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**Reasoning on the complex plane via inscriptions and gesture.**

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Summary: Using a diagrammatic reasoning framework about inscriptions, we explored undergraduates' reasoning about complex-valued equations. Our findings suggest that reasoning geometrically requires first reasoning algebraically about algebraic inscriptions. We found students tended to create algebraic and geometric inscriptions when their verbiage could no longer support geometric reasoning. Furthermore, they incorporated similar iconic gestures for reasoning about their geometric inscriptions, which reduced to deictic gestures as they applied their previously developed reasoning to subsequent tasks. Contrary to other research, our participants' gestures did not taper off with future tasks. Rather, their gestures transformed as concepts were automatized. Moreover, our research suggests that gestures serve as a link between verbiage and inscriptions rather than inscriptions serving as a link between verbiage and gesture as other researchers claim. In promoting synchronicity of algebraic and geometric reasoning, teachers may want to capitalize on the fact that students tend to implement similar gestures as they reason.

*Classification:* H35 F55 E55 C55

*Keywords:* algebraic reasoning; complex variables; diagrammatic reasoning; geometric reasoning; gestures; inscriptions

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