Recounting Counting: Self-Appraisal in Math-Adjacent Discourse

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Abstract: This study illuminates how women position their relationship to everyday textile craft practices (e.g., knitting, sewing, crocheting) and to mathematics. We employ discursive psychology and conversation analysis to analyze interviews with crafters. Rather than just (not) being "math people," preliminary findings reveal that speakers discursively orient to mathematics as consisting of both "lower-level" and "higher-level" categories, and speakers appraise their own mathematical abilities with regard to each.

Keywords: math, gender, discourse

Background

This study focuses on how women position their own competence in mathematics to illuminate when and how institutional environments erect barriers to participation. We focus on self-appraisals of mathematical ability made by women who engage in textile crafting practices and contrast this with their appraisals of their abilities in math in formalized schooling environments. Textile practices have been recognized as sites where rich mathematical reasoning occurs (Harris, 1997), as well as sites with historically deeply engagement from women (Barber, 1994). However, it is likely that both crafters and non-crafters have inadequately recognized the math inherent in crafting to be "legitimate" or "real," and therefore not capitalized on the potential of crafting to open up trajectories that lead to success in formal math learning environments.

Methodological approach and methods

The learning sciences has historically focused on the role of discourse in mathematics learning (e.g., Sfard & Cobb, 2014). In this study, we analyze 13 interviews with women who have experience with weaving, sewing, crocheting, or knitting, in which participants were asked to discuss their textile crafting practices and make connections to mathematical thinking. We focus on the interactive and discursive features of the interview, drawing upon discursive psychology (Edwards & Potter, 1992) and conversation analysis (Heritage, 1984). Our goal is to explore the questions: (RQ1) How do crafters position math as "school math," "craft math," or in some other way, and (RQ2) How do crafters position themselves in relation to these various sorts of math?

Initial findings

As a case instance, in the following extract, "Bianca", a crafter with experience sewing, knitting, and crocheting, and the interviewer are discussing the mathematical nature of crafts in an online video-conferencing platform. Before the extract, Bianca explained how she made some stuffed animals. Bianca begins by assessing the mathiness of knitting. In so doing, she quickly makes a distinction between counting and higher math and qualifies her experience with each of these two types of math ("I" is short for "interviewer").

A.1 A.2	I:	Do you find that you need mathematics to make those crafts, or does that seem just sort of (.2) uh (.6) not so (.2) so: obvious.
A.3 A.4 A.5 A.6 A.7	Bianca:	Well I mean I think knitting is kind of at its base it is mathematical cus it's all about counting (.2) um and not (.) sort of any sort of higher math or or I I've never really done any sort of (1.2) like math-based patterns that you know. (1.4) like I I'm kind of <u>aware</u> of it, (.2) but you do have to keep counting.
A.8	I:	[Right]
A.9 A.10	Bianca:	[Um] (1.0) and I know that there are people who do design patterns that are <u>based</u> on math. [which]
A.11	I:	[right]
A.12 A.13	Bianca:	think are <u>cool</u> erm but I've never: (.2) yknow either sought them out or made my own patterns or anything like that

In this extract, the interviewer asks Bianca if her craft (knitting) tends to "need mathematics" (A.1). This is set up as a choice between finding that math is necessary or that math's presence is less obvious—thus the preferred response is agreement that math is present, and in practice the question is more about how obvious this mathematics is. Bianca offers that knitting is mathematical "cus it's all about counting" (A.4), which constructs counting as a part of mathematics. Furthermore, counting and mathematics are established as having a strong correlation as knitting is "all" about counting (A.4). The language of "at its base" (A.3) functions to demonstrate how inseparable the math and the counting are. Bianca elaborates without prompting that the knitting has "not…any sort of higher math" (A.4–A.5). She presents a non-counting kind of math that is both "higher" (more difficult) and not present in knitting, which in turn may function to establish why a knitter might not be expected to be competent in this kind of higher math. While noting that she has never done any "math-based patterns" (A.6), Bianca would be contradictory had she been referring to math as counting, so "math" is interpreted here as referring to the amorphous "higher math." The language of "base" and "based" (A.3, A.6, emphasized on A.10) position math as something that underlies or is fundamental to knitting, rather than as something that sits on top of or is extraneous to knitting. Although Bianca has "never" (A.5, A.12) used math-based patterns, she emphasizes that she is aware of them (A.6), which places a qualifier on her inexperience and serves to position her as not entirely incompetent with this topic. In summary, Bianca does note that knitting has counting and possibly not "any sort of higher math," thus constructing counting and higher math as two opposing kinds of math (RQ#1). She goes on to carefully explicate her experience with each of the two, noting that the former is necessary to her knitting "at its base," while the latter is something she is "kind of aware of" but has "never really done" (RQ #2).

Discussion

A key finding of this study is that the women crafters interviewed appraised their own mathematical competency by separating math into multiple parts (e.g., higher and lower) and positioning themselves relative to each. Constructing two kinds of math functions to allow speakers to position themselves in variable ways with regard to math. It is possible that this in turn allows speakers to (a) account for their self-appraisal as less capable in higher-level math or (b) position themselves as especially competent since they are capable at both types of math. In so doing, speakers may tacitly or implicitly resist simplistic identities as "math people" or "not math people." These findings have deep implications for the study of mathematical self-appraisal. Rather than simply treating people as "math people" or as having a stable-low or stable-high mathematical self-appraisal, a discursive psychology (DP) approach revealed much deeper complexity in how and why speakers construct a representation of mathematics as a subject and their own abilities therein. By focusing on what speakers do in talk, DP can reveal flexible, occasioned, and fluid understandings of mathematical ability. These findings also have potential implications for the design of learning environments that seek to encourage learners to engage with mathematical concepts and thus broaden participation in STEM. Learning environments should explicitly call attention to the depth of the mathematical work being done therein, illustrating to learners that they are engaging in "higher" math when they are. Relatedly, these environments might also seek to reposition productive, useful kinds of math—like the kind of "basic" arithmetic that powerfully can be used to accomplish textile crafting—as not necessarily being of a "lower level" than more abstract kinds of math (Papert, 1980). This approach in turn may invite learners to position themselves as legitimate participants in deeper mathematical practices.

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