lysine methyltransferase, suppressor of variegation 39H1 (SUV39H1), initiates silencing with selective methylation on Lys⁹ of histone H3, thus creating a high-affinity binding site for HP1. When an antibody to endogenous SUV39H1 was used for immunoprecipitation, MeCP2 was effectively coimmunoprecipitated; conversely, α HA antibodies to HA-tagged MeCP2 could immunoprecipitate SUV39H1 (Fig. 2G).”² (p. 1748)

Here is an attempt at paraphrasing the above material:

The H3 methyltransferase SUV39H1 mediates gene silencing of neuronal genes in Rat-1 fibroblasts by methylating lysine 9 of histone H3, thus creating a binding site for the heterochromatin protein HP1 and subsequent formation of a chromatin complex involving multiple silencing factors including the methyl-CpG-binding protein MeCP2 and SUV39H1 itself (Lunyak, et al., 2002).¹

Unlike the previous examples of appropriate paraphrasing, the above example does not embody as many textual modifications. In order for the exact meaning of the original *Science* paragraph to be preserved in the present case, many of the same terms must be left intact in the paraphrased version. Although synonyms for some of the words may be available, their use in the specific context of the original paragraph is simply not appropriate. For example, take the word *affinity*, which is defined as “that force by which a substance chooses or elects to unite with one substance rather than with another” (Dorland, 2000) or, in its more recent edition, “a special attraction for a specific element, organ or structure” (Dorland, 2011). *Roget’s Thesaurus* (Moorhead, 2002) lists the following synonyms for *affinity*: *liking, attraction, relations, similarity*. Although it might be possible to rewrite the first sentence using the synonym “*attraction*,” this alternative fails to capture the precise meaning conveyed by the original sentence, given how the term is used in this area of biomedical research. The word *affinity* has a very specific denotation in the context in which is being used in the *Science* paragraph and it is the only practical and meaningful alternative available. The same can be said for other words that might have synonyms (e.g., binding, silencing, site). Other terms, such as *methylation* and *antibodies* are unique and do not have synonyms. In sum, most of the rest of the technical terms (e.g., immunoprecipitation, endogenous, coimmunoprecipitated) and expressions (e.g., HAtagged, high-affinity, mammalian histone lysing methyltransferase) in the above paragraph are extremely difficult, if not impossible, to substitute without altering the intended meaning of the paragraph. As a result, a properly paraphrased version such as the one offered above will share many common elements with the original and thus, applying the strict definitions of paraphrasing provided by some writing guides might render the above paraphrase as a borderline, or an outright, case of plagiarism.

It may be worth noting that the “correct paraphrase” version of the Lunyak, et al (2002) paragraph that had been included in the previous version of this guide and which is reproduced immediately below had been written by a nonspecialist in that field and contained a subtle misinterpretation of the processes described in the original material paragraph:

A high affinity binding site for HP1 can be produced by silencing Lys⁹ of histone H3 by methylation with mammalian histone lysine

¹ Paraphrased version prepared by John Rodgers.

methyltransferase, a suppressor of variegation 39H1 (SUV39H1). MeCP2 can be immunoprecipitated with antibodies prepared against endogenous SUV39H1; on the other hand, immunoprecipitation of SUB39H1 resulted from aHA antibodies to HA-tagged MeCP2. ²

Such subtle misrepresentations illustrate the fact that highly technical descriptions of a methodology, phenomena, etc., can be extremely difficult to properly paraphrase and, to do so, a writer must have a thorough conceptual understanding of the concepts and processes being described. It is perhaps for this reason that ORI's definition of plagiarism (Office of Research Integrity, 1994) provides the following caveat:

“ORI generally does not pursue the limited use of identical or nearly- identical phrases which describe a commonly-used methodology or previous research because ORI does not consider such use as substantially misleading to the reader or of great significance.”

