



The achievement gap thesis reconsidered: artificial intelligence, automation, and meaningful work

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Abstract

John Danaher and Sven Nyholm have argued that automation, especially of the sort powered by artificial intelligence, poses a threat to meaningful work by diminishing the chances for meaning-conferring workplace achievement, what they call “achievement gaps”. In this paper, I argue that Danaher and Nyholm’s achievement gap thesis suffers from an ambiguity. The weak version of the thesis holds that automation may result in the appearance of achievement gaps, whereas the strong version holds that automation may result on balance loss in possibilities for workplace achievements, i.e., in the appearance of an overall gappier work landscape. Against the strong version of the achievement gap thesis, I characterize situations where automation may result in boons to meaning-conferring workplace achievements: the appearance of what I call achievement spread and achievement swaps. Nevertheless, Danaher and Nyholm are right to worry about some uses of automation whereby human workers become subservient to AI. But these situations are better framed, I argue, as autonomy gaps rather than achievement gaps.

Keywords Achievement · Meaningful work · Meaning in life · Artificial intelligence · Automation

1 Introduction

The recent success and popularity of ChatGPT and other generative AI has once again raised public concerns about how technology will impact the future of human work. The last decade has seen several thinkers worry that with the breakthroughs of AI and technological automation, there will soon be a lot fewer jobs, including previously shielded intellectual jobs that were (mistakenly) thought to be beyond the reach of machines. The anxieties accompanying this prediction have found expression in a number of academic and popular books sounding the alarm that many workers may increasingly find themselves out of work (e.g., Brynjolfsson and McAfee 2014; Ford 2015; Lee 2018; Danaher 2019a; Susskind 2020). While this is hardly a consensus (for an relatively optimistic account see Autor et al. 2021), what AI means for the future of work and society more generally remains to be seen. Many of the worries about technological

unemployment concern straightforwardly economic considerations. But these concerns are further amplified when we consider the way in which work has not only provided people a living but also reasons for living, i.e., being bound up with our sense of meaning and purpose in life. This has led several writers on the subject to speculate about how AI may impact human attempts to lead meaningful lives (e.g., Coeckelbergh 2020; Danaher 2017, 2019a; Floridi 2014; Kim and Scheller-Wolf 2019; Lee 2018; Susskind 2020; Tegmark 2017).

Here the concern is what sort of options for meaning will exist in a society where AI-powered automation increasingly re-shapes society. This raises concerns about how AI will impact the attempt to lead meaningful lives, more generally (see Nyholm and Rüter 2023 for an overview), and meaningful work, more particularly (for an overview of concerns in this domain see Bankins and Formosa 2023). For instance, some authors have considered how the integration of AI-powered robots will impact the meaningfulness of human work as we increasingly work alongside these technological counterparts (Nyholm and Smids 2020; Smids et al. 2020; Sorrell 2022).

While some of these issues are immediately facing us, there are still concerns about the long-term effects

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of AI-powered automation on the world of human work, including those goods beyond paid employment. Taking a long view, John Danaher (2019a) has investigated our prospects for meaning in a world where AI-powered automation has fully saturated society. Drawing on Thaddeus's Metz's (2013) theory of meaning in life, Danaher (2017, 2019a) has argued that the deployment of AI could "sever" us from various spheres of meaning, above all, those of cognitive and moral goods. This leaves us, on his view, with enjoyment of aesthetic and ludic activities (Danaher 2017, 2019a, b), and he goes on to speculate that human beings may lead meaningful lives in a society oriented around playing games in virtual worlds or as cyborgs (Danaher 2019a).¹

These arguments assume a long-term time horizon in which both work and non-work possibilities for human meaning dwindle. But more immediate concerns abound. John Danaher and Sven Nyholm (2021) have recently given these concerns about AI's impact on the future of work a more analytically precise and specific formulation by raising concerns about so-called 'achievement gaps', places where humans no longer can make meaning-conferring achievements in their work where they formerly could. Here the concern about automation is articulated as the subversion of opportunities for human beings to achieve goods in the workplace, thus draining work (and thereby, presumably, life) of an important source of meaning.

In this essay, I want to consider these worries about automation-induced, meaning-draining gaps in the workplace. I will argue that we need to distinguish two versions of the achievement gap thesis: a *weak version* whereby meaning-detracting gaps appear and a *strong version* whereby meaning-detracting gaps count as a net loss of possibilities for attaining meaning. The former posits the existence of gaps; the latter posits the existence of a gappier landscape of human work. Focusing on the strong version of the thesis, I will argue that gap theorists fail to adequately motivate the idea that, on balance, an increasingly automated society will diminish the chances for achievement in the workplace. They face a version of the much-discussed problem of whether AI will count as a "replacing technology" that eliminates the need for human labor (and thus also achievement) or an "enabling technology" that facilitates it in novel ways (Frey 2019, 13ff; see also Autor 2015; Acemoglu and Restrepo 2018; Susskind 2020). The stronger version of the achievement gap thesis, I will argue, must consider a more multi-faceted relationship between AI's impact on meaning-conferring workplace achievements that also includes the phenomena of what I shall call *achievement spread* and *achievement swaps*. Nevertheless, Danaher and Nyholm

are right to worry about some uses of automation whereby human workers become subservient to AI. But, I argue, these situations are misframed as achievement gaps and better understood using other normative concepts—notably, autonomy gaps.

2 Workplace automation and achievement gaps

While Danaher's (2017, 2019a) earlier work explored the existential possibilities of living in an automation-saturated society, more recently Danaher and Nyholm (2021) have considered a more immediate threat to meaning posed by automation—namely, the loss of workplace achievement.² Their argument is that AI-powered automation may result in a sort of inversion of the well-known problem of "responsibility gaps" (Matthias 2004), whereby activities in a job that formerly used to provide meaning-conferring achievements are taken over by machines. Observing that "automation may result in a redrawing of the task boundaries of particular jobs without necessarily resulting in a net loss of jobs" (2021, 228), Danaher and Nyholm argue that "achievement gaps" may afflict both jobs as a whole as well as the content and distribution of their constituent tasks. They call these two concerns, respectively, the worry about "total replacement" and "collaborative displacement" (229). Both by eliminating jobs (understood as paid work) as well as by changing their internal composition, the rise of AI and proliferation of automation poses a threat to both meaningful work and, more generally, meaningful living. When certain tasks are automated within a job, it matters *how* it is done. Danaher and Nyholm distinguish three types of relationship: (1) where human beings remain in a "supervisory" role over technology; (2) where human involvement is reduced to a "maintenance" role with regard to the machines; and (3) where human beings are subservient to machines, reduced to mere "order-following" (229). These different scenarios for automation, on their view, pose different risk profiles for meaningful work.

Following Susan Wolf's (2010) hybrid theory of meaning in life, which involves both subjective and objective dimensions, Danaher and Nyholm further clarify their concerns by focusing on the value provided by achievements. On this point, they turn to the work of Gwen Bradford (2013, 2015) to further specify *what* it is about an achievement

¹ For responses to Danaher's argument, see Chan (2020), Scliper (2022), and Knell and R  ther (2023).

² A related yet still importantly different set of concerns surrounds the issue of how enhancing human cognition might impact the value of achievements. See Forsberg and Skelton (2020) and Wang (2021) for a discussion of these issues. In this paper, I will limit my concerns to the deployment of AI in the workplace.

that is meaning-conferring.³ They highlight four features: (1) “[t]he *value* of the output produced”, (2) “[t]he nature of [the] *causal contribution* of the agent”, (3) “[t]he *cost* of the agent’s commitment to producing the outcome”, and (4) “[t]he *voluntariness* of the agent’s actions” (231, emphasis added). They argue that AI and automation may diminish the first three of the factors. As they summarize their argument:

The introduction of automating technologies into the workplace has the potential to open up numerous achievement gaps. This is because automating technologies tend to reduce the value of the outputs associated with human work tasks, reduce the cost of the human commitment to producing valuable commodifiable outputs (or redirect costly commitment in arbitrary and counterproductive ways) and, ultimately, sever the causal connection between human workers and valuable outputs. This is a bad thing since achievement is a key component of meaningful work (Danaher and Nyholm 2021, 234).

