The Effects of AI on Street-Level Bureaucracy: A Scoping Review

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Abstract

The use of artificial intelligence (AI) by "street-level bureaucrats" - a term coined by Micheal Lipsky to explain the public servants who distribute public benefits and sanctions using professional discretion in interactions with the public - has been expanding. By adopting the structure set forth in Lipsky's 2010 book, *Street Level Bureaucracy*, we analyze the effects of AI on the characteristic facets of their work: discretion, working conditions, and patterns of practice. According to more than 70 works gathered from across the fields of justice, policing, education, and social work, we cover how each of these has been or will likely be affected by AI and draw out the ethical implications associated with these changes. We find that AI has mixed effects on frontline discretion - at times supporting and at times limiting it. The literature suggests changes in working conditions, specifically in the form of a shift in resource constraints (from lack of time to inadequate training), technologization of performance measures (which yield few discernible advantages over traditional assessment methods and lead to privacy concerns), and client interactions influenced by their perceptions of AI (resulting from personal and contextual factors). While there is limited literature on how most patterns

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of practice are affected by AI use, we find that rationing at the level of clients has, across many domains, been made more efficient by the use of these tools, while exacerbating bias, due to biased training data and human-computer interaction. From the literature, we explain the potential effects of AI on three other patterns of practice - rationing at the level of services, securing client compliance, and reconceiving work and clients.

Keywords: Artificial Intelligence, Street-Level Bureaucracy, Ethics, Public Services, Government

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1. Introduction

This article analyses the important changes caused by the use of artificial intelligence (AI) to street-level bureaucracy and their potential implications in a scoping review. In 1980, in his seminal book, *Street-Level Bureaucracy*, Michael Lipsky gathered all the government employees who use discretion in regularly interacting with the public under the label of "street-level bureaucrat" (see now Lipsky 2010). Judges, police, teachers, and social workers (among others) work to distribute public benefits and sanctions to their "clients" (Lipsky's term) - the citizens with whom they interact, often impoverished, disadvantaged or disenfranchised. These workers wield enormous power over citizens' lives - from deciding how children are taught to the length of a criminal sentence (Leana, Appelbaum, and Shevchuk 2009; Bushway and Piehl 2001). In his account, Lipsky highlights how the working conditions and practices of street-level bureaucrats influence public service delivery and come to establish informal, bottom-up public policy. With the adoption of evermore powerful, efficient, and affordable forms of AI, the role of street-level bureaucrats is poised for its greatest transformation since Lipsky coined the term. AI has been increasingly incorporated into their workplaces and a burgeoning body of literature suggests that it will have major effects on working conditions and patterns of practice - which may affect resultant informal public policy. This article seeks to shed light on what the changes might look like to bring awareness of the benefits and drawbacks of AI use in street-level bureaucracies.

We draw from literature which deals exclusively with the use of AI by street-level bureaucrats except where this was not available due to the novelty of the topic. In case of these gaps, we draw from existing literature outside the context of street-level bureaucracy on forms of AI that are used by street-level bureaucrats.

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To ease historical comparisons and facilitate continuity in the analysis, we have adopted the structure suggested by Lipsky in the first three parts of *Street-Level Bureaucracy* (2010). In section 2, we summarize the debate on the effects of AI on frontline discretion. In section 3, we address how the working conditions (particularly resource constraints, performance measures, and client relationships) of street-level bureaucrats are affected by the incorporation of AI into their workplaces. In section 4, we outline how patterns of practice employed by street-level bureaucrats – particularly rationing, ensuring client compliance, and conceiving work and clients – may be affected by AI. Finally, we conclude with some recommendations on further research areas to explore.

2. Discretion

Discretion is at the heart of street-level bureaucracy because it allows street-level bureaucrats to make determinations about how, when, and to whom public benefits and sanctions are dealt, through balancing personal and agency orientations. In the exercise of their discretion, Lipsky postulates that street-level bureaucrats are responsible for the creation of new, informal policies – shaped by workplace conditions, agency goals, and public service ideals among other things. Thus, unsurprisingly, the most developed and closely linked body of literature on the effects of AI on street-level bureaucrats' work is that which characterizes the effect of AI on discretion. The effects of these technologies can best be understood as conforming to either the *curtailment* or *enablement thesis*. First introduced by Buffat (2015), the curtailment and enablement theses hold that information and communications technologies (ICT) curtail or enable frontline discretion. Authors analyzing the use of AI by street-level bureaucrats have tended to conform to one of the two theses.

