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From rhythms to stop, drop and roll: Unpacking the impact of algorithmic management on discretion in hotel housekeeping work

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Abstract:	The spread of algorithmic management (AM) into traditional employment settings raises growing concerns about its effects on workers' discretion. Research has largely characterized AM as a form of intensified control, but this framing obscures its complexity. We argue that understanding these complexities requires attention to time: workers enact discretion over work rhythms they use to pace, sequence, and sustain their labor. When layered into pre-existing routines, AM unsettles those patterns by introducing irregularity. Drawing on a qualitative study of hotel housekeeping, we show that AM introduces temporal irregularity that disrupts workers' work rhythms, grounded in time, space and body, through two mechanisms: the reduction of sequencing discretion and the fragmentation of cleaning work. Yet workers rebuild temporal structures through "rhythmic reconstitution," a selective and negotiated process that blends algorithmic directives with situated knowledge. These findings reveal how AM transforms discretion over rhythms, advancing studies of technology, the labor process, and temporality in organizations.

SCHOLARONE MANUSCRIPTS

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In recent years, concerns about job quality in low-wage service work have increasingly focused on the instability and unpredictability of working time. Workers in sectors such as retail, hospitality, and logistics are often subject to fluctuating schedules and real-time adjustments to their work assignments. These precarious temporal conditions have been linked to work-life conflict, stress, and high turnover, prompting growing scholarly and policy attention.

At the same time, the adoption of algorithmic management (AM) systems has expanded across these sectors, enabling employers to allocate and adjust work instantaneously in response to changing demand. A recent survey finds that nearly 30 percent of U.S. workers report that their tasks are assigned in part by automated technologies (Hertel-Fernandez 2024), highlighting the growing role of such systems in organizing work. These systems not only determine what work is assigned, but increasingly when and in what order it is carried out. As a result, workers may experience not only unstable and unpredictable schedules across days and weeks, but also continual disruptions within the workday itself. The rapid adoption of such technologies is especially consequential because, without a full understanding of how workers experience and engage with these systems, organizations risk implementing technologies that reshape workers' roles in ways that are poorly understood.

In line with these concerns, a central question in the growing literature on AM is how such technologies reshape workers' discretion over work. Although existing research largely casts AM as intensifying control and reducing workers' decision-making, other scholarship points to the ways in which workers retain or expand their scope for decision-making even in

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contexts heavily managed by algorithmic direction. Yet in both cases, scholars generally consider discretion in relation to discrete decisions, leaving unexplained how these choices coalesce into coherent, sustainable work rhythms, and what happens when algorithms continuously interrupt them. We argue that these temporal patterns, or work rhythms, are critical to understanding how AM reshapes time and discretion.

In this paper, we ask, how does AM reshape workers' discretion over work rhythms—their ability to decide when, where, and how their labor unfolds—and how do workers respond? How do they produce workable routines when neither workers, managers, nor technology alone determines the organization of their work? We examine these questions through a qualitative study of hotel housekeeping, where AM is layered into established work routines of guest room attendants (GRAs), and where the physical demands of work make discretion over work rhythm especially consequential.

We show that GRAs' discretion depends upon their capacity to integrate temporal, spatial, and embodied knowledge into work rhythms. AM destabilizes this process by introducing temporal irregularity, disrupting the temporal foundations that underlie rhythms and GRAs' capacity to construct them. However, workers do not passively accept this disruption. They actively work within and around algorithmic constraints to rebuild workable rhythms, which we refer to as rhythmic reconstitution. Reconstituted rhythms are neither a return to previous patterns of decision-making nor outright resistance to technological control. Rather, they produce blended rhythms shaped by algorithmic directives and workers' contextualized knowledge. Their viability is shaped by how AM is configured, managerial responses to workers' efforts, and, in our setting, institutional protections that govern work.

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Our study advances understanding of how algorithmic technologies reshape workers' discretion over work rhythms in three ways. First, we identify work rhythm as a central but overlooked site of transformation under AM, particularly when these technologies are layered into pre-existing routines. In doing so, we move beyond conceptualizing discretion as a set of discrete decisions to show how workers' decisions coalesce to produce coherent and sustainable patterns of work. Second, we further identify temporal irregularity as a distinct mechanism through which AM transforms discretion, departing from traditional labor process accounts that emphasize technologies' standardization and rigidity as a primary means of temporal control. Third, we theorize rhythmic reconstitution as neither consent nor resistance to technology but as a form of temporal repair through which workers rebuild workable rhythms, advancing organizational goals while also protecting their own interests.

Algorithmic management and temporal control

Time and temporal control have long been a central terrain of struggle in the labor process. Labor process scholars, grounded in industrial workplaces, argue that management controls time, pacing, and sequencing by standardizing rhythms and rationalizing work processes that constrain workers' autonomy. Thompson (1967) wrote of the "discipline of the clock" that accompanied industrialization. Edwards (1979) showed how machines intensified regularity and repetitiveness, stripping workers of the capacity to set their own pace. Braverman (1974) argued that strict temporal control through scientific management separated workers' skills from the execution of their work. In these accounts, discretion over when, how fast, and in what order work is performed is a central site of struggle between labor and management.

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Algorithmic management (AM), defined as systems where algorithms make and execute decisions involving labor (Duggan, Sherman, Carbery, and McDonnell 2020:119), represents a recent and consequential "contested terrain" in the struggle over time (Kellogg, Valentine, and Christin 2020). AM aggregates data and automates decisions traditionally made by managers. While AM is often associated with platform work, it has diffused throughout traditional organizational contexts such as logistics, healthcare, communications, and manufacturing (e.g., Vallas, Johnston, and Mommadova 2022; Doellgast, Wagner, and O'Brady 2023). In these settings, AM frequently augments, rather than replaces, managerial decision-making (Jarrahi et al. 2021; Parent-Rocheleau and Parker 2022). Yet, as we explain below, scholarly understanding of its implications for workers' discretion over the temporal conditions of their labor, and specifically the work rhythms workers construct, remains incomplete.

Existing research shows that AM reshapes workers' discretion, or "latitude of action or control over how one does one's work," reflecting the freedom to choose among options or actions and exercise judgment (Caza 2012:144). The literature widely argues that AM reduces workers' discretion by tightening control over work (Meijerink and Bondarouk 2023) through its "encompassing, instantaneous, interactive and opaque" nature, which intensifies real-time direction, discipline, and monitoring in ways that lack transparency and visibility (Kellogg et al. 2020:366-7). AM does so by increasing surveillance, enforcing rules, and narrowing opportunities for creativity, limiting workers' ability to shape how they perform tasks (Möhlmann and Zalmanson 2017; Leicht-Deobald et al. 2019; Kellogg et al. 2020; Meijerink and Bondarouk 2023; Liu et al. 2024). Platform workers in particular face information and power asymmetries that restrict choices over acceptance and pacing of assignments (Lee, Kusbit,

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Metsky, and Dabbish 2015; Rosenblat 2018; Shapiro 2018; Curchod, Patriotta, Cohen, and Neysen 2020).

The literature also suggests, however, a less unidirectional, more nuanced relationship, built on the idea that AM redistributes rather than simply reduces discretion (Meijerink and Bondarouk 2023). This is in line with previous work on the uneven effects of technological change, which illustrates that the same automation can simultaneously constrain decision-making for some workers while expanding it for others (Vallas 1988). In the context of AM, this is evident in studies of rideshare drivers, who make constant micro-decisions across narrow stages of algorithmically defined labor processes, choosing whether to comply with or subvert algorithmic directives (Cameron and Rahman 2022; Cameron 2024). Studies of online platform workers similarly show that workers retain, and at times expand, control over the timing and place of work, and who they choose to work for (Wood, Graham, Lehdonvirta, and Hjorth 2019; Wood 2021).

