



What Makes Math So Hard For English Language Learners?

Merri Longoria Gutiérrez
Director of School Support
Bilingual/ELL



Can Research Help?

- History/anecdotal
- Cuevas, 1984
 - Language factors
 - Discourse patterns
 - Cultural backgrounds

Isn't English a Trip?

Isn't English a trip?
Everyday while I sit in class
And wait for Mrs. Jones to call on me,
She writes on the chalkboard
But calls it a blackboard
And yet---
I look at a greenboard.

And when reading time rolls around,
It's hard to understand why the word Nike
Is not pronounced like bike,
Or hike,
Or Mike

Mrs. Jones always gives us these rules.

I remember the one about
“when two vowels go walking,
The first one does the talking
And the second one does the walking.”

And guess what!

It works with a word like beans.
There are two vowels—
E does the talking
And *a* does the walking.
Sort of like my sister and me---
She does all the talking and I do all the walking.

BUT
Then they break the rules.



What about words like

Choose

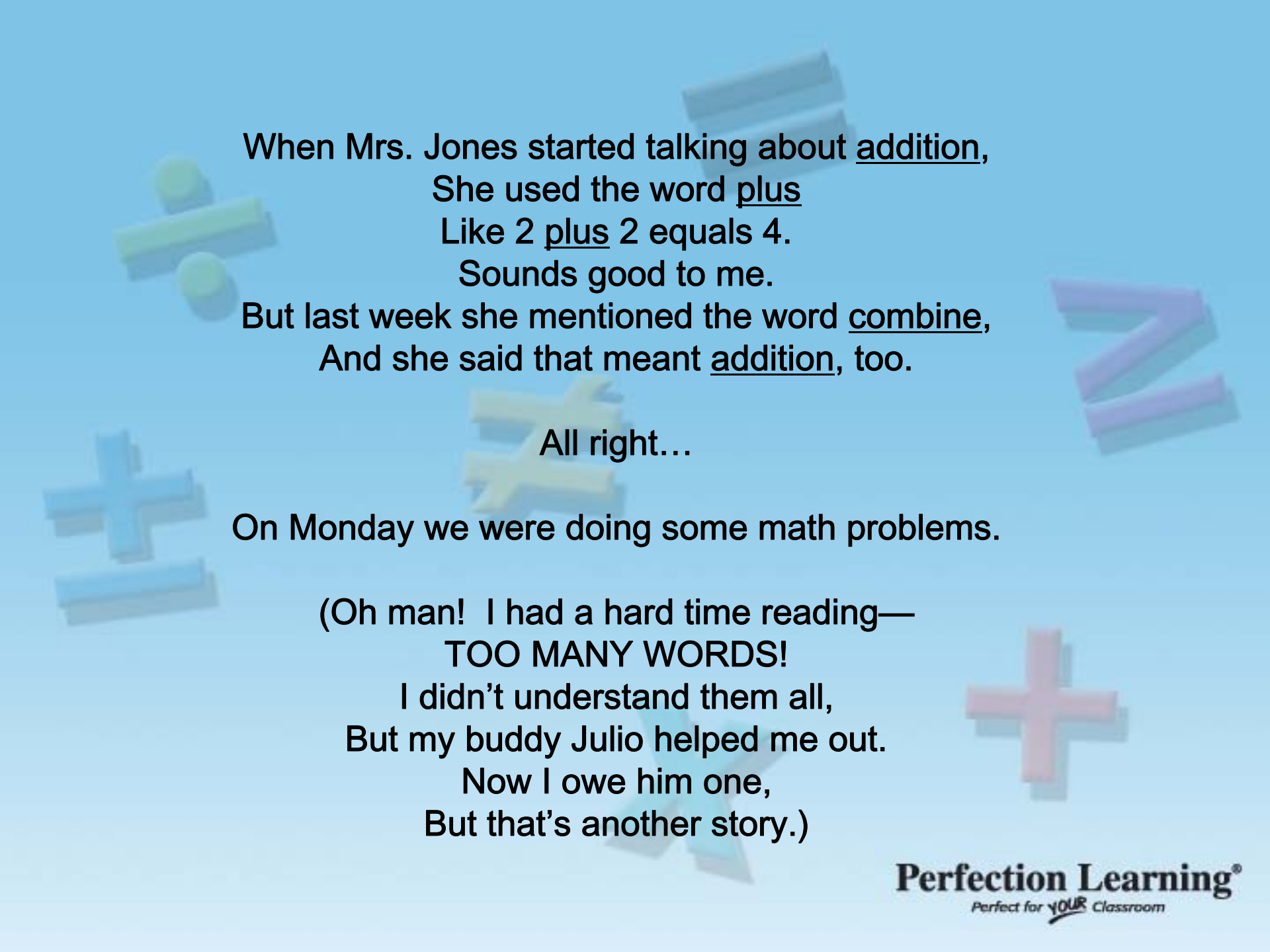
Or eight

Or feather?

