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Abstract. Platforms in the gig economy rely on algorithmic control to manage their workforce, but recent scientific evidence has shown that workers have begun to resist this control. Due to lacking focus and limited empirical data, the phenomenon of worker resistance to algorithmic control is still insufficiently understood. Based on a topic modeling approach with over 2 million text documents extracted from Reddit forums of different food-delivery platforms, we identify 14 resistance actions showing how food-delivery workers resist algorithmic control. Our study contributes to current research by expanding the understanding of resistance to algorithmic control in the gig economy, showing what resistant actions workers take, and discussing the concepts of individual opacity and collective knowledge as possible escalators and de-escalators of this resistance.

Keywords: Algorithmic Control, Resistance, Gig Economy, Topic Modeling

1 Introduction

The gig economy is booming around the globe. Not only in the US, where already one in three working Americans rely on income from platform-mediated work, or in the EU, where 11% of employees participate in the gig economy, but also in China, the number of gig workers could reach a projected 400 million by 2036, making gig work one of the most dynamic features of the global economy (Wong, 2022, Masiero, 2021, Cini, 2022). Among the fastest-growing sectors within the gig economy is food delivery, as part of the app-work sector (Yu et al., 2022). One of the enablers for this growth is the ability to manage large workforces using algorithms. This managerial use of algorithms is referred to as algorithmic management (AM), which describes a system of oversight, governance, and control practices based on algorithms that are responsible for making and executing automated decisions that affect the work process, and limit human involvement and oversight of the work process (Lee et al., 2015, Bucher et al., 2021, Duggan et al., 2020, Möhlmann and Zalmanson, 2017). A central part of AM is algorithmic control (AC), which includes large-scale collection and use of data to monitor and align workers' behavior with business objectives, previously performed by human managers (Cram and Wiener, 2020, Kellogg et al., 2020, Möhlmann et al., 2021).

The resulting continuous tracking and evaluation of worker behavior (Pregenzer et al., 2020) leads to several health issues such as anxiety (Jhaver et al., 2018), sleep deprivation and social isolation (Wood et al., 2019), frustration and burnout (Zhang et al., 2022), and many other impacts on workers' well-being. Most gig workers experience some form of algorithmic unfairness (Schulze et al., 2022) but feel powerless to stand up to the platform corporations (Jarrahi et al., 2020, Möhlmann and Zalmanson, 2017). As a consequence, recent studies have found that workers show resistant behavior toward AC practices (Anwar and Graham, 2020, Ferrari and Graham, 2021, Tassinari and Maccarrone, 2020, Woodcock, 2021). These resistance actions take on different forms. Some forms are highly covert, e.g., the creation of "hidden transcripts" (Yu et al., 2022), gaming or manipulating the algorithm (Bambauer and Zarsky, 2018, Cameron, 2022, Jarrahi and Sutherland, 2019, Wood et al., 2019). Some are more visible, like organizing in online forums (Pregenzer et al., 2021, Martin et al., 2014) to undertake collective actions (Chen, 2018, Rizzo and Atzeni, 2020, Lei, 2021) such as strikes (Vandaele, 2022), which can be summarized as "algoactivism" (Kellogg et al., 2020).

Although several studies uncovered various worker responses to AC, there is still a lack of dedicated theory-driven focus on uncovering worker resistance, as previous resistance-related findings emerged rather as a byproduct. The core focus so far has been on understanding AC as something workers are exposed to, overlooking the possibilities workers have in reacting to such a type of control (Bucher et al., 2021). There is still a gap in understanding the complex construct of resistance, its various manifestations (Curchod et al., 2020, Bucher et al., 2021), and how it escalates through phases (Jiang et al., 2021). Therefore, we propose the following research question: *How are food-delivery workers resisting algorithmic control and how does resistance escalate?* We deliberately focus on food delivery as it is the fastest-growing gig economy sector, where workers are exposed to the most stringent AC mechanisms (Yu et al., 2022, Franke and Pulignano, 2022). Our study uses the novel Big Data topic modeling approach BERTopic, which allows us to analyze 33,864 text documents from food delivery-related Reddit forums. By identifying 14 resistance behaviors and discussing concepts that enable their escalation and de-escalation, we contribute to the understanding of resistance in the specific context of the gig economy.

