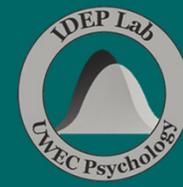# Do Researchers Practice What They Preach?
## Unjustified Causal Language in Psychological Scientists' Descriptions of their Work

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## Background

People are biased toward seeing associations between independent events and assuming causal explanations for those associations.[1,2] Indeed, the lay public *incorrectly* infers cause-and-effect from descriptions of *non*-experimental research as often as they correctly infer cause-and-effect from descriptions of experimental research.[3] Although "correlation does not imply causation" is a core tenet in psychology[4] and understanding the concept of cause-and-effect is a long-standing element of scientific thinking,[5] even university students have difficulty distinguishing between causal and correlational statements.[6] People's confusion might be exacerbated by press releases and news headlines that "spin" scientific results[7] or make exaggerated causal claims.[8] However, scientists themselves might also contribute to the confusion. Researchers in education, for example, have been criticized for using inappropriate causal statements in their articles;[9,10] and counseling psychologists have been warned against utilizing counseling practices that have not been supported by randomized experimental designs.[11] We suspect that these warning calls to educational and counseling psychologists are indicative of the state of research in the social sciences more generally, and we hypothesize that unjustified causal language occurs in empirical, peer-reviewed journal articles in psychology.

## Method

### Sample

We sampled empirical articles taken from seven peer-reviewed journals. These journals had impact factors characteristic of a "middle of the road" journal (1 ≤ IF ≤ 3):

- *Journal of Psychology: Interdisciplinary and Applied (JPIA)*
- *Personal Relationships (PR)*
- *Journal of Youth and Adolescence (JYA)*
- *Social Psychology Quarterly (SPQ)*
- *Personality and Individual Differences (PAID)*
- *Journal of Sport and Exercise Psychology (JSEP)*
- *Sex Roles (SR)*

From each journal, we collected the most recent 30 articles (total *N* = 210). Four articles were excluded from coding because they were either theoretical reviews or comments on previous articles and therefore did not describe an empirical study (final *N* = 206).

### Procedure

For each article included in our sample, we recorded the journal name, volume number, page range, article title, and all authors and their respective institutions. We then coded each article for use of cause-and-effect language in the title and abstract; if causal language was present, we recorded the specific words used. For each article, we also coded whether the research was quantitative or qualitative, whether their primary sampling procedure was cross-sectional, longitudinal, or successive independent samples, and, if they used cause-and-effect language, whether their research design supported that language.

### Coding Rules

We established coding rules for two primary elements: 1. cause-and-effect language, and 2. justified use of cause-and-effect language.
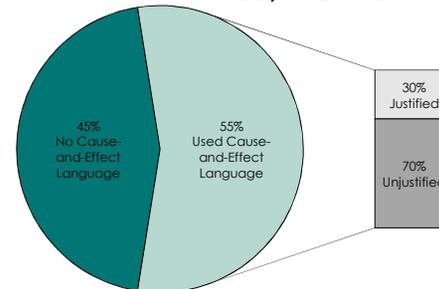
Existence of Cause-and-Effect Language
- Coded as "No" if there was no causal language, or if the causal word (e.g., "effect") was used in a statistical sense (e.g., "main effect of"). Additionally, we did not count "modulate," "mediate,' or "moderate" as causal.
- Coded as "Partial" if the causal language was preceded by "may" or "perhaps;" if the causal language was posed in the form of a question; if the causal language was used in descriptions of past studies that provided a rationale for the current study; or if the causal language was used in discussion of the potential implications of the current study's findings.
- Coded as "Yes" if elements of the current study description included words such as influence, affect, produce, boost, depend, etc.

Use of Cause-and-Effect Language
- Coded as "Justified" if the researchers' design included an imposed manipulation and the causal words pertained to the manipulated variable; if the researchers used a longitudinal 'pre-post' design involving a comparison group; if the research involved a single-subject design (e.g., ABAB design); or if the research was a genetically informed design (e.g., twin or adoption design).
- Coded as "Unjustified" if the researchers did not include an imposed manipulation, but they nonetheless used causal language; if the researchers' design included an imposed manipulation, but the causal words pertained to a subject variable or a variable that was not manipulated; or if the researchers utilized a 'pre-post' or cross-sectional design without a control group comparison but they nonetheless used causal language.