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Some researchers see automated decision-making (ADM) as detracting from the discretion once held by street-level bureaucrats, by transferring discretion to a systems level where developers and system architects have discretion instead (J. B. Bullock 2019; J. Bullock, Young, and Wang 2020). This is particularly concerning because discretion allows agency heads to "defer committing to meaning" of legislation. Systems-level engineers, who never face the effects/repercussions of their systems, become policy creators instead (McCann 2023). Many hold more skeptical conceptions of the coexistence of discretion and AI in street-level bureaucracy. One analysis of police discretion paints predictive policing as reducing discretion in the field because it influences police suspicions, which may then present challenges to human rights-based standards of reasonable suspicion and presumption of innocence (Blount 2022). However, calls for further investigation of this dynamic in the field remain (Johnson et al. 2022). Other researchers claim discretion is at odds with AI because of the obscurity it engenders. As one author describes the situation, "The uniformity wrought by AI/ML algorithms will come at the cost of increasing the opacity of the decision-making criteria and, potentially, the intuitiveness of the decision metric," (Bell 2021, 96). In the courtroom, scholars highlight that while these technologies can be used to ensure greater uniformity across judicial decisions, the push for uniformity may come at the cost of a reduction in discretion (Bonicalzi 2022). In response, researchers have proposed that high-discretion problems be diverted from algorithmic decision-making and dealt with by human decision-makers instead (Alkhatib and Bernstein 2019). These views support the curtailment thesis, as they indicate that artificial intelligence used by street-level bureaucrats decreases their decision-making discretion.

Another group of scholars offers a more positive interpretation of the relationship between discretion and AI use. Increasingly, researchers are presupposing the presence of AI in

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the bureaucracy (likely reflecting the increased incorporation of AI into jobs) and reimagining the tools as part of the discretionary process. One researcher calls for a broader interpretation of discretion, defining it as a process implicated in many stages of the broader decision process, rather than one discrete instance, in order to accurately account for how AI is 'embedded' in discretionary practices of street-level bureaucrats (Bentley 2022). Social work research has indicated that decision support tools have been perceived by some as an alternative form of collaborator, from which social workers may draw support or evidence for their treatments of clients, much like rehab counselors or other medical professionals who advise on cases (Ammitzbøll Flügge, Hildebrandt, and Møller 2021). For example, Jeon and Lee elaborate on the roles of ChatGPT as a collaborator in the classroom, delineating its 4 collaborative roles as interlocutor, content provider, teaching assistant, and evaluator (2023; Ji, Han, and Ko 2023). AI teaching assistants have also been developed and shown promise in supporting teachers (Zhang et al. 2023; Kasepalu et al. 2022). These indicate a distribution or dispersal of discretion, rather than a reduction. These results echo earlier findings of researchers studying bureaucratic discretion after the implementation of a set of algorithms to detect corruption in an administrative office in Spain (SALER) who determined that, when implemented as decision-support rather than decision-making, the algorithms were regarded as discretion-enhancing (Criado, Valero, and Villodre 2020). Use of AI has also been understood to aid police discretion by supporting their decisions with data and evidencing decisions with documentation (Aviram, Correa, and Oliviera 2024). These cases support the idea that AI enhances the discretion of street-level bureaucrats, hence the enablement thesis.

The significant bodies of work that support both the curtailment thesis and the enablement thesis indicate that AI typically has mixed effects on discretion. Some work has been

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done to uncover the contextual factors that influence AI's effect on frontline discretion. However, the literature is still limited. Future research on the specific factors that promote curtailment and enablement of discretion in particular contexts of street-level bureaucracy is needed to establish a more complete account of the effect of AI on street-level bureaucrats' discretion and the degree to which fields within the label differ or share in how AI affect frontline discretion. Moreover, most of the research done on the topic of AI's effect on the discretion of street-level bureaucrats is conceptual rather than empirical. Further empirical research, like that of Marienfeldt (2024), can better elucidate the effects of AI on street-level bureaucrats' discretion.