Thus, if Danaher and Nyholm are right, automation poses a threat to meaningful work and living by diminishing the role human beings play in bringing about valuable things through challenges that cost an agent something to pursue, i.e., achievements.

Danaher and Nyholm’s achievement gap thesis is not without its critics. Tigard (2021) has taken issue with Danaher and Nyholm’s characterization of these ‘achievement gaps’ as versions of ‘responsibility gaps’; they do not, on his view, have the same internal problem structure. Nevertheless, he still concedes there is a problem: “workplace automation undoubtedly raises a host of challenges, including the potential for *missed opportunities to achieve something in the workplace*” (617, emphasis added). For our purposes below, it will not matter who is right in this particular dispute; it is the diminished chances for achievement in the workplace that matters—not whether it is properly seen as a species of inverted responsibility gap.

More recently, scholars have responded to Danaher and Nyholm’s achievement gap thesis in still other ways. One criticism has taken the form of a direct challenge to their underlying theory of meaningful work (Parmer 2023). In what follows, I will accept Danaher and Nyholm’s theory of meaningfulness but challenge its application to the future of work. Still other writers have been more favorable to the idea of that AI may result in gap problems. Brett Karlan (2023) advances the concern that AI may undercut human achievement in localized ways by displacing human labor in a manner that especially impacts the already disadvantaged.

³ On the relationship between achievement and meaning in life, more generally, see also James (2005) and, more recently, Bradford (2022).

Sebastian Knell and Markus Rütter (2023) have argued that automation may also take away not simply from the possibility of certain meaning-conferring results but may also make unintelligible certain meaning-conferring processes—namely, earnestly striving after certain sorts of goals in the workplace or what they call “striving gaps”. They write: “With the full automation of the world of work, we lose the opportunity to realize an essential component of leading a meaningful life: the formation of rational intentions aiming at bringing about the objectively valuable results” (4). I will accept that along with the loss of achievement also goes a loss in the point of trying, as a sort of ‘atelic’ shadow.⁴ Both meaning-conferring achievements as well as their associated processes may be degraded or diminished by AI-powered automation. In what follows, I will frame my argument primarily in terms of ‘achievement gaps’, although the argument may have implications for ‘striving gaps’ as well.

3 Achievement spread and achievement swaps

Assessing the impact of AI-powered automation remains beyond the scope of philosophical analysis insofar as it rests on predictive claims of an empirical nature.⁵ While philosophers may be limited in their direct contribution to answering these empirical questions, they can, however, help to clarify how automation may impact the meaningfulness of work and, more generally, lives. Philosophers are well positioned to lend conceptual clarity and precision to debates concerning how automation may endanger meaningful work and living by analyzing in greater nuance how automation, work, and meaning in life are connected. Danaher and Nyholm’s (2021) achievement gap thesis exemplifies how philosophers can contribute to thinking more granularly about the threats to human meaning arising from automation. In this vein, I seek to further articulate and sketch linkages of a different sort between automation and meaningful work. My point is not to make empirical predictions about what the future of human work looks like, but rather to sketch how certain scenarios would impact the pursuit of meaning in life in greater nuance.

From the outset, we need to keep in mind two limitations that are already implicitly in place in Danaher and Nyholm’s achievement gap argument. First, they are concerned not with how automation will impact meaning in life

⁴ On the distinction between goal-oriented “telic” activities and process-oriented “atelic” activities, see Setiya (2017).

⁵ Indeed, even economists and economic historians have no consensus and remain tentative in their various assessments about how automation will likely impact the future state of human work (e.g., Frey 2019; Susskind 2020; Autor et al. 2021).

as a whole, with a full consideration of all the sub-spheres of life, but rather they remain focused simply on implications for the domain of paid work. This is an important restriction because there is not an agreement, as Susskind (2020, 223) observes, on how strong the link is between meaning and work. After all, meaning is derived from far more than just work in life, as Danaher (2017, 52) and Mark Coeckelbergh (2020, 139–142) have both emphasized (cf. Kim and Scheller-Wolf 2019). In what follows, we will follow Danaher and Nyholm in considering only the meaning that flows from work. Call this the *meaningful work restriction*.⁶

Second, Danaher and Nyholm's achievement gap thesis is not concerned with the full range of implications for meaningful work, which involves, as Andrea Veltman (2016) has persuasively argued, a plurality of different considerations, e.g., the way work can provide an opportunity for developing skills or, virtues as well as its role in giving an agent a sense of purpose and coherence in life (see also Gheaus and Herzog 2016; Bankins and Formosa 2023). Elsewhere in his collaborative work, Nyholm has examined a more multi-faceted range of implications AI may have on meaningful work, both positive and negative effects (see Smids et al. 2020, 2023; Nyholm and R  ther 2023). However, in the achievement gap thesis, the focus zeroes in on one specific dimension of meaningful work—namely, achievements in the workplace. Danaher and Nyholm note that there may be ways of compensating for automation's creation of achievement gaps by focusing on non-achievement yet still meaning-conferring dimensions of work, e.g., promoting team-building or carving out a niche space for human artisanship, as well as non-work-related sources of meaning (2021, 234–5).⁷ However, the achievement gap argument itself suspends these concerns and draws our attention to how AI specifically threatens workplace achievements. Call this the *meaning-conferring workplace achievement restriction*.⁸

The following argument will remain within the parameters already operative within Danaher and Nyholm's argument—namely, (a) a focus on meaningful work and (b) a delimitation only to achievement-related meaning. My aim is to highlight ways in which automation, especially of the

AI-powered variety, can not only diminish achievement, as in the gap thesis, but also can facilitate meaning-conferring workplace achievements, too. A fuller picture of the impacts of automation on the sphere of human work requires attention to both types of relation between automation and meaning-conferring workplace achievements.

Before sketching the ways in which AI-powered automation might prove positive to meaningful work, a clarification is needed. The achievement gap thesis suffers from an ambiguity. Are these gaps simply localized phenomena or are the appearance of gaps meant to suggest that the overall landscape of work has become more pocketed with gaps? At stake here is the overall force of the argument. A gap in achievement is not necessarily a problem if it is compensated for by achievement elsewhere. To appreciate the significance of the achievement gap thesis, we, thus, need to distinguish between two versions: (1) the claim that automation may result in the appearance of some achievement gaps, i.e., there will be some diminished opportunities for meaning-conferring work-based achievements (*the weak gap thesis*) and (2) the claim that *on balance* automation will lead to diminished opportunities for meaningful work in terms of opportunities for meaning-conferring work-based achievements (*the strong gap thesis*).⁹ The crucial difference between the weak and strong versions is that the former admits that there may be some losses but does not make a claim about the overall landscape of work-related possibilities. There could be achievement gains that offset the losses. The stronger thesis, by contrast, holds that automation will negatively impact the overall prospects for achievement both within a particular job as well as across the society. On this version, there will be *in toto* fewer opportunities for achievement and striving in the sphere of paid employment and thus, as a consequence, diminished opportunities for meaningful work and living. Here the claim about achievement gaps is that the landscape of work becomes, overall, gappier.

It is unclear which thesis Danaher and Nyholm are advancing, but for the sake of the following discussion, we will focus on the stronger thesis for the reason that it underscores a much more serious worry about the impact of automation on the world of human work and our prospects

⁶ Elsewhere Nyholm has provided a broader overview of various ways in which AI may impact the meaningfulness of life that goes beyond the workplace. See Nyholm and R  ther (2023).

⁷ With regard to non-work, non-achievement sources of meaning, some authors have recently emphasized the importance of passive experiences as a source for meaning. See Knell and R  ther (2023) and Scriptor (2023).

