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**Do students confuse dimensionality and “directionality”?**

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Summary: The aim of this research is to understand the way in which students struggle with the distinction between dimensionality and “directionality” and if this type of potential confusion could be a factor affecting students’ tendency toward improper linear reasoning in the context of the relations between length and area of geometrical figures. 131 9th grade students were confronted with a multiple-choice test consisting of six problems related to the perimeter or the area of an enlarged geometrical figure, then some interviews were carried out to obtain qualitative data in relation to students’ reasoning. Results indicate that more than one fifth of the students’ answers could be characterized as based on directional thinking, suggesting that students struggled with the distinction between dimensionality and “directionality”. A single arrow showing one direction (image provided to the students) seemed to strengthen the tendency toward improper linear reasoning for the area problems. Two arrows showing two directions helped students to see a quadratic relation for the area problems.

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