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The social life of STEM creativity: Social interaction and the birth and death of scientific ideas

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Abstract

Modern scientific research combines exceptional innovation with increasing rates of collaboration. Creativity in STEM fields thus offers a model system for investigating collective creativity. Much of what we know about STEM innovation and collaboration comes from analyses of published articles, but this ignores the rich, hidden “backstage” of the scientific process — the informal interactions, initial hunches, and abandoned ideas that drive STEM creativity. Here, we investigate this hidden social life of STEM creativity, focusing on how social interaction shapes the generation and abandonment of research ideas. In a survey of PhD-level STEM researchers ($N = 150$), we find that idea generation and abandonment are associated with different styles and dynamics of social interaction. We introduce a minimal mathematical model of scientific collaboration that can reproduce these empirical patterns. Understanding the informal social interactions that drive scientific progress sheds light more generally on the human capacity for collective creativity.

Keywords: creativity; STEM; collective intelligence; idea generation; idea abandonment; mathematical modeling