2   Theoretical Background

What differentiates the gig economy from other economic forms can be summarized by three criteria: (1) the use of digital platforms, mechanisms, and processes (2) enabling the de/re-construction of work into smaller, distributable tasks ("gigs"), which in turn enables more (3) flexible, short-term, and heterogeneous working arrangements (Tan et al., 2021). The mentioned working arrangements differ depending on the gig work sector, which can be divided into capital platform work, crowd work, and app work, where food delivery is classified (Duggan et al., 2020). What makes the gig economy unique lies in the use of algorithmic technologies to automate various mechanisms and processes. These can be summarized as AM systems, e.g., systems of oversight, governance, and control practices that are based on algorithms with the responsibility

for making automated decisions affecting labor, limiting human involvement and oversight of the labor process (Duggan et al., 2020, Möhlmann and Zalmanson, 2017, Bucher et al., 2021, Lee et al., 2015). The algorithms are often automated and self-learning to be able to transform input data into desired outputs (Gillespie, 2014). Besides algorithmic matching, AC is the main feature of AM (Möhlmann et al., 2021).

AC describes the managerial use of intelligent algorithms and advanced digital technology as a means to align worker behaviors with organizational objectives (Cram and Wiener, 2020, Kellogg et al., 2020). The central part in which AC differs from traditional forms of control is that decision-making and control may be exerted entirely through computerized systems or a technology interface rather than by a human manager (humans out of the loop), it may be subjected to human oversight (humans on the loop), or it may be used as a means to support human decision making and control (humans in the loop) (Danaher, 2016, Cram et al., 2020).

After we have laid the first part of our theoretical foundation and described AM and AC, we now turn our focus to resistance as a theoretical concept. The concept of resistance is difficult to grasp and comes in different forms and intensities (Woodcock, 2021). In the first step, we draw on the epistemological conceptualization of resistance by Hollander and Einwohner (2004), which is based on four core dimensions. The first core dimension of our resistance understanding, implied in nearly all scientific use of the term, is a sense of **action** (Hollander and Einwohner, 2004). Therefore, we consider the terms resistance and resistance action interchangeable since we always imply a behaviorist action and thus follow the terminological root of the word resistance, which the Oxford English Dictionary defines as the action of resisting (Laumer and Eckhardt, 2012). The second core dimension builds on the first, as action is **target-**oriented or directed against an opposition (Hollander and Einwohner, 2004). These resistance targets may vary from individuals to groups and organizations to institutions or social structures. Regarding resistance to AC, some studies found resistance to the algorithm itself, e.g., in the case of Upwork, where workers use a second monitor or a timer to circumvent automatic screenshots (Wood et al., 2019) or in the case of Uber, where drivers deactivate their GPS signal to become invisible for the algorithm (Möhlmann and Zalmanson, 2017). However, workers' resistance also targets the customer, as platforms outsource monitoring and task evaluation to the customer, making the worker dependent on the customer's evaluation (Shapiro, 2018, Wood et al., 2019). In the rather rare cases of algoactivism, which describes collectively organized actions such as strikes, workers' resistance is directed directly against the platforms or even the gig economy as a whole (Kellogg et al., 2020). The third dimension is the **recognition** of resistance. There is an ongoing discussion about the visibility of a resistant act, as visibility is a prerequisite for recognizing resistance (Hollander and Einwohner, 2004). On the one hand, scholars argue that an act of resistance must be visible and recognized by others to be considered resistance (Rubin, 1995). On the other hand, it is argued that recognition depends in part on the goals of the actor, which may consist either of an action to be recognized or of the deliberate concealment or disguise of an action (Hollander and Einwohner, 2004). Especially in the context of AC, the concept of transparency is essential, as platforms are concerned with managing transparency through the help of AM to maintain competitive advantages, protect intellectual property, and

