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Understanding Team Dynamics: Scientific Culture

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What is Scientific Culture?

Scientific teams do not form in a vacuum. Most research teams operate within a shared scientific culture shaped by disciplinary norms, academic training, institutional structures, and many other invisible influences, such as personal values. Across fields, this scientific culture typically emphasizes hierarchical organization, clear role differentiation, and productivity measured through tangible outputs such as publications, grants, patents, datasets, toolkits, and citations (Merton, 1973; NASEM, 2015).

Within this context, Principal Investigators (PIs) and team members are often socialized into systems that privilege hierarchical authority over horizontal collaboration. Decision-making power and credit allocation tend to flow upward, reinforcing seniority-based hierarchies rather than collective or distributed leadership models (Falk-Krzesinski et al., 2010). While these structures can increase efficiency and accountability, they can also limit open dialogue, suppress dissenting perspectives, and constrain opportunities for genuine collaboration beyond task completion.

Challenges of Scientific Culture

Many science teams struggle to work horizontally or share decision-making and ownership of ideas, particularly when collaboration is framed primarily as a means to produce a finished product rather than as a relational and iterative process. This dynamic disproportionately benefits senior team members, who already possess greater institutional power, job security, and oftentimes recognition, while placing junior scholars, trainees (e.g., postdoctoral researchers), and staff in more vulnerable positions (Bozeman & Boardman, 2014; Settles et al., 2021).

Challenges can intensify when teams include members whose scientific culture differs from the group's dominant norms. For example, differences in expectations around hierarchy, communication styles, authorship, or collaboration, such as those that may arise between European and American scientists, can introduce friction if left unexamined (Hofstede et al., 2010). When teams fail to reflect on how scientific culture shapes norms of participation and influence, these differences are often misinterpreted as interpersonal conflict rather than structural or cultural misalignment.

Addressing Scientific Culture

Understanding the influence of scientific culture is therefore a foundational step in improving team

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dynamics. Teams that explicitly reflect upon power hierarchies and cultural assumptions are better positioned to design collaborative practices that are more inclusive and effective. Team members and team leaders should assess at the start of their collaboration what shared scientific culture they have (if any), and set out to ensure that everyone understands how their scientific backgrounds affect their expectations of team dynamics (e.g., communication, credit, trust, conflict resolution, decision-making). If the team has not done such an exercise before, it can useful for each team member to individually sketch out their expectations for the team. Having the PI or team leaders review and reflect on those statements can help guide a group dialogue on clarifying differing aspects of the team's scientific culture.

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