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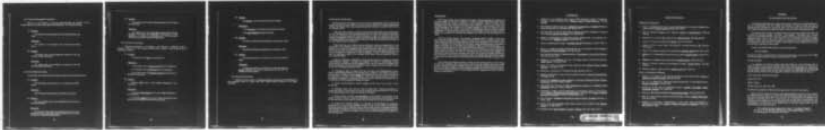
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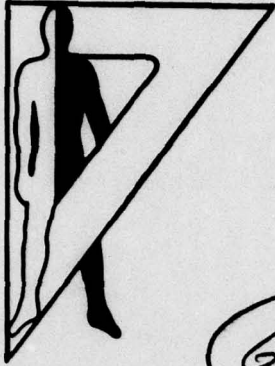
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NONSEXIST USE OF LANGUAGE IN SCIENTIFIC AND TECHNICAL WRITING.

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Patricia A. Billingsley
Neil A. Johnson

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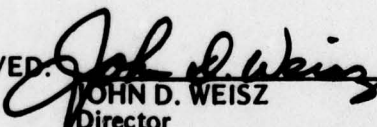
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Patricia A. Billingsley
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APPROVED.


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NONSEXIST USE OF LANGUAGE IN SCIENTIFIC AND TECHNICAL WRITING

INTRODUCTION

Linguistic sexism, despite being dismissed with ridicule by many, and disregarded out of lack of knowledge by others, is being confronted with increasing awareness by those who recognize its political and social implications. Changing long-established language habits is always a slow process, but there are several ways in which institutions and individuals can foster the transition to a more egalitarian form of verbal communication.

Positive and reasonable action has already been initiated by a number of publishers and a few government agencies. Publishers who have issued guidelines to their staff members and authors include Scott, Foresman and Company, McGraw-Hill Book Company, John Wiley & Sons, and Holt, Rinehart and Winston. The National Council of Teachers of English has recently issued its own set of "Guidelines for Nonsexist Use of Language in NCTE Publications." Another useful publication for behavioral scientists is the American Psychological Association's "Guidelines for Nonsexist Language in APA Journals." Finally, within the US Government, the Department of Transportation's general counsel has issued a memorandum urging employees to "phase sex-neutral terms" into regulations.

In reviewing DOD publications, it is apparent that there is room for improvement in both journal articles and technical publications. A random survey has revealed that much of the resistance to adoption of nonsexist language results from a lack of knowledge of reasonable alternatives. Many authors of government publications and regulations, rather than making a conscious effort to deal with the issue; simply include a statement that "Wherever a masculine pronoun 'he', 'him', or 'his' is used, it shall be construed to include the feminine 'she', 'her', or 'hers', as appropriate."

There are, however, viable alternative words and phrases that can be substituted to avoid misrepresenting or stereotyping either sex. Therefore the remainder of this paper is dedicated to pointing out where changes need to be initiated, and to offering reasonable substitute wording that does not become clumsy or ridiculous. Such usage is especially important in scientific writing, where objectivity, technical accuracy, and attention to detail are critical.

STYLISTIC GUIDELINES

This section is not intended to alter an author's general style of writing. Rather, it is presented so that authors may deal with specific problems in language usage that, in reference to the sexes, lead to ambiguous, inaccurate, unclear, or biased perceptions by the reader. Such usage is usually unconscious by the writer, and need not imply a deliberate attempt to perpetuate certain stereotypical ways of perceiving the world, and, more specifically, the existing sex roles in it. For example, in a recently released film depicting activities at an Army installation, the narrator described a radar operator's duties and functions, referring to how "he" was trained. On the screen, however, was a radar operator who was obviously female. A simple substitution of "radar operator" for "he" would have made the narration both more accurate and more appealing to an audience consisting of both sexes.

Once writers are attuned to the misleading nature of many common modes of English usage, they will hopefully incorporate a more careful selection of words into their own writing styles, insuring that masculine, feminine, or neutral-sex terminology is used appropriately in the future.

There are two conceptually different aspects of writing style on which attention should be focused: language that designates improperly and language that evaluates in situations that should be nonevaluative.

Designation Problems

Unlike many other languages, the English language does not have a generic singular neutral-sex pronoun in common usage, although "they" is grammatically correct. (See additional comments below.) This is, perhaps, the single most difficult area with which authors must contend. However, careful selection of nouns, pronouns, and adjectives can eliminate or minimize the occurrence of ambiguity in sex identity.