prevent malicious users from gaming the system (Eslami et al., 2019, Burrell, 2016, Tan et al., 2021). Because the employed AC mechanisms are deliberately created opaque, workers constantly feel like being under the "algorithmic gaze" (Newlands, 2021), which reinforces covert resistance practices (Hollander and Einwohner, 2004) or "invisibility practices" (Anteby and Chan, 2018) to escape the gaze and prevent recognition. The fourth dimension, namely **intent**, follows this. If workers intend to resist, their actions are considered resistance, regardless of whether they are recognized or achieve the intended result (Hollander and Einwohner, 2004). Often intent is a better sign of resistance in the case of highly covert resistance actions or when the desired effect is not achieved (Scott, 1985). From this follows that resistance requires: a subject of oppression or target and a recognizable expression of a desire to counter that oppression, which results in action intending to counter the targeted oppression (Leblanc, 1999).

Worker resistance to AC practices can vary widely, ranging from passive resistance, such as cynical comments and avoidance (Pregenzer et al., 2021), to more active forms of resistance, like gaming tactics (Rahman, 2021, Petre et al., 2019) or active manipulation of the algorithm (Jarrahi and Sutherland, 2019) to even more aggressive resistance, like mobilizing in online groups (Cini, 2022) to perform collective resistance actions (Chen, 2018, Rizzo and Atzeni, 2020, Lei, 2021) such as strikes (Vandaele, 2022). To help classify these escalating phases of resistance, we further adopt the categorization of resistance by Coetsee (1999) into apathy, passive resistance, active resistance, and aggressive resistance. Apathy involves inaction and disinterest, followed by more mild actions of passive resistance such as complaining, withdrawal, or excuses (Coetsee, 1999, Laumer and Eckhardt, 2012). Active resistance actions are characterized as strong but not destructive, such as voicing opinions, collectivizing, and asking others to intervene (Laumer and Eckhardt, 2012). Aggressive resistance actions have a destructive or at least disruptive nature and include threats, collective boycotts, and strikes (Lapointe and Rivard, 2005).

3   Method and Analysis

To gain insight into gig workers' acts of resistance to AC and the escalation of such acts in food delivery, we apply a topic modeling approach using BERTopic (Grootendorst, 2022) based on Reddit data. Topic modeling is well suited to understanding online audiences (Hannigan et al., 2019) and presents an efficient way to analyze large datasets compared to other qualitative methods (Schmiedel et al., 2019). Due to the collective settings in forums and the natural occurrence, social dynamics are more visible for analysis than in an interview setting (Aromaa et al., 2019). We, therefore, focused on active Reddit forums (subreddits), which were selected by searching Reddit with relevant terms and brands of food-delivery platforms. This resulted in the following forum selection: DoorDash (r/doordash_drivers), Deliveroo (r/deliveroos), Grubhub (r/grubhubdrivers), and a general forum for food-delivery workers (r/couriersofreddit) to achieve good data coverage and a homogeneous sample. The data was retrieved using the Pushshift API (Baumgartner et al., 2020) and its Python wrapper

pmaw (Podolak, 2021) between October 2016 (by then, all four forums had been founded) and August 2022. Posts on subreddits consist of user *submissions,* including text or media and *comments* replying to them. We refer to them as *documents.* Submissions' titles and content sections were combined into a single document, and media submissions were excluded. Comments shorter than 15 words were also removed, as a random sample turned out to be not meaningful. Table 1 shows the initial size of the data set for every forum. As we are not concerned with platform-specific differences, the extracted forum data do not represent the respective platform but rather a homogeneous sample of food-delivery workers in general, and thus were intentionally not weighted the data for the final dataset. To further narrow down the selection of relevant documents, we searched the selected documents with a semantic keyword-based search consisting of a combination of Sentence-BERT (SBERT) (Reimers and Gurevych, 2019) and FAISS (Johnson et al., 2019). SBERT is a modification of the BERT (Devlin et al., 2019) technique to compare semantic sentence embeddings for similarity that allows using different pre-trained models. For this semantic search, we chose the *msmarco-distilbert-base-dot-prod-v3* (huggingface.co) model, which was trained on search queries in the Bing search engine and performs well at retrieving text passages relevant to keywords or search phrases. A set of 73 resistance-related keywords for search queries were derived from worker comments quoted in three highly relevant empirical studies in the AM research field (Lee et al., 2015, Möhlmann and Zalmanson, 2017, Möhlmann et al., 2021). Example keywords are "algorithm", "rules", and "resistance". The full keyword set can be provided on request. Using this search engine, we retrieved the 500 best search matches for each keyword. Since the results for some keywords overlapped, the final dataset contained 33,864 documents. Table 1 shows the number of documents from each source before (initial) and after (final) the keyword filter and Figure 1 comprehensively summarizes all analysis steps.

