American Psychological Association

American Psychologist

© 2020 American Psychological Association
ISSN: 0003-066X

2020, Vol. 75, No. 5, 727–728
http://dx.doi.org/10.1037/amp0000700

REPLY

Clarifying What Forward Flow Is (and Isn't): Reply to Rossiter (2020)

Yoed N. Kenett
University of Pennsylvania

Stephen Anderson
Pennsylvania State University

Eric Chen and John Michael Kelly
University of California, Irvine

Michael Christian and John Patrick
University of North Carolina at Chapel Hill

Laura Huang
Harvard Business School

Kevin Lewis
University of California, San Diego

Kurt Gray
University of North Carolina at Chapel Hill

Forward flow is a new measure that quantifies free thought and predicts creativity (Gray et al., 2019). In his comment, Rossiter (2020) raises some conceptual and measurement concerns about this measure. We believe these concerns are specious, resting on fundamental misunderstandings about our aim and approach. This reply clarifies the nature of forward flow and dispels these concerns.

Keywords: forward flow, latent semantic analysis, creativity

Forward flow (FF) is a new measure that assesses how much the semantic content of people's thought changes over time (Gray et al., 2019). A person's FF is obtained by calculating the average semantic distance between each thought and all previous thoughts in a chain of free associations. Our work finds that FF reliably predicts creativity across many domains.

Rossiter (2020) raises some concerns about FF; however, they are unfounded because they stem from confusion over the essence of FF, which Rossiter believes to be a "test of originality" (p. 725). FF is not a test of originality. As clearly stated in our article, FF is a metric that quantifies the semantic evolution of naturalistic thought—operationalizing James's notion of a person's "streams of consciousness" (James, 1890, p. 141). It is true that FF predicts creativity in both experimental and real-world settings. It is also true that originality is part of the definition of *creativity.* However, it is a logical fallacy—and a clear misreading of our article—to equate FF with a test of originality, simply because FF predicts creativity.

Rossiter (2020) argues that any test of originality should more strongly predict creativity. We agree: Originality is definitionally part of creativity, and constructs should obviously predict themselves. Again, however, FF is not a measure of originality but of semantic evolution. Our research does reveal that this semantic evolution *predicts* creativity, consistent with emerging research (e.g., Beaty & Johnson, in press; Kenett & Faust, 2019) that uses computational methods to test Mednick's (1962) classic theory that individual differences in creativity are tied to the structure of semantic knowledge.

In addition, Rossiter (2020) points out that the average correlation between FF and creativity across domains is $\beta = .20$. We point out that the average effect size of psychological interventions is .23 and the correlation between social support

Yoed N. Kenett, Department of Psychology, University of Pennsylvania; Stephen Anderson, Department of Psychology, Pennsylvania State University; Eric Chen and John Michael Kelly, Department of Social Ecology, University of California, Irvine; Michael Christian, Kenan-Flagler School of Business, Department of Organizational Behavior, University of North Carolina at Chapel Hill; John Patrick, Department of Public Policy, University of North Carolina at Chapel Hill; Laura Huang, Organizational Behavior Unit, Harvard Business School; Kevin Lewis, Department of Sociology, University of California, San Diego; Kurt Gray, Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill.

Correspondence concerning this article should be addressed to Yoed N. Kenett, Department of Psychology, University of Pennsylvania, 3710 Hamilton Walk, Philadelphia, PA 19104. E-mail: yoedkenett@gmail.com

and immune functioning is .21 (Meyer et al., 2001). Although these correlations are all modest, we still think it is worthwhile to do psychological interventions, to seek social support, and to assess FF.

Finally, we agree with Rossiter (2020) that instructions to "be creative" would make any task responses more "original" (p. 725). But this is not our aim. Again, FF is intended to measure *naturalistic* thought—free association without instruction. That FF predicts creativity without instructions to "be creative" is precisely the point, attesting to the importance of general cognitive dynamics in predicting creativity (Stella & Kenett, 2019). We also agree that FF, by relying on chained association, creates a topography of thought that "differ[s] for each respondent" (p. 725). People indeed have unique streams of thought, and that is exactly what FF seeks to capture.

In conclusion, we reiterate that Rossiter's (2020) concerns do not apply to FF, which is not a "test of originality." Rather, it is a novel metric—with open-access data-analytic tools—quantifying how naturalistic thought evolves over time. We note that although developing a standardized measure of originality is not our aim, it is a worthy goal, and we encourage Rossiter to leverage his ample experience in pursuing it.

References

Beaty, R. E., & Johnson, D. R. (in press). Automating creativity assessment with SemDis: An open platform for computing semantic distance. *Behavior Research Methods*.

Gray, K., Anderson, S., Chen, E. E., Kelly, J. M., Christian, M. S., Patrick, J., . . . Lewis, K. (2019). "Forward flow": A new measure to quantify free thought and predict creativity. *American Psychologist, 74,* 539–554. http://dx.doi.org/10.1037/amp0000391

James, W. (1890). *The principles of psychology*. Cambridge, MA: Harvard University Press.

Kenett, Y. N., & Faust, M. (2019). A semantic network cartography of the creative mind. *Trends in Cognitive Sciences, 23,* 271–274. http://dx.doi.org/10.1016/j.tics.2019.01.007

Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review, 69,* 220–232. http://dx.doi.org/10.1037/h0048850

Meyer, G. J., Finn, S. E., Eyde, L. D., Kay, G. G., Moreland, K. L., Dies, R. R., . . . Reed, G. M. (2001). Psychological testing and psychological assessment. A review of evidence and issues. *American Psychologist, 56,* 128–165. http://dx.doi.org/10.1037/0003-066X.56.2.128

Rossiter, J. R. (2020). Forward flow—An alternative interpretation: Comment on Gray et al. (2019). *American Psychologist, 75,* 725–726. http://dx.doi.org/10.1037/amp0000607

Stella, M., & Kenett, Y. N. (2019). Viability in multiplex lexical networks and machine learning characterizes human creativity. *Big Data and Cognitive Computing, 3,* 45. http://dx.doi.org/10.3390/bdcc3030045

Received May 8, 2020
Revision received June 5, 2020
Accepted June 8, 2020 ■