In many of these accounts, discretion is understood in relation to distinct decisions workers must make (e.g., whether to accept a job through a platform). Even in instances in which scholars connect decision-making to the overall structure of the labor process (e.g., Wood 2021; Cameron 2024), the insights derived from platform work, where algorithms temporally structure when and how decisions can be made, are difficult to transfer to more traditional settings where work is not determined solely by AM's directives. In such settings, the temporal dimensions of decision-making do not necessarily emerge at discrete intervals or stages. Rather, time is a process that workers actively construct through judgment and action, and through which they must reconcile AM direction with preexisting structures, routines, and practices (Jarrahi et al. 2021). Workers' discretion over when, how fast, and in what order work is done is shaped by

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these organizational dimensions, requiring contextualized knowledge that is specific to place, time, and experience (Davenport and Prusack 1998), which allows them to adapt to unforeseen events (Leach et al. 2013). Understanding AM's impact on temporal discretion in this sense thus requires a different framework than that derived from platform settings.

Scholarship in industrial relations and labor process theory provides a partial response to these limitations. Labor process traditions show that temporal control is a fundamental site of struggle in which workers exercise discretion. This is observed in workers' responses to rigid temporal controls, including whether they consent through accommodation (e.g., Burawoy 1979), or resist through noncooperation or protest (e.g., Edwards 1979). Yet these accounts are situated in different regimes of temporal control, ones marked by intensified rigidity through standardization and routinization (e.g., adherence to clock time, the assembly line, and time-and-motion principles). AM, in contrast, is instantaneous and interactive by design, adjusting directives in response to real-time conditions (Kellogg et al. 2020). This suggests a different orientation, characterized by unpredictability, to temporal mechanisms of control, thus requiring new ways of understanding how workers respond. Malhotra (2021:1099) highlights this gap by noting the "intended and unintended time and work choice restrictions" that algorithms introduce.

Emerging scholarship in industrial relations underscores this point, showing how temporal irregularity is a distinctive dimension of control in service work. Here, temporal irregularity, or uncertainty in when and how work demands arrive, undermines workers' capacity to control when and how they work. This is observed primarily in relation to schedule unpredictability, where uncertainty is associated with work-life conflict and inability to pace and sustain routines (Henly and Lambert 2014) as well as longer-term disadvantages in wages and

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mobility (Choper, Schneider and Harknett 2022). These studies show that temporal uncertainty disrupts the foundations workers rely on to manage labor and exercise discretion over how it unfolds but focus on external constraints rather than unpredictability within the labor process itself. To address the latter dimension of temporal irregularity, a different set of conceptual and practical tools is needed.

Discretion over work rhythm: Processes of temporal structuring

Addressing how AM's temporal irregularity impacts discretion within the labor process requires examining how workers actively construct time. Organizational scholarship on temporality provides a conceptual foundation to do so, offering a framework for understanding how workers produce and maintain temporal order through their everyday labor, and what happens when that order is disrupted.

At the core of this framework is the concept of temporal structuring, or the process through which actors actively produce and reproduce temporal patterns that give "rhythm and form to everyday work practices" (Orlikowski and Yates 2002:685). Objective measures of time, such as schedules and deadlines ("clock time"), structure routines (Zerubavel 1981; Orlikowski and Yates 2002; Blagoev, Hemes, Kunisch, and Schultz 2024). But workers do not simply adapt to these measures; they actively modify them through practice and interactions, aligning their activities and routines with organizational demands and adapting to unforeseen events (Ancona and Chong 1996; Feldman and Pentland 2003).

The outcome of this process is work rhythms, or patterned temporal movements that organize and synchronize activities (Zerubavel 1981). Work rhythms are not purely temporal but also contextual and embodied, rooted in the physical space and in bodily knowledge (Lefebvre

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2013). As such, they constitute sites of discretion: workers actively create and adapt temporal structures in response to changing demands (Orlikowski and Yates 2002). For example, Lupu and Rokka (2022) show how workers in a professional service firm strategically speed up during undesirable slow periods, sequence tasks in ways that build momentum, and incorporate delays when pace becomes too rapid. Discretion unfolds as a temporally grounded practice: workers draw on work rhythms to manage labor and maintain control.

Scholarship on temporal structuring has not fully examined technologies that destabilize rhythms, focusing instead on how tools such as scheduling systems modify structuring practices (Blagoev, Hemes, Kunisch and Schultz 2024). It also focuses on settings (e.g., professional services (Lupu and Rokka 2022)), where workers have greater authority and resources to shape temporal experiences, overlooking contexts where rhythms are destabilized within power-asymmetric employment relationships. Yet the framework is useful for understanding how the temporal unpredictability of AM affects workers' discretion, as it emphasizes the process through which workers actively create and sustain rhythms. By bringing organizational temporality scholarship into dialogue with industrial relations and labor process theory, we examine how AM reshapes workers' discretion over work rhythm in a traditional employment setting and how workers respond.

Research Setting and Methods

Research Setting

We investigate these questions in unionized hotel housekeeping, where AM augments the process used by supervisors to manage the cleaning and turnover of guest rooms. Traditionally, managers rely on "manual" systems involving basic property management software to assess

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room inventory, track room status by guest (e.g., check-outs versus stayovers) and servicing (e.g., vacant versus cleaned), and assign "boards", or GRAs' room assignments, often distributed as printed sheets.

AM consolidates and digitizes this process. AM is configured by management, which inputs rules (e.g., quotas based on points, credits, or square footage that reflect the time and effort required to clean different room types). Supervisors use AM to prioritize, monitor, and reorder room flows to optimize the release of clean, vacant rooms to guests. Because guest behavior is highly variable, room allocation requires constant adjustment. For example, a supervisor may shuffle assignments if a GRA cannot start service because guests have not vacated their rooms or have placed "do not disturb" (DND) signs on their doors. By integrating inputs from other systems, such as digital checkouts, AM also centralizes communication and collaboration, enabling GRAs to receive changes to their boards, message supervisors, and communicate with other departments. GRAs receive their assignments on handheld mobile devices and interact with them continuously to log when they start and finish rooms, submit requests to other departments, and input guest preferences.

Although GRAs appear to have little discretion in their jobs (Hunter Powell and Watson 2006; Sherman 2007), their work is more varied and complex than assumed. Beyond standardized cleaning tasks (e.g., making beds, scrubbing bathrooms, vacuuming), GRAs also manage carts and inventory, maintain sanitation and safety protocols, coordinate with supervisors and other departments, and respond to guest requests. Although overseen by supervisors, they largely work independently, with scope to take initiative over organizing and performing tasks and responding to daily changes (Bernhardt, Dresser and Hatton 2003; Hunter Powell and Watson 2006).

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Housekeeping work is also physically arduous: GRAs have the highest rates of occupational injury in the industry (Buchanan et al. 2010) and report widespread back and neck pain resulting from the intensity of their physical labor (Krause, Scherzer, and Rugulies 2005). Their work has further intensified with employer strategies such as flexible staffing, outsourcing, and expanded amenities aimed at capturing consumer segments (Seifert and Messing 2006; see also Valenzuela-Bustos, Gálvez-Mozo and Alcalde-Gonzalez 2023). AM is another effort aimed at greater operational efficiency. Together, these features make housekeeping a useful setting for examining how AM reshapes discretion over rhythm and time in complex service work. Our focus on unionized workplaces amplifies the usefulness of our setting, as all respondents work under similar work rules (e.g., similar room quotas and credit systems) that shape their daily routine.