Use of Personal Pronouns

When the sex of the subject or subjects of a sentence cannot be determined, or the category of people in question is known to include members of both sexes, there are many nonsexist alternatives to the use of the so-called generic "he," "his" or "him," which are highly suspect as true generic pronouns in any case (see Martyna, 1978). In the section below are some examples of common usage drawn from DOD technical reports. Alternative usages and comments on why they should be adopted are also provided.

(1) Example:

Every observer flew two flights. On each flight he was seated in a different position in the aircraft and flew the course in a different direction than that of his first flight.

Alternative:

On each flight they were seated . . . than that of their first flight.

Comment:

Since the sex of the observer was not specified in the report and since flying MOS's are open to men and women, one alternative is to pluralize.

Alternative:

On each flight he or she was seated . . . than that of his or her first flight.

Comment:

If both sexes were used, and the author chooses not to pluralize, both the male and female pronoun can be used. However, overuse may become awkward.

Alternative:

On each flight the observer was seated . . . than that of the first flight.

Comment:

The sentence has been rewritten in the passive voice.

(2) **Example:**

Thus, the primary purpose of the present experiment was to manipulate the subject's preparation for what he would see on a given trial.

Alternative:

Thus, the primary . . . was to manipulate the subjects' preparation for what they would see . . .

Comment:

Pluralize, since the sex of the subjects was not specified.

Alternative

Thus, the primary . . . for what would be seen . . .

Comment:

Rephrase to eliminate all pronouns.

(3) **Example:**

For each change, the participant first had to press the OFF key so that he started from a blank screen. The test observer then asked him to make a change.

Alternative:

For each change the participants first . . . so that they started . . . The test . . . then asked them to . . .

Comment:

The sex of the participants was not specified so pronouns can be pluralized.

Alternative:

For each change, the participant first pressed the OFF key to black-out the screen. The test observer then directed a change . . .

Comment:

Rephrased to eliminate the pronoun.

(4) **Example:**

The soldier is usually the best judge of the fit of his helmet.

Alternative:

The soldier is . . . the fit of a helmet.

Comment:

A is substituted for his since helmets are worn by both sexes.

Alternative:

The soldier . . . judge of personal helmet fit.

Comment:

Rephrased.

(5) **Rediscovering "they":**

The use of "they" as a singular generic pronoun is grammatically correct and fully provided for in the Oxford English Dictionary. "If someone wants to go to college, here's what they should know," reads a line in a New York Times advertisement. Another example is, "When a soldier is firing the 105mm Howitzer, they should wear ear protection." No forcing of the language is necessary, we are simply using a form that has recently fallen into disuse (Bodine, 1975; Turner, 1977).

Use of Generic Terms to Indicate Homo Sapiens

With careful attention to syntax, it is almost always possible to find nonsexist substitutes for the generic "man." "Man" or "mankind" can be replaced by "human," "human being," "humankind," "people," "persons," or similar terms. Some examples are presented below.

(1) Example:

This study will attempt to answer the basic question as to how inherent equipment capabilities might be used by the man to accomplish a military mission.

Alternative:

This study will . . . by the soldier to accomplish . . .

Comment:

The use of the generic "man" is not accurate in that the term theoretically encompasses all homo sapiens, whereas "the soldier" accurately describes the group being studied and does not reflect biases.

(2) Example:

In this light, then, the system must be defined as the combination of man, his equipment, the environment . . .

Alternative:

In this light . . . the combination of personnel, their equipment, the environment . . .

Comment:

Since the author's topic could be individuals of either or both sexes and their equipment, the use of the word "personnel" in place of "man" is a more accurate, unbiased description.

(3) Example:

This is a strict requirement when you man a project.

Alternative:

This is . . . you staff a project.

Comment:

The bias is removed without changing the meaning.

(4) Example:

Department of Manpower

Alternative:

Unless an official change is made, an author should not alter an official title.

Comment:

Official changes that could be made without resorting to ridiculous combinations or overly cumbersome titles might be as follows: Department of Personnel, Department of Workers or Department of Workforce.

Evaluation Problems

In scientific publications or articles, the author should be careful not to make evaluative statements about the sexes unless the topic specifically concerns sex differences. Many statements that are habitually made evaluate the sexes when such judgments are irrelevant to the topic being addressed. In the examples that follow, problems of evaluation are presented with suggested alternatives.

Sex-Typed Adjective or Descriptions

There is often a tendency to describe females and males in unequal terms. Females are frequently described in terms of their appearance when such descriptions are totally irrelevant or not applied to males.

(1) Example:

Assistance was given by Dr. John Smith and his pretty blond assistant.

Alternative:

Assistance was given by Dr. John Smith and his assistant, Mary Jones.