Table 1. Composition of the dataset

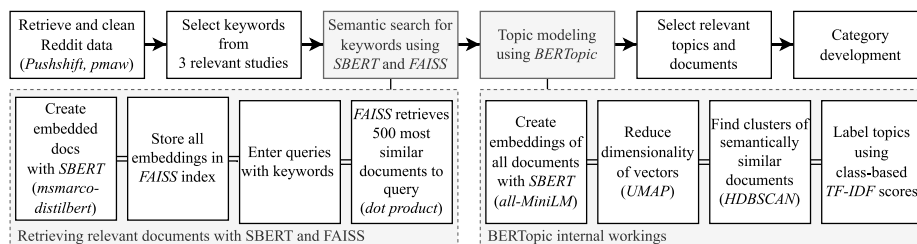| Forum	r/doordash_drivers	r/deliveroos	r/grubhubdrivers	r/couriersofreddit
Initial	2,465,383	120,539	470,659	209,372
Final	24,510	4,964	2,506	1,884

Figure 1. Analysis steps

To analyze our final data set, containing 33,864 documents, we used the topic modeling approach BERTopic (Grootendorst, 2022). BERTopic sets itself apart from other topic modeling approaches by attempting to capture the semantics of texts using pre-trained large-language models. In contrast, most well-known topic modeling approaches, such as Latent Dirichlet Allocation (LDA), rely on a bag-of-words encoding that can only be used to consider the co-appearance likelihood of the individual words in a single dataset (Grootendorst, 2022). This makes BERTopic the most potent topic modeling method for analyzing text from social media (Egger and Yu, 2022). The next step involved labeling the resulting topics from the topic model. In addition to the automatic topic labels, we retrieved the most representative documents for each topic and followed an open coding approach to create the topic labels (Corbin and Strauss, 2014). The research team members independently coded and compared their labels to ensure intercoder reliability and minimize confirmation bias. To derive our 1st-order concepts, we clustered topic labels with similar or overlapping meanings using axial coding (Corbin and Strauss, 2014). To develop the 14 2nd-order themes representing resistance actions, the research team analyzed the representative documents of the 1st-order concepts and theorized, based on the four resistance dimensions (action, target, recognition, intent), whether and in what form resistance occurred. The found resistance action *coping*, for example, is intended to relieve work-related emotional stress, tension, and anxiety, has no specific target, usually goes unrecognized, and therefore resembles what Coetsee (1999) describes as apathetic or indifferent resistance behavior. The found resistance action *striking*, on the other hand, is intended to enforce workers' claims, gain public interest, and is targeted against the platform itself, and recognized by almost all stakeholders resembling aggressive resistance. After theoretical saturation was reached through this process, the final 2nd-order themes were deductively allocated to the dimensions representing the phases of resistance by Coetsee (1999) (Glaser and Strauss, 2017, Gioia et al., 2013). Figure 2 shows the resulting data structure.