Data Collection and Analysis

We draw on multi-year fieldwork conducted between 2021 and 2024 in unionized hotels (Table 1). This work is part of a multimethod, interdisciplinary project on AM in hospitality. The effect of AM on discretion emerged as a constant theme throughout our various data sources. We started our research by conducting exploratory workshops and participatory prototyping sessions with GRAs (2021), informal background interviews with various industry actors, and field observation and short interviews over a multi-day visit at one hotel (2023). These activities provided early insight into how AM is configured and used, informing subsequent data collection.

[Insert Table 1 here]

Our data include 41 interviews and two focus groups with GRAs at over 35 properties conducted between 2022 and 2024. The interview sample primarily includes large, full-service

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upscale and luxury hotels and casino resorts and spans 31 geographically dispersed properties in North America that use AM and are represented by over a dozen union locals of a single international union. Respondents have long industry tenure (17.2 years) and job tenure (14.4 years), but relatively recent exposure to AM (typically 5 years or less). The sample is overwhelmingly female (93%) and racially and ethnically diverse: half identified as Latinx, seven as Black or African American, ten as Asian American, and none as non-Hispanic White. Three-quarters were foreign-born and spoke a first language other than English. Focus group participants came from multiple properties in the West and Midwest. Respondents were prompted to describe a typical workday (e.g., "Can you walk me through a typical day, starting from when you arrive at work?"), how they clean rooms and sequence tasks, and their use of technology ("You mentioned UpKeep [a pseudonym for a widely used AM application used by nearly all of our respondents]. Can you tell me more about that?"). We also probed responses to system issues and comparisons with manual systems, which all our respondents had experience with. These open-ended questions elicited detailed accounts of daily decision-making and routines before and after AM. We reached theoretical saturation in the later phase of interviews (Glaser and Strauss 1967), when further data collection confirmed emerging themes without yielding substantially new dimensions.

Our data analysis was inductive (Charmaz 2006) but guided by concepts from literature, as we constantly iterated between data and theory (Gioia, Corley, and Hamilton 2013). Using NVivo 14, we followed a staged process in which codes were iteratively developed, refined, and linked to emergent conceptual categories.

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Because we draw from multiple data sources, we first generated a set of 36 index codes with our larger research team[1], which serve as broad topical organizers rather than conceptual claims. In other words, we identified the main themes that emerged across our various data sources such as workflow, technological change/comparisons, technology configuration, and time (Deterding and Waters 2018). For the analysis that follows, the two authors then coded inductively across all themes. Our initial open, descriptive coding (Charmaz 2006) remained tightly linked to participants' experiences and language. For instance, coding at this stage reflected participants' descriptions of pacing their shifts, sequencing rooms, the physical work of cleaning rooms, and interacting with the device. Where appropriate, we then grouped these into themes that reflected emerging, descriptive patterns. For instance, codes reflecting participants' descriptions of how long different rooms and tasks should take, time pressure (e.g., *fighting the clock*), and daily routines were aggregated into the theme of *time*. To ensure reliability, we simultaneously coded transcripts separately, wrote memos on emerging codes and groups, and met regularly to reconcile codes and interpretations. We continued this process throughout all remaining stages of analysis. Throughout, we consulted with members of our research team who were not directly involved in our analysis and engaged in stakeholder validation with a union partner. Their feedback validated our interpretations, helped us refine emerging categories, and sharpened our understanding of GRA experiences. For instance, their insights helped us differentiate between decision-making that occurs in housekeeping work both with and without AM, making more precise our understanding of changes induced by technology.

[1] To create index codes, the full team closely read a shared set of transcripts and identified broad themes that recurred across interviews (e.g., how workers organize their workflow, how they compare manual and AM-based systems, and how they describe the configuration and use of technology, and how they experience and manage time) (Deterding and Waters 2018). Code definitions were refined through two one-hour training sessions and regular team meetings. To ensure coding consistency, three expert team members not directly involved in data collection independently reviewed coded transcripts and provided feedback.

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As we wrote memos and iterated between data and literature, additional emerging constructs and relationships became clear. For instance, engaging AM literature highlighted a contrast between temporal "scaffolding" and irregularity in our setting. Accordingly, codes reflecting tasks related to inputting information in devices (e.g., *interacting with UpKeep*) and attention paid to devices (e.g., *monitoring UpKeep*), among others, were aggregated to *fragmented cleaning work*, which, along with reductions in discretion over room sequencing, contributed to the broader category of *temporal irregularity*. Through iterative memo-writing and constant comparison, the descriptive themes of time, space, and body were consolidated into three higher-order analytical categories–temporal, spatial, and embodied logic–capturing the dimensions through which GRAs construct their work rhythms and through which AM's disruptions operate.

We subsequently turned to workers' responses, using guiding questions such as "How do workers restore workflow?" and "What strategies do they use to manage or mitigate disruption?". We identified a set of practices aimed at restoring work rhythm and categorized them into two forms: selective reconstitution and negotiated reconstitution. We further traced how these practices related to earlier categories, linking them back to temporal, spatial, and embodied logics, and showing how workers sought to recover these forms of knowledge in practice. Our overall coding approach is illustrated in Table 2. Finally, we examined the conditions shaping these responses, uncovering how AM configuration, managerial receptiveness, and institutional protections explain variation in the extent to which rhythmic reconstitution is enabled or constrained.

[Insert Table 2 here]

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Findings

Our data show that GRAs organize their labor process by exercising discretion using interdependent temporal, spatial and embodied logics of work that underpin their work rhythms. Through these practices, they anticipate the demands of their shift and formulate responses to real-time changes stemming from guest behavior and managerial requests, map tasks across time and space, and distribute physical effort, culminating in a workflow which constitutes discretion over rhythm. Their discretion over rhythm is disrupted through two sources of temporal irregularity under AM: the reduction of discretion over room sequencing, which rearranges the order of work, and the fragmentation of work in cleaning rooms, which breaks the flow of work. In response, workers engage in what we term rhythmic reconstitution, rebuilding workable rhythms through selective and negotiated forms of adjustment. We explain these dynamics in turn and illustrate them in Figure 1.

[Insert Figure 1 here]

Worker rhythms as integrated temporal-spatial-embodied practice

GRAs build work rhythms, or patterned temporal routines of work, by drawing on temporal, spatial, and embodied decision-making. These logics reflect discretion over when to perform tasks, where to carry out work, and how to manage physical effort. In doing so, they align work with organizational demands while responding to uncertainty. The result is a work rhythm that is both structured and fluid, enabling workers to maintain a constant flow of work in a dynamic environment while distributing physical effort across the shift and managing physical strain. This interplay underpins discretion over work rhythms and how they change under AM.

Temporal logic of GRAs' decision-making is anchored by organizational routines, including scheduled shifts, breaks, and the timing of guest check-out and -in cycles. Upon

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clocking in, GRAs gather for a morning stand-up meeting where supervisors distribute assignments organized by credit systems, reflecting units GRAs use to gauge effort across room types:

> We start at eight in the morning, and then we usually grab soaps and [the amenities] for the rooms. And we have 14 credit-hours each day to fulfill…One [break] is in the morning, one is in the afternoon, and then we have a 30-minute lunch. (Interview_16)

Throughout the day, work is punctuated by such predictable temporal markers, such as breaks and checkout times, but also by less predictable ebbs and flows: slow periods in the morning when guests have yet to leave (Bunzel 2002), rooms left "trashed" (Interview_9, Interview_34), or guests refusing service. GRAs make sense of the time it takes to clean a room with familiarity grounded in embodied knowledge: "So it's hard when you have a guest who's there for five days and they don't get service and then you only have half an hour to be in that room. Well, actually it's about 28 minutes to clean that room…" (Interview_14).

