

Summarizing some lessons from our first [“free SWI digital drop in”](#) Monday, March 23.

I was so pleased to get the following email before our inaugural session

“Hello Pete,

This is Armaity from Toronto. I took your course in person about 1.5 years ago - on a Saturday - in a school in Mississauga!

For tomorrow's seminar, I was wondering if you could shed some light on some of these issues I have with making matrices...”

She shared the matrix below that she had constructed, but that had a number of issues that she did not think were right, but she wasn't sure how to go forward.

re	sum	are	il	y
			ize	ing
		y		
		e		
		ed		
		ing		

She had specific questions about how to understand the word sums for the words <summary> and <summarily>. I was pleased she asked about those words, because I could see she had tried to represent them in the matrix, but I could also see problems with her analysis.

I was delighted Armaity's had shared her thinking an draft matrix because it provided so many rich possibilities to help our group explore the process of analyzing words with word sums.

I knew a central issue we would get to look at is the issue of 'false analysis' vs. 'incomplete analysis' the '[structure and meaning test](#)' and how the word sum offers us a critical scientific tool to falsify hypotheses of word structure.

Don't skip on the construction -- and spelling-out-loud -- of the word sum!

During the Monday session, I highlighted a key step in asking ourselves or others about morphological structure. ALWAYS consider your question in light of a hypothesized completed word sum. When I say 'completed word sum' I don't mean one that you are confident is valid -- but one in which you show the hypothesized morphemes on the left side of the re-write arrow *and* what the result that the hypothesis would have to be given the suffixing conventions.

When people are trying to work out word structure, it is common for people trying to think about the morphological structure and suffixing conventions in their head, without the benefit of getting to see the implications of their hypothesis in concrete on the page.

The careful, considered construction of a word sum is essential because the word sum is the scientific falsification tool for orthographic inquiry. If you can not justify any part of your hypothesized word sum, then you know you have to reject that hypothesis and look for another hypothesis.

Many make the mistake of worrying about making a mistake.

What I mean by the above statement is that as they start to construct a word sum, if they sense something seems wrong, they often stop without being able to look at their thinking on the page. But our chances of finding a better hypothesis when we get to look at what might be wrong about our first hypothesis. I recommend we don't think about constructing a word sum as 'drawing a conclusion' -- but instead as 'presenting a concrete representation of our hypothesis that we can study so that we can accept it or reject it with evidence.

One key advantage of the act of "writing-out-loud" word sums is that it gives us a way of ensuring that we don't let ourselves skip by details that are easy to miss when we don't include that level of close attention to our hypothesis. We can make errors in a matrix that we don't see that become evident when we try to write-out-loud the word sum that matrix would require. The matrix shows us the full written form of morphemic elements in a morphological family. It's a lot of information about a lot of words all at once.

The word sum let's us focus on just the structure of one word at a time. Also, the matrix does not show us suffixing conventions - only the word sum does that.

See the conventions I recommend for "writing-out-loud" at [THIS LINK](#). I've been focusing on this practice more and more, and how it ties perfectly with a theory of learning called 'cognitive load theory'. I just recorded my video for the upcoming [4th annual Virtual Dyslexia Conference starting April 20](#). For that presentation, I picked the topic of 'spelling-out-loud' and cognitive load theory. You can see more about cognitive load theory and SWI at [THIS LINK](#) on Real Spellers.

Here are some of the paths of inquiry with the scaffolding of written word sums that we went through with the group last Monday.

We started with <summary>. I presented the word sum reflected by Armaity's hypothesized matrix (below) and asked what was it that she was uncertain about.

¹? sum + are + y → summary

My memory is that her first question was whether there was an <-are> suffix.

Ah! Good question. But before we even look for evidence for that, I decided we should actually mark any suffixing changes that this word sum would require to result in the attested spelling of <summary> I also brought out the 4 questions to remind ourselves that before going further, we need to address the meaning question.

¹ I sometimes find it helpful to put an initial question mark when I share a word sum that is a hypothesis for the purpose of thinking to make it clear that this is not presented as an answer, but a question. I didn't do that in the class as I could explain that, but on text -- I want to make sure no-one mistakes the word sum below as either a 'mistake' nor a 'conclusion'. It is there simply to help us question our thinking.

Found an interesting word?