Illustrative Topics	1st-Order Concepts	2nd-Order Themes	Aggregated Dimensions
Topic 3: dd, just, app, orders	Adaption to decrease tension	Coping	
Topic 17: Acceptance, acceptance rate, rate, orders	Detachment from involvement or responsibility	Detaching	Apathy
Topic 66: memes, meme, send, sending	Denying the algorithmic capabilities	Denying	
Topic 56: robots, ai, automation, drone	Using irony, sarcasm, and cynicism	Mocking	
Topic 34: deactivated, appeal, account, fraud	Figuring out how the algorithm works	Sensemaking	Passive Resistance
Topic 24: independent, contractors, contractors, independent contractors	Independent contractors as position of power	Empowering	
Topic 25: multi, multi app, apping, multi apping	Complaints about lack of support and general	Complaining	
	Working with given conditions to gain advantages	Gaming	
Topic 13: gig, gig work, work, gig workers	Actions to avoid the algorithmic gaze	Vanishing	Active Resistance
	Deliberately changing conditions to gain advantages	Manipulating	
	Threats against platform, customers, or restaurants	Threatening	
Topic 42: protest, protests, strike, protesting	Collective execution of actions	Collectivizing	Aggressive Resistance
Topic 49: unions, union, unionize, workers	Collective organized stoppage of work	Striking	
	Quit the job and leave the platform	Quitting	

Figure 2. Data structure

4 Findings

4.1 Apathy

From our analysis, we found that apathetic or indifferent resistance actions emerged in the form of *coping*, *detaching,* and *denying*. This form of resistance was mainly non-targeted and primarily recognized by other workers with the predominant intent to decrease work-related distress, tension, and anxiety.

Coping: Workers engaged in coping actions to decrease their emotional distress, tension, and anxiety caused by their work and exposure to opaque AC mechanisms. Through *coping*, workers maintain their ability to continue working.

"Yo dont quit your job but stop actively caring or stressing about it if you get fired your gonna cope that unemployment as long as you have been there for 3 months. Ive had shitty jobs and i just turn my brain off and we good."

Detaching: Apathetic actions of resistance were also found to be expressed in workers not taking responsibility or *detaching* from their identity as food-delivery workers and the emotional attachment that comes with it.

"[…] Good luck. Get out while u can or multi app and save yourself the "lacking funds" headache. Dd [DoorDash] *dont care about us. Time to keep that same energy when considering them."*

Denying: Another way in which workers show their indifferent behavior towards the platform or the AC practices used is by denying the capabilities of the algorithm in terms of its control and matching capabilities.

"All you need is that one order to offer itself, who cares micromanaging your location compared to other dashers... the algorithm isn't as logical as you may expect it to be [...]."

4.2 Passive Resistance

Actions of passive resistance emerged in the form of *mocking*, *sensemaking*, *empowering*, and *complaining*. This form of resistance was targeted against various actors (customer, algorithm, and platform) and also recognizable by them and other workers with the predominant intent to express dissatisfaction and gain knowledge about the functionality of the algorithm.

Mocking: *Mocking*, as a form of passive resistance, is targeted against the platform, customers, or restaurants by using irony, sarcasm, and cynicism to express dissatisfaction and undermine the platform's authority.

"I broke the algorithm matrix. Aka. How yo get orders if it's slow.: Every time. And I mean every time. When it's slow and I'm getting mid afternoon sleepy, I head into a parking lot and lean my seat back. As soon as I close my eyes, the alert chimes and an order roll in. Doordash knows when you are sleeping and when you're awake."

Sensemaking: Many workers use the analyzed forums to gather information and exchange with others to make sense of how the algorithm functions. Workers try to observe patterns and figure out why they receive specific orders and what behavior triggers the algorithm.

"The offers are all computer algorithms. Any algorithm will follow a set of rules. Just analyze the offers and look for patterns."

Empowering: Workers used their position as independent contractors as a position of power and leverage to formulate conditions and justify resistance actions. Workers strongly voice their opinions and are calling for outside actors to intervene.

"You're not a doordash driver, you're a self-employed independent contractor who controls their own income. […] No, your location is your option. As an independent contractor you get to choose when and where you work. […]"

Complaining: A prominent theme that appeared was that various workers use the forums to express their dissatisfaction and complaint about the algorithm, the platform, customers, restaurants, or support.

"Support is a fucking joke.: A complete and utter waste of time…Unprofessional..slow.. literally worthless. Never trying to do the right thing for this bogus company ever again. They don't give a shit about any of us."

4.3 Active Resistance

Active forms of resistance emerged in our analysis in the form of *gaming*, *vanishing*, *and manipulating*. This form of resistance was targeted primarily against AC practices and mostly unrecognizable for the target with the predominant intent to gain advantages and actively sabotage the algorithm.