These temporal demands create urgency: "There's no time, you have to be really fast" (Interview_33). Another stated, "It's very demanding. We don't have time to take breaks and they often demand more and more cleaning in the same amount of time" (Interview_39). The fast pace amplifies the sense that GRAs are "fighting the clock":

> From the moment you punch in, you fight with that clock…before you even get up on the floors…You're fighting against the clock to try to get all these rooms done by the time you have to punch out. (FocusGroup2)

Spatial logic emerges through GRAs' detailed knowledge of the physical space of hotel properties, such as the layout of floors, hallways, and the location of elevators and supply closets. GRAs use this knowledge to develop strategies for grouping rooms, minimizing

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movement, and coordinating tasks across space in ways that reduce inefficiencies and physical strain. Maintaining work rhythms via sequencing decisions–the order in which rooms are cleaned–is therefore an integral part of GRAs' discretion. One GRA describes how she would map her assignments before cleaning if working without AM:

> I got two rooms on this floor, three rooms on that floor and four rooms on that floor. I'm gonna work smarter, not harder. Before I bring my cart around...I'm gonna go and check all my rooms to see which ones I can get in first. If I can get into the rooms [on the floor] where two are open, I'm gonna start with that. And then the ones that have the three, I can't get in none. And then the ones in four, I can get in maybe two, I'm gonna start them and then finish them out. Go on my break at 11:30. Finish them two and then work my way down. (Interview_9)

GRAs also use their spatial knowledge within rooms, explaining how layouts and furniture arrangements shape how cleaning tasks are physically and temporally organized: "...we have suites…you got a long hallway, you go to your front room which has a table, bar, couch, big screen TV, and the bathroom for the guests to use, you go around the corner and it's a whole other big bedroom…it's a pretty big spacious [suite]...and they give you an hour to clean. The Secretary suite that's a little smaller…that one's 45 minutes" (Interview_34).

This spatial mapping is closely intertwined with temporal logic, as workers understand how different room layouts translate into different cleaning demands and time requirements. Spatial knowledge therefore informs how workers anticipate the effort needed for particular tasks and organize their work to maintain pace throughout the shift.

Embodied logic reflects how workers manage the physical execution of tasks. Through repetition, they develop deep, embodied knowledge of the physical effort, motions, and

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capabilities required to clean rooms while meeting expected standards of appearance and cleanliness (Valenzuela-Bustos et al. 2023; Seifert and Messing 2006). They are intimately familiar with the precise physical requirements of individual tasks and how they map onto space and time, and use this knowledge to make decisions about how to coordinate bodily movements, as one GRA describes:

> We need to bring [the shampoo bottle] to the closet and then refill it for them… So it's like, in one hand carry that bottle, in one hand scoop by and pull the dirty linen to the closet…That's a lot." (Interview_15).

These small decisions underpin preferred routines GRAs arrive at for cleaning (Sherman 2007) and shape how work is physically organized within individual rooms: "[The hardest part is] the bathroom. Especially the standing. It's really hard. …But it's on how you manage it, like which thing you'd like to do first…cause what I do in my routine is, I spray the bathroom first, before I do my bed." (Workshop1_1). By generating routines, workers arrive at what one respondent calls a "rhythm for accuracy" that enables speed and pace:

> So it is better to have a rhythm for accuracy, then you will gain your speed. Because there's nothing worse than having to go back to a room numerous times because you are rushing. Because you wanna know quality is first. Because the last thing we need is a guest coming in and complaining about everything from A to Z. (Interview_19)

GRAs use this knowledge to distribute physical effort across the shift between rooms, accounting for the varying demands associated with different room types: "I have to do my sequence, one checkout, one occupied, and another checkout. And that way I don't get tired…" (Interview_41). As one GRA illustrates, these decisions draw simultaneously on temporal, spatial, and embodied logics:

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> So with the paper [referring to a manual system], … You are the one who decides, I'm going to start with checkout, then I can finish with the occupied rooms…Like you can say it's eight o'clock or nine o'clock. I'm strong, I'm still fresh. Let me start with my checkout. Let me decide to do the suite. Let me start the big room. It depends on you. Unless the management asks you, we have something like an emergency, go to this room, it's up to you. (Interview_31)

These embodied rhythms shape how workers experience the physical demands of their work. GRAs describe knowing when their bodies feel strong, when to take breaks, and how to distribute strain across the shift. Discretion over rhythm can produce satisfaction: "Once you pace yourself, and you are on point with cleaning your area really good, you have those good days" (Interview_14). At the same time, the physical toll of the work is evident: "Even your arms hurt from handling the linens, grabbing things…" (Interview_33). Over time, the work can lead to injury and strain ("You can tell her [a former GRA] wrist is, like, always [injured]. If you see the back, they don't even know how to work correctly. They messed up everything" (Interview_31)), underlying the idea that work rhythms are not simply a means of coordinating tasks efficiently but also a way of distributing labor, creating opportunities for recovery, and sustaining physical capacity across the shift.

By accumulating temporal, spatial and embodied knowledge, GRAs develop rhythms through which they manage how they perform their work, anticipate patterns of labor over shifts, and manage physical exertion and strain. We show that AM unsettles these rhythms by introducing temporal irregularity, reorganizing work and breaking the relationship among tasks through direction that reflects managerial priorities and guest demands rather than GRAs' logics of efficiency, based on time, space, and body.

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Temporal Irregularity Under Algorithmic Management

AM introduces temporal irregularity into the coordination of work, disrupting the rhythms through which GRAs organize their labor. We find that AM rearranges *when* and *where* work is done in real time, often overriding the integrated temporal, spatial, and embodied knowledge that workers have developed through experience. This irregularity operates from within the labor process itself, intervening in the moment-to-moment decisions through which workers sustain rhythms. We identify two related mechanisms of irregularity: the reduction of room sequencing discretion, which disrupts how work is organized, and the fragmentation of cleaning work through AM-mediated interactions, which breaks the flow of work.

Reduction of sequencing discretion. In housekeeping, AM assists supervisors in breaking out boards, determining room cleaning sequences and updating room status so supervisors can adjust assignments. Under AM, GRAs are assigned predetermined sequences that they report being unable to change, receiving in some cases a few rooms at a time and in others their full list at once. We observed GRAs during morning meetings, logging into their devices and scanning lists but unable to map out plans as they describe doing under manual systems. AM thus sets the overall structure and pace of work: "I open it [the device] and put my password...we click the button and that is the way the pace is coming. How many rooms?" (Interview_8). At the outset, workers must shift from proactively organizing their rhythms to reacting to sequences determined by AM.