## Results

### Analysis of 206 Peer-Reviewed Journal Articles



45% No Cause-and-Effect Language

55% Used Cause-and-Effect Language

30% Justified

70% Unjustified

Across all journals, 113 articles (55%) used cause-and-effect language in the title and/or abstract. Of these 113 articles that used cause-and-effect language, 79 (70%) used it without justification (e.g., when explaining findings of a study that did not include an experimental manipulation).

Of the 113 articles using cause-and-effect language:
- Five articles contained cause-and-effect language in their title, but not in their abstract. All five (100%) were unjustified in their use.
- Seventy-one articles contained cause-and-effect language in their abstract, but not in their title. Of those, 80% were unjustified in their use.
- Thirty-seven articles contained cause-and-effect language in both the title and abstract. Of those, 46% were unjustified in their use.

### Cause-and-Effect Language In Seven Popular Psychology Journals

| Journal Name | Number of Articles with Cause-and-Effect Language | Number of Articles whose Cause-and-Effect Language was Unjustified |
|---|---|---|
| *Journal of Psychology: Interdisciplinary and Applied* | 14 of 30 (47%) | 9 of 14 (64%) |
| *Personal Relationships* | 15 of 30 (50%) | 11 of 15 (73%) |
| *Journal of Youth and Adolescence* | 14 of 30 (47%) | 13 of 14 (93%) |
| *Social Psychology Quarterly* | 23 of 28 (82%) | 14 of 23 (61%) |
| *Personality and Individual Differences* | 13 of 28 (46%) | 11 of 13 (85%) |
| *Journal of Sport and Exercise Psychology* | 17 of 30 (57%) | 7 of 17 (41%) |
| *Sex Roles* | 17 of 30 (57%) | 14 of 17 (82%) |

The table displays use of cause-and-effect language broken down by journal. Although the journals vary in their prevalence of unjustified cause-and-effect language, all journals had unjustified use of cause-and-effect language well above zero.

## Discussion

In this study, we documented unjustified use of cause-and-effect language in seven popular, medium impact psychology journals. The high rates of unjustified cause-and-effect language in all seven peer-reviewed journals suggests that warning calls to educational and counseling psychologists[9,10,11] are indicative of the state of research in psychology more generally.

Some causal words were used quite frequently. For example, journal article titles included statements such as, "Maternal and Paternal *Influences* on Young Swedish Women's and Men's Cosmetic Surgery Acceptance" and "Contextualizing the *Impact* of Romantic Relationship Breakup on Crime Among Serious Adolescent Offenders."

Unjustified causal phrasing was more prevalent in the journal article abstracts than in the titles, with statements such as, ". . .predicts that people's behavior toward a relationship partner *shapes* their security regarding that partner's care, regard, and commitment" and "exposure to male, but not female, intervention students *caused* decreased perceptions of the acceptability of harassment. . ."

There are several possible explanations for the misuse of cause-and-effect language (e.g., laziness, scientific shorthand, convention, confusion, lack of standards, untrained researchers). All of these explanations may be tied to why researchers are misusing cause-and-effect language in their work. Because past research has documented that humans in general do not understand the difference between correlational and causal language,[3,12] we speculate that the misuse of cause-and-effect language is primarily tied to confusion. However, before researching the various reasons for why this is happening, we believe it is important to first document if this misuse occurs at all journal impact levels (i.e., high, medium, low). In high impact journals, with more rigorous standards, we would expect to see less misuse because contributing authors, reviewers, and editors for these journals may better understand the differences between correlational and causal language, may have more stringent standards for research designs that allow for cause-and-effect interpretations, and may pay more explicit attention to correct scientific conventions. We hope that future research will continue to document the prevalence of unjustified cause-and-effect language as well as the explanations for this misuse.

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