3. Working Conditions

In all workplaces, context affects decision-making . This is particularly important in the case of street-level bureaucracies because, in them, workers' decisions influence public service delivery and establish informal policy. According to recent literature, the adoption of AI by street-level bureaucrats has primarily impacted three work conditions outlined by Lipsky: "resources are chronically inadequate relative to the tasks workers are asked to perform", "performance oriented towards goal achievement tends to be difficult if not impossible to measure", and "clients are typically non-voluntary" In the following sections, we outline how each of these conditions is changing in the face of AI adoption by street-level bureaucracies.

3.1. Inadequate resources

All street-level bureaucrats face resource constraints – whether these be on time, like the social worker who must balance their high caseload with their desire to provide individualized service

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to clients, or money, like the teacher who must decide which classroom supplies to buy. AI that has been adopted at virtually all stages of the street-level bureaucrat's work promises to alleviate such resource constraints. Examples include the Alleghany Family Screening Tool (AFST) used to maximize the efficiency and accuracy of child welfare call responses; the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) decision aid used by judges to support bail and sentencing decisions; predictive policing to forecast where crimes will occur and maximize the efficacious deployment of police resources; and Dropout Early Warning System(s)(DEWS) to direct teacher attention towards students who are most at risk of dropping out. In most cases, these systems have succeeded at alleviating the constraints that they address.[1] However, other constraints emerge as a result, namely those on what Lipsky calls "personal resources" in the form of training. Across the spectrum, street-level bureaucrats lack adequate training to work with the AI tools that they are provided. Numerous studies have indicated that teachers are not adequately trained to implement AI in their classrooms (Kim and Kwon 2023; Lipovec and Flogie 2023; Lim 2023). Police officers use facial recognition software and other emergent technologies to seek out criminals with limited (if any) training (Hill 2020; Paulsen 2020). Judges have expressed that there is a lack of and need for adequate training to operate legal AI (Martinho 2024).

The constraints imposed on personal resources by AI in street-level bureaucracy have important implications, particularly for adoption rates and the quality of service delivery. Willingness of teachers to adopt AI in their classrooms has been linked to technological self-efficacy (Al Darayseh 2023). In Pennsylvania (USA), a survey of judges' opinions on an in-state

[1] It is worth noting that each has been the subject of scrutiny for other ethical dilemmas which will be discussed in more detail in section 4.2

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recidivism risk assessment tool found that they commonly ignored tool results due to a lack of understanding of its existence, functioning, and product (Pruss 2023). Without training, workers may be less likely to use AI. Moreover, if these tools are implemented by workers lacking proper training, they are more likely to exacerbate the negative implications because of misuse. For example, Hannah Quirk documents how police's lack of experience and understanding of AI tools within the Metropolitan Police Forces resulted in inefficiencies that negatively impacted rape victims' experience with the police and may have resulted in the false conviction of Liam Allen (2023). Lack of appropriate training may also result in dependence on or excessive skepticism of AI - often known as algorithmic bias (Burton, Stein, and Jensen 2020). This has been found to occur in police forces that lack the technical training to work with predictive policing (among others) algorithms (Yu and Carroll 2022). Social work scholars have commented on the tension between approaching AI critically and successful implementation in the workplace (James et al. 2023). They write, "positive social work maintains critical distance from these technical processes, including ADM, while becoming proficient enough in technologized service delivery to understand how and when to use it well — and perhaps when to not use it at all" (2023, 14). As James and colleagues suggest, as well as other reviews from different fields within street-level bureaucracy, the best way to alleviate personal constraints and avoid related issues is through training (Lameras and Arnab 2022; Celik 2023).

Some constraints also follow from the tools themselves, as in the case of algorithms built without regard to the professional experience of the street-level bureaucrats who use them (Waardenburg, Huysman, and Sergeeva 2022)[2]. For example, a study conducted on the response

[2] This issue reflects the transition from street- to system-level bureaucracy outlined by Bovens and Zouridis (2002).

