Description: Distributing a variable over other variables. Does it check out with numbers? **Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview One of Seven** **Date: 1995-11-08** **Location: Harding Elementary School** **Researcher: Professor Carolyn Maher**	**Transcriber(s): Aboelnaga, Eman** **Verifier(s): Yedman, Madeline** **Date Transcribed: Fall 2010** **Page: 1 of 4**

1		R1	Okay. Have you done anything like this yet? Okay – as we do these examples. Did you do anything like this? *[a(x + y)]*
2		Stephanie	Um hm. Not that I can recall. No.
3		R1	No, what do you think that could possibly mean?
4		Stephanie	It's any number times two other variables that could also stand for any number – so – can you get a number that's like $ax + ay$?
5		R1	Let's think about that? Why don't you write –
6		Stephanie	'Cause that's what it's telling you to do. It's telling you.
7		R1	So you think that's going to be *[Stephanie writes $ax + ay$]*.
8		Stephanie	That's what it's telling you.
9		R1	That's an a, right? *[corrects Stephanie's handwriting]*
10		Stephanie	Yeah.
11		R1	Okay – So your conjecture is that – why don't you test it? Why don't you try some numbers for a, x, and y? And see if it works?
12		Stephanie	Alright *[2(3 + 4)]* is six plus eight is fourteen.
13		R1	Does that work?
14		Stephanie	Well, actually I have to try one number at it – well…
15		R1	Well.
16		Stephanie	I have to just plug in one number and then – what I really have is go like equals fourteen and then plug in – if I just plugged in like the two.
17		R1	Okay. So what you're saying here – two – is…
18		Stephanie	It comes out to be the same – I mean, I guess you could put a variable with another variable and multiply it.
19		R1	Right.
20		Stephanie	We just never did it before.

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21		R1	So, Let's think about this. What did you use for *a*? What did you use for *x*? And what did you use for *y*?
22		Stephanie	Um two for *a*.
23		R1	And…
24		Stephanie	Three for *x*.
25		R1	For *x*.
26		Stephanie	And four for *y*.
27		R1	Okay, so um your conjecturing is that is, it *ax* plus *ay* and so *ax* would be six and *ay* would be eight.
28		Stephanie	Oh, I see.
29		R1	Okay, so is it-
30		Stephanie	What I should have done is – *[writes 2·3 + 2·4 between her steps]* 'Cause I just leave that step out. Like sometimes too.
31		R1	That's okay. That doesn't bother me. Um but that's if you distribute, right?
32		Stephanie	Yes.
33		R1	If you don't distribute, what do you get?
34		Stephanie	If you don't distribute?
35		R1	If you did it without distributing.
36		Stephanie	You get twelve plus two – fourteen.
37		R1	You get two times seven, right?
38		Stephanie	Yeah?
39		R1	So it still worked for two, three, and four?
40		Stephanie	Yeah, it worked the same way.
41		R1	Okay, now do you think it's always going to work? *[pause]* For any choice of…
42		Stephanie	I don't know.
43		R1	Of *a, x* and *y*.
44		Stephanie	I think we might of – we went over something like this, but it was with um exponents and I don't remember if it'll work every time. Should I try it with different variables?

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45		R1	Okay. What's your intuition on it?
46		Stephanie	Um, I don't know. If it works every time, I don't understand why they make us um distribute in the first place – if it works every time. So I don't think – I think there's going to be a problem *(inaudible)* I mean 'cause – it's pretty dumb then if we always have to distribute – you know.
47		R1	Um hm. Do you think you always have to distribute?
48		Stephanie	Well, obviously not in this problem.
49		R1	Um hm.
50		Stephanie	So I mean…
51		R1	You know you could've gotten the answer without distributing, if that were true.
52		Stephanie	Yeah, I could've just…
53		R1	If that were true. If they were equivalent, you didn't have to, did you?
54		Stephanie	Well actually I shouldn't have – I should've just distributed after I added those two.
55		R1	Well no. I don't know that you should've…
56		Stephanie	I mean – it doesn't matter. Like it I had…
57		R1	Let me ask you a question? Does it matter?
58		Stephanie	If I had a variable. Like if it was *(writes) [2(x + 4)]*. 2(x + 4) right. I have to distribute first 'cause I can't add four to x.
59		R1	Okay, so what would that look like?
60		Stephanie	So that would have to be $2x + 8 = 14$.
61		R1	Where did you get the fourteen from?
62		Stephanie	Well, fourteen was my answer up here. I'm just doing – using
63		R1	That's if you don't know what x is?
64		Stephanie	Yeah.
65		R1	Okay.
66		Stephanie	Eight minus eight. *[writes $2x + 8 – 8 = 14 – 8$]* equals *(inaudible) [continues "figuring"]* x equals three. It worked.

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67		R1	Interesting.
68		Stephanie	This problem's working out.
69		R1	What's the it that worked? What were you thinking when you did it?
70		Stephanie	Well, um I was just try – 'cause like here I didn't have to distribute, but if I had a problem where I had a variable in the inside of the parentheses I would have to distribute.
71		R1	Um hm.
72		Stephanie	Because I can't combine like terms if they're not the same -- so
73		R1	Um hm.
74		Stephanie	I was just saying that you know if you have a variable, you have to distribute first.