⁸ The threat to meaning-conferring achievements also goes beyond the workplace and may include games. This is considered in Karlan's (2023) discussion.

⁹ This distinction opens a space for considering a more complex dynamic with respect to meaningful work whereby human achievement may both be lost as well as facilitated. It parallels the debate had by economists and economic historians over whether automation "substitutes"/ "replaces" human labor or whether it "complements"/ "enables" it (respectively, the terms of Susskind 2020 and Frey 2019). While Danaher and Nyholm's analysis is, roughly, the philosophical counterpart of the idea that automation substitutes for human achievements, my argument is the opposing counterpart that emphasizes that we must consider how automation may also facilitate human achievement.

for finding meaning therein.¹⁰ While the mere appearance of achievement gaps may be concerning, if these are easily offset elsewhere, it is not obvious that this amounts to a real threat to meaningful work or living. Indeed, if the appearance of achievement gaps occurs alongside the appearance of new spaces for achievement, then we may have grounds to rejoice. Thus, we will set aside the weak version of the achievement gap thesis and interrogate the strong formulation.

Do the gap theorists successfully demonstrate the strong version of their theses? Here there seems to be an important missing premise: that workplace automation will eliminate more achievement-conducive jobs and/or tasks than it will create. This is a version of the now entrenched debate about whether new technologies “substitute” or “complement” human work (Susskind 2020, 22; see also Autor 2015, Acemoglu and Restrepo 2018; Frey 2019). The question is, thus, whether we have grounds to think there will be an overall decline in opportunities for meaning-conferring achievements and strivings. But do we have such grounds? Even if workplaces automate some jobs and/or tasks that eliminate the possibility of certain achievements, they may enable achievements in still other ways, which may be even more meaningful as understood on Danaher and Nyholm’s own terms: the achievement’s value, cost, and causal connection to the agent. But how might this occur?

Let us begin by considering Danaher and Nyholm’s own example of warehouse workers and delivery drivers. They write:

Think, for example, of the Amazon warehouse worker who is given a set of customer orders and a route through the warehouse to pick up those orders that has been planned by algorithm. They see the stimulus given to them by the machine and respond, not with creativity or foresight, but just following the route that is recommended. They dare not second-guess the algorithm or exercise any creativity in case they are less efficient at their jobs (and are reprimanded for failing to follow the orders). Similar things are happening in

¹⁰ Some textual evidence suggests that Danaher and Nyholm (2021) are making broader claims about the impact of AI on society, which would align with the strong version of the thesis. For instance, “As AI and other automating technologies are increasingly used to augment and replace human task performance in the workplace, there is, we argue, a significant risk to the value of human achievement. This, in turn, makes it difficult for us to ensure that people have access to meaningful work. In addition, while this argument focuses specifically on the impact of automation in the workplace, it may have broader implications for the impact of automation on human life more generally” (227–8). This claim suggests the stronger reading that the existence of achievement gaps may have negative social effects on a broad scale.

other forms of work where algorithms play a key role in planning and coordinating the physical activity of workers, e.g., in ‘platform’ work, such as that provided by companies like Uber and Deliveroo (2021, 233).

For starters, it is worth noting that examples of gig work in delivery driving or warehouse picking and sorting are curious examples of achievements that are threatened. While I share Danaher and Nyholm’s concerns that the use of algorithms in these contexts do pose a threat to the meaningfulness of work, it is not, in my view, best characterized as undercutting achievements. It is not obvious that choosing one’s route through a warehouse or selecting which streets and alleyways to take to deliver a pizza or some noodles meet Danaher and Nyholm’s own criteria for achievement: high-value outputs, cost to an agent, or causal connection. These types of job may be thought to be less meaningful than other jobs for the reason that they have a relatively limited range of high-value outputs and thus limited achievement potential. But when algorithms take charge of the lives of workers, we do have reason to worry about a loss of autonomy and the instituting of a punishing regime of surveillance and discipline (see e.g., Delfanti 2021; Vallas et al. 2022; Ajunwa 2023) or rendering their work more precarious through ‘just-in-time’ shift scheduling (Moradi and Levy 2020). The question is whether the worries of these applications of AI are best understood in terms of a loss of achievement or whether we need other normative concepts. I will return to the issue of AI-subservient work below.

But first, let us consider another example of an achievement gap, one that could be thought of as a paradigm case of meaningful work: healthcare, more specifically being a doctor.¹¹ The work of doctors, e.g., healing bodies and saving lives, clearly meets Danaher and Nyholm’s (2021) criteria

¹¹ In other work on how the introduction of robotics into the workplace could impact meaningful work, Nyholm has also addressed similar medical technologies. See Smids et al. (2020, 511, 514) on making, respectively, radiology and surgery easier. In this context, Smids et al. (2020) discuss how working alongside robots may have both positive and negative effects. Quite saliently, they observe, for example, “supported by robotic helpers, radiologists might be freed from routine and time-consuming tasks, leaving them more time for their patients” (511). This is related to the argument I will develop below about achievement spread and swaps. Importantly, Smids et al. frame their argument, however, in terms of the *purposive* dimension of meaningful work. With respect to robotic surgery, they consider how this may have a leveling effect and impact the social prestige and recognition of surgery work. This second application is getting closer to the concerns about how automation may impact meaning-conferring workplace achievements, although achievements are not the same as and cannot be reduced to mere social recognition. My argument is that a similar mechanism weakens Danaher and Nyholm’s “achievement gap” thesis. What they treat as leveling may be seen, more positively, as spreading achievement around.

for achievement: (a) it involves challenges or ‘costs’ to the doctor delivering care, (b) the doctor’s involvement is typically thought to involve a significant causal connection to the results, (c) the outcome—namely, the restoration of a patient’s health—is highly valued, and (d) the doctor’s work is voluntarily undertaken. Such medical work is, thus, a good candidate for meaning-conferring achievements. How might AI-powered automation affect this occupation? The scientist and venture capitalist Kai-fu Lee (2018, 113–5) speculates that AI technologies may impact the medical profession by providing doctors scattered across the world, even in rural or remote settings, with cutting-edge diagnostic precision; the social uptake of medical-diagnostic AI will amount to, he predicts, “a massive democratization of high-quality services to those who previously couldn’t afford them” (113, emphasis added). Equipping medical professionals with AI-powered diagnostic tools, he believes, will improve the general level of medical diagnosis available to patients: “Given enough training data—in this case, precise medical records—an AI-powered diagnostic tool could turn any medical professional into a super-diagnostician, a doctor with experience in tens of millions of cases, an uncanny ability to spot hidden correlations, and a perfect memory to boot” (114). He considers one example of this sort of AI-diagnostic app currently available in China:

The app never overrides a doctor—who can always choose to deviate from the app’s recommendations—but it draws on over 400 million existing publications to make recommendations. It disseminates world-class medical knowledge equally throughout highly unequal societies, and lets all doctors and nurses focus on the human tasks that no machine can do: making patients feel cared for and consoling them when the diagnosis is not bright (2018, 115).

What sort of achievement gaps may arise in this sort of AI-supplemented labor? Most obviously, there seems to be an immediate threat to the achievements of diagnosis themselves. If AI enables doctors to more accurately predict, for instance, whether a skin growth is cancerous, then it seems to diminish the accomplishment of cultivating the human skill to assess skin anomalies. It would seem to make this feature of being a doctor redundant or at least less important than other features, e.g., bedside manner, patient education, performing surgery, etc. This is, I want to concede, a genuine loss of achievement by Danaher and Nyholm’s criteria as this is a difficult skill to cultivate that stands in a close causal connection to a valuable goal. The worry is that the integration of AI technology may result in the loss of achievement as this task is simply eliminated or ‘displaced’ (Karlan 2023) as humans no longer participate in the activity of diagnosing but rather rely on machines for this.