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of Danish social workers to the inclusion of a decision support algorithm found that social workers often felt that provided tools failed to capture the nuance of situations, by classifying complex cases on a binary scale - they indicate that similar examples have been found in social work operations in Spain and the Netherlands (Jacobi and Christensen 2023). Similar issues have been raised concerning the inability of algorithms to capture the nuance of the situations confronted by street-level bureaucrats. As Lehtiniemi (2023) writes, "clients have individual strengths, coping skills, and stressors that cannot be reliably determined in this way". In sentencing, scholars have cast doubt on AI aids due to their inability to incorporate a defendant's remorse into results (Ludwig and Mullainathan 2021). Beyond the limitations on input, the way in which output is presented has been shown to affect the use of these tools – with judges opting not to use AI-derived recidivism risk scores due to unclear presentation (Pruss 2023). The extent to which these constraints affect decision-making depends on how much street-level bureaucrats rely on the tools to make a decision,[3] but they are important to note as they may affect AI adoption and broader service delivery. These constraints may be alleviated by increased collaboration between developers and bureaucrats in the development of these tools, as suggested by Criado (2020) among others.

3.2. Performance Measurement

One of the central challenges that results from the discretion with which street-level bureaucrats are required to do their work is its incompatibility with performance measures. As Lipsky remarks "When the output consists of services provided or the validity of discretionary decisions made, it is extremely difficult to oversee or scrutinize these decisions if standards of quality are

[3] Perspectives vary on the degree to which workers rely on AI when making decisions/doing work.

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at issue". (2010, 49). Despite this, AI tools have recently emerged as promising ways to assess the efficacy of these workers. Thus, another way in which AI is transforming the work experience of street-level bureaucrats (that follows from the high level of discretion they use to do their jobs) is in the assessment of their work. Technologies measuring metrics from educator posture to within-judge judicial decision consistency have popped up claiming to be able to account for teacher success or the factors that characterize successful judicial decision-making (Bex and Prakken 2021; Ye et al. 2023). These ultimately automate assessment without actually changing its substantive methods or outcomes – meaning that such tools are liable to the same pitfalls as analog forms of performance measurement, namely the prioritization of tasks subject to measurement at the expense of other important but not measured tasks. This has occurred, for example, in the case of social workers who 'received demerits' when they failed to upload documentation by deadlines, thus shifting priority from improving client welfare to timely documentation (Ball et al. 2023). More generally, several scholars have raised the issue of standardization of decisions as algorithmic performance measures are introduced (Greenhouse 2021; Marie Leth Meilvang 2023).

Moreover, affiliated issues have emerged as a result of these algorithmic performance measures - with privacy concerns at the forefront. As Arantes explains, "Educational technology businesses are increasingly collecting teachers' *personal* data, which can improve AI systems, including how they assess teachers as potential customers. Their assessment arguably aims to increase profitability more so than educational outcomes" (2023, 871). Her analysis of the Australian Human Rights Commission's Human Rights and Technology final report also raises the issue of a lack of due process (and the accompanying impossibility of redress) in algorithmic teacher evaluations (EVAAS) which were used to support teacher firings in Houston's

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Independent School District. Some scholars contend that this environment of intensified surveillance may "desensitize" teachers to its risks (Rensfeldt and Rahm 2023, 35). In the private sector, though still dealing with the workers who use discretion to interact with clients, the use of an algorithmic management video recording system to monitor call center employees (particularly a "Transaction Monitoring Record (TRM) control and surveillance system") was restricted to voice recording by the Norwegian Data Protection Authority for worker privacy violations after worker complaints were escalated beyond the firm when the company failed to resolve the issues in house (Doellgast, Wagner, and O'Brady 2023). Similar concerns have been brought to bear in the public sector upon police departments using Truleo (audio and video monitoring of body camera footage) by Seattle's police union (Santos 2023), after which Truleo's contract with the department was terminated. These incidents support the results of Aviram and colleagues' (2024) research on police, which indicates that police officers are less likely to approve of the use of "system" technologies when they are used for worker monitoring. This small body of literature indicates that, despite promised benefits, algorithmic management leads to issues that affect both the worker and the client experience. However, further research is needed to uncover the extent of the implications/effects of algorithmic management/performance measurement on street-level bureaucracy.

3.3. Client Relations

Lipsky highlights the street-level bureaucrats' relationship with their clients as an important influence on their work. He notes that clients are non-voluntary and, as such, have limited power in interactions with street-level bureaucrats. Nonetheless, client compliance is important to the functioning of street-level bureaucracies, particularly when workers are assessed in light of it.