Algorithmic ordering also disrupts workers' control over spatial coordination. One GRA recounted, "Sometimes we have to move from one end to another because we might start at room one and then be sent all the way to room 32. The managers tell us that we have to follow the

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given sequence….” (Interview_4). Another describes losing the ability to make physically efficient decisions anchored by temporal routines:

> Say it's like 11 o'clock, I am on the 25th floor, I have 11 rooms. So when I first get there, my assignments will show me the first available rooms that I can get to, which will be 2548. Now by 11 o'clock, people are now checking out. Now I can, I see everyone is out of the room. Now the device is telling me which room to go to next. Now, when you use it that way, you are now going back and forth. Because if they put 2556 on my board, that's next. But I'm at 2548. Next to it is 47. I can do that, but no, it is taking me to 56. So now you’re going back and forth as opposed to you saying, okay, I can do 47 now and 56 as I'm closing out my board. (Interview_11)

AM also reshapes how GRAs handle uncertainty from unpredictable guest behavior, such as messy rooms or service refusals, and managerial interventions, such as rush requests. These changing conditions prompt supervisors to shuffle boards via AM, rather than adjusting plans by walking halls and engaging in direct conversation with workers on the floor, as was past practice. GRAs perceive sequences to be in continuous flux, often in ways that conflict with workers’ own preferences derived from their rhythms. As one GRA stated, “Everybody faces this problem…I don’t know which is my next room and where I go, what floor? We have this kind of issue all the time (laughing)” (Interview_1). Another described:

> Throughout the day, these changes in UpKeep can constantly change your workload. Before, when there were rooms with DND…the manager was responsible for verifying it. Now you have to notify them [in the app], but they can change it so we are constantly having to adjust. (Interview_21)

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These sequencing changes have physical consequences, as one GRA explained: "The hotel where I work has 550 rooms…So, sometimes when a private room becomes available, and they replace it with another, it can be from the twentieth floor to the first floor. And that means we have to walk quite a bit." (Interview_40). Similarly, another stated,

> Sometimes if [an area] is not available for cleaning, then they will assign you to another floor…So you have to travel, carrying your cart with you everywhere. ..It's really hard. I have a hard time pushing my cart, you know, back aches…the carpet, the rollers don't really roll well. So you have to really push, push, push. (Workshop2_2)

The risks of being unable to manage physical effort through one's own sequencing logic are direct:

> You cannot rush no room. It takes the same amount of time to do each and every room. So what you're doing is causing the ladies to be overworked because now they're moving much faster. Now here comes a slip. Now here comes your feet getting tangled in the sheet. Cuz you gotta hurry up now. You can't have lunch at one o'clock…because you have to do this room. (Interview_11)

Thus, sequencing discretion shifts from proactive design to reactive adjustment, with consequences across all three logics.

Fragmentation of cleaning work. AM also fragments workers' rhythms by requiring continuous interaction with devices: GRAs must mark when they start and finish rooms, communicate with supervisors, enter work orders for other departments, and monitor assignment changes through devices. These interactions disrupt the flow of cleaning work. They compress the time available for cleaning, break the embodied flow of tasks within rooms, and interrupt the spatial transitions within and between them. One interviewee states, "I don't want no distractions.

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So if I know that this is my task, I know what I have to do. I don't need to keep looking and checking and refreshing…It is extra work" (Interview_11). Another echoes these sentiments: "To go from one room to another, you finish this one, and if the next one is not going to be opened soon, you have to first mark that you've finished, so they can assign the next room for you to clean. It's distracting as well because it's like, well, we have to first check the phone" (Interview_40).

The interactions with the device thus occur in the spatial transition between rooms—the moment when, under manual systems, GRAs survey the floor and make judgments about where to go next—as well as within rooms, where interacting with the device is reported to interrupt cleaning routines developed over time. Such subtle changes prompt GRAs to talk about how AM "takes time off my board" (Interview_34), "[takes] up too much time and makes the job difficult" (Interview_7), or "wastes time." These task-based interruptions force workers to "catch up." As one GRA described, the device "takes time away from you cleaning your rooms", intensifying pace (Interview_3).

Algorithmic workflows also introduce user- or system-driven interruptions. This occurs when GRAs make mistakes ("Sometimes, you know, you forget to punch in your room that you're cleaning and then they'll take it away and you're like, um, I'm halfway done. I'm in the room and need it back." (Interview_3)) or when the system rejects inputs based on backend logic that workers cannot see:

> I needed one of my floors shampooed in the suite that I had. And every time I input it in the [device], 'my suite–carpet shampoo', it says it's a work order already in place and it would not allow me to change it…So one of the supervisors had to override it. (Interview_11)

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The reduction of sequencing discretion and the fragmentation of cleaning work make it difficult for workers to sustain their rhythms. Rhythms in cleaning become harder to sustain as time is repeatedly reorganized and interrupted, requiring workers to adjust. The GRA who described landing upon her "rhythm" of cleaning described how these interruptions, and the pressure they generate, prompt her to "stop drop and roll":

> Depending on what's taking place or who the person is or how bad the rush is, you can get, on a busy day, about three to four [rush rooms]. Sometimes you'll finish one or get another right from the start. So as soon as you do one, you have to go and do the other. That means anything on your list that you were doing according to your rhythm has just been broken. Because you have to stop, drop and roll. To go and then get back to finish the credits that you were assigned for the shift. (Interview_19)

These repeated disruptions force workers to respond to immediate demands, setting the stage for how they rework and reestablish their rhythms under AM.

Rhythmic Reconstitution: Reclaiming Discretion Over Work Rhythm

In response to the temporal irregularity of AM, we find that GRAs engage in what we call *rhythmic reconstitution*–the process through which workers actively draw on their embodied, spatial, and temporal knowledge to partially recover or repair discretion over work rhythms. The result is more coherent and sustainable patterns of work, representing a hybrid or blended rhythm that incorporates algorithmic direction and workers' own situated knowledge.

Our data reveal two forms of rhythmic reconstitution: *selective* and *negotiated.* Selective reconstitution refers to the moment-to-moment, individual adjustments through which workers either work around or disengage with AM to restore or preserve work rhythms. It operates across both mechanisms of temporal irregularity, allowing workers to rework sequences or protect the

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flow of cleaning from fragmentation. Negotiated reconstitution, in contrast, relies on workers leveraging relational channels to shape sequencing and restore rhythm when AM's irregularity under either mechanism cannot be resolved individually.

Selective reconstitution. To restore their own rhythms with sequencing, GRAs selectively deviate from or ignore AM-assigned procedures, especially when such directives directly contradict temporal, spatial, or embodied logics. To start, a common strategy is to input "return later" or "DND" next to a room assignment in UpKeep, repeating this process until preferred rooms are moved to the top of the list. One GRA described the spatial logic driving this decision:

> …there have been situations where I have rooms right next to each other, and they prefer to send me to a faraway room when I could have done the one right next to it first. So, in those instances, I've done it my way and continued with the rooms I have nearby and marked the other as 'return later' in case it sends me to another faraway room. (Interview_21)

This workaround allows the GRA to act on her spatial logic to restore a more efficient rhythm, avoiding additional time and physical effort that would disrupt the pacing she already established for the shift. The same workaround often draws on multiple logics at once:

> Sometimes we need some special supplies. Like if it's the VIP room, I need some extra mattress, bed, more stuff, and we know we don't have enough stuff in my cart so I don't wanna wait and I don't wanna waste my time, so I put 'return later'. Or sometimes it's really very dirty. …So I put 'return later'. (Interview_1)

Here, the workaround draws on all three logics at once: the GRA's spatial knowledge of what the room requires, her temporal judgment that cleaning it now without the right supplies would waste her time, and her embodied knowledge that a dirty room is physically demanding

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and should be approached when she is prepared. The workaround is not without cost, however, as another describes:

> If I am in [room] 1230 and it's available for me to clean, but then I got 1229, 28, 27 in a row [on UpKeep], I can't even punch 1230 because I have to go through all these other ones to move them to the bottom. [You enter] Fifteen minutes - go back, 15 minutes - go back, 15 minutes - go back. Now you got 10 rooms, and the one room you can get in is at the bottom. (Interview_34)

Another GRA noted:

> I have to go through the whole system to get back to that room. So now I gotta punch in, punch out, wait five minutes...I'll hit, come back later, hit 15 minutes just so I can get to that room. (Interview_11)

This GRA expresses frustration—"I was right here next to this room"—highlighting the spatial logic she is trying to act on: the room is physically adjacent and is the more efficient next step. But the effort required to recover that discretion through the device is costly, drawing on the temporal resources she is trying to protect. As a result, the rhythm GRAs reconstruct is not a full return to how work was previously organized, but a partial and effortful adjustment.

