Article

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A formal model of street-level bureaucracy

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Abstract

Different from a classic Weberian bureaucracy, public service bureaucrats directly interact with citizens at the frontlines of government. These first responders use their discretion to meet some citizens' needs but deliberately overlook the other clients. What lies beneath the street-level bureaucrats' behavior in their contacts with citizens? This study develops a model to explain how street-level bureaucrats are motivated to move toward the public and the extent to which they are engaged in helping their citizens. The model is driven by costs and benefits of behavior based on the assumption that street-level bureaucrats are rational actors trying to maximize their utility. However, utility here is defined as more than self-interest; it is the set of outcomes valued by the bureaucrats such as reducing job-related stress, pursuing work-generated ends, serving needy citizens, and implementing good public policy.

Keywords

Bureaucratic behavior, motivation, street-level bureaucracy

Introduction

Every day, public service bureaucrats make choices that influence various facets of people's lives. As the locus of bottom-up policy implementation, these public officials—such as healthcare workers, law enforcement officers, and social workers—do the actual work of the agency by interacting with

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citizens in the course of their job. In nature, public service bureaucrats are actors who need to achieve policy objectives and also to be responsible for their citizens (Prendergast, 2007). These frontline bureaucrats have been referred to several different ways such as boundary-spanners (Thompson, 1967), operators (Simon, 1947; Wilson, 1989), or human service bureaucrats (Goodsell, 1981). A major theoretical advance occurred when the concept of street-level bureaucracy was firstly articulated by American political scientist Michael Lipsky in 1969. To find viable means for examining the impact of government on the general public, Lipsky (1980) focuses on those bureaucrats who work at the intersection between citizens and government.

Scholarship surrounding street-level bureaucracies centralizes on their distinct characteristics. First, street-level bureaucrats directly interact with citizens and these bureaucrats' on-the-spot decisions have a profound influence on service users' lives. Second, street-level bureaucrats have substantial discretion in their work, which is different from other types of bureaucrats. For example, cops decide whether to pull over a driver and how to handle any violation on the street. Similarly, social workers identify families who are in need of protection and review their eligibility for social care support. As such, a wide array of bureaucratic actions[1] at the lowest echelons of administration substantially influences practical content of public service. Therefore, the quality of government service delivered to citizens hinges upon the behavior of street-level bureaucrats at the frontlines of government.

In recent years, street-level bureaucrats have played a critical role in the pandemic response. When the crisis hits entire segments of society, they have tried to adapt or readjust the way in which government service is delivered to citizens to minimize disruptions. Amid occupational constraints such as scarce resources, high workloads, and conflicting demands from needful citizens, street-level bureaucrats' legitimate autonomy enables them to exercise wide discretion over public service delivery within the context of organizational rules, normative considerations, and clients' characteristics (Downs, 1967; Heclo, 1977; Kaufman, 1960; Wilson, 1989). In reality, it appears that street-level bureaucrats engage more in activities that help some clients' demand, but delay with (or even overlook) the other clients' needs. Therefore, street-level bureaucrats' behavior affects how public service of justice is tailored to individualized justice.

Against this backdrop, this study asks—how street-level bureaucrats are motivated to move toward citizens? More specifically, what determines the extent to which these bureaucrats are engaged in helping their needy citizens? To answer these questions, the present study develops a model of street-level bureaucrats' behavior by examining their underlying motives in

their dealing with citizens' demand. The model basically assumes utility-maximizing bureaucrats, but it extends the meaning of the utility. Following Lipsky's (1980) seminal book, much previous literature has mainly focused on street-level bureaucrats' behavior as their efforts to reduce occupation-related constraints. However, the starting point of this study is to understand the motivational bases of street-level bureaucrats' behavior in a broader sense. We assume that street-level bureaucrats' behavioral mechanism as their way of dealing with work-related constraints, pursuing their desire to serve citizens, and seeking self-serving ends.