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Moreover, public service values (understood as providing good service to clients) motivate street-level bureaucrats. Thus, the way clients perceive street-level bureaucrats has important implications for the success of street-level bureaucracy even though clients are "not among street-level bureaucrats' primary reference groups" (2010, 57). Several researchers have conducted studies on the conceptions of clients of the use of AI in street-level bureaucracy. From the literature, two broad types of factors affect client perceptions of AI use in street-level bureaucracy: personal characteristics and contextual factors.

There is a small body of literature that addresses how personal characteristics influence peoples' perceptions of artificial intelligence by street-level bureaucrats. One study, conducted by Araujo and colleagues (2020), deals with the effect of personal characteristics on fully automated decision-making (ADM) in media, health, and justice contexts. In it, researchers consider the effects of knowledge, online privacy concerns and self-efficacy, demographics, and belief in equality on peoples' perceptions of automated decision-making. The results indicated that a majority of people perceived it as risky, more people perceived it generally as useful than either not useful or less useful, and people were evenly mixed about fairness perceptions. General knowledge was positively associated with perceptions of ADM usefulness. Domain-specific knowledge and online self-efficacy were positively associated with perceptions of ADM fairness and usefulness (and negatively associated with risk for online self-efficacy). Greater knowledge of AI has also been linked to greater acceptance of, and less negative views on, systems with less human involvement (Horvath et al. 2023). Perceptions of fairness and usefulness were negatively associated with online privacy concerns. Age was negatively associated with usefulness (as was female gender) and positively associated with risk. The negative effect of age and female gender on perceptions of AI in street-level bureaucracy has

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been studied in more specific contexts like in the cases of fully automated decision-making in speed(ing) ticketing, benefit distribution, and partially automated recidivism risk prediction decision support for criminal sentencing. In surveys on these uses of AI, Busch found that clients favored human discretion across the board (2023). Results indicated that these effects were most pronounced in older respondents. Moreover, despite respondents most widely approving of the ticketing use case, women were less likely to approve than men. These may be important because lower perceptions of usefulness and higher perceptions of risk are correlated to lower education levels and female gender – both of which map onto historically underrepresented or disadvantaged groups. Political party membership has also been shown to influence approval of some aspects of AI use by street-level bureaucrats (the targets of AI use by police), with democrats preferring automated internal reviews while republicans preferred predictive policing (Schiff et al. 2023). Street-level bureaucracies do not have influence over the personal characteristics of their clients. However, these may be useful in explaining some aspects of client-SLB interactions down the line. For example, which clients appear for service.

Contextual factors also affect client perceptions of street-level bureaucrats' use of AI. For instance, the impact of a decision has been shown to affect perceptions of fairness and risk of AI use by street-level bureaucrats. According to one study, fairness perceptions were higher for ADM than humans in high-impact decisions in justice and health contexts but not in low-impact scenarios or those in the field of media. Moreover, perceptions of risk were lower if decisions were made by ADM (rather than humans) in high-impact scenarios. The same study found that decisions made by ADM were perceived as more useful (than those made by humans) in high- and low-impact scenarios in health and high-impact scenarios in justice (Araujo et al. 2020). The impact of a decision may differ from the level of discretion required to make it. For

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example, the decision of a police officer to give a parking ticket is a high discretion, low impact decision, while the decision by a social worker to award benefits is one of low discretion and high impact. Thus, variations in the level of discretion required by street-level bureaucrats have also been shown to affect acceptance of AI in some cases. In low discretion scenarios,[4] citizens were found to prefer greater human involvement than in a high discretion, low impact scenario (Horvath et al. 2023). More nuanced factors have also emerged in context-specific literature. In a survey on police use of AI, Schiff and colleagues found that bureaucratic proximity was linked to more positive citizen attitudes towards AI use by the police: people tended to have higher levels of trust in AI used by local sheriffs than the FBI. This can be explained by the fact that the local sheriffs are embedded within the community (2023). Such factors could extend beyond the context of policing to judges adjudicating cases at a municipal court instead of the Supreme Court or social workers working for state instead of federal agencies. The same study found that public attitudes were the same regardless of algorithmic target – in this case, whether AI was used externally for predictive policing of the public or internally for detecting misconduct. In another study, in which the quantity of targets was varied (as well as the decision's objective – to sanction or assist), Raviv (2023) found greatest public approval (defined by high fairness and accuracy) of the use of automated decision systems (ADS) in policing, social work, and educational contexts which assist collectives and lowest approval for ADS which sanction individuals. This indicates that some qualities of algorithmic targets may affect their public approval while others may not. In the judicial context, case complexity has been shown to affect the willingness of clients to go to court and the strength of their preference for human judges,

