

Real Subsumption and AI: Braverman's Labor Process Theory in the Age of Algorithmic Management

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ABSTRACT: This paper reframes Harry Braverman's labor process theory as the practical manifestation of Marx's concept of real subsumption of labor under capital. Building on Braverman's analysis of Taylorism, I argue that management functions as the mediator of real subsumption, depriving workers of production-related knowledge to facilitate capital's control. However, the introduction of AI fundamentally transforms this dynamic. Drawing on examples from Japanese manufacturing, I demonstrate that AI enables capital to appropriate workers' knowledge as data without encountering resistance, thereby eliminating the need for management as mediator. In this sense, AI represents real subsumption itself—embedded directly within the production process. I conclude by examining workers' resistance movements around algorithmic control and argue, following Kohei Saito and André Gorz, that reclaiming ownership of knowledge is insufficient; workers must transform the very nature of production-related knowledge to overcome capitalist relations of production.

Introduction

Recent scholarship has extensively examined employment changes resulting from AI introduction. Generally, these studies have focused on the “quantity” of employment (Frey and Osborne 2017). That is to say, which jobs will be lost due to AI. Conversely, Benanav (2022) argues that automation theorists overstate automation's extent and that global unemployment stems from stalled economic growth rather than technological displacement, not technological innovation itself.¹ Less considered is AI's impact on the quality of employment. In other words, how will the introduction of AI affect the labor process?

Analyzing how human labor has been organized under AI requires returning to Braverman's labor

process theory. This article deals specifically with the introduction of AI in the Japanese manufacturing industry because the subsumption of management is particularly important for our understanding of recent changes in the labor process. Braverman clearly demonstrated the characteristics of the labor process in the capitalist mode of production. However, many criticisms directed at Braverman have focused exclusively on his idea of the “degradation of labor”. While critics have emphasized Braverman's concept of “deskilling,” this interpretation oversimplifies his contribution. For example, John Bellamy Foster, although not in the context of criticizing Braverman, explains that the emphasis is on the polarization of labor: “Braverman's analysis then is not simply about ‘deskilling’ in some generalized, abstract sense, but about the polarization of working conditions. He is especially concerned with the degradation of work

¹ Automation theorists say that automation will free humans from punishing labor and also that it will lead to mass unemployment as more advanced machines replace workers. However, the technologies that are preferentially adopted by capital strengthen its control over the labor process.

as it affects the working class, not the entire society” (Foster 1994, 9). Indeed, deskilling characterizes capitalist labor organization, but Braverman’s deeper significance lies in his analysis of real subsumption and management as its mediator.

The first section explains Marx’s real subsumption of labor under capital and shows how real subsumption is essential to the completion of the capitalist labor process. The second section considers Braverman’s analysis of Taylorism and scientific management. For capital to achieve real subsumption, management is employed to respond to workers’ resistance to changes in the labor process. From this perspective, this paper shows that management is positioned as a mediator for real subsumption. The third section discusses what qualitative changes the introduction of AI will bring to the labor process. By introducing examples from the Japanese manufacturing industry, this paper will demonstrate how AI functions as real subsumption. The final section examines workers’ resistance to the growing state of knowledge deprivation through AI. It shows that what is needed is not simply for workers to seize knowledge, but a transformation in knowledge itself related to production.

Labor and Monopoly Capital and Marx

Harry Braverman’s *Labor and Monopoly Capital* (1998) address a deceptively simple yet radical question: Braverman’s purpose was to study how capitalist property relations form the labor processes of capitalist society in the specific manner (Braverman 1998, 16). His research methodology deliberately limits analysis to the “objective” content of class, omitting the “subjective” dimension (*ibid.*, 19). This approach aimed at portraying the working class “as it exists,” shaped by capital accumulation processes (*ibid.*, 19).

Critics like Paul Thompson (1989, 87) argue that Braverman’s “deliberate exclusion of the dimension of class struggle and consciousness” led him to neglect worker resistance’s effects.² However, Braverman’s objective analysis that the labor process in the

capitalist mode of production is transformed into a valorization process, not a process directly aimed at creating use value, is important. This is because in the valorization process the laborer is subordinated to the logic of capital accumulation. As Braverman notes, capitalists purchasing labor power acquire “an undefined quality and quantity”—infinite in potential but limited by workers’ subjective states, previous history, social conditions, and the enterprise’s technical setting (Braverman 1998, 39). This indeterminacy necessitates real subsumption.