Gaming: Workers use various *gaming* practices to gain advantages. *Gaming* practices are characterized by the fact that the conditions imposed by the algorithm are not changed or manipulated but are dealt with by behavioral adaptation.

"I would assume they'd classify that under motorcycle but I'm not sure. Setting yourself to motorcycle gets the same short distance priority because the food still gets cold faster despite the same driving speed as a car. The problem is the algorithm. From what I understand if your set to bike it periodically checks your speed via GPS. If your going over a certain threshold it knows you can't be biking and flags you for fraud which can lead to deactivation. And we don't know what that threshold is..."

Vanishing: Since most of the control mechanisms used are GPS-based, workers have developed specific circumvention tactics to hide from the algorithmic gaze to take unnoticed breaks, avoid low-paying orders, or avoid being monitored by customers.

"[…] Another little trick I just confirmed last week: Airplane mode on. Restart phone. Airplane mode off. It won't solve the problem of oversaturation but it gives a noticeable edge. That process resets your GPS and connections (ip address mac sim etc..)...also good to solve many other app issues with anything on your phone."

Manipulating: Workers try to manipulate the algorithm or the decisions made by the algorithm and, therefore, deliberately try to change the set conditions to gain advantages as an individual or a collective.

"There is a way to emulate "moving" to fool the algorithm into sending you orders without burning gas. Requires a computer though."

4.4 Aggressive Resistance

Aggressive resistance emerged in the form of *threatening*, *collectivizing*, *striking*, and *quitting*. It was targeted primarily against the platform with the predominant intent to force disruptive change and gain outsider attention.

Threatening: Workers try to *threaten* the platforms by announcing collective actions such as strikes, collectively declining orders which fall under a certain minimum payment, quitting, or even a class action lawsuit.

"Personally, I think this is a scam they are running at Doordash. It allows them to retain more income and is also in violation of minimum mileage payments that they promote to drivers. If we can get enough people to speak to being treated similarly, I think we can collectively address the problem. This can be done through state attorney's general and the threat of class action litigation."

Collectivizing: Most of the found active resistance actions had the potential to escalate into aggressive resistance actions by being performed by a collective rather than by an individual worker. For example, manipulation practices were much more impactful on a collective level. By forming a worker union, workers try to overcome the intentional individualization that the platform favors by managing workers separately.

"One thing im noticing, is that we as a community need to actually link up. I feel like we have the whole "gig-economy" filled to the brim with budding entrepreneurs but we're all sitting here."

"I wonder what would happen if we collectively started declining every order & clicked "order to small" I know they pause you but the algorithm should pick up that an entire region, or swaths of land go unclaimed. Any dasher out right now should click deny, reason, small order. Let's Wallstreet the system."

Striking: We found various calls for strikes and many signs that strikes have taken place. *Striking* is one of the most aggressive forms of resistance, as it involves high levels of organizing and planning, and a strong intent to take action and be recognized.

"DoorDash Strike Force - Means of Negotiation: I believe it's too early to put a date on a "strike" and I also believe that without any form of ongoing bargaining, and official discussion with DD [DoorDash] *about rates, this tactic will be, largely, ineffective. For that reason, I've created a group whose goal it will be to gather enough drivers into one spot that we can then have enough power over their markets to inflict actual damage on their earnings. Once we've done that, the goal is to renegotiate with DD* [DoorDash]*, as a group, with a council.* […]*"*

Quitting: One of the most aggressive forms of resistance, which produces the most harm for the platforms but also the highest consequences for the workers, is *quitting*.

"[…] *You have ZERO control of the outcome, but may look foolish in the process OR Quit and find another job that suits your needs. You have 100% control of this outcome."*

5 Discussion

By mapping the 14 emerged resistance behaviors to the resistance categories (Apathy, Passive Resistance, Action Resistance, Aggressive Resistance) by Coetsee (1999) and

discussing them based on the underlying resistance dimensions action, target, recognition, and intent we showcase how our findings contribute to the more broad scientific discourse on resistance. Furthermore, we discuss concepts that potentially function as escalators or de-escalators for resistance in the gig economy context.