Other GRAs preserve their discretion over rhythm by writing room assignments on paper and deferring the act of inputting information into their devices. As one GRA stated: "[A lot of GRAs] don't follow the device. They write on paper, all the rooms, and they start doing the rooms [that way]. And, and it's at the end of the shift that people start clocking the rooms on the device" (Interview_32). By seeing all their rooms at once on paper, workers can plan and carry out a sequence grounded in their own temporal and spatial logic. By deferring input, they also

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protect the embodied rhythm of their work, both via the sequencing of rooms across their shift and the cleaning routines within rooms.

GRAs also selectively disengage from their devices once cleaning is underway. As one GRA described, the physical reality of cleaning work makes continuous interaction with the device incompatible with the task itself:

> Sometimes we don't have it [the device] in our pocket and we just have it in the cart or somewhere.…we are outside of the room, we open a door, and we're basically ready to start cleaning it, and then we punch start cleaning. And we put it in the cart and leave it there. (Interview_14)

By selectively disengaging, GRAs retain discretion over their cleaning rhythm. Another GRA described the same logic when supervisor messages mid-room: "They [supervisors] can ask you to call them when they send you a message [on UpKeep]…If you've already started that room, sometimes I don't call them. I just finish the room. They keep sending you messages, and they drive you crazy...I don't pay attention to them" (Workshop2_1). These practices limit how AM's temporal irregularity enters the task. Unlike noncooperation, where workers refuse algorithmic directives more broadly (Kellogg et al. 2020), this practice is intentionally tied to workers' efforts to protect work rhythms and complete work.

Negotiated reconstitution centers on interpersonal discretion, where workers use relational channels to restore rhythm. Negotiated reconstitution draws on ongoing relationships between GRAs and supervisors to restore rhythm through human channels that AM is unable to replace. To illustrate, one GRA described requesting rooms directly rather than waiting for reassignment:

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> So you're standing there from nine o'clock, waiting for the room to be opened, so you're wasting time. Now imagine you have 14 checkouts and your guests are not leaving. And the first room you start making is at 11:30, so you wait for this time. So you know, we know that sometimes they have open sections, or we have rooms available, and we don't have nobody there, or they are just waiting for somebody who wants to do an extra room. Then we will send a message to the supervisor, "Can you send me a room?" and she'll find a room, and then that way, she knows. (Interview_14)

This highlights the temporal and embodied logic driving negotiated reconstitution: waiting for AM to reassign rooms means losing the productive, early hours of the shift, which workers rely on to establish pace for the day. By "calling downstairs", the GRA maintains discretion over rhythm when the tasks are taken up. Our fieldnotes from a supervisor's office capture how this kind of negotiation flows continuously across the shift:

> The phone was ringing constantly while we were there [in the supervisor's office, around noon]. There were about six calls. The calls were from housekeepers reporting their DND rooms and requesting additional rooms. Some had entered their DND status already in UpKeep and were calling to expedite assignments; others preferred to call instead of updating UpKeep and have [the supervisor] complete this. [The supervisor] said GRAs have to tell her about DNDs before two o'clock.
>
> Some of the conversations we observed were as follows:
>
> Example 1: "I have one DND, do you have more rooms." "Room # checked out." "Really?" "Do you want to give me that room back and take 11?"
>
> Example 2: "I have occupied DNDs… 1712, 1709, 1705, 1721, 1716." "Ok, let me see what I have. I will send you something."

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Example 3: “Room # refused [service]. I need more rooms” “I’m doing that right now as we speak, ok?”

Through these negotiations, workers recover the rhythm that AM’s logic interrupts. Some calls are proactive requests for rooms, while others reflect a related dynamic, where uncertainties driven by guests have created sequencing conflicts that AM’s own logic cannot resolve. One GRA described this dynamic in detail:

> If I have three stayover rooms that do not want service right now, or are still in bed, I have to input it and then return later. Now, an hour later, they want service, but now the room is all the way at the bottom. So I will call down and say, “Since this is a stayover, could you send me 2542?” A guest has requested the service now.” I can’t input that in the device. (Interview_11)

Here, the GRA uses “return later” as intended, but when AM cannot easily accommodate the change, she bypasses the device and calls the supervisor, who restores workflow. In effect, negotiated reconstitution enables a form of joint human-algorithmic decision making grounded in workers’ access to relational channels.

Negotiated reconstitution also occurs collectively. When individual negotiations prove insufficient to address disruptions to work rhythms, GRAs organize through their union to push for broader changes:

> Housekeepers are complaining, this is not fair. And you could see, like, they’re writing their rooms down or they’re taking pictures off their private phone to know their rooms. And you hear ‘em every morning: “No, no, no, no, no.” So shop stewards get together, like, “It’s just gotta change. We can’t do this. Let’s go to management.” Management says, “Oh, we're trying to change it. We’re trying to get it together. (Interview_9)

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This account shows how selective reconstitution, such as writing rooms on paper and taking photos of boards, becomes the basis for collective negotiated reconstitution. What begins as individual efforts to maintain discretion over work rhythm becomes visible to union shop stewards as a recurring problem, prompting escalation to management (see also, Authors 2025). Negotiated reconstitution thus operates across levels: individual interactions with supervisors restore rhythm in the moment, while collective action targets the underlying conditions that make such adjustments necessary.

Rhythmic reconstitution illustrates how GRAs draw on their temporal, spatial, and embodied knowledge to partially recover discretion over work rhythm when it's disrupted by AM's irregularity. The rhythms that result are neither the worker-generated rhythms that preceded AM nor completely algorithmically determined. They are blended rhythms, shaped by both algorithmic directives and workers' decisions based on temporal, spatial, and embodied knowledge. As a practice, rhythmic reconstitution thus responds to disruptions in work organization and breaks in temporal continuity of work introduced by AM to generate workable, sustainable rhythms that restore a hybrid temporal order.

Conditions that shape rhythmic reconstitution. The viability of reconstituted rhythms, however, is enabled (or constrained) by various factors, including how AM is configured, managers' responses to reconstitution practices, and, in our setting, institutional protections pertaining to workers' efforts at recovering discretion.

First, the design and configuration of AM systems shape the extent to which GRAs can reconstitute rhythms, specifically through individual acts of selective reconstitution (e.g., workarounds, disengagement). This includes not only what information the system makes transparent, but also the features and settings, set by management at the property level, that shape

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how workers interact with the device. These features shape both the degree of interruption GRAs face as well as the technical feasibility of selective reconstitution. For instance, we observed that some hotel managers allowed GRAs to see their entire board in UpKeep, while others did not ("We don't see 15 rooms. We see one, two, then we see four… they're messing up your time and your mood" (Interview_31)). Without being able to see all rooms on their board, GRAs' use of selective reconstitution via workarounds is constrained:

> I've never come across [instances where] I could actually look at my whole board because if that's the case, we can just go to that particular room. A lot of us carry a pen and a notepad, and we'll write down all the rooms. But with [UpKeep], when you've done one room, you close it out as either occupy clean or clean and vacant. Then the next room will come up… Once I have a [full] list on my device, …I can better navigate…GRAs have a different method to their madness. It's all about what rhythm you're comfortable with. (Interview_19).