To accurately understand Braverman’s labor process analysis, we must have a clear understanding of Marx’s theory of the labor process. Specifically, two concepts prove essential: formal subsumption and real subsumption of labor under capital in an unpublished manuscript, the *Economic Manuscripts of 1861–1863* (MECW 34, 424–439). In capitalist labor processes, capitalists must impose their own designs for valorization on the workers. This means subjecting workers to capitalists’ command and order, which Marx called the “formal subsumption of labor under capital” (MECW 34, 424).

Although workers work and engage in production, they have little control over the production process and instead are subordinated to capital to generate maximum surplus value. As a result, workers are positioned as objects, rather than subjects, in the production process.

[I]n the labor process which is at the same time a capitalist production process the means of production make use of the worker, with the result that labor appears only as a means whereby a certain amount of value, hence a certain amount of objectified labor, absorbs living labor in order to preserve and increase itself. (MECW 34, 415–416)

In the valorization process, the relationship between workers and the means of production reverses. Workers do not use the means of production, but the means of production use workers. In skilled occupations, as exemplified by the guild’s artisans, the traditional knowledge and skills necessary for production lay in the hands of workers who maintained control of production. Independent peasants, artisans, and guild craftsmen treated the

2 “The root of the problem is seen as stemming from Braverman’s deliberate exclusion of the dimension of class struggle and consciousness. While this is prioritized by him as a means of painting a picture of the working class in work ‘as it really is,’ it is argued that this involves a neglect of the important effects of worker resistance and organisation on technology and labour processes” (Thompson 1989, 87).

means of production as their own property. However, in the capitalist production process, the technical elements of production (knowledge, skills and experience), which were originally resources for workers, were shifted under the wage relation and remade in subordination to capital. Thus, capitalists were able to maximize surplus value.³ In this case, knowledge related to production is only given to workers to the extent that they need it, because the possession of knowledge by the producers themselves is a positive obstacle to the capitalist mode of production.

The deprivation of workers' knowledge and skills is what Marx called the "real subsumption of labor under capital." Consequently, the capitalists gain control of the labor process and "give the very mode of production a new shape and thus first create the mode of production peculiar to it" (MECW 30, 92).

What is generally characteristic of formal subsumption remains valid in this case too, i.e. the direct subordination to capital of the labor process, in whatever way the latter may be conducted technologically. But on this basis there arises a mode of production—the capitalist mode of production—which is specific technologically and in other ways, and transforms the real nature of the labor process and its real conditions. Only when this enters the picture does the real subsumption of labor under capital take place. (MECW 34, 438-439)

To strengthen the command-and-order relationship between capitalists and workers, real subsumption is required, stripping workers of knowledge related to production. What is important here is that the capitalist mode of production can only be firmly established through the deprivation of workers of knowledge and skills. Moreover, capital constantly attempts to take the technical mode of labor into its

own hands. Otherwise, the command-and-control relationship is not even established. As a result, labor is effectively subsumed under capital, and capitalists come to directly control the labor process.

Braverman's Critique of Taylorism

Real subsumption is not easy to achieve because workers do not readily surrender their knowledge and skills. Even under real subsumption, workers' resistance arises. In the face of resistance from workers, management is employed to suppress it. In other words, management is a means of shifting control of the labor process from the hands of workers to those of capital. Braverman explains this relationship with the analogy of horse-training: just as jockeys try to control horses with carrots and whips, capitalists try to control workers through management. If workers control the labor process, capitalists cannot impose the maximization of surplus value on workers. Therefore, in the capitalist mode of production, capitalists always try to control workers' work through management. Following Braverman, we can understand management as the mediator of real subsumption.

In general, real subsumption is understood to follow formal subsumption. However, these processes maintain a reciprocal relationship. Formal subsumption achieves completion only through real subsumption. Unless workers' knowledge is appropriated, they retain autonomy and formal subsumption fails. Frederick Taylor's idea of scientific management must be viewed in this context to accurately grasp the nature of the capitalist labor process.