Apathy: When looking a the resistance behaviors *coping*, *detaching*, and *denying*, which we categorized as an apathetic or indifferent state of resistance, we find various similarities with resistance to IS or traditional management. Similar to service work systems, gig workers have to display certain behaviors or emotions (which may be inconsistent with their true feelings) in their customer contacts alongside the pressure to conform to an algorithm's requirements (Cameron, 2022, Shapiro, 2018). As a result, the workers focus more on their well-being by *coping* with work-related stress or feelings of powerlessness, which fits in with current findings that show that working in the gig economy leads to several health issues (Jhaver et al., 2018, Wood et al., 2019, Zhang et al., 2022). These *coping* tactics strongly resemble similar actions found by Jiang et al. (2021), such as comforting each other, as this also helps to keep emotions under control (Bucher et al., 2021) while working.

Passive Resistance: Workers express their dissatisfaction more openly by *mocking* and *complaining*. In regards to the *mocking* theme, we found that the workers have developed their language, e.g., referring to very good orders as "unicorns" or the Door-Dash algorithm as "Tony" (in reference to the CEO Tony Xu). This resonates with a previous study, which also identified passive resistance actions such as using cynic language to mock the platform or the algorithm (Pregenzer et al., 2021). With a more strong intent, the actions are more target-oriented, and gaining knowledge about the algorithm's functionality becomes more important. This is found in *sensemaking* actions. *Sensemaking* describes a process that unfolds as a sequence in ongoing circumstances of workers organizing extracted cues from their work environment to make plausible sense (Weick et al., 2005). This can occur on the individual level or be extended to communities as collective sensemaking, referring to shared understanding arising from interactions within a social ecosystem (Chandra and Pal, 2019, Weick, 1995). Many workers, therefore, use forums to gather information, exchange with others, and share hints and advice (Jiang et al., 2021). Studies researching sensemaking of ride-hail drivers found that they engage in malevolent sensemaking, which includes beliefs with a negative assumption, and benevolent sensemaking, which refers to neutral or positive assumptions (Pregenzer et al., 2021). Furthermore, Möhlmann et al. (2022) theorized a new form of sensemaking – algorithm sensemaking – which describes how platform workers keep up with algorithmic instructions systematically. In our understanding, *sensemaking* serves three properties. It is a form of passive resistance, following Pregenzer et al. (2021)'s notion of malevolent sensemaking, it is a form of knowledge creation and gives workers a sense of *empowerment* as they become more knowledgeable.

Active Resistance: The feeling of *empowerment* and knowledge building through *sensemaking* can strengthen the intent. With more knowledge, workers can *vanish* from the algorithmic gaze, stay under the radar (Bucher et al., 2021), circumvent (Jarrahi and Sutherland, 2019), and avoid (Pregenzer et al., 2021) its continuous tracking. Workers

constantly feel like being under the "algorithmic gaze" (Newlands, 2021), which reinforces covert resistance practices to escape the gaze and prevent recognition (Hollander and Einwohner, 2004). The forms of active resistance are mainly targeted against the algorithm or the implied AC mechanisms. The resistance intent behind the actions of *gaming* and *manipulating* is to gain a financial advantage, more freedom, and to harm the platform. This resembles what scholars describe as sabotage, which is defined as any behavior that deliberately undermines organizational goals (Brown, 1977). It is differentiated into "sabotage by direct action", which resembles *manipulating*, and "sabotage by circumvention", which is similar to *vanishing* (LaNuez and Jermier, 1994).

Aggressive Resistance: A central aspect of aggressive resistance is that workers *collectivize* to undertake resistance actions. Aggressive resistance is not targeted solely against the algorithm, but the target focus shifts to the platform. Targeting other actors, such as customers or restaurants, becomes rare. Also, the intent is to deliberately harm the platform by trying to organize a class action lawsuit or *collectively* decline orders which fall under a minimum threshold. Also, aggressive resistance actions are meant to be recognized by a wide range of actors and gain attention. Ultimately *striking* emerged as the second most aggressive form of resistance as it needs strong intent, a high degree of *collectivizing*, and a clear target. In our view, *quitting* is the most aggressive action of resistance because it harms the platform the most in the case of mass *quitting*. However, it also has high consequences for workers and thus requires the strongest intent.