Such constraints are amplified by GRAs' inability to directly select or reorder room sequences, requiring them to use time-consuming workarounds. Without configuration that allows for both visibility and the capacity to act on information, rhythmic reconstitution is more difficult. As one stated: "I am able to see all the rooms…[But] I wish I can change the sequence of the room. I wish that I can have the ability to choose whichever room that I wanted to do first" (Interview_16).

Second, GRAs' ability to realize blended rhythms depends in part on how they perceive and experience managerial receptivity to practices that reflect both selective and negotiated reconstitution. For instance, GRAs describe variation in how managers react to their use of

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workarounds that deviate from the system's sequence. When GRAs anticipate reprimand, selective reconstitution carries risk, even when the entire board is visible. To illustrate:

> I can see my whole list. [Interviewer: do you have to follow what comes up on that device?] Yeah, we have to go into [the assigned] room. We need to click it, because if we don't update, the management is gonna get mad, and then they can write you up. 'How come you don't follow'. Because they keep checking what room the lady finishes. If you finish three rooms, and update all in one minute [after you finish], it's not good. (Interview_15)

However, in other cases, supervisors tacitly accept deviations and "do not issue discipline because they know it [UpKeep] is not perfect" (Interview_11). This is especially so when their own knowledge of housekeeping work aligns with GRAs' embodied logic. As one GRA noted:

> [Managers] understand. They get it… They prefer we [follow the order on the device], but they get the fact that we have to travel with these heavy carts. (Interview_19).

This variation in perceived managerial receptivity creates different degrees of informal space for GRAs to incorporate AM directives into workable rhythms through selective reconstitution without abandoning the temporal, spatial, and embodied logics on which their work depends. In similar fashion, it shapes how GRAs engage in negotiated reconstitution—whether managers are willing, for example, to make accommodations to room sequences, as we observed in our field notes, in workers' attempts to reinsert control over how their work is organized.

Finally, the GRAs in our study work in unionized hotels covered by collective bargaining agreements, which shape workers' ability to engage in negotiated reconstitution. Bargaining agreements establish baseline standards around workload, room quotas, shifts, breaks, and room

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reductions, all of which are integrated into AM configuration and shape the temporal foundation of work rhythms. Although many agreements contain language addressing technology generally—requiring, for example, advance notice before any new technology is implemented (Kresge 2020)—specific rules regarding AM practices often fall outside contracts. As one GRA explained,

> The use of UpKeep is not specified in the contract…You cannot say, 'No, I'm going to put it on hold and work on the adjacent room instead.' Because if you do that, you will have a problem with the manager because you are not following the instructions. And that aspect is not yet mentioned in the contract. (Interview_20).

However, in one property in our study, GRAs, through their union, successfully negotiated explicit rights to workarounds that allow them to sequence rooms, allowing workers to engage in rhythmic reconstitution more openly and with formal protections from reprimand. We spoke to a GRA at this property both before and after the adoption of such rules. She described how these protections allowed her to regain greater discretion over her work rhythm:

> So, it's good that we, the housekeepers, can do the control instead of the technology or the smartphone controlling us. That's why we fought so hard to win our housekeeping language as well as the technology, because we housekeepers want to have control when it comes to a smartphone. Because if the smartphone is telling us where to go, it is really hard on us because we travel so many floors. So now we can do our sequence. Because we know how to maneuver, we know how to deal with the smartphone now. (Interview_41)

This GRA describes how, through collective action, workers secured greater discretion over sequencing, enabling them to decide where to go, when to clean particular rooms, and how

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to manage physical demands of the shift while working within AM. Collective bargaining thus formalizes what rhythmic reconstitution attempts to recover informally. Similar forms of negotiated protection are beginning to emerge at additional unionized hotels (Authors 2025). That GRAs are willing to negotiate AM underscores the importance of involving workers in the design of workplace technologies, giving workers more voice and ensuring that technology is designed in worker-centric ways that protect discretion (Kochan and Dyer 2020; Authors 2023).

Discussion and Conclusion

In this paper, we examine how AM reshapes workers' discretion over work rhythm in unionized hotel housekeeping, where such technologies are layered into preexisting routines and introduce irregularity into the labor process. We show that discretion is not simply authority over decision-making but is enacted through workers' ability to construct and sustain work rhythms by integrating their accumulated temporal, spatial and embodied knowledge. By doing so, GRAs are able to anticipate demands on their labor across a shift, mapping their physical labor onto the spatial and temporal organization of their tasks while accounting for changes that stem from demands of guests and managers. With control over rhythms, they can organize, pace, and sequence work in ways that allow them to distribute physical effort and accomplish work efficiently. AM disrupts this capacity through two mechanisms: reduction of room sequencing decisions, disrupting the organization of tasks, and the fragmentation of work through algorithmic interruptions, disrupting the flow of tasks. In response, workers engage in rhythmic reconstitution, or the deliberate rebuilding of work rhythms through selective strategies that include workarounds and disengagement on one hand, and negotiation on the other. The outcome of rhythmic reconstitution is blended, hybrid rhythms that account for algorithmic direction,

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managerial and guest demands, and workers' own integrated knowledge of space, time, and body. Their viability depends on how technological configuration, managerial response, and institutional protections shape rhythmic reconstitution practices.

A primary contribution of our paper is to conceptualize discretion as unfolding through the temporal organization of work and identify how AM disrupts this process. Our findings suggest that understanding AM's impact on discretion requires attention to whether workers can integrate choices into the unfolding temporal organization of work. We therefore conceptualize work rhythms, or the patterned organization of decisions through which routines become sustained, as a central but overlooked site of transformation under AM. From this perspective, decisions become meaningful when considered in light of the entire labor process—an idea echoed in more nuanced accounts, such as Meijerink and Bondarouk's (2023) argument that AM redistributes rather than eliminates discretion and Cameron's (2024) analysis of constrained choices in the labor process of rideshare drivers, that move beyond the focus on curtailment.

A second contribution is to identify temporal irregularity under AM as a distinct mechanism of control over discretion. While AM is organized around producing a standard output—the turnover of clean rooms—it introduces unpredictability into the workflow that achieves it, destabilizing the temporal foundations upon which workers make decisions about labor. Judgments about cleaning tasks and sequencing rooms become provisional, requiring workers to continually adapt and reconstitute their rhythms. Temporal irregularity thus constrains discretion not by simply making work unpredictable but by disrupting workers' capacity to coordinate, plan, and make work sustainable.

Third, we theorize rhythmic reconstitution as a form of temporal repair through which workers respond to the disruptions and irregularity introduced by AM. It is an agentic process

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through which workers actively reconstruct temporal order while meeting organizational demands. This practice does not fit neatly into established categories of resistance or consent (e.g., Edwards 1979; Burawoy 1979). While elements of rhythmic reconstitution may resemble resistance and noncooperation (e.g., Kellogg et al. 2020), its primary orientation is not oppositional but constructive, seeking to restore workable patterns of labor. Nor is rhythmic reconstitution understood fully as consent, because workers do not simply adapt to constraints imposed by algorithmic direction. The paradox of AM's implications for discretion is that, through reconstitution, GRAs enact rhythms that sustain work for the organization even as their discretion is constrained by technological directives that organizations implement.

While prior work emphasizes that temporal structures in organizations are actively produced through practice (Orlikowski and Yates 2002), it has examined settings where workers have positional resources to sustain those practices. We show that, when temporal foundations of work are disrupted in power-asymmetric contexts, repairing order becomes an ongoing, effortful process, the viability of which is shaped by the balance of power between workers and employers. Moreover, where workers have stronger collective bargaining protections, receptive managers, or worker-centered system configurations, rhythmic reconstitution is less costly. These conditions demonstrate that discretion over temporal structuring under AM is not solely technologically determined but co-produced through organizational and institutional arrangements, making our understanding of how AM changes discretion context-dependent (Gallie 2007).