Taylor (2011) distinguished scientific management from ordinary management. Before the introduction of scientific management (i.e. ordinary management), management began by gathering workers in one place, imposing regular working hours, and supervising them. Distractions such as talking and smoking were also restricted. It prohibited workers from working at their preferred pace. However, with the introduction of Taylor's scientific management, workers came to be controlled and ordered, not merely managed:

3 Braverman also pointed out the following: "(t)he coin of labor has its obverse side: in purchasing labor power that can do much, he is at the same time purchasing an undefined quality and quantity. What he buys is infinite in potential, but in its realization it is limited by the subjective state of the workers, by their previous history, by the general social conditions under which they work as well as the particular conditions of the enterprise, and by the technical setting of their labor. The work actually performed will be affected by these and many other factors, including the organization of the process and the forms of supervision over it, if any" (Braverman 1998, 39). This quote, contrary to Thompson, would indicate that it is unlikely that Braverman was ignoring the aspect of workers' resistance.

Taylor raised the concept of control to an entirely new plane when he asserted as an absolute necessity for adequate management the dictation to the worker of the precise manner in which work is to be performed. (Braverman 1998, 62)

Here Braverman refers to the transformation from the ordinary management dimension, in which workers simply work according to rules and instructions, to absolute and necessary control over the worker and the labor process. Taylor insisted that management “could be only a limited and frustrated undertaking so long as it left to the worker any decision about the work” (*ibid.* 62). From valorization’s perspective, ordinary management remained uncertain and inadequate. This was because management, in setting working hours and production quotas, did not intervene at all in the “way” workers work.

Workers who are controlled only by general orders and discipline are not adequately controlled, because they retain their grip on the actual processes of labor. So long as they control the labor process itself, they will thwart efforts to realize to the full the potential inherent in their labor power. To change this situation, control over the labor process must pass into the hands of management, not only in a formal sense but by the control and dictation of each step of the process, including its mode of performance. (*ibid.* 69)

These circumstances necessitated that the concept of control be raised to the dimension of real subsumption, meaning “direct interference in the worker’s mode of performing [tasks]” (*ibid.* 62). Taylor’s scientific management sought to leave no decision-making power to workers. This is why Braverman considered Taylorism so important. That is, Braverman positioned Taylor’s scientific management as a means of achieving real subsumption.

Braverman did not focus on the phenomenological aspects of scientific management, such as the “stopwatch” and “speed-up” methods, but rather extracted from Taylorism the elements that are indispensable in establishing the capitalist relations

of production.⁴ That is, if capitalists merely hired workers and set quotas and rules, the labor process could not fully function as a process of valorization.

Thus, Taylor derived three principles that form the basis of the management in remaking the labor process and controlling workers, fending off resistance from workers: the first principle is the dissociation of the labor process from workers’ skills. The second principle is the separation of conception from execution. The third principle is the monopolization of knowledge to control every aspect of the labor process: what to do, how to do it, and when to do it (Braverman 1998, 82).

According to the first principle, to remake the labor process into a valorization process, the workers’ knowledge must be stripped from them. Before the introduction of scientific management, workers possessed the knowledge and skills necessary for production, while managers possessed less than one-tenth of such knowledge (Taylor 2011, 38). So, as a first step, in changing the relationship between managers and workers, the labor process is divorced from the skills of workers.

In turn, regarding the second principle, we must first assume the following. Unlike instinct-driven animal labor (such as spiders building webs, which cannot be transferred mid-process), human labor’s conscious and purposive nature permits separating conception from execution. Marx defined this conscious mediation of human-nature interaction as “metabolism,” emphasizing that “in laboring, human beings first have a concept of what needs to be done, based on which action is taken to realize the concept” (Sasaki 2021, 135). This intellectual dimension distinguishes human from animal labor. The separation of conception and execution is the cornerstone of scientific management:

4 However, the scholars who criticize Braverman do not see his analysis of Taylorism as described above. As illustrated by the below criticisms, the critics focus on the phenomenological aspect of thorough monitoring and supervision when capital separates conception from execution. For example, Andrew Friedman argued that “Braverman too must be criticised for confusing one particular strategy for exercising managerial authority in the capitalist labour process with managerial authority itself” (Friedman 1977, 80). “Certain strategies” refers to Taylorism. Friedman then criticized Braverman, as “Taylorian scientific management is not the only strategy available for exercising managerial authority” (*ibid.* 80).