Individual Opacity vs. Collective Knowledge: When looking at what differentiates AC from previous or more traditional forms of control, it comes down to the replacement of the human manager by an algorithm, which results in much tighter, less subjective, and more objective control due to the increased comprehensive, instantaneous, interactive, and opaque characteristics of AC (Kellogg et al., 2020). Especially the opacity of AM systems leads to difficulties in communicating with the platform or the algorithm, and the complexity of algorithmic decision-making lead workers to increasingly consider algorithms as "black boxes" (Shin, 2021, Rani et al., 2021, Eslami et al., 2019). This perception of algorithms as "black boxes" makes it difficult for workers to target their resistance actions as they encounter a depersonalized machine, which makes it almost impossible to estimate the impact of a specific resistance action. This opacity aspect helps to explain why workers begin to personify the algorithm by referring to it as "Tony" as a way to define a target against which they can direct their actions. Our findings are in line with other scholars who also identified opacity as a moderator of resistance Pregenzer et al. (2021) and fit in with the discussion about the transparency of AC and AM in current research (Weber et al., 2022, Schulze et al., 2022, Weiskopf and Hansen, 2022). Another key aspect of work in the gig economy is the isolation workers face as they operate highly individualized and separated from each other and the collective. As workers do not have personal contact with the platform or other workers and work independently from each other, this can lead to social isolation (Wood et al., 2019). Furthermore, workers can lose the ability to understand how their actions are perceived by others, whether their skills are satisfactory and improving, and how they contribute to the work of others as well as to the performance of the organization as a whole (Gal et al., 2020). Also, by interacting almost solely with a technology interface, workers are left with minimal human interactions. Consequently, in the gig economy,

where algorithms mediate interpersonal relationships and communications, the ability of workers to create a community and a collective identity from which resistance actions could emerge is diminished (Gal et al., 2020). In summary, the interaction of these aspects forms the concept of individual opacity, which de-escalates or hinders resistance. In contrast to individual opacity, we present collective knowledge as a possible escalator for resistance. Collective knowledge emerged as a resistance escalator, as to perform resistance, workers need to gain knowledge about the algorithm. When looking at the similarities of the resistance actions *sensemaking*, *vanishing*, *manipulating*, and *gaming,* it emerged that knowledge about the target becomes a prerequisite to performing these actions. *Sensemaking* channels these efforts of knowledge creation. Furthermore, knowledge can help workers in an apathetic or indifferent state to form a stronger intent and better identify their target by learning more about it. Alongside knowledge, the community concept emerged as an integral part of resistance. The most characteristic theme of the community concept is *collectivizing*. We found that almost all of the aggressive resistance actions were carried out on a collective level. Therefore, the community seems amplifies passive or active forms of resistance to become aggressive forms of resistance. The impact of passive resistance actions such as *mocking* and *complaining* or active resistance actions such as *manipulating* or *gaming* could be strengthened and turned into aggressive resistance actions by acting as a collective.

6   Conclusion and Limitations

In conclusion, based on over 2 million text documents extracted from Reddit forums of different food-delivery platforms, we uncover 14 resistance actions showing how food-delivery workers resist algorithmic control. We further embed the found resistance behaviors in the current scientific resistance discourse and discuss possible concepts that function as escalators and de-escalators of resistance. By doing this, we contribute to current research in broadening the understanding of worker resistance against AC in the gig economy. Additionally, we developed an empirical use case for the topic modeling method BERTopic. The study design is limited in its ability to uncover apathy as workers who already participate in forums might already have a stronger resistance intent. Because our extracted forum data do not represent the respective platforms, but rather a sample of food-delivery workers, one or more platforms may be overrepresented, limiting the generalizability of the results. The identified escalators and de-escalators could serve as a first step toward better understanding the dynamics behind resistance. Therefore, the next steps are to track individual trajectories of resistance behavior over time and validate our findings by conducting focus group interviews.

Acknowledgments

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