Looking at this achievement gap in a vacuum, however, we fail to appreciate the complexity of the broader medical work landscape. We might wonder whether the use of these sorts of diagnostic technologies counts as an ‘achievement gap’ with respect to meaningful medical work in the stronger sense, i.e., whether, *on balance*, this amounts to a loss of meaning-conferring workplace achievements when we zoom out and take a look at the broader world of human medical work. Even if there are some areas where medical achievements are lost, does this mean that, on balance, there are less achievements to be had in the sphere of medicine?

Lee’s (2018) description of the social uptake of these new AI-diagnostic technologies already anticipates two potential problems for the strong version of the achievement gap thesis. First, AI-powered diagnostic tools, which automate, say, cancer diagnosis, make more accurate diagnoses more generally available. A few elite doctors in high-powered medical centers may lose their edge, but a far greater number of lesser-trained or less-specialized doctors may now be able to offer much better care. Given that healing people is the aim of the medical profession—and diagnosis an auxiliary task to this end—this means that the overarching achievement of providing high-quality medical care is improved, for both highly skilled and lesser skilled practitioners. If Lee’s prediction is right, a far greater number of doctors may soon be able to offer improved care and more lives may be saved.

Does this also translate into a greater number of achievements? It might be thought that while competent medical care is more widely delivered, there are fewer achievements to be found in medical work. However, this argument is not convincing. When a technology allows a doctor to save a life that would have otherwise been lost or to heal an injury or cure a disease that otherwise would have taken longer to heal, these count as achievements, even by Nyholm and Danaher’s own criteria; a valued outcome was achieved where it otherwise would not have been. For this reason, I want to argue that the use of these diagnosis-improving technologies may translate into more achievements across the board with respect to the primary aim of medicine—curing disease, improving health, and saving lives. Call this phenomenon *achievement spread* in the sense of spreading out and more widely distributing achievement-potential.¹² Even if there are pockets for diminished achievement opportunities, an improved edge in certain domains yielded by AI enables lesser skilled actors to achieve more valuable

¹² Forsberg and Skelton (2020, 331ff) discuss in the context of human enhancements the “dispersion” of achievements whereby a personal achievement is transformed into a collective achievement. This could also apply to AI and automation. While we may have a collective dimension insofar as we take into consideration the designers of AI technologies, my point in discussing achievement spread is to consider how lesser skilled agents now can have achievements that would not have been possible or would have been less likely absent

outputs. And this amounts to a gain for human achievements. Let us specify this as follows:

Achievement spread occurs when a technology, A, automates a subordinate task, T, and thereby allows more lesser skilled actors to better achieve greater outcomes for a superordinate aim, S, which is a meaning-conferring achievement.

Whether or not achievement spread will offset the losses incurred by achievement gaps in some sub-domains is a question I cannot answer here as it turns on empirical matters. Nevertheless, my argument is that we need to recognize this counterbalancing force that will affect the overall space for achievement. By Danaher and Nyholm's criteria of achievement, there is reason to think there may be increased meaning-conferring workplace achievements facilitated by AI alongside any gaps that may appear.

It might be objected that achievement spread is illusory because it trades upon essentially deskilling the medical profession. Thus, even if there are more patients saved, this does not translate, so the objection goes, into more workplace achievements. This objection is strengthened if one underscores the centrality of difficulty for achievement, as Bradford does (2015) in her account. Consider the following case:

Miracle Healer. Z has the miraculous power of an unknown source to immediately heal any illness or ailment with the simple touch of her hand. People flock to her to be healed by her magical touch, and she cures countless numbers with little more than the tap of her finger.¹³

It is hard to see how Z's miracles would count as an achievement on either Bradford (2015) or Danaher and Nyholm's (2021) accounts. There is neither difficulty nor cost to her supernatural medical altruism. Would AI-improved medical care approximate this case? Consider a further example.

Techno-Healers. After studying the miracle healer Z's unique physiology, Miracle Corp. developed a technology that allows ordinary people to perform comparable medical miracles with the mere touch of their fingers.

The proliferation of the curing power made possible by the Techno-Healers scenario would not, an objector may continue, count as an achievement. Here, too, there is simply not enough difficulty to warrant considering medical work an achievement. Does not this suggest that even if the practice of healing spreads, as in the case of rural doctors using AI-powered diagnostic equipment, there is no corresponding spread in achievement?

While I agree that the Techno Healers case may sap medical work of its achievement factor by altogether eliminating the difficulty of healing practices, I do not think that this is a comparable case of how AI-technologies would, at least in the near and middle-term, impact the meaningfulness of medical work. Here three features are salient. First, while the automation of medical diagnosis may take away an achievement—namely, the achievement of successfully diagnosing a disease—and thus give rise to an achievement gap, the good of diagnostic achievement remains *subordinate* to the accomplishment of a superior good—namely, healing people and saving lives. Indeed, it is not clear that diagnostic activity separated from other activities of healing and curing lives is of much value. If a doctor was able to successfully diagnose rare cancers and yet all of her patients ended up shortly thereafter (for whatever reason) dead, we would be unlikely to celebrate and praise this doctor's diagnostic achievement. The value of the successful diagnosis turns out to be related to its superordinate end; it is not isolated in a vacuum. Thus, even if there is a loss of achievement at one level, there is a gain in achievement at a higher, more important level, insofar as it results in a greater yield of valued products.

Second, even if medical technologies make diagnosing easier, this is embedded within a basket of other practices that remain challenging.¹⁴ The work of doctor involves many different tasks that may remain difficult and costly even if, say, diagnosis becomes successfully automated. Thus, it is not the case that the use of AI technology for one sub-task entails that medical work is as simple as the miracle touch in the scenario above. When assessing the overall achievement of medical work, as with other forms of work, it is important that certain tasks are nested in a bundle of various activities, not all of which are easy. The difficulty of other tasks renders the job as a whole still challenging, even with successful automation of some tasks.¹⁵

Footnote 12 (continued)

the assistance of AI and the automation of some tasks. This phenomenon occurs even if we remain focused solely on the respective achievements of all the AI-facilitated agents rather than looking at a larger group level that includes technicians and designers.

¹³ Cf. Bradford's (2015, p 31ff) discussion of a musical virtuoso.

¹⁴ There is a parallel here to debates regarding human enhancement. Forsberg and Skelton (2020, 325ff) have argued that a performance-enhancing drug, for instance, need not undermine all difficulty of an activity, and therefore it may still count as an achievement.

¹⁵ In his treatment of how AI may impact achievements, Karlan (2023) distinguishes between (a) the worry about "displacement" and (b) the worry that AI will make tasks too easy. However, here we see that these may interact when we consider how various tasks relate within a job. My point is that when a task with meaning-conferring

Moreover, the gain in the higher-order achievement is one in which there is no fundamental competition between actors, even if, say, some cutting-edge cancer researchers see their edge over lesser-trained doctors diminished by the appearance of beneficial technology. These are, in Iddo Landau's terminology, 'non-competitive' values (Landau 2017, 44). This may mean that their achievements in diagnosis are no longer unique, but the gains made in providing better health care more widely are not diminished by this fact. That a physician in rural West Virginia can now, say, make cancer diagnoses on par with medical practitioners at elite university hospitals in New York City or Boston does not diminish the achievements being made here: doctors are saving more lives. I want to suggest that the phenomenon of achievement spread will, thus, be typical when the automated tasks are (i) *subordinate achievements*, (ii) *embedded in a basket including challenging activities facilitating*, (iii) *non-competitive goods*. Thus, even in the face of achievement gaps, when these gaps appear in a certain constellation of other activities, their loss with respect to meaning-conferring workplace achievements may be offset elsewhere.

