

How miscommunication can be constructive during problem-solving in diverse groups

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Study co-author Ryan Muldoon, pictured above, says when miscommunication occurs, it is how we've organized ourselves that matters. Credit: Douglas Levere

Failing to clearly communicate when problem solving can actually benefit groups that lack diversity, and the degree to which miscommunication helps or hinders the search for a solution is strongly based on factors such as team dynamics, according to a new paper co-

written by a University at Buffalo researcher.

The results are so surprising that they almost demand reading the previous sentence a second time. How does a communication barrier, such as [miscommunication](#), constructively lend itself to [problem solving](#) ?

"Miscommunication creates [diversity](#) by presenting opportunities for people to better explore the available search space when actively engaged in problem solving," says Ryan Muldoon, Ph.D., an associate professor of philosophy in the UB College of Arts and Sciences, and co-author of the paper with corresponding author Keith Hankins, Ph.D., an assistant professor in the philosophy department and founding member of the Smith Institute for Political Economy and Philosophy at Chapman University, and Alexander Schaefer, Ph.D., Classical Liberal Institute Fellow, New York University.

But it's the internal structure that makes a difference when introducing miscommunication.

"When we work in groups, communication is crucial. Sometimes we randomly make a communication error, but sometimes miscommunication stems from the group diversity," says Muldoon.

"When miscommunication occurs, it is how we've organized ourselves that matters."

The findings, published in the journal *PLOS ONE*, emerged by recreating a famous mathematical model of diversity created by Lu Hong and Scott Page. One of the theorems to come out of the Hong-Page model of diversity found that diverse groups under certain conditions could outperform uniform groups of higher ability, leading to the succinct claim that "diversity trumps ability."

"Higher-ability groups tend to think about a problem in the same way when making predictions or finding solutions," explains Muldoon. "They end up exploring the same spots. Diverse groups collectively are able to explore more options, increasing the chance of bigger successes."

But while the Hong-Page model has received a great deal of attention, the idea that group diversity also carries the potential for a greater chance of misunderstandings among its members—misunderstandings that arise through miscommunication—has not.

So the research team built a new computational model that introduced different ways people might misunderstand one another and generated new questions with real-life applications relevant to any group—from small neighborhood civic organizations to large corporations—that requires intragroup problem-solving cooperation.

By adding to the original Hong-Page structure, the researchers could examine how to maximize diversity's potential across different structures of cooperation, an area left unexplored by Hong-Page.

"The additional structure allowed us to look at different ways groups can work together, and demonstrate how some miscommunication can make errors worse, while other examples of miscommunication can diminish the harm that might come from those errors," Muldoon says.

Institutional context is the pivot point.

"What we found is that how we organize groups matters a great deal when we're evaluating the benefits of diversity—especially when we can miscommunicate," says Muldoon.

The researcher model used for the paper has nine agents working together, in subgroups or on their own, to solve a problem of reaching a

specific goal over rugged terrain. The different methods of interaction are meant to capture different institutional arrangements, or different rules and procedures that would facilitate cooperation.

"Think of how a firm organizes teams that are working toward a goal, or how a science lab structures its work," says Muldoon. "This helps explain and can start us thinking about how certain institutions are better at handling mistakes.

"Specific ways of organization are critical," he says.

More information: Keith Hankins et al, Does (mis)communication mitigate the upshot of diversity?, *PLOS ONE* (2023). [DOI: 10.1371/journal.pone.0283248](https://doi.org/10.1371/journal.pone.0283248)

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