1. What is the sense and meaning of your word?

2. How is it built?

↕ • Can you identify any bases or affixes with a word sum?

3. What related words can you find?

- **Morphological relatives:** Look for words that share a **base**.
- **Etymological relatives:** Look for words that share an historical **root**.

4. What graphemes function coherently here?

- Check that they represent the phonemes *across the morphological family*.
- Check the influence of word origin on grapheme choice.
- Is what you thought was a grapheme actually an orthographic marker?

So, we started by seeing if it was a reasonable hypothesis that the word 'sum' had any logical meaning connection to the word 'summary'. We would go on to test the hypothesis in Etymonline soon, but for the moment we could see that we could think of 'sum' as adding things up and putting them in a 'summary' seemed plausible. So now we can return to question 2 that we had already started. That is not the necessary order by the way. We could have decided to jump into etymology right now to test the meaning hypothesis. That's why the double sided arrow between question 1 & 2. But back to the path we took -- and the testing of the suffixing changes.

From the hypothesized word sum we could see that we would need her hypothesized <-are> suffix to double the final single consonant of the base, and that her vowel suffix <-y> would have to replace the final, non-syllabic <e> of that <-are>. We used the old Real Spelling [Big Suffix Checker](#) to test that hypothesis.

We found that *if* the morphemes were valid, the word sum was plausible according to suffixing conventions

Hypothesis #1

? sum + are + y → summary

Hypothesis #2

? sum(m) + are/ + y → summary

Now back to *Armaity's* question about <-are> as a suffix. We took a brief look in a dictionary, and looked for other words that might give us evidence of an <-ary> suffix, but didn't come up with anything after a short look. This allowed me to bring up the key concept of 'false analysis' vs. 'incomplete analysis'.

If we don't have clear evidence of an <-are> suffix right now, why not reduce our level of analysis by one step? What if the structure was not <-are/ + y>, but that this part of the word was one suffix <-ary>? Do we have evidence of <-ary> acting like a suffix in other words?

This time my Oxford gave us helpful information and evidence:

-ary 1 /əri/

suffix

1 forming adjectives such as *budgetary, primary*.

2 forming nouns such as *dictionary, granary*.

The word <dictionary> that has this structure <dict + ion + ary> shows me that this letter sequence *can* act like a suffix that marks nouns. And that works for <summary> as in "That is a good summary." Also, <prime/ + ary> as an adjective works. I can use an adjectival form of our word as in "My summary position is...".

So now we can sit with a safe structural analysis as our next hypothesis

Hypothesis #3

? sum(m) + ary → summary

Understand that this is not a conclusion that Hypothesis #2 is *false*. We have simply recognized that we do not yet have evidence of an <-are> suffix in general, or in this word. So to conclude Hypothesis #2 would put us in danger of committing a 'false analysis'.

A **false analysis** is when we analyze a word in such a way that we violate the structure of a morpheme. This brings us to the scientific principle that *scientists should not draw conclusions that are deeper than they can prove*.

A false analysis is the main type of error we should do everything possible to avoid. This error is dangerous because it has to be undone before we can move forward in understanding.

A classic example of a common false analysis is the non *<-tion> suffix. No matter what word you try to fix this letter string to as if it is a suffix hinders access to the structure and meaning of a word. When we have this non suffix in our head, we can't see the <act> in <action> or the <quest> in <question>. False analysis must be *undone* for healthy learning to grow.

By contrast, an **incomplete analysis** *is always an invitation for later learning*.

It is very possible that someone could find evidence of an <-are> suffix, and that it is often combined with a <-y> suffix. But until we have evidence in front of us that we understand, the only safe, scientific conclusion is to risk *incomplete analysis* in order to avoid a potential *false analysis*.

Once people understand this scientific process of drawing safe working hypotheses that are always 'pending further evidence' they can come to *safe* conclusions. The bottom line is, if we could not find an analysis of this word that we understand, we could always just treat <summary> -- the whole thing -- as a base. If we don't see how to analyze it yet, we can always have a go later as our understanding grows. As it is now, however, we have a safe structural hypothesis with hypothesis #3.

But what about the 'meaning test'?

We have a hypothesis that the words 'sum' and 'summary' have a related meaning, but is that apparent semantic connection happenstance, or is that meaning connection the result of a common historical *root*. Are <sum> and <summary> etymologically related? If they are not, they *cannot* be morphologically related.