Use of Irrelevant Demographic Information

When it is not relevant to the topic being discussed, the inclusion of such characteristics as race, marital status, age, physical appearance, etc., should be omitted.

(1) Example:

The authors of this experiment were John Smith and Mrs. Jack Jones.

Alternative:

The authors of this experiment were John Smith and Sally Jones.

(2) Example:

The authors wish to acknowledge the assistance of Mr. Jim Johnson and Mrs. John Smith.

Alternative:

The authors wish to acknowledge the assistance of Mr. Jim Johnson and Ms. Mary Smith.

Use of Non-Parallel Construction

As with other terms, authors should use parallel construction with sex-linked terms.

(1) Example:

This field study was supported by two medics and a woman doctor.

Alternative:

This field study was supported by two medics and a doctor.

(2) Example:

The men and girls used in this experiment were from the 5th Mechanized Division.

Alternative:

The men and women used in this experiment were from the 5th Mechanized Division. (Of course, use men and girls if that is a correct description of the group being discussed.)

(3) **Example:**

The subjects were 10 tracked vehicle mechanics and 10 female tank mechanics.

Alternative:

The subjects were 10 tracked vehicle mechanics and 10 tank mechanics. (As long as sex is specified at some point, or, if sex designation is necessary to the discussion, use "10 male tracked vehicle mechanics and 10 female tank mechanics.")

Use of Inaccurate Terminology

Inaccurate terminology is non-objective, and objectivity is especially critical in technical writing. Each of the example sentences below contains a word or phrase that is misleading or incorrect.

(1) **Example:**

The subjects were 10 girls from the laboratory.

Alternatives:

1. The subjects were 10 female personnel from the laboratory.
2. The subjects were 10 adult women from the laboratory.
3. The subjects were 10 laboratory personnel (as long as sex is specified at some point).

(2) **Example:**

Fourteen coeds from a local college participated in the experiment.

Alternatives:

1. Fourteen female students from a local college participated in the experiment.
2. Fourteen students from a local college participated in the experiment (as long as sex is specified at some point).

(3) **Example:**

The chairman of the review panel opened the meeting.

Alternatives:

1. The chairperson of the review panel opened the meeting.
2. The panel moderator opened the meeting.

(4) **Example:**

The animals exhibited mothering behavior toward their young.

Alternative:

The animals exhibited nurturing behavior toward their young.

(5) **Example:**

Participating scientists and attendees are invited to bring their wives.

Alternative:

Participating scientists and attendees are invited to bring their spouses. (Obviously the author overlooked the fact that there are numerous female scientists.)

Use of Sex-Typed Illustrations

Attention should be given to individuals depicted in illustrations and photographs so that stereotyped views of "typical male" and "typical female" activities are not rigidly reinforced.

SUBSTANTIVE GUIDELINES

Specific nonsexist word usage is only the first step in eliminating sex bias in scientific and technical writing. The actual content of a report or article, especially if it concerns experimental findings from research with human subjects, should reflect attention to certain broader criteria for nonsexist writing.

1. Whenever human subjects are used, the author of the experimental report should specify the sex of all subjects and of the experimenter(s). This may seem to be an obvious prerequisite, but research has shown that this critical information is often not available to the reader. Hudgens and Billingsley (1978), for example, found that over 30% of the articles published in the two leading journals in the field of human factors from 1965 through 1976 failed to include the sex of the subjects used in the research.

2. When both sexes are included in approximately equal numbers in an experiment, it is the responsibility of the researcher to look at sex as a variable in the course of data analysis. If sex differences are found to be significant, they should be reported. If there are no significant sex differences, this should also be communicated to the reader, since either alternative may provide critical information to present-day or future investigators. As Harris (1971) commented, it is especially misleading to ignore sex as a variable in areas where it has previously been found to have a significant effect.

3. When sex differences are significant, authors should be careful to consider all reasonable interpretations of the data, including the possibility of biases in methodology. Genetic interpretations of sex differences are often suggested, but they are usually far too simplified, and ignore environmental and social factors that may influence behavior. [See, for example, Lehrke (1972) and the response by Anastasi (1972).]

4. If findings are based on research that uses only male or only female subjects, authors should avoid making generalizations from the behavior of a single sex to the behavior of people in general, unless it has been previously clearly demonstrated that sex is not a factor determining the behavior(s) in question. (See Schwabacher, 1972.) Also, wherever research is cited for explanation or in support of a particular conclusion, the author should be sure to specify the sex of the group on which the additional findings were based.

5. Authors should attempt to include colleagues of both sexes in the review of their manuscripts.

6. Although authors may not and need not agree with a feminist interpretation of experimental results or other events, they should include the feminist perspective in any review of the possible determinants of behavior by groups or individuals.