There are two vowels walking,
So which one is the talker and
Which one is the walker?

I thought it would be easier
When math class started.
Because that's just about numbers,
And circles,
And things like that,
Right?

Was I in for a surprise?



When Mrs. Jones started talking about addition,
She used the word plus
Like 2 plus 2 equals 4.
Sounds good to me.
But last week she mentioned the word combine,
And she said that meant addition, too.

All right...

On Monday we were doing some math problems.

(Oh man! I had a hard time reading—
TOO MANY WORDS!
I didn't understand them all,
But my buddy Julio helped me out.
Now I owe him one,
But that's another story.)

Anyway...

We were doing our math problems.

I read the problem

And it said the herd of elephants was increased
by three.

Julio and his cousin Julia told me that increased
by

Means addition also.

“What, Mrs. Jones?

Could you please repeat your question?

What’s the sum of all the elephants?

Hmmmmm

What did Julia tell me sum meant?

Is that the same as some

Like “when some of the kids tease me”?

Sorry Mrs. Jones.

I don’t know what the sum is.”

(Actually, I don't know what the word means.)

Oh well—

I hope tomorrow I have a better day.

Right now

I have to catch up with my friend Herb.

I just learned in science class today

That in the word *herb*,

The *h* is silent.

I need to apologize to Erb for saying his name wrong.

Isn't English a trip?

-----by José Franco



What does Research say about Vocabulary?

- Isabel Beck's "tier words"
- Robert Marzano's systematic, standards-based vocabulary instruction
- Use of the Frayer Model or G.O.s
- Diane August & Catherine Snow's multiple exposures
- Jim Cummins' rich oral language and extensive reading experience/cognates

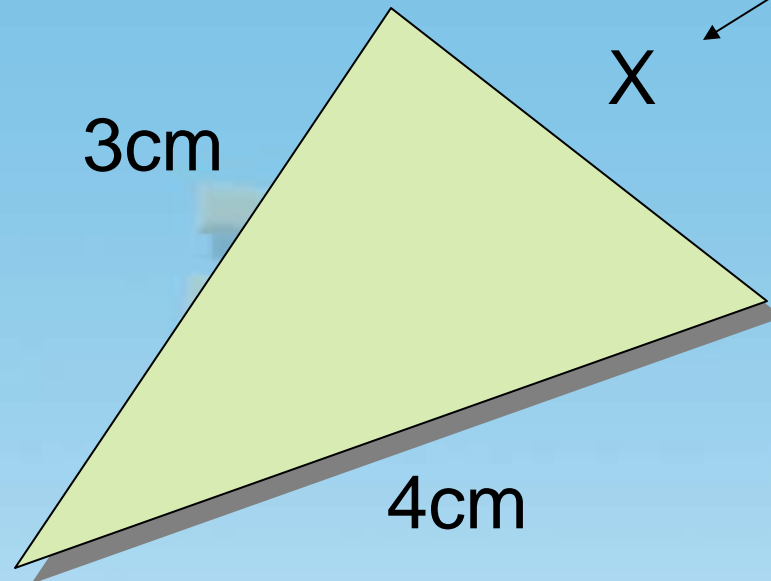


Language Factors

- Vocabulary/semantics
 - Math meanings
 - Conceptually dense
 - Multiple terms for the same thing



Find x.



Moschkovich, 2007



Language Factors

- Vocabulary/syntax
 - Relationships
 - Lack of 1-to-1 correspondence



Language Factors

- Discourse
 - Logical connectors
 - References of variables
- Cultural difficulties



What is academic language?

- Content area words/technical vocabulary
- Vocabulary knowledge (depth & breadth)
- Written distinct from oral vocabulary
- Complex sentence structures & syntax
- “Story” problems



Problem:

A submarine is 285 feet under the surface of the ocean. A helicopter is flying at 4,500 feet above sea level. Given that the helicopter is directly above the submarine, how far apart are they?



What else makes math hard for ELLs?

- Language acquisition takes 5-7 years
- Math language is another language
- Other factors
 - > Prior schooling
 - > Prior content knowledge

How do teachers handle this?

- Not all students learn the same
- Not all teachers have the training
- Not all classrooms have access to great materials



MATH
+ ACADEMIC LANGUAGE
+ ELLs
= SUCCESS

Merri Longoria Gutiérrez
Director of School Support Bilingual/ESL
aln@perfectionlearning.com