[I]f the workers' execution is guided by their own conception, it is not possible to enforce upon them either the methodological efficiency or the working pace desired by capital. The capitalist therefore learns from the start to take advantage of this aspect of human labor power, and to break the unity of the labor process. (Braverman 1998, 78)

Thus, the destruction of the unity of the labor process (i.e., the separation of conception from execution) is crucial for capitalists in their quest to acquire control. This is because it prevents the labor process from being organized under the workers.

However, since conception and execution are always required in production, they must be combined again. How then does capital reconnect conception and execution? Once production is organized under the control of a capitalist who oversees "conception," "execution" by the workers is planned in advance by the manager as to what steps, at what speed, and by what means it should be carried out. Taylor's third principle operationalizes this through the concept of "task":

Perhaps the most prominent single element in modern scientific management is the task idea. The work of every workman is fully planned out by the management at least one day in advance, and each man receives in most cases complete written instructions, describing in detail the task which he is to accomplish, as well as the means to be used in doing the work... This task specifies not only what is to be done but how it is to be done and the exact time allowed for doing it. (Taylor 2011, 29)

Through the concept of tasks, capital predetermines all the elements of the labor process under which the workers carry out production. Capital, having taken control of the conception, uses tasks to control individual workers and their execution. Thus, the capital-driven labor process becomes a valorization process. The principles of scientific management indicate how the labor process can be controlled by capital.

AI as Real Subsumption

As demonstrated, Braverman revealed how real subsumption practically manifests in capitalist

labor processes—through management-mediated knowledge deprivation. This transfer continues today through AI.

AI has been used to optimize the vast amount of data accumulated to make inferences and decisions for specific purposes. AI using this technology has already been introduced in a variety of fields. This section examines two examples of firms in the Japanese manufacturing industry that have introduced AI to the labor process. In both cases, workers are replaced by AI technology in manufacturing, but this does not mean that they are simply being replaced by machines. From the perspective of real subsumption, we can see that AI functions to make some of the knowledge accumulated by humans unnecessary.

The first example is Nichirei Foods Inc., the largest frozen foods company in Japan, which introduced a new system that uses AI technology from Hitachi Ltd. (Nichirei Foods 2020).⁵ This system can automatically allocate the personnel needed for production. Previously, experts planned worker placement based on their experience, but with the introduction of this system, the time required for such work was reduced by one-tenth. The AI system takes data from past production plans and decisions to derive optimal placement plans. For example, managers can easily make production plans without relying on the knowledge of experts when the temperature, humidity, and number of workers are the same as in past data.

AI similarly transforms non-routine manufacturing tasks. When production lines stop, AI searches past records to identify causes of breakdown, eliminating the need for experienced technicians. In such circumstances, workers do not require new knowledge or skills and may be replaced by non-regular workers (Milanez 2023).

The second example is Kirin Brewery Company Ltd., a large alcoholic beverage manufacturer with global operations. This company has developed an AI-based automated production planning system in collaboration with Mitsubishi Research Institute. The process of preparing and fermenting raw materi-

⁵ Hitachi, which deals with railways, power stations and manufacturing plants etc., is also in the process of replacing skilled workers. Experts perform their work based on years of experience and knowledge, but training them is not easy. (Nikkei Asia 2023)

als for beer products is complex and relies on some amount of craft knowledge. Ordinarily it takes a decade or more to train a professional brewer. Kirin Brewery tried to change this situation by interviewing skilled workers at each factory and developing an AI system that incorporates the know-how of skilled technicians (Nikkei Asia 2017b). Managers use AI to collect and analyze past production records to determine the optimal combination of beer ingredients and fermentation times. In the past, production plans were made by skilled workers based on their own knowledge and experience.

Prior to AI, real subsumption had already advanced through microelectronics and internet technologies, enabling labor process subdivision performed by unskilled workers. Capital always seeks to take control of knowledge in the labor process; however, capital cannot completely accomplish real subsumption. Therefore, capital allocates skilled workers within their sphere of influence. In the above case studies, the introduction of AI has made both traditionally skilled workers' and management presence relatively unnecessary by taking charge of "conception" in the labor process. Compared to previous technologies, AI is accelerating the transfer of knowledge as designed by the principles of scientific management. By using the above AI systems, past productions are recorded as data just by running the operation, and AI can also make production plans based on these data. AI aims to provide a solution to a given problem using accumulated datasets; therefore, the repetition of operations ostensibly results in the enhanced accuracy of AI decisions.