7. Women authors are often under-represented in text citations in proportion to the number of eminent women in a particular field (MacCleod and Silverman, 1973). Authors should include references to research done by women when it is relevant to the topic of discussion.

8. Authors can contribute greatly to a decrease in sex-stereotyping by consciously attempting to use non-sex-typed examples. Female as well as male names can be used for prototype doctors, pilots or mechanics. Male as well as female names can be used for prototype child caretakers, homemakers or clerical workers. Also, any discussion of occupations and career choices should not imply that members of only one sex have the desire for or access to a particular goal in life.

CONCLUSION

Many authors believe that the attempt to introduce nonsexist language into scientific and technical writing can lead only to ridiculous or awkward results. Other authors have tried to generate entirely new words or combinations such as "chairone", "heshe", or "hisher". These neologisms cause more confusion than clarity, and are difficult to take seriously. However, by taking advantage of the versatility of the English language, an author can easily and clearly indicate that either one or both of the sexes is being discussed, without resorting to biased, euphemistic, or newly-invented wording. Under no circumstances should an author hide sex identity in an attempt to be unbiased, if knowledge of sex could in any way be important to the reader.

There are authors, however, who maintain that good intention is enough to insure both clarity and equity. Unfortunately, in spite of the good intent or lack of malicious intent of the writers, Martyna (1978) has demonstrated that use of the so-called generic "he" is often neither clear nor equitable. She found that male and female college students generate quite different imagery when using "he" to complete such statements as "When a doctor performs surgery, _ is aided by competent assistants." The men had visualized themselves, or a known male doctor, while the women tended to not assign either male or female characteristics to the hypothesized doctor, using "he" more in the sense of a true generic pronoun. The men were probably not making any conscious attempt to exclude women from the occupational category described by the word "doctor"; they were only repeating a pattern of language usage that is deeply instilled in this culture, one which tends to make certain options seem much more viable to one sex or the other.

If we continue the traditional omission of either sex from particular roles, or if we continue to accept the assumption that "good intent" alone resolves the problem, then there is little reason to attempt to change the language content of our scientific journals and technical reports. However, if we desire to rethink our use of traditional language for the sake of clarity and equity, then we must take the elimination of sexist language seriously. Language can be either a powerful weapon or a powerful tool.

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APPENDIX

THE GENDERIST RATING SCHEME

The Genderist Rating Scheme is a rather simple measure that derives a Genderist Ratio for a piece of communication. The ratio reflects the proportion of times the author has made an assumption about the gender of a particular role; a low ratio means that the work is relatively free of gendered references and a high ratio reflects a need for further consciousness-raising.

The Genderist Ratio is simple to calculate. First, count the number of times that a given role is mentioned by title (for example, "the doctor," "the manager," "the soldier," etc). Call this count I, for title references. Next, count the number of times the same role is referred to with a gendered pronoun, such as "he," "she," "him," or "her," and call this count G, for gendered references. Lastly, count the number of times the role is referred to with non-gendered or neutral pronouns, such as "one," "they," or "him/her." Call that N, for neutral references. Do not count any reference to specifically named people.

To derive the Genderist Ratio (GR), use the following formula:

$$GR = \frac{G}{I+G+N}$$

Express the result as a decimal fraction. The ideal work should have a value close to $GR = 0.000$; the most thoroughly genderist writing would approach $GR = 1.000$.

Example paragraph:

... It is composed of a series of research teams each headed by a senior researcher, each of whom is clearly an expert in his respective field. These personnel also serve as consultants to other directorates when needed on specific problem areas. Each team leader also augments his in-house research program with back-up research support from universities and other industrial research agencies. Thus, over the years they have developed considerable depth in each area.

(1) I = 2 (a senior researcher, team leader)

(2) G = 2 (his, his)

(3) N = 1 (they)

(4) $GR = \frac{G}{I + G + N} = \frac{2}{5} = .400$

The GR for this paragraph is .400, which still leaves plenty of room for improvement.

Take the time to compute the GR for a few sample paragraphs from the next journal article or technical report you read. If you find that the GR value seems too high, write a short note to the author or authors letting them know that you are concerned about the objectivity and accuracy of their material. If you are given some text to edit before its publication, your computations and comments can have even greater value. Working with the GR can be fun, and eye-opening at the same time. It can benefit both you and those whose written and oral communication you choose to measure.

(This material has been excerpted from: Rose, L. A. Programmer/analyst: He, she, or it? The Genderist Rating Scheme. The Yourdon Report, 1978, 3, 6-7, and adapted by the authors for this report.)