Related literature

One defining characteristic of street-level bureaucrats is their face-to-face interactions with the public. This feature makes them efficiently manage their ambiguous, complex, and uncertain tasks on a mass basis. From a viewpoint of service providers, Lipsky (1969) summarizes street-level bureaucrats' job conditions: (1) resource inadequacy, (2) physical and psychological threat, and (3) ambiguous role expectations. To reduce these occupation-related difficulties, street-level practitioners strategically (or sometimes inevitably) structure their behavior. Indeed, street-level bureaucrats invent special devices to cope with complexities, uncertainties, and ambiguities in their workplace. For example, child welfare caseworkers establish routines in their work practice. They control the service-seekers by reviewing their eligibility, husband the given resources for their service plans, or ration the foster care services. These routines are associated with how frontline professionals implement public programs and policies; some are *working* to accomplish the policy, while others are intentionally *shirking* or even undermining the policy objectives through *sabotage* (Brehm and Gates, 1997).

Early academics have focused on the linkage between citizens and government in their discussion of bureaucracy, highlighting considerable independence of public service bureaucrats' behavior (Becker, 1952; Blau, 1955; Simon, 1947; Skolnick, 1960; Thompson, 1967). Research in street-level bureaucrats' behavior has developed in several different ways; some scholars describe the behavioral patterns of these bureaucrats by relying on the term "coping behavior" (e.g. Kelly, 1994; Tummers et al., 2015), while others emphasize the street-level bureaucrats' behavioral divergence in practice (e.g. Brodkin, 2011; Gofen, 2014). Also, ways of street-level bureaucrats' behaviors are illustrated such as stretching the rules to meet their clients' demand (Evans, 2013; Maynard-Moody and Musheno, 2003), making routines for their work processing (Sandfort, 2000), or prioritizing citizens they encounter (Jilke and Tummers, 2018).

To better understand the bureaucrats' motivational bases, it is worth noting Downs's (1967) illustration of public bureaucracies. He presents five types of public officials—*climbers, conservers, zealots, advocates*, and *statesmen*. The *climbers* are likely to maximize their power, income, and authority, while *conservers* only seek to retain their current power. Although these two are driven by their pure self-interests, the other three—*zealots, advocates*, and *statesmen*—are grouped as being both self-interested and altruistic. In this mixed-motive bureaucrats' group, Downs (1967) argues that *zealot*s are loyal to relatively narrow policy areas, whereas the *advocate*s are loyal to a broader organization or policy areas. However, the *statesmen* are defined as those who enjoy exerting an influence on policies and also value the society and the whole nation.

Following Downs's (1967) portrayals of bureaucrats, this study assumes that street-level bureaucrats have multiple goals; some of their goals may lead them to outweigh their own self-interests while the other goals may make them engage more in serving citizens. Complex trade-offs among these goals result in heterogeneous motivations of bureaucratic behavior. To better illuminate the decision-making calculus of public service bureaucrats, utility functions of the street-level bureaucrats' behavior in our model are made up of both self-interested and altruistic motives. As stated, we propose that street-level bureaucrats would value a set of goals such as reducing work-related constraints, pursuing job-related ends, satisfying their clients, and ultimately implementing good public policies. Note that some bureaucrats may be partially or wholly motivated self-interest, while the other bureaucrats are motivated by altruism or have prosocial intentions to benefit others

The argument proceeds as follows. First, we lay out the model of street-level bureaucrats' behavior with benefits, costs, and some constraints as its major components. Then, the next section develops extensions of the model that consider street-level bureaucrats' people processing, their inherent limits of rationality, and the issue of social optimality, respectively. The final section presents the implications of our model, suggests some avenues for future inquiries, and concludes.

The model

In our model, street-level bureaucrats are rational actors who try to maximize their utility (Brehm and Gates, 1994, 1997). According to Downs (1967), utility maximizers are those who rationally pursue their goals. He adds:

> [a]ll the agents in our theory—officials, politicians, citizens, bureau clients, and so on—are assumed to be utility maximizers. . . .. In other words, a man

> implicitly assigns certain "utility ratings" to the results of possible acts various acts, chooses the act, or the combination of acts, that gives him the most total utility. Thus, he maximizes his utility
>
> (Downs, 1967: 81).