[4] A visa application (high impact but not personally impactful to the participant) and parking permit applications (low impact but personally impactful)

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with the strongest preference for human judges in highly psychologically (as opposed to technically) complex cases (Yalcin et al. 2023). Results like these point to the importance of how AI is implemented within street-level bureaucracies because they show that the conceptions people form, whether due to personal or contextual factors, affect whether and how they choose to interact with street-level bureaucrats.

4. Patterns of Practice

In the 3rd section of his book, Lipsky elucidates the "patterns of practice" (his terminology) that characterize street-level bureaucracy. He highlights four in particular: rationing at the level of services, rationing at the level of clients, securing client compliance and workload, and altering their conceptions of work. On his account, each of these emerges in response to the challenges that arise as a result of the working conditions faced by street-level bureaucrats: Street-level bureaucrats ration at the level of services by limiting access and demand to public services through imposing monetary, time, information, or psychological costs on clients using strategies like queuing or routines. They also ration at the level of clients by differentiating among clients in the distribution of public services to provide services to those clients deemed most likely to succeed (a strategy known as 'creaming') or otherwise deserving. They secure client compliance by controlling client interactions and workload to husband limited resources using strategies like screening, rubber stamping, and referrals. They alter their conceptions of work by developing 'private goal definitions' in the face of goal ambiguity, specializing in particular functions to maximize efficiency, leaning on established professional ideology, and relinquishing or maximizing their discretionary power. They also develop "private reconceptions of the clientele"

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to cope with job stresses and conflicting goals. Of these patterns, rationing at the level of clients is most clearly affected by the use of AI by street-level bureaucrats though all appear likely to be affected. These are the topics of the next four sections.

4.1. Rationing at the level of clients

Rationing at the level of clients is one of the main functions for which AI is used in street-level bureaucracies. Social workers use the AFST to determine which children are at the greatest risk of child abuse. Judges base bail and sentencing decisions on COMPASs' recidivism risk estimates. Police use facial recognition and predictive policing at the individual level to apprehend and monitor suspects. Teachers decide to allocate extra attention to students with a greater risk of dropping out of school based on DEWS assessments. These tools have clear benefits in terms of alleviating resource constraints and improving efficiency. However, in some cases, they promulgate bias, a regular side effect of this pattern of practice.

Traditionally, it has been thought that bias was likely to arise and persist in street-level bureaucracies due to the high levels of discretion and limited opportunities for performance measurement (Lipsky 2010, 105–7). Because AI is programmatic and not subject to human whims, some scholars have advocated for its use on the grounds that it will not be biased, or at least less biased than people. However, it has become clear in many cases that this may not be true and, rather than reducing bias, AI simply changes its origin from human subjectivity to biased training data. Researchers analyzing the design of AFST encountered this issue when the algorithm was found to score Black households and those with disabled members more highly (Horowitz 2023). They attribute this difference to the databases used to train the algorithm which disproportionately include information on, "people who have more contact with

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government agencies than others", "Black children", and "people with disabilities". Researchers have found that bias in predictive policing results from similarly unrepresentative training data sets (Richardson, Schultz, and Crawford, n.d.). Similar issues have occurred in the courtroom, Black defendants scored by COMPAS were found to be "45% more likely to get a higher score than whites" and "77.3% percent more likely than white defendants to receive a higher [violent recidivism] score"(Larson et al. 2016). DEWS was found to falsely alert educators of high drop-out risk in Black and Hispanic students (Feathers 2023). A study on DEWS conducted by Perdomo and colleagues found that, "differences in the predictive performance suggest that students from historically disadvantaged groups may have been systematically deprioritized for additional attention"(2023, 18). Facial recognition, a technology increasingly used by police, has also faced issues with bias due to data quality, with female and darker-skinned faces being incorrectly classified at higher rates than their male and lighter-skinned counterparts (Buolamwini and Gebru 2018).

