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An Attention Based Theory to Explore Affordances of Textual and Diagrammatic Proofs

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Abstract: Shimojima and Katagiri have demonstrated that diagrams reduce "inferential load" during reasoning by scaffolding visual-spatial aspects of memory. In response, we wondered why, if this is true, that proofs are usually text based? The purpose of this paper is to explore ergonomic affordances of text that may encourage its use in the communication of proofs by building on prior work in attention. We claim that textual notations may focus a reasoner's "spotlight" of attention through serialized sequential chunks, whereas many diagrams may "diffuse" attention and that a diagrammatic notation system that serialized information in chunks amenable to focused attention could leverage the power of textual notations. We present such an example through a case study focused on generalized constraint diagrams, a visual logic with attributes that may support focused attention and extract ergonomic principles that may transcend each notation system.