Off to Etymonline we went...

[summary \(adj.\)](#)

early 15c., "brief, abbreviated; containing the sum or substance only," from Medieval Latin *summarius* "of or pertaining to the sum or substance," from Latin *summa* "whole, totality, gist" (see **sum** (n.)). Compare Latin phrase *ad summam* "on the whole, generally, in short." Sense of "done promptly, performed without hesitation or formality" is from 1713.

sum (n.)

c. 1300, *summe*, "quantity or amount of money," from Anglo-French and Old French *summe*, *somme* "amount, total; collection; essential point; summing up, conclusion" (13c., Modern French *somme*), from Latin *summa* "the top, summit; chief place, highest rank; main thing, chief point, essence, gist; an amount (of money)," noun use (via phrases such as *summa pars*, *summa res*) of fem. of *summus* "highest, uppermost,"

Yup. Both <summary> and <sum> derive from the historical Latin root *summa* for 'top, gist'

With the structure test and the meaning test completed. we can now remove that initial question mark and treat this as a possibly incomplete, but a totally safe analysis:

sum(m) + ary → summary

How about <summarily>?

Armaity's matrix hypothesizes this word sum

? sum(m) + are/ + il + y → summarily

Again, if we have evidence for EACH of these morphemes, then we can double check the suffixing conventions, and then we can do the "meaning test". (Some find it helpful to think of this as the "etymology test" or the "historical root test".)

Now we get to build on the analysis of <summary>. We still don't have evidence of that <-are> suffix. Armaity also pointed out she was unsure of the proposed <-il> suffix.

So I suggested we started to work on a new word sum hypothesis with the attested <-ary> suffix we discovered in <summary>.

Without knowing if it is 'right' we just start a new word sum with this structure to see what ideas surface.

We write what we have, and leave what is unknown...

? sum(m) + ary + ____ → summarily

What is left in our word sum that could plausibly result in the attested spelling <summarily> ?

If my memory serves, the first hypothesis was perhaps there is an <-ily> suffix. Let's check that out while writing-out-loud and marking changes. We would end up with this falsification of that hypothesis.

? sum(m) + ary/i + ily → *summariiily

Notice, an <-ily> suffix that is tempting because we see that letter sequence at the end. But that hypothesis is revealed to be a false analysis because, the <y> of our <-ary> suffix would have to be replaced by an <i> and that results in the not-possible spelling on the right side of the word sum.

NOTE! If we didn't write out the entire word sum, follow the steps of writing-out-loud as described in [THIS DOCUMENT](#) it would have been so easy to just skip by this false analysis. Also, *seeing* this concrete representation of a false analysis, helped us see an new possibility. What could we try instead of <-ily>?

Do you see it?

What about the super common <-ly> suffix? With that hypothesis, our structural hypothesis falls into place...

? sum(m) + ary/i + ly → summarily

Ah! we don't need an <-ily> suffix. Having rejected the suffix <-are> for now, we were able to see a safe structural hypothesis that was hard to see before!

Why do I still have that initial question mark in our word sum?

We have not yet checked etymological relatives as Question # 3 in the 4 questions reminds us.

Found an interesting word?

1. What is the sense and meaning of your word?

2. How is it built?

↑ • Can you identify any bases or affixes with a word sum?

3. What related words can you find?

- **Morphological relatives:** Look for words that share a **base**.
- **Etymological relatives:** Look for words that share an **historical root**.

4. What graphemes function coherently here?

- Check that they represent the phonemes *across the morphological family*.
- Check the influence of word origin on grapheme choice.
- Is what you thought was a grapheme actually an orthographic marker?

Back to Etymonline...

summarily (adv.)

1520s, "briefly, in few words," from **summary** + **-ly** (2). Meaning "without hesitation or formality" is from 1620s.

summary (adj.)

early 15c., "brief, abbreviated; containing the sum or substance only," from Medieval Latin *summarius* "of or pertaining to the sum or substance," from Latin *summa* "whole, totality, gist" (see **sum** (n.)). Compare Latin phrase *ad summam* "on the whole, generally, in short." Sense of "done promptly, performed without hesitation or formality" is from 1713.

sum (n.)

c. 1300, *summe*, "quantity or amount of money," from Anglo-French and Old French *summe*, *somme* "amount, total; collection; essential point; summing up, conclusion" (13c., Modern French *somme*), from Latin *summa* "the top, summit; chief place, highest rank; main thing, chief point, essence, gist; an amount (of money)," noun use (via phrases such as *summa pars*, *summa res*) of fem. of *summus* "highest, uppermost,"

And now we have passed the structure test *and* the meaning test for our word sum for <summarily>!