There is still another reason to think that automation may lead to a boon in meaning-conferring workplace achievements. As Lee (2018) suggests, by making diagnosis faster and less labor intensive, it also means that medical practitioners would be released to attend to other important aspects of their work, specifically, he notes, 'making patients feel cared for and consoling them' (115)—hardly insignificant features of medical work. But we might add still others: prescribing treatments, patient education, attention to surgery, and so on. These are also features of the medical profession that involve achievements that contribute to the main achievement—namely, healing patients and restoring health. Here we see what might be called an *achievement swap*.¹⁶ We might suspect that this sort of pattern is not limited to the

medical profession but will take place in still other domains where AI is integrated to improve performance in certain sub-tasks of a job.

An *achievement swap* occurs when a technology, B, automates a task, T, and thereby releases time and energy to pursue other tasks, X (Y, Z, etc.) which themselves provide opportunities for meaning-conferring achievements.

Note that this is *not* substituting a non-achievement source of meaning in work for an achievement source of meaning in work, which Danaher and Nyholm (2021) discuss as a way to deal with achievement gaps (234–5). Rather, it is shifting the focus from one sort of achievement to another. Otherwise put, it is not a shift from one type of workplace meaning to another but rather a shift internally within the category of meaning-conferring workplace achievements.

Consider another case of an achievement swap that comes from impact of computer statistical packages on the field of economics, which has facilitated economists focusing on arguably more meaningful and achievement-prone activities than doing tedious, albeit difficult, calculations. I quote at length from correspondence with a professional economist:

The development of statistics software has dramatically changed the way people like me have done empirical research. 30 or 40 years ago, statistics work involved a ton of very difficult calculations and programming. Today, the computer automates most of that work. This does not mean that economics has become de-skilled; however, quite the contrary. The end result is that economists have just focused much more time on the higher level conceptual work of statistical modeling. We are dramatically more productive at doing statistics, and because there was huge room for growth in performance, the added productivity is channeled entirely into what you have called an "achievement swap" and it seems to me that it was a swap from a very difficult high-skill onerous task to a difficult high-skill enjoyable task, so it feels like a win.¹⁷

It might be objected that this pattern of achievement spread and achievement swaps is the exception rather than the rule: only in the most rarefied professional work might we expect this pattern. Let me ward off this line of attack

Footnote 15 (continued)

achievement potential is eliminated, how this task is positioned vis-à-vis other tasks matters for the achievement value of the overall job.

¹⁶ The idea that some tasks might be automated and thereby liberate human labor for other meaningful tasks has been well observed by others, including Nyholm in other work: "if there are activities that we can use our intelligence to engage in, but those are activities that we find meaningless, and AI systems can take over those activities and thereby free up time for us to engage in other more meaningful activities instead—well, then the AI could be seen as a *meaning-booster* or *meaning-enabler*. This requires two things: first, that there are certain activities we now engage in that involve a kind of opportunity cost in relation to other more meaningful things we could be doing instead; and secondly, that AI technologies could take over those less meaningful activities while not taking over any of the activities that we do find it meaningful to engage in ourselves" (Nyholm and Rüter 2023, 7, emphasis added; see also Smids et al. 2020; Bankins and Formosa 2023). My argument is that we can apply this reasoning to the issue of meaning-conferring workplace achieve-

Footnote 16 (continued)

ments and thereby challenge or at least complicate the achievement gap thesis. Even if AI can take over tasks that are achievement-conducive, the net result may still be an increase in achievement if it allows workers to devote their time and effort to activities equal or greater in potential meaning-conferring achievement value.

¹⁷ Personal communication with Steven C. McMullen.

with two responses. First, whether patterns of achievement spread and achievement swapping are common or uncommon depends on the social uptake of AI and automation technologies. This involves the overall deployment and impact of AI and automation in various domains of skill and the landscape of work (paid and unpaid) as a whole, an empirical prediction that goes beyond the domain of moral philosophy. My argument is that the strong version of the gap thesis needs to consider a greater range of possible configurations of the social uptake of AI-automation technologies than just achievement gaps to appropriately appraise the future of the overall work landscape. Answering this question requires a greater range of conceptual tools at our disposal for assessing the impact of AI technologies on workplace achievements. It is not just gaps that matter but also other configurations of impact that I have expressed in terms of spread and swaps. How this will play out rests on the still open question of the relative priority of whether new technology ‘substitutes’ or ‘complements’ human labor (Susskind 2020, 22) or, in other terms, the relative dominance of “replacing technologies” versus “enabling technologies” (Frey 2019, 13; see also Autor 2015; Acemoglu and Restrepo 2018).

Second, achievement swaps are not only found in domains of highly professionalized activities like medical doctors. One can also find achievement swaps and achievement spread in more quotidian careers. Take the much-discussed example of bank tellers and the introduction of automatic teller machines or ATMs (Bessen 2015; Autor 2015; Susskind 2020, 27–8). As an example of how technological development did not eliminate jobs but changed them, Susskind (2020) writes: “ATMs did not simply substitute for bank tellers, but also complemented them...ATMs didn’t make tellers more productive at handing out cash, but they did free them up to focus their efforts on other activities, like offering face-to-face support and providing financial guidance” (27). What does this mean for our discussion of meaning-conferring workplace achievements? It seems, on the face of it, to amount to an achievement swap insofar as tellers were able to shift to more interpersonal, less mechanical tasks. These tasks seem to be more achievement-prone than the displaced task of exchanging money: more challenging, more valuable outputs, and more closely connected with the teller’s involvement. Seen through the lens of meaning-conferring workplace achievements, the introduction of ATMs seems to have amounted to an *achievement upgrade*, whereby the swapped-out tasks have features more conducive to achievement than those relinquished to machinery, e.g., consulting customers rather than dispensing cash. The replacement tasks are, one might easily imagine, more challenging, more valuable, and more enjoyable, than those automated, which better fit Danaher and Nyholm’s own criteria

for meaning-conferring achievements. This demonstrates that some relatively mundane achievement swaps may also be positive insofar as it frees up agents to engage in more achievement-prone tasks.

Where does this leave us? The above argument has not attempted to show that there will be, on balance, more achievement swaps and spread than achievement gaps. Such a thesis would require conclusions of an empirical nature, which have achieved no consensus. Rather the argument here has dealt with the conceptual linkages between automation and meaning-conferring workplace achievements. Following Danaher and Nyholm, I have been attempting to articulate in a more granular way concerns about the impact of automation, especially as it is carried out by powerful new AI technologies, upon the meaningfulness of work, specifically, on meaning-conferring workplace achievements. One task of the philosopher is to describe clearly the avenues by which automation may eat away or contribute to the circumstances that make possible meaningful work and living. I have suggested that when one zooms out to look at how the broader landscape of work could be impacted by automation, one encounters not only achievement gaps but also achievement spread and achievement swaps (some of which can be of an upgrading nature). This is a philosophical counterpart to the debate over whether technology will “replace” or “enable” human labor—one that gives us reason to think automation may not be disastrous for meaningful work and living. The result is a more complicated picture than suggested by the strong version of the achievement gap thesis.

4 (Mis)framing the gap

I want to return now to Danaher and Nyholm’s (2021) example of AI-subservient labor. To illustrate this type of relationship, they point to Amazon warehouse workers who rely on AI to guide their movements in fulfillment centers for optimal efficiency and delivery/rideshare drivers who follow the optimized driving plans displayed on phones. In these cases, they allege, meaning-conferring workplace achievements are lost. While I agree with them that there are concerns here, it is not clear to me, however, that the achievement gap thesis is the best way to formulate these concerns. Rather, I believe, the worry raised by these concerns is better framed in terms of diminished autonomy. But the possibility of confusing achievement gaps with what I will call autonomy gaps reveals something worth cashing out in greater nuance. Both share a common root but differ in ways that are important to mark on pains of inadvertently masking more fundamental problems.

