PSY 225 – Research Methods
Professor Gernsbacher's Lecture Video "How to Synthesize Psychological Science"

By now you've read several psychological science articles. And no doubt you've noticed that scientific articles are not the easiest to read. Why not?

Well, one obvious reason is that scientific articles are often written about technical topics, and readers without expertise in those techniques don't always have the background to understand the technical writing.

But another reason why scientific articles are often hard to read is that scientists are often lousy writers. And sadly, as illustrated by a recent empirical study titled

CLICK: The readability of scientific texts is decreasing over time, scientific articles are getting harder not easier to read, which is unfortunate.

However, not all scientists are bad writers, and not all scientific articles are poorly written. In this video, we're going to look at excerpts of well--written scientific articles. In particular, we're going to look at excerpts of well--written scientific articles that synthesize psychological science.

What do I mean by synthesize psychological science? Well, one of the definitions of

CLICK: synthesize is "To combine (a number of things) into a coherent whole."

And that's what the excerpts that we're going to look at do: They

CLICK: combine the results of OTHER scientific articles into a coherent paragraph. When writers combine the results of other scientific articles into a coherent paragraph, it's called reviewing the literature or writing a literature review.

Unfortunately, not a lot of students have been taught how to write a literature review. They often think all that's required is to fill in sentences, MadLibs style. What do I mean by that? Well, in the game of MadLibs, a player fills in blanks in sentences.

CLICK: For example, in this page from an Incredible Hulk themed MadLibs game, a player filled in the blank for a plural noun, with the word, **chickens**. And they filled in the blank for a verb, with the word, **tickle**. And they filled in the blank for a noun with the word, **flower pot**.

Then another player reveals that the words the first player filled in are part of a sentence, in this case,

CLICK: a sentence that the Incredible Hulk said. And the rest of the sentence is revealed, for example,

CLICK: "If puny **chickens** attack, Hulk will **tickle** them because Hulk is the strongest **flower pot** there is!" And the point of MadLibs is that everyone laughs because it's such a silly sentence.

But that's how the game is played. The next player fills the blanks of another sentence, and then the next player fills the blanks of another sentence. And none of the sentences hang together. None are coherent because each time the players are simply filling the blanks with nouns, verbs, and the like.

That's also what happens if you try to write a literature review in a MadLibs style. Meaning, if you try to just fill the blanks of the sentence,

CLICK: "Researchers investigated topic with some number of participants and found a statistically significant effect.

CLICK: Other Researchers also investigated topic with another number of participants and found a statistically significant effect."

And you play this game, over and over and over again, just filling in the blanks differently. For example,

CLICK: "Cairns, Wei, and Johnson (2012) investigated maternal attachment with 26 participants and found a statistically significant effect."

CLICK: "Freeman and Ahadi (2006) also investigated maternal attachment with 109 participants and found a statistically significant effect."

CLICK: "Hernandez (2001) also investigated maternal attachment with 50 participants and found a statistically significant effect."

"Rosenstein and Tanaka (2017) also investigated maternal attachment with 64 participants and found a statistically significant effect."

These sentences aren't even silly like the Incredible Hulk MadLibs are;; in fact, they're boring. And repetitive. And they do a terrible job of synthesizing psychological science.

In contrast, here is how good writers synthesize psychological science. First, they use our trusty

CLICK: Hamburger Recipe for paragraphs. The start with a Topic Sentence that introduces their paragraph's main idea;;

They provide three supporting examples, evidence, or details to support their paragraph's main idea;; and they hold everything together with a Conclusion Sentence.

And the real secret sauce, all puns intended, is that they use their Supporting Sentences to review the literature. Let me show you how.

CLICK: In Parker et al.'s article on Psychotropic Placebos and the Misinformation Effect, their opening paragraph begins with the Topic Sentence,

CLICK: QUOTE "One of the puzzles of human behavior is how taking a substance that does nothing can cause something." UNQUOTE

Then, they support that Topic Sentence with three examples, and each of their examples synthesizes the key finding of another study.

CLICK: The example, "Phoney painkillers can lessen our pain" synthesizes the key finding from a study by Colloca and Bendetti published in 2006.

CLICK: The example, "Phoney alcohol can lead us to do things we might otherwise resist" synthesizes the key finding from a study by Cheong and Negoshi published in 1999. And

CLICK: the example, "phoney feedback can even cause us to shed body fat" synthesizes the key finding from a study by Crum and Langer, published in 2007.

So, Parker et al. began with a Topic Sentence, "One of the puzzles of human behavior is how taking a substance that does nothing can cause something," and they supported thattopic sentence with three examples that were key findings from other studies.

They then concluded their opening paragraph with a quote from yet another study:

CLICK: Perhaps Kirsch (2004, p. 341) said it best: "Placebos are amazing."

Let's look at how other authors use the Hamburger Recipe for paragraphs and support their Topic Sentence by synthesizing findings from the scholarly literature.

CLICK: In a classic paper titled "The Theory of Cognitive Dissonance: A Current Perspective," famed social psychologist Elliot Aronson synthesizes the psychological science of Cognitive Dissonance theory in a paragraph that begins with the Topic Sentence,

CLICK: "The research on Cognitive Dissonance has been as diverse as it has been plentiful."

Then, Aronson supports his Topic Sentence with four examples, each of which shows us how diverse and plentiful research on Cognitive Dissonance has been AND each of which synthesizes the key finding of another study.

CLICK: "Its range extends from maze running in rats,"

CLICK: "to the development of values in children,"

CLICK: "from the hunger of college sophomores"

CLICK: "to the proselytizing behavior of religious zealots."