What about <resume>?

This question was particularly fascinating to me. The thing that jumped out to me from Armaity's first matrix first was the inclusion of an <-e> suffix. I've never seen evidence of an <-e> suffix, so I knew we would have to look at this. From her word sum, I could see she was trying to represent a word spelled <resume>. I took that to be the word in a sentence like this... "I hope things resume to normal soon." I was all prepared to show the importance of "meaning test" by showing that my search of etymology shows no common root between that word and <sum>.

But Armaity explained that she was thinking of an entirely different word, as in, "I need to build up my resume for work." Here is that entry...

resume (n.)

also *résumé*, 1804, "a summary," from French *résumé*, noun use of past participle of Middle French *resumer* "to sum up," from Latin *resumere* (see **resume** (v.)). Meaning "biographical summary of a person's career" is 1940s.

I see that the phrase 'to sum up' is what confused her. This highlights how carefully we need to read etymological references like Etymonline. Notice that while this entry shows "sum" to be a related sense of the word <resume>, if you follow the etymological trail, you never get back to the Latin root *summa* that we found for <sum>. It's not just 'meaning' connections we are looking for. It is meaning connections based on a common historical root!

So whichever word we mean with this spelling <resume> neither passes the structure test *or* the meaning test. Because of Armaity's question, I've been going on a fascinating tail trying to understand either <resume> and I'm a long way from drawing conclusions there². But we can confidently reject the hypothesis that either belongs in this morphological family, so it does not belong in this matrix.

Ah, the joy of falsification!

Do you notice that? Do you feel any sadness at discovering that <resume> (either one) doesn't belong in this matrix?

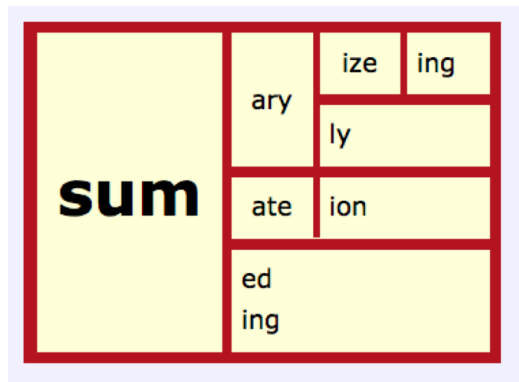
I certainly don't. This is falsification that brings *understanding*. We know see how the actual pieces fit.

After the session I asked Armaity if she was OK with me sharing this investigation more widely, and she was delighted to do so.

She also shared her revised matrix based on what we all learned together.

Isn't it lovely!

Now I just want to see all the word sums that built it.



Falsification is not failure -- it is *success*.

There is great satisfaction at coming to a safe analysis that we can use to revise a matrix for a family. However, the spelling, meaning and morphological structure of the words in Armaity's beautiful revised matrix is actually a very small part of the value of this investigation.

Far more generative is the learning about the *process* of scientific orthographic inquiry that we used to get to this point. We have a better understanding of the "structure and meaning test", the importance of studying the implications of our word sums, and the joy that can result when we let those word sums falsify our hypotheses.

Notice that the suffixing changes we look at, are not specifically about 'spelling accuracy' but about a necessary aspect of morphological problem-solving. We could not do any of this work if we don't learn those conventions. Morphological investigations without access to the suffixing conventions is like trying to add fractions without knowing your multiplication facts.

And now, because of Armaity's 'mistake' I and some friends are have a rich question about trying to understand <resume>.

I don't plan on this kind reflection/analysis after every [free Monday SWI digital drop in](#). I hope it feeds learning for future ones, and for anyone interested in SWI.

Pete Bowers

March 28, 2020

² I now have complex questions about <resume> that I have not resolved (they have nothing to do with <sum> - it's just that I am not clear on how to safely analyze <resume> in English, and how it worked historically. I'm in no hurry to resolve that, but I'm looking forward to playing with it!