Since street-level bureaucrats try to meet their clients' demand, we assume that utility of these bureaucrats contains more than self-interest. Rational street-level bureaucrats seek to attain their goals by achieving the balance between costs and benefits of their behavior toward citizens. In his study on varieties of police behavior, Wilson (1978: 83) explicitly mentions that public service bureaucrats rely on their evaluation of the "costs and benefits of various kinds of action" when they have to decide whether to intervene in a situation. Concerning the underlying mechanism of street-level bureaucrats' behavior, Lipsky (2010: xvi) also claims that frontline practice seeks to "find a satisfactory balance between the realities of the job and personal fulfillment." The cost-benefit calculus of both risks and rewards under uncertain circumstances is useful for explaining bureaucratic behavior in their encounters with citizens. Our basic model thus considers both benefits and costs that street-level bureaucrats can expect in their encounters with citizens.

Similarly, Lipsky (2010) describes the dilemmas that street-level bureaucrats would experience and their efforts to orchestrate between their job expectations and personal aims. Through their behavioral response to clients, for instance, street-level bureaucrats can benefit directly by receiving pay incentives or getting promoted faster in their workplace. At the same time, the bureaucrats can also be benefited from serving a needy citizen. As found in Handler and Hollingsworth's (1971) study of welfare officers in Wisconsin, frontline practitioners deliver public service in order to meet their clients' demand and also to achieve their work-generated ends.

Connecting the motivations to actual behavior, Downs (1967) claims that bureaucrats have two goals for their behavior—(1) private motives that carry out their behavior and (2) social function (or goals) that their behavior serves. He demonstrates that the private motives include power, income, prestige, convenience, or security. In contrasts, social motives indicate some desire to serve the public interests and commitment to specific policies or programs. With regards to their decision-making process, bureaucrats similarly consider both "the cognitive mechanisms and mechanisms of social motivation" as the rewards in determining the criteria of choice (Simon, 1956: 284).

Based on the previous literature, we specify two types of benefits that street-level practitioners can get from their behavior—private benefits and

social functions (or goals). The model assumes that frontline bureaucrats can benefit personally by: (1) improving their reputation (prestige), (2) receiving promotions and, (3) being rewarded personally (perhaps including convenience, security, or even bribery). While these private motives are a return that can be directly and personally benefited, social functions are what street-level bureaucrats can attain from service recipients' satisfaction. Lipsky (2010: 105) clarifies this aspect by assuming that street-level workers derive their work satisfaction from "making a difference for some clients and improving clients' lives." Nielsen (2006) buttresses this aspect in his study on the behavioral mechanism of Danish regulatory inspectors. He argues that street-level bureaucrats are not always compelled, but they are enticed to dealing with their clients in order to maximize their job satisfaction.

As such, there are social functions (or goals) that potentially benefit street-level bureaucrats. Although there are many different elements, the model here assumes that street-level bureaucrats have a desire to serve the general public based on the theories of public service motivation (PSM) (Perry and Wise, 1990). PSM is assumed to be instrumentally developed in bureaucracies in their improving public policy and engaging in public service. It explains the bureaucrats' desire to pursue self-serving goals such as actively engaging in helping their citizens.

At the same time, there are costs when street-level bureaucrats behave toward the citizens. These costs are specified using insights from Lipsky who views the cost from the client's perspective. Based on Lipsky's (2010: 88–94) understanding, we reinterpret the "cost" in our model from the street-level bureaucrats' viewpoint when they deal with clients' needs. The costs of street-level bureaucrats' behavior thus involve (1) psychological or physical strain such as occupation-related stress, and (2) money, time, and other immeasurable efforts involved in acquiring information, additional knowledge, and capabilities to complete a given task. In practice, street-level workers are likely to make decisions based on their assessment of citizens' characteristics and identities (Maynard-Moody and Musheno, 2003). This is because street-level practitioners often require information about customers of public service to categorize and prioritize them. Assessing clients and their demand also rests on street-level bureaucrats' own expertise, knowledge, intuition, and adaptation to each unexpected circumstance.