So, in four sentences, really four phrases, Aronson supported his Topic Sentence, and he synthesized four previous findings. Lastly, Aronson held his hamburger together with a bottom bun, his Conclusion Sentence:

CLICK: "The proliferation of research testing and extensions of dissonance theory results from the generality and simplicity of the theory."

Let's look at another example.

CLICK: In a psycholinguistics paper titled "Polite Responses to Polite Requests," Herb Clark and Dale Schunk from Stanford University empirically investigated why speakers make indirect requests. For example, why do speakers ask, "Can you tell me what time it is?" rather than just asking "What time is it?"

When we ask a question like "Can you tell me what time it is?", we don't really want the person to tell us if they know how to tell time;; rather, we want the person to tell us what time it is. So why do we make such indirect requests?

Clark and Schunk begin their paragraph by asking just that question. They wrote:

CLICK: "For conventional indirect requests like "Can you tell me the time?" which kind of process is used?"

Asking a question is a perfectly acceptable thing to do in a Topic Sentence.

Then, Clark and Schunk supported their Topic Sentence question by synthesizing four hypotheses:

CLICK: "Within linguistics, the earliest proposals by Sadock (1970) required an idiomatic process,"

CLICK: "but more recent ones, by Searle (1975) and Morgan (1978) for example, require a multiple--meaning process."

CLICK: "Within psychology, Schweller (1978) and Gibbs (1979) have proposed idiomatic processes"

CLICK: "but Clark & Lucy (1975) and Clark (1979) have proposed two different processes of the multiple--meaning variety."

So, in four sentences, the authors have supported their Topic Sentence and they have synthesized four hypotheses: a linguistics--based idiomatic hypothesis;; a linguistics--based multiple--meaning hypothesis, a psychology--based idiomatic hypothesis;; and a psychology--based multiple--meaning hypothesis.

Then, Clark and Schunk held their paragraph together with a Conclusion Sentence:

CLICK: "Thus, there is an issue here to be resolved," meaning, we need to find out which of these four hypotheses can be empirically supported.

By the way, one of the things you might notice that's a bit different in this paragraph by Clark and Schunk is that they put their citations, for example to Sadock (1970) and to Searle (1975), in the middle of their sentences, rather than tucked into a parentheses at the end of their sentences, as we saw with the paragraphs on placebos and on Cognitive Dissonance.

Although tucking citations in parentheses at the end of a sentence is the preferred mode of citation, occasionally you might want to highlight another researcher, particularly when you're talking about their theory or hypotheses. So, you bring the citation out from parentheses at the end of the sentence.

But, truly, the preferred mode of citations is to place them in parentheses at the end of a sentence. In this way, you're taking about behavior and phenomena, not researchers.

Let's go through one more example of a paragraph that synthesizes rather than MadLibs previous results. For this example, we're going to a rather technical topic,

CLICK: Nicotinic Acetylcholine Receptor (Beta 2) Subunits in the Prefrontal Cortex. But even with this rather technical topic, the authors use the Hamburger Recipe for their paragraph, and they synthesize previous findings in their Supporting Sentences.

They begin with the topic sentence,

CLICK: "Cortical acetylcholine (ACh) release from the basal forebrain is essential for proper sensory processing and cognition."

Then, the authors support that Topic Sentence by synthesizing three previous sets of findings:

CLICK: "Loss of cholinergic function during aging and Alzheimer's disease results in cognitive decline, notably a loss of memory and the ability to sustain attention."

CLICK: "Interfering with the cholinergic system strongly affects cognition."

CLICK: "Rapid changes in prefrontal cortical ACh levels at the scale of seconds are correlated with attending and detecting cues."

Then, after the authors have synthesized these three previous sets of findings, they conclude with a caution:

CLICK: "However, the causal relation between nicotinic ACh receptor subunits expressed in the medial prefrontal cortex and attention performance has not yet been demonstrated."

These authors' use of however, reminds me to mention that it's also possible to synthesize **conflicting** results. For example, in the placebo paragraph,

CLICK: If not all three of the previous findings supported the Topic Sentence, if for example, previous studies had failed to demonstrate that phoney feedback causes us to shed body fat, it's perfectly acceptable to still include that finding,

BUT

CLICK: mark that finding as not supporting the Topic Sentence by preceding it with However.

OK, let me summarize what I've talked about. When we are reviewing the literature, that is when we are writing a literature review or even a term paper,

CLICK: we don't want to write in MadLibs style. That's boring and repetitive. And it doesn't do a very good job of synthesizing psychological science, which is what we want to do.

Remember that to

CLICK: synthesize means "To combine (a number of things) into a coherent whole."

And that's what want to do. We want to

CLICK: combine the results of OTHER scientific articles into a coherent paragraph.

CLICK: And we'll use our trusty Hamburger Recipe to write that coherent paragraph. We'll write a Topic Sentence, Three or so Supporting Sentences, and a Conclusion Sentence.

We'll use our three or so Supporting Sentences to synthesize previous findings. And we'll write our sentences so that we're talking about

CLICK: behavior and phenomena, not researchers and their number of participants.

In fact, when we synthesize psychological science we want to write broad statements, not nitpicky details.

It's actually a bit hard to write like this. It takes work. It's much easier go the MadLibs route, but your readers will be happier if you put in the effort to synthesize the previous findings, to boil down each previous find to a short sentence that talks about behavior and phenomena, not researchers and details about their study.

And for just about every writing task, be it a term paper or a scholarly article, we want our readers to be happy.