Two clarifications need to be made. First, my criticism is not simply that Danaher and Nyholm offer a poor example

to illustrate their concept of achievement gaps. This quibble would not amount to much. After all, I do accept the weak formulation of the achievement gap hypothesis, i.e., that sometimes automation can result in diminished meaning-conferring workplace achievement. Moreover, I am not suggesting that achievement gaps and autonomy gaps are mutually exclusive. Indeed, as Nyholm in collaboration with Smids et al. (2023) have recently argued the deployment of automating technologies in warehouse work may impact the meaningfulness of work in several different aspects, including diminishing both autonomy and achievement. Clearly, the deployment of AI-subservient technologies may be bad in multiple ways simultaneously.

Rather, my concern is with *misframing* of the impact of the social uptake of automating technologies. Contra Danaher and Nyholm's original achievement gap thesis, I will argue that it is not at all clear that the use of AI-powered monitoring and guidance technologies result in achievement gaps. Nevertheless, they are right to worry about the deployment of such technologies in, e.g., warehouse settings. Other normative categories, however, are more salient and necessary for properly appreciating the ethical issues in this case. But the fact that autonomy gaps can be misclassified as achievement gaps reveal a common root that warrants attention. Framing matters here because it shapes both how we perceive the loss as well as how we devise a remedy.¹⁸ In what follows, I will offer an explanation as to how achievement gaps and autonomy gaps differ as well as a reason why they can be conflated. Keeping them separate is important, I conclude, to prevent masking or overlooking substantial differences that call for different responses.

For starters, is there a loss of achievement in this sort of AI-guided warehouse work? If so, wherein does the loss consist: in the value of the product or the difficulty? Both of these answers are problematic. On the one hand, it may seem like there is not a loss of achievement here because there never was much of an achievement in the first place. It could be argued that these sorts of jobs already suffer from a deficit in meaning with or without AI-guided tools because picking, sorting, and stowing are not achievement-prone activities. Packing or unpacking items in boxes or placing them in the right receptacles for transit are just not sort of activities that have a high value and thus do not generate much of an achievement, it might be objected. Choosing one's path through the warehouse does not seem to make much of a difference with respect to achievement value. If this is right, then it is not clear that the use of AI in warehouse settings will cause achievement gaps because there is little achievement value to diminish.

On the other hand, it might be objected that AI-guided tools do not diminish the workplace achievements that warehouse work affords. Bradford's account of achievement (2015) is a useful point of reference for this argument. She stresses the importance of *difficulty* for constituting an achievement.¹⁹ In contrast to Danaher and Nyholm's (2021) position, which also brings into play the value of products, as we saw above, for Bradford (2015) this is not essential to achievements. Rather, on her view, the two factors that matter are (a) difficulty and (b) what she calls "competent causation" (64ff). On this conception of an achievement, the AI-guided work of warehouse workers need not undermine the difficulty or competency involved. Following the directives of an AI-powered scanning device still requires competent causation to find the necessary products and move them to the right locations. It also remains as a physically difficult work. Empirical researchers studying Amazon fulfillment centers have underscored in their reports the challenging physical nature of the work involved in keeping up a high pace of processing units (Delfanti 2021; Vallas et al. 2022). The integration of AI tools into the warehouse context does not eliminate the physical difficulties of processing a large volume of units at a high speed. Indeed, it even provides the management with tools needed for tracking performance. Practices within warehouses such as "power hour" challenges (Delfanti 2021, 49–50) may create the conditions under which the labor is transformed into a contest-like environment (see also Vallas et al. 2022, 439) that bring its difficulty (and thus achievement value) to the fore. On Bradford's (2015) conception of achievement, there is no reason to think AI-guided labor would undermine the conditions for warehouse work to count as an achievement: processing a high number of units quickly and with stamina over several hours provides the conditions under which difficulty is present. Doing this successfully may indeed count as achievements for the workers as they stretch themselves to be ever more productive and as workers compete with themselves and each other, a feature that has been held to be central to achievement (Dunkle 2019). There is, even with the assistance of AI, always room to push a little harder, to challenge oneself a little more, and to outperform one's colleagues. If this is correct, the use of AI tools in warehouse settings may not generate achievement gaps because such tools do not drain warehouse work of its difficulty (and thus achievement value).

Not everyone, however, agrees with Bradford's difficulty-centered account of achievement. Sukaina Hirji (2019) has

¹⁸ For the locus classicus on the significance of framing see Tversky and Kahneman (1981).

¹⁹ Indeed, Bradford's (2015) account has prompted consideration as to what counts as 'difficulty' and 'effort' as well as its significance for achievement. See, e.g., von Kriegsten (2017), Dunkle (2019), Hirji (2019), and Karlan (2023).

argued, by contrast, that our sense of achievement needs to be more multi-faceted and consider not just the capacity to overcome difficulty with respect to diligent and persistent work but also cultivate other capacities, e.g., creativity. This view may explain why the hardworking warehouse worker may be open to certain sorts of achievements (e.g., the top picker or stower award) and yet we may worry that there is still something problematic about this work as it does not allow the workers to cultivate achievements in a full range of abilities. Even if one is physically stretched to pick and stow rapidly over an extended shift, this may strike us as still a problematic condition. But if this is the case, then the worry is not just that there are achievement gaps as such but rather that there are achievement gaps of different sorts that hit, as it were, different capabilities.

Nevertheless, I do share a concern that AI-subservient labor may detract from work's meaningfulness. However, my worry with this example is that Danaher and Nyholm misframe the real threat from AI and automation in these contexts as a loss of achievement when actually the loss is better characterized using other normative concepts. The worries raised by the warehouse worker example exist irrespective of whether or not there is an achievement gap. The fact that there are lingering concerns that can be confused with the generation of achievement gaps raises an interesting question that requires more detailed analysis.

Even if we accept that both achievement gaps and what I'll call autonomy gaps may be generated by automating technologies, it matters how we frame the issue.²⁰ Classifying the loss of meaning in AI-guided warehouse work in terms of achievement gaps masks, I worry, a more subtle and pernicious threat to meaning. As Pegah Moradi and Karen Levy (2020) have argued, even without eliminating jobs (or tasks), AI poses a real threat to the integrity of work by intensifying the surveillance and control of workers and rendering work more fragmented, contingent, precarious. Following their lead, I want to suggest that the main worry with respect to AI-subservient jobs, at least of the sort discussed in Danaher and Nyholm's paper, is not the formation of achievement gaps but rather diminished worker autonomy and increased surveillance and control. Paralleling their terminology of 'achievement gaps', call these *autonomy gaps*.

An *autonomy gap* occurs when a technology, C, diminishes the control had by an agent over some range of activities and/or imposes surveillance backed by sanctions over activities which were previously less subject to monitoring and guidance.

In continuing with the 'gap' metaphor used by Danaher and Nyholm and taken over from the "responsibility gap" literature, I am drawing attention to the relative loss of space for an agent's individual decision-making over some aspect of her work. This loss of agency characterized the diminution of agency need not be seen as a species or dimension of achievement gaps. Indeed, construing them in this way would be misleading because it suggests that autonomy is only valuable insofar as it contributes to achievement. In contrast, I want to argue that even in cases where achievements are quite minimal and/or sparse, there may still be reasons to worry. The worker whose movements are dictated by an algorithm suffers a meaning-relevant loss, even if it is not one of the achievement.

Several authors have argued for the close connection between meaningful work and autonomy. Generally stated, these writers hold that work is less meaningful where it is less autonomous or undercuts an agent's own decision-making (Schwartz 1982; Bowie 1998; Roessler 2012; Yeoman 2014; Veltman 2016). An agent's autonomy can be diminished when they have less control over their circumstances both concerning which jobs they take as well as how much control they have over their work in the workplace (see Veltman 2016). Indeed, not only is autonomy an important feature of meaningful work, but it has also been underscored as an important ethical concept for assessing AI's societal impact in general (Floridi et al. 2018) and AI's impact on meaningful work, more specifically (Smids et al. 2020, 2023; Bankins and Formosa 2023).²¹ I am, thus, in agreement with these authors that we need to consider how autonomy may be diminished by the deployment of AI technologies. What I want to add is that it is important that we distinguish this from threats to achievement and acknowledge how the two can be confused. Seen through this lens, AI algorithms may threaten to degrade meaningful work by taking away an agent's *autonomy* rather than opportunities for *achievement*. Even if AI technologies are taken up, say, in ways that guide, monitor, and facilitate the control of worker movements in factories, this is worrying irrespective of whether achievement gaps appear. Even if these jobs continue to be achievement-prone in virtue of the difficulties and challenges of the labor, as discussed above, the deployment of this technology does still raise meaning-related concerns.