Furthermore, the model assumes two broad conditions that constrain street-level bureaucrats' behavior: (1) resource availability and (2) the amount of authority conferred on the bureaucrats. Above all, early literature shows that either insufficient or inadequate resources would influence both the attitudes and behavior of street-level bureaucrats (Riccucci et al., 2004). If resources are not available to meet the clients' demand, a "public service

gap" would exist and the street-level bureaucrat might experience policy alienation (Brodkin, 2011; Hupe and Buffat, 2014). Accordingly, there are inherent tensions between resource constraints and public service demands. Here, resources include both tangible and intangible ones that are given to each organization and are available to the frontline bureaucrats. It is possible to understand the problem of resources by regarding street-level bureaucrats as personal resource units (Lipsky, 2010). For instance, if newly joined caseworkers are undertrained or inexperienced in the field, existing senior professionals will need to make more efforts in making clients' eligibility determinations. In this case, street-level bureaucrats' behaviors toward clients would be influenced by the lack of personal resources. Moreover, resources need to be adequate, even if the amount of resources would be sufficient to meet the public demand. It is inevitable that all these cost issues put street-level bureaucrats under a lot of stress.

As stated, another constraint subject to street-level bureaucrats' behavior is the range of authority delegated from those higher-ups, which determines the range of bureaucratic discretion. Indeed, street-level bureaucrats exhibit differences in their dispense of benefits or sanctions, due in part to their wide range of authority.

Taken together, the street-level bureaucrats' problem is to maximize their utility as follows:

$$\begin{aligned} &max_a \mathrm{U} = \mathrm{B}\big(\mathrm{r}(\mathrm{a}), \mathrm{p}(\mathrm{a}), \mathrm{k}(\mathrm{a})\big) + \mathrm{Z}\big(\mathrm{w}(\mathrm{a})\big) - \mathrm{S}(\mathrm{a}) - \mathrm{T}(\mathrm{a}) - \mathrm{I}(\mathrm{a}) \\ &\text{subject to } \mathrm{M}(\mathrm{a}) \le \bar{M} \text{ and } \mathrm{A}(\mathrm{a}) \le \bar{A}, \end{aligned} \tag{1}$$

where U denotes the total net benefits of street-level bureaucrats' behavior,

B denotes personal benefits such as reputation (r), promotion (p), private interests (k),

a is the level of street-level bureaucrats' behavior, which means how much they take actions to fulfill their clients' demand,

Z denotes the social functions that street-level bureaucrats attain, as a public servant, from the satisfaction of service recipients (w),

S means the job-related stress that the bureaucrats have due to high workloads or conflicting citizens' demands,

T is the time costs that the bureaucrats spend to process citizens' requests,

I indicates the costs that street-level bureaucrats make in order to acquire the information about citizens' personal background, their demand, and to administer or process them,

M and $\bar{M}$, respectively are the amount of resources required to implement a given level of behavior and the total amount of resources that an organization has, and

A and $\bar{A}$, respectively, are the amount of authority required for street-level bureaucrats' behavior and the total amount of authority that an organization delegates to them.