In addition to purely data-derived bias, what humans do with the results of algorithms can create bias. Judges have been shown to exhibit disparate interpretations of risk scores of defendants of different races (Stevenson and Doleac 2022; Albright 2024). In the case of public employment services in a Swiss canton, when employees were provided with a profiling tool to predict the level of difficulty of placing job seekers, they placed those easiest to place and neglected to place those classified as difficult (Kortner and Bonoli 2023). Instead of improving case placement across the board, the algorithm allowed workers to improve placement rates for the most easily employable at the expense of those who were predicted to be more difficult to

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place. According to the authors, this pattern[5] may emerge as the result of unwieldy performance measures – which, as addressed in 3.2, are increasingly enforced by AI applications.

4.2. Rationing at the level of services

Changes brought on by the use of AI in the other three patterns of practice are less evident in the literature. Perhaps this is due to the newness of the use of AI in these workplaces. It is hard to establish a coherent account of how a recently (and unevenly) adopted technology affects how workers conceive of their work, for example. However, one can imagine the effects that AI may have on these patterns. Rationing at the level of services might be enabled or supported by attention to public reactions to AI implementation in public services. If, as Martinho (2024) and colleagues suggest, clients are less inclined to seek out judicial services when the judge is AI, courts facing overly high workloads might publicize the introduction of AI judges to decrease demand and deter clients from seeking the court's services. Likewise, agencies seeking to increase demand may publicize the implementation of AI tools that make registering for, seeking, or obtaining public benefits less costly by increasing efficiency and facilitating information spread. Indeed, as these tools become more widely adopted, changes to rationing at the level of service are worth examining, even for the judge example, the mechanisms (or costs) influencing clients' willingness to seek services are not clear.

4.3 Securing Client Compliance

In some cases, the use of AI by street-level bureaucrats may make it easier to ensure client compliance. AI implemented to track citizens during COVID to enforce social distancing is one

[5] Referred to by Lipsky as "creaming"

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prominent example, although with it comes privacy risks (Naudé 2020). In other cases, it may make it harder. For instance, if processes are moved online, street-level bureaucrats risk losing the sense of control fostered by particular service settings. Lipsky writes, "settings facilitate the functioning of the bureaucracies by drawing attention to the location of power and cuing the expectations of clients". (118) When adjudication of small claims cases occurs online by algorithm rather than in the traditional formal court setting, it may limit the power of judges and affect the functioning of the bureaucracy.

Likewise, controlling the workload may be made more difficult as tools that seek to maximize efficiency or delegate tasks do so without respect to these informal patterns. For example, police dispatchers who once controlled the dispatch of officers can be replaced by computer-aided dispatch (Redden, Aagaard, and Taniguchi 2020). Moreover, the AI tools that have frequently been implemented alongside those that assign cases – those used to complete routine, repetitive administrative tasks – may ultimately create a more challenging working environment as workers are no longer able to allocate reserve time to tasks outside of client interaction. This effect has occurred in the case of adoption of other efficiency improving technology (electronic communication, though not AI) by the Norwegian Labor and Welfare Administration (Løberg 2021). Various technologies such as eDiscovery for judges or AI used to complete police reports, social work documentation, or lesson plans display this benefit (Roitblat, Kershaw, and Oot 2010; Marie Leth Meilvang 2023; Akiba and Fraboni 2023; Lee 2021). Although the increase in time made available to devote to client interaction is touted as a positive, these tools may disable or minimize workers' ability to conserve resources and impact job performance.

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4.4 Reconceiving work and clients

Most abstract of all the patterns, and thus least clear in its manifestation, the conception of work and clients created by street-level bureaucrats to manage their work, is also certainly changed by these technologies. Considering the discussion around the effects of AI on frontline discretion, it would be hard to deny that AI has affected how street-level bureaucrats conceive of their jobs and clients. There is evidence that AI use impacts street-level bureaucrats' (police) perceptions of their decisions, by way of confirmation bias (Selten, Robeer, and Grimmelikhuijsen 2023). The same study – which supports findings in education that perceived trust is linked to AI acceptance by teachers (Choi, Jang, and Kim 2023) – found that street-level bureaucrats who perceive provided AI systems to be more trustworthy are more likely to follow their recommendations, supporting the idea that conceptions at work affect service delivery. A review of social work decision support algorithms found evidence that social workers did not, in many cases, find these algorithms useful or change their assessments when provided DSA risk scores (Jacobi and Christensen 2023), indicating that there are differences in the degree to which AI affect bureaucrats' conceptions of clients and work. However, studies characterizing these changes in greater depth have yet to emerge, meaning that the extent and nature of changes to conceptions of work and clientele brought by AI cannot be fully understood yet. Nonetheless, these conceptions affect service delivery and a more complete account of how AI changes them will be important to understanding how AI affects public service delivery and informal policy creation at the street level.