Assessing whether AI-subservient labor is meaning-diminishing because it is autonomy-subverting requires empirical research into the character and conditions of these

²⁰ For an alternative use of "autonomy gaps" see Anderson (2009).

²¹ The loss of autonomy is also given as one the reasons why Nyholm (2022) thinks "technological manipulation," as in the intentional spread of online conspiracy theories for political ends, undercuts the meaningfulness of lives caught in this snare.

contemporary modes of labor. Fortunately, there have been studies on the conditions in Amazon Fulfillment Centers in recent years (Delfanti 2021; Vallas et al. 2022).²² I rely on these studies to ground our assessment of AI-subservient scenarios in real world conditions. My point is not to contribute to the empirical assessment of contemporary working conditions, but rather to articulate a conceptual point about how certain sorts of AI integration within the workplace may degrade meaningful work without framing this in terms of achievement gaps.

Consider the integration of algorithmic technology in Amazon warehouses as described by Delfanti (2021) and Vallas et al. (2022). These researchers detail how workers are guided by scanners that direct them to stow incoming products or pick selected products that are then packed by other employees. This technology makes it possible to manage the products despite their overwhelming quantity of items and complexity of the stockroom: “this process generates an inventory that no individual human being can navigate without the aid of Amazon’s system algorithm” (Delfanti 2021, 45; see also Danaher 2016, 253). As Delfanti (2021) comments, “little craft of knowledge of the inventory is required to work as a picker. In fact, because of the rigid form of task allocation it generates, many workers perceive algorithmic management as an agent of alienation” (47). In the words of one worker, “You just need to follow the scanner, which tells you go here, go there, pick this and pick that. You don’t need to do anything else, but you don’t need to think. Eight hours can last 24 h because you are in a limbo” (quoted in Delfanti 2021, 47). While this may look superficially like the loss of achievement as stowers and pickers can rely on their scanners rather than memories, it is not clear to me that the loss of achievement is the best characterization of the worry for the reasons discussed above. Nevertheless, what does seem disturbing about these empirical studies is the loss of autonomy. Indeed as Vallas, Johnson, and Momadova (2022) mention in their study of Amazon Fulfillment Centers, “[a] large proportion of workers feel treated as a disposable resource or as machines” (445). But it is not just that workers may feel alienated but they are also under greater surveillance facilitated precisely by the scanner that allows management to keep track of an employee’s productivity in real time. As Delfanti (2021) describes it, “The barcode gun thus becomes a tool of surveillance and communication in the service of managers, whose networked computers can access the backend of inventory software and track each associate’s activity” (50). Vallas et al. (2022) refer to the deployment of such technology as “techno-economic

despotism,” which they characterize as situations where “management polices worker productivity using a sophisticated algorithmic system that places workers at risk of termination if they fail to ‘make rate’” (423). The surveillance control provided by AI-assisted labor has the effect, as Vallas et al. (2022) observe, of heightening the sense of precarity among workers: “Crucially, when workers describe their fear of being fired, they almost always reference the company’s sophisticated system of digital or algorithmic controls, which management uses to police each worker’s productivity” (434).

A brief look at the empirical literature on warehouse workers (Delfanti 2021; Vallas et al. 2022) does not primarily emphasize that AI-powered technologies are eliminating the sense of achievement, but rather how AI technology enables a sophisticated surveillance that leads to feelings of alienation, a loss of control, and a heightened sense of precarity, all conditions we might more generally associate with a loss of autonomy.²³ Concerns about heightened surveillance and loss of autonomy are not restricted to warehouse work. For example, Karen Levy (2023) has provided a compelling portrait and analysis of how new surveillance technology has transformed the trucking industry, undercutting an industry long defined by its autonomy and worker independence and subjecting truckers to intense levels of scrutiny and tracking. She worries that “truckers may be canaries in the coal mine” as these technologies proliferate and transform still other professions and industries (2023, 9). Indeed, as Ifeoma Ajunwa has argued (2023), we live in an age of “the quantified worker” whose life is intensely monitored and scrutinized by employers in many covert and not so covert ways.

It is not a surprise that achievement gaps and autonomy gaps might be conflated as both involve diminished agency on the part of the worker. As AI usurps various tasks and activities within a job, workers may exert less causal influence in the production of valued goods and hence be able to take less credit for the value produced (achievement gap). However, if AI diminishes more fundamental aspects of agency, say, control over basic movements, what is at stake is not achievement but a basic level of control (autonomy gap). While these two types of gap are both occasioned by diminished human agency, it is important to analytically keep these two types of gap distinct as they threaten meaningful work (and living) in different ways and call for different responses.

Of course, achievement gaps and autonomy gaps are by no means mutually exclusive. Both are threats to the meaningfulness of work. However, when considering more

²² Cf. the analysis of Smids et al. (2023), which draws on a different body of empirical research into the uptake of automation technology in warehouses (see Berkers et al. 2023) but reaches some similar conclusions.

²³ For a discussion of the relationship between alienation, autonomy, and meaningful work see Roessler (2012, 85ff).

closely one of Danaher and Nyholm's chief examples of AI-subservient work—namely, warehouse work—it is questionable whether the idea of an achievement gap best captures the underlying worry. What is clear upon consulting the empirical literature is that these AI-assisted forms of labor go along with methods of surveillance and control that may impact the meaningfulness of work. While achievement gaps may be doubtful, we have grounds to suspect autonomy gaps. My point is not simply that Danaher and Nyholm chose a poor example for their argument. Rather I worry that in misframing the issue, we will not adequately address the full range of concerns raised by AI. For instance, if we think that the AI-guided labor of the warehouse worker may suffer an achievement gap, efforts by management may focus on shoring up a sense of achievement with competitions, awards, and so on. But this would leave unaddressed the deeper concern that the technologies of surveillance and control, which are used in monitoring performance, render work more alienating, more precarious, and with less individual control for the worker. How we frame the issues matters for how we seek to improve the situations for workers. The fact that achievement and autonomy gaps can be confused speaks to what they share: the technological diminution of agency. But the loss of agency occurs at different levels: the loss of achievement may occur at higher levels, where the focus is on the attainment of difficult goals, whereas the loss of autonomy may occur at more fundamental levels of basic control over one's activities and situation, e.g., the location or speed at which one must move one's body.

5 Conclusion

Recent breakthroughs in artificial intelligence have once again stoked concerns that technological improvements may have deleterious consequences for the future of work. John Danaher and Sven Nyholm's achievement gap thesis provides a useful conceptual model for articulating one way in which the social uptake of AI technology may diminish the meaningfulness of human work—by sapping it of the potential for achievements. Nevertheless, I have insisted that we need to distinguish weaker and stronger versions of this thesis. Against the strong version, which holds that AI-powered automation will result in a gap-pier work landscape with respect to meaning-conferring achievements, I suggest that we need to consider still other ways in which AI may facilitate workplace achievements, which I have formulated in terms of achievement spread and achievement swaps. It will be the complex interplay of achievement gaps, spread, and swaps that determine how achievement-prone the workplace of tomorrow will

be. Finally, in response to their extended example of AI-guided warehouse work, I have argued that we should not misframe the issues in terms of achievement gaps, which may or may not exist, but rather frame problematic AI-subservient work in terms of the loss of autonomy and increased surveillance that may more aptly fit concerns raised by some empirical researchers.

