© *Academy of Management Discoveries*
2024, Vol. 10, No. 1, 150–153.
https://doi.org/10.5465/amd.2024.0009

COMMENTARY

A COMMENT ON "CAN YOU OUTSMART THE ROBOT? AN UNEXPECTED PATH TO WORK MEANINGFULNESS" BY BERNADETA GOŠTAUTAITĖ, IRINA LIUBERTĖ, SHARON K. PARKER, AND ILONA BUČIŪNIENĖ: CALLING FOR A DIFFERENT PATH FOR THE FUTURE OF HUMAN–ROBOT TEAMING

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The article "Can You Outsmart the Robot? An Unexpected Path to Work Meaningfulness" by Goštautaitė, Liubertė, Parker, and Bučiūnienė (2023) examines how people handled the integration of industrial robots into two Lithuanian manufacturing facilities. We applaud the authors for this work and we hope scholars will continue to examine how humans can work in a healthy way alongside robots, artificial intelligence (AI), automation, and disembodied agent peers both now and in the future of work. In particular, much more fieldwork like this is needed to help guide our understanding of modern technological appropriation by humans.

The article by Goštautaitė et al. (2023) was concerned with human work meaningfulness in the context of low-reliability robots, as well as automation and autonomy more broadly. The authors offer several interesting observations about their findings that have important implications to consider for the future of human–robot teaming. Here are some examples:

> By outsmarting the robots, the workers aimed to ensure a stable production process … as a consequence, the employees felt even more powerful and even more inclined to demean the robots. (p. 22)

> The operators' successful attempts at outsmarting the robots … helped them gain a real sense of pride and meaningfulness due to feeling more intelligent than the robots. (p. 23)

> … robot unreliability initially causes mistrust among workers; yet, in the long run, we show that unreliability also strengthens the worthiness of human work and makes automation efforts more acceptable. (p. 31)

> … employees working along with robots developed practices to demean and outsmart the robots in order to achieve their performance goals, which, in turn, were conducive for experiencing their work as meaningful and vital in the production process. (p. 35)

One might very well interpret the above quotes, and Goštautaitė et al.'s (2023) manuscript more generally, as implying that (a) low reliability is desirable, because humans will feel more important; (b) demeaning robots in the workplace has desirable effects such as emphasizing "human superiority" (p. 27); and (c) fooling, propping up, and more generally "outsmarting the robots" (p. 22) is a healthy adaptation to unreliable technology that might be a strategy to promote in future human–robot work integrations.

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The theme underlying our commentary is that we view the above as suggesting a dangerous path forward insomuch as it could promote cultures of disrespect, incivility, and abuse among robots and humans. We expand on this and we offer an alternative vision for the future of human–robot teaming below.

INTERPRETATIONS, IMPLICATIONS, AND LABELING OF FINDINGS

Goštautaitė et al.'s (2023) labeled classes of human behaviors emerging from their research as (a) *demeaning* the robots, (b) *fooling* the robots, and (c) *propping up* the robots. We offer an alternative perspective on fooling and propping up the robots. "Fooling the robots" was less about intentionally deceiving or playing tricks on the robots, and more about the general class of behaviors known as "workarounds." Indeed, as Morrison (2015) notes, in the title of his paper on operations management, "the problem with workarounds is that they work." When employees developed workarounds to keep the assembly lines moving, we see this as a healthy, production-focused motive like many other instances of workarounds—generally, a healthy employee reaction that makes an undesirable process or technology beneficial to their environment. By labeling this "fooling the robots," readers might be led to conclude that work processes among humans and robots should encourage mean-spirited interactions. Reframing it as a workaround, however, would (a) be more accurate, (b) link to a solid base of research evidence, and (c) encourage future teams to develop productivity-minded processes when working with robots and to develop team adaptability by creatively finding productivity solutions even when technology fails. Therefore, we would recommend considering this theme as "workaround behaviors" and leveraging that literature to understand better how humans can work with robots to adjust and learn as needed to maintain productivity.

We had a similar reaction to the class of behaviors labeled as "propping up the robots." The authors used this label to capture human behaviors such as humans manually taking over the robot's work when the robot is malfunctioning, or humans reorganizing objects to assist the robots. Rather than the negative connotation that comes with propping up the robots, we view this simply as "backup behaviors," which are an important and helpful class of action-related team process behaviors in virtually all models of human–human teamwork (e.g., Marks, Mathieu & Zaccaro, 2001). From the perspective of high-performance teamwork, human backup behaviors that support robots in maintaining their productivity are desirable (as long as they are done safely) and, therefore, should be promoted as a healthy part of human–robot teaming.

A Desirable Future for Human–Robot Teaming

From our perspective, the two factories studied in Goštautaitė et al.'s (2023) research provided an example of a management and technological integration failure. Management of the organizations apparently introduced the robots with the explicit, communicated intention that they wanted to replace human jobs. This sets up a highly competitive context (for each job, it will either go to a human or a robot; in other words, a zero-sum competition). We view this as extremely poor change management that is likely to promote all the negatives of competition between human and robot team members (Tjosvold, 2008), and this intention is antithetical to the goals of the human–autonomy team research community (McNeese, Demir, Cooke & Myers, 2018; O'Neill, McNeese, Barron & Schelble, 2022). We offer a threefold vision for the future of human–robot teaming, as a reaction to the Goštautaitė et al. (2023) article.