All of the above considerations serve to illustrate the reason why an operational definition of proper paraphrasing/plagiarism (i.e., how many consecutive words taken from the original constitutes plagiarism) is impractical, not to mention the fact that there are certain stock phrases, perhaps even entire sentences that occur with some frequency in unrelated journal articles (e.g., “the results obtained do not support the hypothesis”). Nevertheless, and in spite of the above clarification provided by ORI, a responsible writer has an ethical responsibility to readers and to the author/s from whom s/he is borrowing, to always respect and acknowledge their intellectual content.

Plagiarism and common knowledge

As noted above, we always must give proper credit to those whose ideas and facts we are using. One general exception to this principle occurs when the ideas we are discussing represent “common knowledge.” If the specific facts and figures we are discussing are assumed to be known by the readership, then one need not provide a citation. For example, suppose you are an American student writing a paper on the history of the United States for a college course. In your paper, you mention the fact that George Washington was the first president of the United States and that the Declaration of Independence was signed in the year 1776. Must you provide a citation for that pair of facts? Most likely not, as these are facts commonly known by average American high school and college students. The general expectation is that “everybody knows that”.

However, suppose that in the same paper you must identify the 23rd president, his running mate, and the main platform under which they were running for office, plus the year they both assumed power. Should such material be considered common knowledge? The answer is probably no, for it is doubtful that the average American student would readily know

those facts without needing to consult an authoritative source (I had to look up the answers).

But, the question of what constitutes common knowledge is a little more complicated. Let's take another example. Imagine that we are writing a paper and we need to discuss the movement of sodium and potassium ions across a cell's membrane as described by the Martini and Bartholomew paragraph above. Surely, those ideas are not common knowledge amongst college students and if they were expected to use those concepts in a paper they would be expected to provide a citation. However, let's suppose that the individual writing the paper was a seasoned neuroscientist and that she intended to submit her paper for publication to a professional journal. Would the author need to provide a citation for that material? Not necessarily. Although for the non-scientist the description of the concentration gradients of sodium and potassium ions inside neurons may look sufficiently complex and unfamiliar, the material is considered common knowledge amongst neuroscientists. It would, indeed, be shocking to find a neuroscientist or biomedical researcher who was not familiar with those fundamental concepts.

In sum, the question of whether the information we write about constitutes common knowledge is not easily answerable and depends on several factors, such as who the author is, who the readers are, and the expectations of each of these groups. Given these considerations, we recommend that authors abide by the following guideline:

Guideline 8: When in doubt as to whether a concept or fact is common knowledge, provide a citation.

Plagiarism and authorship disputes

Consider the following scenario. Two researchers who have collaborated on various projects in the past have jointly published a number of papers. Three quarters into the writing of the manuscript from their most recent joint project, the researchers experience a profound difference of opinion regarding the direction of the current project and the incident leads to the eventual break-up of their research collaboration. Soon after, one of the researchers moves to another institution in another country and begins to pursue a different line of research. A year later, the remaining researcher decides to finish writing the remaining quarter of the manuscript and submits it for publication with his name as sole author. By appropriating the joint manuscript and submitting it under his name, has this other researcher committed plagiarism?

Before attempting to answer this question, let's consider another scenario. A graduate student working under her mentor's supervision makes an interesting discovery as part of her doctoral thesis work. Before she is

ready to publish her thesis, however, her mentor feels that the discovery merits immediate publication and decides to report her data, along with other data he had collected from other graduate fellows working in his lab, in a journal article. The mentor does not list the graduate student's name as a coauthor nor is there a byline in the article indicating the extent of her contribution under the pretext that the student's contribution in and of itself was not sufficient to merit authorship.

In the above scenarios, it should be clear that the intellectual property of one individual has been misappropriated. Denial of earned authorship represents an ethical breach that many individuals and institutional policies, including that of the National Science Foundation, would consider an instance of plagiarism. However, not everyone agrees that these types of cases are plagiarism and, therefore, research misconduct. For example, ORI classifies these problems as **authorship disputes** and not within their definition of research misconduct. The involved parties can avoid these and other troublesome situations, such as disputes regarding the order of authorship of a paper, by discussing and agreeing on a plan **before** work on a project commences (see section on authorship).