In this study, the level of street-level bureaucrats' behavior indicates how much they substantially take actions to engage in dealing with citizens' demand. Although there is no exhaustive list of street-level bureaucrats' behavior in their encounters with the public, we assume various types of bureaucratic behaviors. For example, some street-level bureaucrats deliberately neglect their encountered citizens who are seeking public service assistance, while other bureaucrats sympathize with the plight of citizens and help their clients even by breaking the rule or spending their money. Equation (1) presents an answer to the following question: how is the level of street-level bureaucrats' behavior determined in their encounters with citizens? The first-order condition of equation (1) is given as

$$\frac{\partial \mathrm{B}}{\partial \mathrm{r}}\frac{\partial \mathrm{r}}{\partial a}+\frac{\partial \mathrm{B}}{\partial \mathrm{p}}\frac{\partial \mathrm{p}}{\partial a}+\frac{\partial \mathrm{B}}{\partial \mathrm{k}}\frac{\partial \mathrm{k}}{\partial a}+\frac{\partial \mathrm{Z}}{\partial \mathrm{w}}\frac{\partial \mathrm{w}}{\partial a}=\frac{\partial \mathrm{S}}{\partial a}+\frac{\partial \mathrm{T}}{\partial a}+\frac{\partial \mathrm{I}}{\partial a}+\lambda_1\left(\frac{\partial M}{\partial a}\right)+\lambda_2\left(\frac{\partial A}{\partial a}\right)$$

and there exist the complementary slackness conditions under the Kuhn-Tucker Theorem: $\lambda_1 \geq 0, \lambda_2 \geqslant 0$, λ_1 (M(a)— $\bar{M}$) =0, and λ_2 (A(a)— $\bar{A}$) =0.

Here, there are two different cases. If $\lambda_1 = \lambda_2 = 0$, which means M(a) < $\bar{M}$ and A(a) < $\bar{A}$ in the complementary slackness condition, the street-level bureaucrats' behavior is determined where their marginal benefit equals their marginal cost. If an organization sets both resources ($\bar{M}$) and authority ($\bar{A}$) at sufficiently large levels, for instance, street-level bureaucrats' behavior is not influenced by the constraints.

When M(a)= $\bar{M}$ and/or A(a)=$\bar{A}$, however, their optimal choice a^* changes (see Figure 1). Let us consider the case in which A(a)= $\bar{A}$ [2]. This is the case when the organization sets the maximum level of authority ($\bar{A}$) given to street-level bureaucrats at a low level, it is likely that the required amount of discretion equals the given level of authority. When the required authority at a^* is bigger than $\bar{A}$, the bureaucrat cannot choose a^* since the given authority by organization ($\bar{A}$) is less than that of required in actual behavior. Then, the maximum level (optimal) of behavior occurs somewhere between 0 and a^*.

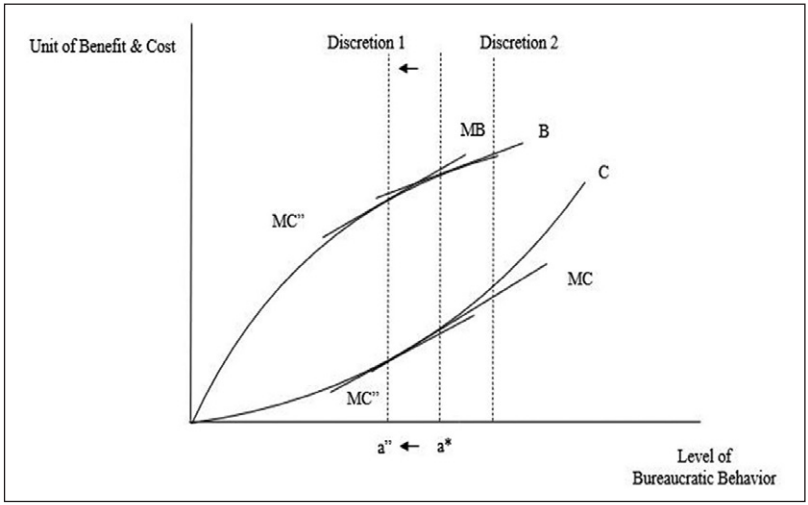

Figure 1. Street-level bureaucrats' behavior under constraints.

Corollary A street-level bureaucrat is likely to decrease his/her level of behavior if there exists resource and/or authority constraints from the organizations.

From the preceding discussion, the following propositions are derived.

Proposition 1. A street-level bureaucrat is likely to increase his/her level of behavior if it brings more personal benefits.