A similar trend can be understood by looking at the work of cab drivers. As cabs equipped with dashboard cameras drive, data is accumulated on the time of day, weather conditions, and the types of passengers they pick up. By analyzing these data, drivers can determine where to pick up their next passengers. In other words, production plans are made by AI. By having cabs drive repeatedly, the predictive accuracy of the data (next period and placement demand) improves (Nikkei Asia 2017a).

Crucially, AI transforms real subsumption's mediating structure. Where capital previously required management to appropriate workers'

knowledge—risking resistance—AI enables direct, automatic knowledge transfer through data accumulation. Capital no longer needs this mediator. The organization of labor processes using AI means that the production itself absorbs the knowledge in the form of data from workers. In this respect, unlike previous technologies, we can see that AI is making greater strides in real subsumption.

With the use of AI, capital can plan production without the help of skilled workers. This fact means that AI technology replaces not only workers who assume "execution" but also managers who monopolize "conception" (only as far as capital will allow). Furthermore, the use of AI for production allows capital to take control of every facet of the labor process. By using AI, data is inevitably absorbed by capital, allowing capital to avoid conflict with workers who might resist. Here, real subsumption can be accomplished with relative ease. In the capitalist labor process, capital needs management as a mediator to mitigate conflicts in the transfer of knowledge. However, if we look at the inevitable migration of knowledge because of the use of AI, we can see that real subsumption is achieved without that mediator. In other words, AI, which functions in a way that eliminates the need for workers' skills in production, is the real subsumption itself. Since this situation means that capital has more of a monopoly on conception in the labor process, we can say that real subsumption is becoming more pronounced.

Not a Shift in Ownership, but a Change in the Nature of Knowledge Itself

As a result of recent changes in the labor process, the labor movement must resist the inevitable deprivation of knowledge through AI. Among platform workers, recent strikes have demanded algorithmic control rights (Mateescu and Nguyen 2019). The core of the problem lies in the fact that capital has a monopoly on the right to manage the algorithm. For example, Michael Hardt emphasizes the significance of delivery workers' demand for control over the algorithm rather than its abolition (Means et al. 2020). Similarly, labor union movements demand algorithmic transparency. The UNI Global Union, an international

trade union that organizes workers in the service industry, has proposed requirements for employers to be transparent, fair, and offer access to data in response to the increasing use of algorithms in hiring, performance management, and everyday decision-making in the workplace. These requirements for information disclosure include a public record using plain language explaining how decisions are made about criteria (UNI Global Union 2020).

It goes without saying that these movements regarding algorithmic control rights and information disclosure are significant efforts in terms of countering real subsumption. However, it is not enough for workers to take back knowledge or manage it themselves because knowledge itself is transformed under capital. Kohei Saito has pointed out that Marx reconsidered the negative implications of the “productive forces of capital” through his study of late Marx. Through late Marx studies, Saito argues that productive forces’ development under capitalism is “not purely formal and quantitative, but deeply rooted into the transformation and reorganization of the labor process.” Therefore, socialist revolution cannot simply replace production relations while maintaining capitalist productive forces—the “productive forces of capital” that emerge through real subsumption “are materialized and crystallized in the capitalist mode of production” and must be transformed alongside it (Saito 2022, 155–156).

This creates knowledge’s contradictory character under capitalism: workers must reclaim knowledge appropriated by capital, yet this knowledge has been fundamentally transformed by capital. As Sasaki (2021, 96–97) notes, Marx emphasized technological education as an “enzyme of social transformation,” recognizing that even insufficient education could enable workers to regain productive capability. However, capital necessarily limits such education to prevent workers from fully controlling production. The productive forces developed under capitalism are closely tied to capitalism’s own methods of production. Therefore, this problem will not radically be solved if workers regain ownership.

Moreover, knowledge is not inherently proprietary. Marx also described knowledge as “common”.