An interesting fact of our work as scientists is that our research and writing may be simultaneously governed by more than one set of policies. For example, and especially in North America, the institution at which we work will likely have a research misconduct policy, the organization that funds our work may have its own misconduct policy, and so might the professional organizations to which we belong. In most instances, those policies will be similar across the various domains of coverage (e.g., plagiarism, authorship, data sharing). However, there may also be subtle differences in how specific situations might be interpreted. For example, authorship resulting from students' doctoral work can differ across disciplines (e.g., psychology vs. biomedicine) and also across countries within a single discipline (see Australian Psychological Association). Similarly, authorship disputes may be classified as instances of plagiarism by one misconduct policy, but not by another policy. As result of these differences a problematic research behavior, such as certain instances of plagiarism, may be viewed as misconduct by an institution, but not by the funding agency.

As this document illustrates, plagiarism can manifest itself in a variety of situations and these can range in degree of seriousness. Although coverage has been provided for the most common forms, there are surely many other scenarios that represent instances of this type of misconduct. In the next section our attention is turned to the problem of self-plagiarism.

SELF-PLAGIARISM

(This section of the module has been substantially modified from its earlier version)

Given that plagiarism is often conceptualized as theft, the notion of self-plagiarism does not seem to make much sense. After all, is it possible to steal from oneself? In fact, Hexam (1999) has pointed out that it is, indeed, possible to steal from oneself as when one engages in embezzlement or insurance fraud. However, when applied to research and scholarship, self-plagiarism refers to authors who reuse their own previously disseminated content and pass it off as a "new" product without letting the reader know that this material has appeared previously. According to Hexam, "... the essence of self-plagiarism is [that] the author attempts to deceive the reader." Let us remember that the concept of ethical writing, upon which the present instructional resource is grounded on, entails an implicit contract between reader and writer whereby the reader assumes, unless otherwise noted, that the material was written by the individual/s listed as authors, and that it is new and is accurate to the best of the author's abilities. As such, self-plagiarism misleads the reader about the novelty of the material. In this section we review some of the most common instances of self-plagiarism and provide guidelines to avoid these pitfalls.

Self-plagiarism is often described in the context of several distinct practices in which some or all elements of a previous publication (e.g., text, data, and images) are reused in a new publication with ambiguous acknowledgement or no acknowledgement at all as to their prior dissemination. Perhaps the most blatant of these practices occurs when a previously published paper is later published again with very little or no modification. However, less blatant forms of duplication exist and these are sometimes classified with various labels, such as redundant, dual or overlapping publication. In examining these types of malpractices, the reader should keep in mind that the various forms of self-plagiarism are best thought as laying in a continuum in which the extent and the type of duplication can vary from substantial to minor, as does their potentially serious effects on the integrity of the scientific record.

A common practice for authors of trade books is to send their manuscript to several publishers. However, for authors of scientific or scholarly papers the acceptable practice is to submit their paper for publication to a single journal. Of course, an author may submit the same paper or a revised version of it to another journal, but only if it is determined that the journal to which it was first submitted has declined to publish it. Only under specific circumstances (see below) would it be acceptable for a paper published in one journal to appear in another journal.