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References

- Acemoglu D and Restrepo P (2018) Artificial intelligence, automation, and work. National Bureau of Economic Research Working Paper 24196
- Ajunwa I (2023) The quantified worker: law and technology in the modern workplace. Cambridge University Press, Cambridge
- Anderson J (2009) Autonomielücken als soziale pathologie: Ideologiekritik jenseits paternalismus. In: Forst R, Hartmann M, Jaeggi R, Saar M (eds) Sozialphilosophie und kritik. Suhrkamp, Frankfurt, pp 433–453
- Autor D (2015) Why are there still so many jobs? *J Econ Perspect* 29(3):3–30
- Autor D, Mindell DA, Reynolds EB (2021) The work of the future: building better jobs in an age of intelligent machines. MIT Press, Cambridge
- Bankins S, Formosa P (2023) The Ethical implications of artificial intelligence (AI) for meaningful work. *J Bus Ethics* 185(4):725–740
- Bessen J (2015) Toil and technology. *Finance Dev.* 16–19
- Bowie NE (1998) A Kantian theory of meaningful work. *J Bus Ethics* 17:1083–1092
- Bradford G (2013) The value of achievements. *Pac Philos Q* 94:204–224
- Bradford G (2015) Achievement. Oxford University Press, New York

- Bradford G (2022) Achievement and meaning in life. In: Landau I (ed) *The Oxford handbook of meaning in life*. Oxford University Press, Oxford, pp 58–73
- Brynjolfsson E, McAfee A (2014) *The second machine age: work, progress, and prosperity in a time of brilliant technologies*. Norton, New York
- Chan B (2020) The rise of artificial intelligence and the crisis of moral passivity. *AI Soc* 35:991–993
- Coeckelbergh M (2020) *AI ethics*. MIT Press, Cambridge
- Danaher J (2017) Will life be worth living in a world without work? Technological unemployment and the meaning of life. *Sci Eng Ethics* 23:41–64
- Danaher J (2019a) *Automation and utopia: human flourishing in a world without work*. Harvard University Press
- Danaher J (2019b) In defense of the post-work future: withdrawal and the ludic life. In: Cholbi M, Warner M (eds) *The future of work, technology, and basic income*. Routledge, London, pp 113–130
- Danaher J, Nyholm S (2021) Automation, work and the achievement gap. *AI Ethics* 1(2021):227–237
- Delfanti A (2021) Machinic dispossession and augmented despotism: digital work in an Amazon warehouse. *New Media Soc* 23(1):39–55
- Dunkle ID (2019) The competition account of achievement value. *Pac Philos Q* 100:1018–1046
- Floridi L et al (2018) AI4People—an ethical framework for a good AI society: opportunities, risks, principles, and recommendations. *Mind Mach* 28:689–707
- Ford M (2015) *The rise of the robots: technology and the threat of mass unemployment*. Oneworld, London
- Forsberg L, Skelton A (2020) Achievement and enhancement. *Can J Philos* 50(3):322–338
- Frey C (2019) *The technology trap: capital, labor, and power in the age of automation*. Princeton University Press, Princeton
- Gheaus A, Herzog L (2016) The goods of work (other than money!). *J Soc Philos* 47(1):70–89
- Hirji S (2019) Not always worth the effort: difficulty and the value of achievement. *Pac Philos Q* 100:525–548
- James L (2005) Achievement and the meaningfulness of life. *Philos Pap* 34(3):429–442
- Karlan B (2023) Human achievement and artificial intelligence. *Ethics Inf Technol* 25(40):1–12
- Knell S, Rütter M (2023) Artificial Intelligence, superefficiency and the end of work: a humanistic perspective on meaning in life. *AI Ethics*. <https://doi.org/10.1007/s43681-023-00273-w>
- Landau I (2017) *Finding meaning in an imperfect world*. Oxford University Press, New York
- Lee K (2018) *AI superpowers: China, Silicon Valley, and the new world order*. Houghton Mifflin Harcourt, New York
- Levy K (2023) *Data driven: Truckers, technology, and the new workplace of surveillance*. Princeton University Press, Princeton
- Matthias A (2004) The responsibility gap: Ascribing responsibility for the actions of learning automata. *Ethics Inf Technol* 6:175–183
- Metz T (2013) *Meaning in life*. Oxford University Press, Oxford
- Moradi P, Levy K (2020) The future of work in the age of AI. In: Dubber M, Pasquale F, Das S (eds) *Oxford handbook of ethics of AI*. Oxford University Press, Oxford, pp 271–288
- Nyholm S (2022) Technological manipulation and threats to meaning in life. In: Jongepier F, Klenk M (eds) *The philosophy of online manipulation*. Routledge, pp 235–252
- Nyholm S, Rütter M (2023) Meaning in life in AI ethics—some trends and perspectives. *Philos Technol* 36:1–20
- Nyholm S, Smids J (2020) Can a robot be a good colleague? *Sci Eng Ethics* 26:2169–2188
- Parmer WJ (2023) Meaningful work and achievement in increasingly automated workplaces. *J Ethics*. <https://doi.org/10.1007/s10892-023-09434-9>. (Forthcoming)
- Roessler B (2012) Meaningful work: arguments from autonomy. *J Polit Philos* 20(1):71–93
- Schwartz A (1982) Meaningful work. *Ethics* 92(4):634–646
- Scripter L (2022) Meaningful lives in an age of artificial intelligence: a reply to Danaher. *Sci Eng Ethics* 28(1):1–9
- Scripter L (2023) Meaning and beauty. *Ratio* 36(1):51–63
- Setiya K (2017) *Midlife: a philosophical guide*. Princeton University Press, Princeton
- Smids J, Nyholm S, Berkers H (2020) Robots in the workplace: a threat to—or opportunity for—meaningful work? *Philos Technol* 33:503–522
- Smids J, Berkers H, Le Blanc P, Rispens S, Nyholm S (2023) Employers have a duty of beneficence to design for meaningful work: a general argument and logistics warehouses as a case study. *J Ethics*. <https://doi.org/10.1007/s10892-023-09442-9>. (Forthcoming)
- Sorrell T (2022) Cobots, ‘co-operation’ and the replacement of human skill. *Ethics Inf Technol* 24:44
- Susskind D (2020) *A world without work: technology, automation, and how we should respond*. Allen and Lane, London
- Tegmark M (2017) *Life 3.0: being human in the age of artificial intelligence*. Penguin, New York
- Tigard DW (2021) Workplace automation without achievement gaps: a reply to Danaher and Nyholm. *AI Ethics* 1:611–617
- Tversky A, Kahneman D (1981) The framing of decisions and the psychology of choice. *Science* 211: 453–458
- Vallas S, Johnson H, Mommadova Y (2022) Prime suspect: mechanisms of labor control at Amazon’s warehouses. *Work Occup* 49(4):421–456
- von Kriegsten H (2017) Effort and achievement. *Utilitas* 29(1):27–51
- Wang J (2021) Cognitive enhancement and the value of cognitive achievement. *J Appl Philos* 38(1):121–135
- Wolf S (2010) *Meaning in life and why it matters*. Princeton University Press, Princeton
- Floridi L (2014) Technological unemployment, leisure occupation, and the human project. *Philos Technol* 27:143–150
- Kim T, Scheller-Wolf A (2019) Technological unemployment, meaning in life, purpose of business, and the future of stakeholders. *J Bus Ethics* 160(2):319–337
- Berkers H, Rispens S, Le Blanc P (2023) The role of robotization in work design: a comparative case study among logistic warehouses. *Int J Hum Resour Manag* 34(9):1852–1875
- Danaher J (2016) The threat of algocracy: reality, resistance and accommodation. *Philos Technol* 29:245–268
- Veltman A (2016) *Meaningful work*. Oxford University Press, New York
- Yeoman R (2014) Conceptualising meaningful work as a fundamental human need. *J Bus Ethics* 125:235–251

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