Our research suggests that disruption via temporal irregularity is most likely where AM is layered into established labor processes and reorganizes tasks, the performance of which depends on workers integrating situated knowledge across time, space, and bodily effort—knowledge

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which cannot be fully captured by technology but remains consequential for how work is performed and experienced. As AM spreads, this assertion can be assessed in settings where algorithms dynamically allocate tasks and where directives must be integrated into situated and physical workflows, such as logistics or food service. Our framework may be less applicable in settings where tasks are highly routinized or where algorithms fully substitute for managerial functions in organizing and coordinating the labor process. Our work also focuses on unionized hotels, where collective bargaining agreements likely mitigate some of AM's effects or better position workers to reconstitute rhythms. Thus, these findings may not capture experiences in non-union settings, where workers may experience AM differently.

Our findings reveal a tension in algorithmically managed work, namely that technological systems designed to coordinate labor can simultaneously disrupt the work rhythms upon which coordination relies. It follows that technological design and implementation that account for worker input and preserve their discretion may better serve both workers and organizations. The central question, then, is not simply whether organizations adopt AM, but whether they implement it in ways that preserve the workers' capacity to make coordination workable in practice.

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Table 1: Data sources

Data Category	Description	Research Task
Background (2021-2023)	Three 1.5-hour workshop session (33 GRAs) and two 1-hour participatory prototyping sessions with a subset (5 GRAs)	Explore GRAs' everyday work experiences; identify broad areas for further inquiry; build rapport; understand how GRAs experience AM design and configuration, and explore alternatives
	One site visit to west coast city A: 5+ hours of recorded and transcribed audio and 20+ pages of fieldnotes (65 mini-interviews with GRAs, managers, IT professionals, etc.)	Develop contextual understanding of hotel operations; map out how AM is used on the ground; identify emerging patterns across roles and properties
	Informal interviews with corporate officers, hotel management, technology vendors, and union researchers	
Interviews (2022-2023)	Semi-structured interviews; in 40+ hours of recorded, translated, and transcribed audio (41 GRAs)	Conduct primary data collection aimed at directly addressing the research question; gather rich accounts of workers' experiences with AM, including shifts from paper-based systems, daily routines and decision-making, to develop emerging theoretical categories
Focus groups (2024)	One 1.5-hour focus group in a west coast city B (5 GRAs)	Deepen understanding of routines, decision-making, and workload, including a structured autonomy module, to refine emerging themes while also informing parallel survey development
	One 2-hour focus group in a midwest city (7 GRAs)	

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Table 2. Overview of Coding Structure

Examples of first order concepts	Second order themes	Aggregate dimensions
"Fighting the clock"; managing credits; ebbs and flows	Temporal logic: *pacing and sequencing of work time and tasks*	Work rhythms as integrated practice: *temporal-spatial-embodied logics*
Setting pace; judging time for tasks		
Mapping assignments	Spatial logic: *mapping physical space and room features*	
Knowing room layouts, amenity locations, furniture arrangements		
Physical labor; bodily strain; knowing when to rest	Embodied logic: *knowledge and management of bodily movements and effort*	
Managing fatigue; "work smarter not harder"		
"Rhythm for accuracy"; pace of work		
AM sets pace and order; going back and forth	Reduction of sequencing discretion: *loss of control over room sequences; changes to order of work*	AM introduces temporal irregularity: *disruptions to work rhythms*
Uncertainty about tasks or location		
Interacting with UpKeep, monitoring UpKeep; communicating	Fragmentation of cleaning work: *interruptions; changes to flow of work*	
"Taking time off my board"		
"Return later"; writing rooms on paper	Selective reconstitution: *workarounds and disengagement; moment-to-moment, individual adjustments to restore and preserve rhythm*	Rhythmic reconstitution: *rebuilding blended rhythm*
Ignoring device; deferring input		
"Calling downstairs"	Negotiated reconstitution: *leveraging relational channels to restore rhythm*	
Huddling, consulting		
Going to the union, going to management		

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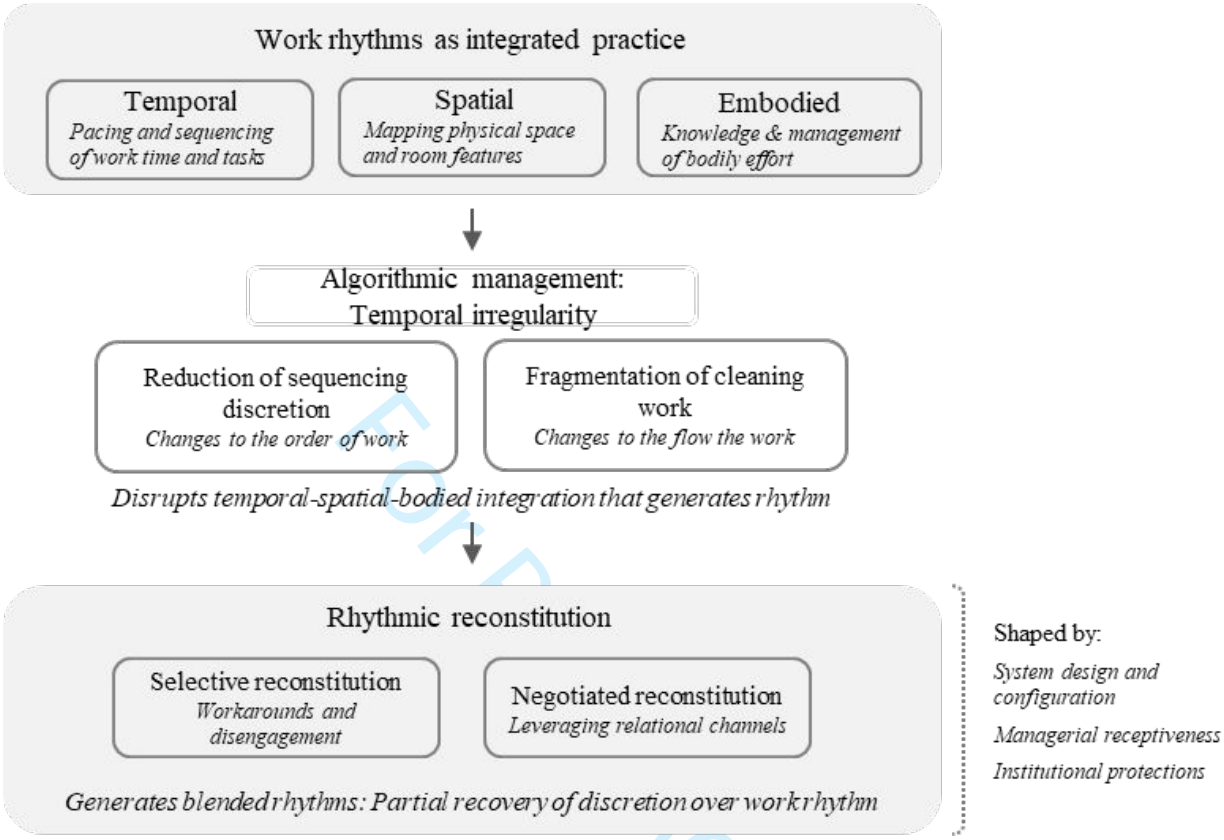
Figure 1. Model Illustrating How GRAs Respond to Temporal Irregularity Under Algorithmic Management



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