Proof. As stated previously, the first-order condition of equation (1) is given as[3]:

$$\frac{\partial \mathrm{B}}{\partial a}+\frac{\partial Z}{\partial a}=\frac{\partial S}{\partial a}+\frac{\partial T}{\partial a}+\frac{\partial I}{\partial a}+\lambda_1\left(\frac{\partial M}{\partial a}\right)+\lambda_2\left(\frac{\partial A}{\partial a}\right). \quad (2)$$

Provided that street-level bureaucrats obtain more personal benefits, $\frac{\partial \mathrm{B}}{\partial a}$ becomes larger. In order for equation (2) to be held in equality, the three types of marginal cost on the right-hand side, $\frac{\partial S}{\partial a}+\frac{\partial T}{\partial a}+\frac{\partial I}{\partial a}$ shall increase[4]. The reason is that the total marginal cost is an increasing function of the level of behavior (a). Thus, street-level bureaucrats will increase their behavior in this case. The result in Proposition 1 provides key implications for when street-level bureaucrats are actively engaged in helping their citizens. In practice, street-level bureaucrats will proactively deliver public

goods or services to the public when their behavior provides more personal benefits for the bureaucrat.

Proposition 2. A street-level bureaucrat is likely to increase his/her level of behavior if he/she benefits more from service recipients' satisfaction.

Proof. Provided that a street-level bureaucrat values more satisfying his or her client, it implies that $\frac{\partial Z}{\partial a}$ becomes larger in equation (2). This shall raise the marginal cost on the right-hand side to achieve the equivalence between both sides of the equation. As noted previously, the marginal cost is an increasing function of the street-level bureaucrat's level of behavior, a, and the worker will move toward a citizen to meet the client's demand in this case.

Proposition 3. A street-level bureaucrat is likely to decrease his/her level of behavior if its cost rises

Proof. As given in equation (1), there are three possible costs for street-level bureaucrats in their interactions with citizens (S, T, and I). If at least one among S, T, and I increases, $\frac{\partial S}{\partial a}+\frac{\partial T}{\partial a}+\frac{\partial I}{\partial a}$ becomes larger in equation (2). As the marginal cost increases, the marginal benefit on the left-hand side also should increase to achieve equivalence between both sides of the equation. Since the total marginal benefit is a decreasing function of the level of bureaucratic behavior (a), the street-level bureaucrat will move away from the citizen.

Extensions

People-processing

Up to this point, the model assumes one public service bureaucrat and her interactions with one client. The reality, however, is that street-level bureaucracies are confronted with unspecified masses. The first extension of the model relates to the situation where one public service bureaucrats encounter more than one citizen. As noted, street-level bureaucrats are inherently at boundary-spanning position between government and citizens. These bureaucrats mediate the public sector and the people by slotting public demand into manageable attributes. This slotting process involves discretion of individual bureaucrats in their identifying facts, applying laws, and deciding what is desirable in the given circumstances (Davis, 1969). The degree of discretion they exercise does shape the behavior of street-level practitioners. Thompson's (1967) explanation seems appealing:

> Jobs at contingent boundaries enable individuals to reduce uncertainties for the organization. To extent that he can contain contingencies, and to the extent that the contingencies are important to the organization, the individual is powerful (p. 111).

As such, bureaucratic discretion largely shapes frontline workers' behavior when they differentiate the citizens. Scholars have suggested that street-level bureaucrats often do "people-processing" toward non-voluntary citizens (Lipsky, 1980, 2010; Prottas, 1978). As a way of people processing, street-level workers transform the citizens into clients as a first step and then categorize these clients in favor of their preferences. How street-level bureaucrats categorize their clients into deserving or underserving would be one determinant of their behaviors.

