Education: Words and Meanings

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This first publication for the column, Education: Words and Meanings, describes the use and misuse of common research terms and words. These words are often used incorrectly and interchangeably, leading to confusion and misunderstanding, when accuracy and clarity are needed.

Data

Researchers collect *data* (the plural form of the singular *datum*). This means, data reflect, represent or demonstrate; *datum*, admittedly rarely used, is the singular form: one datum, many data.

Analysis and Analyses

Analysis is singular; *analyses* is plural. The *analysis* used chi square. The *analyses* used t-tests and ANOVA.

Rationalistic and Narrative

Data may be *rationalistic* or *narrative*. Rationalistic data generally describe research using numbers to indicate participants' choices. This could, for example, be a Likert scale allowing participants to select a number from 1 through 5 to describe their choice on a scale. In order to analyze rationalistic data, researchers use quantitative methods. Quantitative analyses include t-tests, chi squares or an analysis of Variance (ANOVA). The data is rationalistic; the analysis is quantitative.

In contrast, *narrative* data generally refer to words, written or spoken. Researchers collect narrative data when they write observations in field notes, use participants' survey comments, examine existing text (often referred to as available data) such as diaries, newspapers, government documents or interview transcripts. After reading the narratives, researchers look for common themes and trends. The data are narrative; the analysis is qualitative.

Primary and **Secondary** Data

Primary refer to rationalistic or narrative data that you, as the researcher, collect. These original data are generated from surveys, interviews or observations (field notes). The researcher decides the type of data (rationalistic/narrative/mixed), identifies an instrument for collection (survey, interview, field observation), determines a method for analysis (quantitative/qualitative) and finally, interprets, summarizes and draws conclusions.

Secondary data refer to those articles, books and documents already published. Prior to conducting their own study, researchers examine the existing literature, referred to as a "Review of the Literature." Related questions may be, "What are other authors/researchers discussing in a particular area?" "What other studies support or diminish particular claims?" "What are areas of deficit?" "What other authors indicate prominence in this particular area of interest?"

Important note: If you are using content analysis on available sources (narratives, diaries, television programs, teacher comments), then those are primary sources, not secondary.

For example, suppose you have a number of 4th, 5th and 6th grade teachers' comments using words such as "good," "fine," etc. If you say, in your article, "Many teachers use comments such as 'good' and 'fine' on homework evaluations," then you are using those comments as secondary sources. If, however, you take comments such as "good" and "fine" and you run a chi square of words versus gender (male/female), or you run an ANOVA of words versus grade level, then you are doing content analysis, and the comments are primary sources.

In reviewing the existing literature, it is critical that credit is afforded by providing accurate references. Different journals require different styles to reference existing literature (APA, MLA, *Harvard Blue Book*, etc.). The Review of Literature is integral to the research process, but since it is not new/primary data, it is referred to as secondary.

Avoid Redundancy

Redundant writing is annoying, unnecessarily increases the length of your article, complicates what you are saying, and makes your article harder to read.

Here are some common redundancies:
* *Added bonus*. All bonuses are added.
* *2 a.m. in the morning*. 2 a.m. is in the morning. And don't be tempted to say "2 (or two) in the morning." By the way, the word for these kinds of self-referential phrases is "pleonasm."

* *30th year anniversary*. Another good reason for studying Latin. "Anniversary" comes from the Latin word "annum," which means "year." So 30th year anniversary is redundant. "30th anniversary" is the correct form.

* *ATM machine*. The M already stands for "Machine." You get money from an ATM, not from an ATM machine.

* *Completely destroyed*. If it is "destroyed" it is "complete." Be careful with these kinds of intensifiers.

* *Ultimate goal.* Again, knowledge of Latin comes into play. The word "ultimate" means "final" or "last." You can't have a goal in the middle of something; the "goal" is always "final."

* *The children worked with their own hands.* It is impossible for someone to work with someone else's hands. Similar to "I saw it with my own eyes," and "I walked on my own two feet."

* *Frozen ice*. Ice is already frozen water.

* *Suffocated to death*. If they suffocated, they died. They *suffocated*. Period.

* You cannot *center around* anything. The center is the exceedingly small single point in the middle, so you can only *center on*.

* You can only *hold* something tangible, so you cannot *hold* a meeting or *hold* a class or *hold* a funeral. But you can *hold* a book or *hold* a pencil; or *have* a meeting or *conduct* a class.

Causation / Correlation

Causation has a very specific meaning, and unless some very specific protocols are followed, is extremely difficult to prove causation (all of these intensifiers and redundancies are intentionally used to emphasize the point about causation).

Very briefly, in order to show causation, you must (yes, must. You absolutely must) start with at least two randomly assigned groups that you "measure" at Time 1. At Time 2 you apply the test variable (treatment), eliminating all extraneous variables, to Group 1. At Time 3 you again measure the two groups. If (and only if) there is a statistically significant difference between the two groups can you even begin to consider making a claim of causation.

Correlation, which is also important, means simply that there is some kind of relationship between two groups. And as we like to say, "Correlation is not causation."

In order to show correlation, you can simply show there is some kind of connection (usually time) between two groups.

Here is a simple but fun example of perfect correlation but zero causation: every year at your school, students show up in mid- to late-summer. And every year, without fail, 100% of the

time, the weather starts to change about two months later. Do you really think the students arriving at school caused the weather to change? Of course not! Yet although the correlation is a perfect 1.0 (it happens every year), the causation is a perfect 0.0 (no direct causation).

Parallel Construction

Parallel construction is such an easy way to improve your writing it has sometimes been called "instant style." Yet it is surprisingly easy to use.

Here's the idea: parallel construction uses the same grammatical structure across words, sentences or paragraphs.

Here's what not to do: The students like riding bicycles, going on hikes, and swimming." Notice how awkward that sounds. Now, let's make the elements parallel: "The students like to ride bikes, hike, and swim.

Here's a complex example from President John Kennedy's inaugural address in 1961. See if you can find the interlocking parallelisms, including examples of thesis and antithesis.

"We observe today not a victory of party but a celebration of freedom, symbolizing an end as well as a beginning, signifying renewal as well as change."

"Let every nation know, whether it wishes us well or ill, that we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe, to assure the survival and the success of liberty."

"If a free society cannot help the many who are poor, it cannot save the few who are rich."

"And so, my fellow Americans, ask not what your country can do for you; ask what you can do for your country. My fellow citizens of the world, ask not what America will do for you, but what together we can do for the freedom of man."

Note, many of these lines sound better when read aloud (as intended), rather than read silently. Try it and notice the difference. Or better yet, find the original on the Internet.

Finally, return to the discussion above of primary and secondary sources. In this article, the Kennedy quotes are secondary sources (we simply use them as examples). However, you could do a content analysis by taking them apart grammatically and comparing them to other Kennedy speeches (or other inaugural speeches), in which case they are primary sources.