Knowledge is not originally attributed to a specific individual but is socially accumulated. While it is problematic that knowledge related to production is monopolized by capital, seeking to shift its ownership is not at the heart of overcoming the capitalist relation of production:

[T]he productive forces developed under capitalism are tightly connected to the uniquely capitalist way of organizing the collaborative, cooperative and other social aspects of labor. If so, the transcendence of the capitalist mode of production must be a much more radical and thoroughgoing one than the mere abolition of private property and exploitation through the re-appropriation of the means of production by the working class. (Saito 2022, 156)

As Saito pointed out, knowledge itself in capitalistically organized production must be changed. At this point, the distinction made by André Gorz based on the nature of the technology is instructive. Gorz (2018) pointed out the dangers of technology developed under capitalism. He defined the Internet and other technologies that facilitate communication with others as “open technologies,” while technologies that divide people are defined as “locking technologies.” The latter is also a technology that can enable monopolization of the supply of products and services. Locking technologies like AI therefore, by their very nature, do not lend themselves to democratic control. Even if workers were to take control of such technologies, which are monopolized by capital, there are limits to how workers can organize them well. As Gorz indicated, productive forces developed within capitalism cannot directly transition to post-capitalism:

In other words, the development of productive forces within the framework of capitalism will never lead to the gate of Communism, since the technologies, the relations of production and the nature of the products exclude not just the durable, equitable satisfaction of needs but also the stabilization of social production at a level commonly accepted as sufficient. (Gorz 2018, 110–111)

Furthermore, as we have already seen, workers are deprived of their creativity and conceptual power in production through real subsumption. Considering

this disadvantageous situation for workers, there needs to be not only a shift in ownership, but a transformation of knowledge itself.

Conclusion

Braverman demonstrated a practical manifestation of real subsumption in Marx's labor process theory. For capital to transform the labor process into a process of valorization, it must make workers follow capital's orders (formal subsumption). However, if workers engaged in production themselves were to possess knowledge related to production, the labor process would be led by workers who do not necessarily aim for valorization. Therefore, capital must take away the knowledge and experience possessed by workers and consolidate knowledge under its own control; this is real subsumption. Thus, in capitalist relations of production, the capitalist must lead the labor process and subdue workers to maximize surplus value. This inevitably calls for a transfer of knowledge.

This is where the importance of Braverman's analysis emerges. He clearly pointed out that even in real subsumption, workers' resistance arises, and that capital needs its mediator: management. Indeed, real subsumption changes both the technological elements and social relations of production. However, the core of Braverman's argument is not that deskilling results in a uniformly low-skilled workforce. Thus, we should understand that the degradation of labor is brought about by the transfer of knowledge from workers to capital as elucidated in Braverman's analysis of Taylorism, which showed that real subsumption requires the mediator (i.e., management).

In line with Braverman's analysis, the introduction of AI has led to significant changes in the labor process because it allows production to be siphoned off as "data" and accumulated under capital. In other words, AI is real subsumption itself. In AI-mediated labor processes, once capital-worker power relations stabilize, management becomes largely obsolete. The change in real subsumption also changes the nature of management. Management is specified by a manifestation of real subsumption. Management is just a mediator and cannot be considered independently. Through the introduction of AI, management is embedded inside real subsumption of the produc-

tion process. However, new management may emerge in the labor process using AI. For example, we can forecast the appearance of a new management to subordinate workers to AI. It will be necessary to pay attention to future developments of management.

In response to this situation, workers will develop new forms of resistance to the transfer of their knowledge through AI. This is important because it can counter real subsumption. However, it must be pointed out that production-related knowledge resists individual ownership. Skills and experiences are nurtured and passed on through interactions between people. Therefore, knowledge does not belong to any individual, whether they are the capitalist or the worker. In the first place, knowledge is not something that can be owned like objects physically. Knowledge cannot be bought with money, nor can it be owned as an object.

Furthermore, even if the ownership of the machines (as representatives of knowledge) was taken away from capital and transferred to workers, would workers be able to organize production differently than capital does now? The current labor process has been entirely reworked into a valorization process. The knowledge used therein exists to control and subordinate workers. The machinery used in production is systematized for valorization. Therefore, simply shifting its ownership does not necessarily mean that workers can organize production for use value purposes. Consequently, we must transform the very nature of production-related knowledge. From this perspective, it is not enough to demand that capital disclose information about knowledge related to production or to demand ownership rights to knowledge. We must change the very nature of production-related knowledge itself—not merely its proprietor, but its fundamental character and purpose.

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