5. Conclusion

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The introduction of AI systems to street-level bureaucracy has precipitated change in many of the areas that define it. Frontline discretion is, according to some researchers, reduced as a result of AI, since it encourages standardization of results and transfers power to system architects instead of street-level workers. Others view AI as supportive of frontline discretion, as it can serve as a collaborator. The conditions under which street-level bureaucrats work are also changing because of AI. Resource constraints on time and money are alleviated. However, they are replaced by constraints on personal resources and tool nuance. Performance measures have been technologized with little regard for their efficacy or the privacy of those they monitor. Relations with clients are influenced by client perceptions of AI use by street-level bureaucrats derived from demographic, personal or contextual factors.

To function effectively in these working conditions, street-level bureaucrats develop patterns of practice that have also been affected by AI. Rationing at the level of clients has become the purview of algorithms in many bureaucracies. While initially lauded for objectivity, many high-profile incidents have exposed the fact that bias remains an issue in this pattern, despite and sometimes because of its technologization. Rather than resulting from lapses in human judgment, it is now the product of biased training data. The effect of AI on the other three patterns of practice has garnered much less attention in the academic literature. However, they may also plausibly be affected by the incorporation of AI.

The body of literature from which this review was elaborated is nascent. As AI becomes more widely incorporated into street-level bureaucracies, the ethical implications which emerge will likely have far-reaching consequences. In each of the areas analyzed, many questions remain. Empirical research on how frontline discretion is affected by AI across different fields within street-level bureaucracy may help to further characterize how and when discretion is affected by

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this technology. More interaction-level research on how AI is used by street-level bureaucrats is needed to clarify how they handle emergent and existing resource constraints as well as goal conflict in the face of AI adoption. Likewise, there is very little research that characterizes the existence and nature of the changes by AI to most of the patterns of practice that emerge as a result of working conditions. For instance, how workers' conceptions of clients, which affect service delivery, might be changed by their use of AI and whether these changes have a meaningful effect on service delivery (positive or negative). Overall, there is already much more research on the effects of AI on working conditions than patterns of practice. Because working conditions inform patterns of practice, an account of how the changes to working conditions by AI affect workers' patterns of practice, and how that affects informal policy creation, is needed to get the full comprehensive picture of the effects of AI on street-level bureaucracy. We hope to address some of these issues in future research.

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Appendix I

Methodology

This review was conducted as a scoping review of the use of AI by street-level bureaucrats (Grant and Booth 2009). Scoping reviews cover the quantity and quality of research developments and identify opportunities for further research on the subject (Grant and Booth 2009). As this review covers the most current research on how street-level bureaucracy uses and is affected by AI along with pointing out areas for further research, it is well-suited as a state-of-the-art review. The included studies were gathered from Scopus and Google Scholar.

We first conducted a general search to capture all of the recent research on AI in the main fields of street-level bureaucracy. Using one occupation from each of the relevant fields, "police*", "social worke*", "judge*", "teache*" AND "artificial intelligence" (as in we searched each field and "artificial intelligence, separately from every other field). We also conducted one overall search for "street level bureaucra*" AND "artificial intelligence" to search for any articles which specifically dealt with these workers under the designation of street-level bureaucrats. This resulted in 3096 articles[6]. Papers were screened for relevance (specifically, to ensure that they characterized effects of AI on street-level bureaucracy as opposed to describing new technologies that could be used in the field or methods of implementing them) by title and abstract in the first round. Of those, 385 were reviewed and the most relevant (least repetitive, most cited) 70 to Lipsky's narrative were included in the final review.

[6] From Scopus: 13 using "street level bureaucracy" plus 63 using "social worke*" plus 203 using "police*", plus 1248 using "judge*", plus 1569 using "teache*". All filtered to subject areas of social sciences, decision sciences, and arts and humanities from years 2010-2023. The first 100 results from each pairing on Google Scholar

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