In spite of these universally accepted practices, redundant publication¹ continues to be a problem in the biomedical sciences. For example, in one editorial, Schein (2001) describes the results of a study he and a colleague carried out which found that 92 out of 660 studies taken from 3 major surgical journals were actual cases of redundant publication. The rate of duplication in the rest of the biomedical literature has been estimated to be between 10% to 20% (Jefferson, 1998), though one review of the literature suggests the more conservative figure of approximately 10% (Steneck, 2000). However, the true rate may depend on the discipline and even the journal and more recent studies in individual biomedical journals do show rates ranging

from as low as just over 1% in one journal to as high as 28% in another (see Kim, Bae, Hahm, & Cho, 2014). The current situation has become serious enough that biomedical journal editors consider redundancy and duplication one of the top areas of concern (Wager, Fiack, Graf, Robinson, & Rowlands, 2009) and it is the second highest cause for articles to be retracted from the literature between the years 2007 and 2011 (Fang, Steen, & Casadevall, 2012). Many biomedical journals now have explicit policies clarifying their opposition to multiple submissions of the same paper. Some journals even request that authors who submit a manuscript for publication must also submit previously published papers or those that are currently under review that are related to the topic of the manuscript under consideration. This requirement has been implemented to allow editors to determine whether the extent of overlap between such papers warrants the publication of yet another similar paper. If, in the opinion of the editor, the extent of overlap were substantial, the paper would likely not be published.

Duplicate (dual) publication

A sizable portion of scientific and scholarly research is carried out by individuals working in academic or research institutions where advancement structures continue to rely on the presentation and subsequent publication of research in peer-reviewed journals. Because the number and the quality of publications continue to be the most important criteria for gaining tenure and/or promotion, the more publications authored by a researcher, the better his/her chances of earning a promotion or tenure. As can be expected, and in the context of decreasing or, at best, stagnant funding for research, the current reward system produces a tremendous amount of pressure for scientists to generate as many publications as possible. Unfortunately, some of the most serious negative consequences of the present system, aside from fabrication, falsification and outright plagiarism, are the problems of duplicate publication and of other forms of redundancy. In the sciences, duplicate publication generally refers to the practice of submitting a paper with identical or near identical content to more than one journal, without alerting the editors or readers to the existence of its earlier published version. The new publication may be exactly the same (e.g., identical title, content, and author list) or differ only slightly from the original by, for example, changes to the title (see, for example, Attoui, Kherici, and Kherici-Bousnoubra, 2014), abstract, and/or order of the authors. Papers representing instances of duplicate publication almost always contain identical or nearly identical text and/or data relative to the earlier published version. More problematic instances of duplicate publication occur when various components of a paper change (e.g., title, authorship), but the underlying data remain the same, making duplication more difficult to uncover.

Duplicate publication in the academic context: 'Double-dipping'

Duplicate publication has a direct counterpart in the area of academic dishonesty. In the US it is commonly referred to as 'double dipping'. It occurs when a student submits a whole paper, or a substantial portion of a paper that

had been previously submitted and graded in another course to fulfill a requirement of a new course. Many college undergraduates and even some instructors are not aware that this type of practice is a serious academic offense (Hallupa & Bolliger, 2013). Of course, as is the case with duplicate publication, submitting the same paper or a large portion of a paper, to two different courses is entirely acceptable if the student sought permission from the instructors of both courses and they both agreed to the arrangement. However, some institutions may have specific policies prohibiting this practice under most circumstances.

Instances in which dual publication may be acceptable

Some authors who submit the same article to more than one journal rationalize their behavior by explaining that each journal has its own independent readership and that their duplicate paper would be of interest to each set of readers who would probably not otherwise be aware of the other publication. Indeed, there may be circumstances that justify the dual publication of a paper. For example, duplicate publication may be acceptable when an article published in one language is translated into a different language and published in a different journal. However, and consistent with existing guidelines, in all cases where the same paper is published in different journals, whether it is a translated version or the same identical paper, editors of both journals would have to agree to this arrangement and the new version must clearly indicate that it is a duplicate of an existing version. In addition other important conditions must be met and the interested reader should consult sources, such as ICMJE (2014) or Iverson et al. (2007). Similarly, any documentation in which authors list their publications as evidence of their research productivity (e.g., personal vita, ResearchGate), authors would be expected to identify both papers as being identical.