First, we would recommend a more compassionate and sensitive approach that involves gradually introducing the robots and studying how human and robot jobs need to change to optimize performance and productivity. This information can then be used to determine how autonomous systems can best complement and improve existing team processes. For example, applications of AI and robotics in extreme and hazardous environments have happened gradually and with the communicated intention of promoting human safety, and the reception of these applications has proven beneficial (Hyde, Bloodwood, Abeyta & Dierauer, 2023; Wonsick, Long, Önol, Wang & Padır, 2021). In most cases, the humans still have vital roles to play—ideally, ones that are more engaging and healthy for them as team members. And, yes, there will be labor reductions in some contexts due to robots joining the workforce, but there are many compassionate ways to support existing staff along the journey to a new future, including retraining, reskilling, and replacement into roles inside the company or in other organizations.

Second, and relatedly, a cooperative approach to working with robots and AI will get us a lot further than a competitive approach. Indeed, countless studies that explore the theory of cooperation and competition show that teams perform better when members cooperate to achieve shared goals rather than when they compete to achieve incompatible individual goals (see Tjosvold, 2008). This potential challenge of incompatible individual goals has also extended

to human–autonomy teams (Flathmann, Schelble, Rosopa, McNeese, Mallick & Madathil, 2023). In Goštautaitė et al.'s (2023) article, we see many highly competitive terms used to interpret their findings, such as "demeaning," "fooling," "propping up," "outsmarting," "human superiority," and so on. Our interpretation of the findings the authors report is different and more focused on cooperative processes, as already mentioned. The "propping up" behavioral category is actually humans engaging in *backup behavior*—no different from a human helping another human with a task (a form of cooperation). The "fooling" behavioral category can be interpreted as humans finding a *workaround* for a sub-optimally functioning machine, and, while not ideal, it is not the same as trying to trick or pull a hoax on the technology. Workarounds are done in the spirit of moving work along, not to "fool" a machine, which brings with it a negative connotation. Therefore, (a) we see much more optimism in the results of the Goštautaitė et al. (2023) article than perhaps a reader would get at a face-value read of that work, and (b) we believe that promoting a competitive approach over a cooperative approach is a poor choice for our future work lives with robots and AI. We humans will eventually lose this competition, and there will be much pain in the wake of approaching it this way. Why not try to team up, respect, cooperate, collaborate, and build trusting and friendly relations among humans and machines?

Third, reliability matters. The authors interpreted their data as indicating that lower robot reliability created a *stronger* sense of work meaningfulness for humans. Yes, we agree, because humans would be more instrumental in keeping the assembly line moving. However, the danger here is that readers might conclude that low reliability should be a goal of robot or AI design, and then implement low-reliability machines in the workplace thinking it will benefit humans. This is a non sequitur. Would anyone use Google Maps, an automatic vehicle transmission, or a thermostat if it routinely malfunctioned? Would we introduce the massive AI-powered autonomy-driven hauling trucks in oil sands mining if the trucks always crashed (Caterpillar, 2022; Komatsu, 2021)? These forms of automation are used routinely every day precisely *because* they are generally reliable, which makes our lives easier and reduces our cognitive load, unlike the technology utilized in the two factories. In the current study, robots that were highly unreliable were introduced into the workplace at scale (similar robots report breaking down on average every 87 minutes; Goštautaitė et al., 2023: 3) with seemingly no clear communication about their reliability to the employees beforehand. This seems like a bad at-scale test of human–robot teamwork. And, it places a strong and exceedingly narrow boundary condition on much of the authors' findings.

CONCLUDING REMARKS

Goštautaitė et al.'s (2023) conclusions imply that practices that demean and outsmart robots are recommended as a way to address robot unreliability in the workplace, as it makes humans feel that their work is more meaningful and emphasizes human superiority. Whereas cataloguing behaviors is important to our understanding of technology acceptance, we think it is dangerous to encourage unhealthy behaviors like these in our interactions with robots and AI. Robots, AI, agent-based teammates, and the like are coming to the workplace whether humans are prepared or not. We need robust work and technology design practices that allow robots to work with humans productively rather than compete with and frustrate them.

We look forward to research that examines how robots and AI agents can be designed to be complementary to humans and to augment human capabilities and experiences in work settings (McNeese, Flathmann, O'Neill & Salas, 2023). We need to develop and study robots and AI agents that can perform as genuine, fully-fledged team members (O'Neill, Flathmann, McNeese & Salas, 2023). We need to understand how these designs affect human attitudes toward AI and acceptance of technology (Musick, O'Neill, Schelble, McNeese & Henke, 2021; Schelble, Flathmann, McNeese, Freeman & Mallick, 2022). There are researchers already working on this in computer science, engineering, philosophy, and human factors. This is about making life better for humans through functional relationships with robots, synthetic agents, AI, and automation. It is not about denigrating, fooling, insulting, or abusing our robot counterparts.

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