Lipsky (1980, 2010) compares street-level bureaucrats' client assessment to a model of "triage"—a medical personnel's decision, during a battle, to optimize the medical resources between two wounded soldiers considering their degree of woundedness and recovery, respectively. We can apply this example to our current state: if ventilators get scarce under the covid-19 pandemic, frontline healthcare workers have to choose who get the priority. If there is no uniform guideline from the top, these frontline professionals need to do people-processing based on the condition of each patient. Confronted with heavy workloads and resource limitations, client assessment enables frontline service bureaucrats to manage efficient work-processing. When coupled with discretionary power, however, client assessment sometimes generates routine abuse by field practitioners who procrastinate or neglect clients' demand on purpose.

Accordingly, scholars have explored how street-level bureaucrats prioritize their clients in terms of client attributes–such as their friendliness, gender, or race. Evidence shows that frontline bureaucrats in practice are more likely to move toward the clients who are underperforming (Jilke and Tummers, 2018) or hardworking (Kelly, 1994; McDonald and Marston, 2006). All these findings provide somewhat challenging implications on Lipsky's (1980) illustration of creaming practice which refers to the frontline bureaucrat's strategy to deal with clients who expect to perform well. In recent years, it has been suggested that street-level bureaucrats' client assessment enhance their task performance. Using a survey of both employees and supervisors in the U.S. nonprofit organizations, Tummers (2017) finds that bureaucrats who prioritize motivated clients are more likely to receive higher ratings of job performance from their supervisors than those who do not.

As such bureaucrats often identify, categorize, and assess the general public in order to manage a large volume of their demand and, thereby,

determine eligibility priorities. This would largely influence the allocation of the public service benefits. Much scholarship has argued that both people processing and client assessment affect how street-level bureaucrats would behave (Evans, 2013; Jilke and Tummers, 2018; Maynard-Moody and Musheno, 2003). Below, we examine how the presence of more than one citizen changes the street-level bureaucrat's behavior. Suppose that there are two citizens who are seeking the same public service, and one is a "favored citizen" as categorized by the bureaucrat. Proposition 4 formally establishes the street-level bureaucrat's differentiation of these two and shows how this influences bureaucratic behavior.

Proposition 4. If there are two citizens, a street-level bureaucrat will differentiate between them and will likely display a different level of behavior for each.

Proof. Here, the street-level bureaucrat's net benefit in an encounter with two citizens is given by:

$$\begin{aligned} &U = B_1(a_1) + B_2(a_2) - C_1(a_1) - C_2(a_2) \\ &\text{subject to } M(a_1) + M(a_2) \le \bar{M} \text{ and } A(a_1) + A(a_2) \le \bar{A}. \end{aligned} \tag{3}$$

Let B_i denote the benefit that the street-level bureaucrat gains from his or her degree of behavior in response to citizen i and C_i the cost of bureaucratic behavior for citizen i ($i = 1$ and 2). The street-level bureaucrat maximizes his or her net benefits by choosing a_1 and a_2. Under the assumption that the level of bureaucrats' behavior for each client does not influence the others' cost or benefit, the following conditions are derived:

$$\mathrm{MB}_1 = \mathrm{MC}_1 + \lambda_1\left(\frac{\partial \mathrm{M}}{\partial \mathrm{a}_1}\right) + \lambda_2\left(\frac{\partial \mathrm{A}}{\partial \mathrm{a}_1}\right), \tag{4}$$

$$\mathrm{MB}_2 = \mathrm{MC}_2 + \lambda_1\left(\frac{\partial \mathrm{M}}{\partial \mathrm{a}_2}\right) + \lambda_2\left(\frac{\partial \mathrm{A}}{\partial \mathrm{a}_2}\right), \tag{5}$$

$$\begin{aligned} &\lambda_1 \ge 0, \lambda_2 \ge 0, \lambda_1(M(a_1) + M(a_2) - \bar{M}) = 0 \\ &\text{and } \lambda_2(A(a_1) + A(a_2) - \bar{A}) = 0. \end{aligned} \tag{6}$$

Suppose that the bureaucrat is more in favor of citizen 1 than citizen 2. This implies that, all else constant, the bureaucrat has more willingness to prioritize

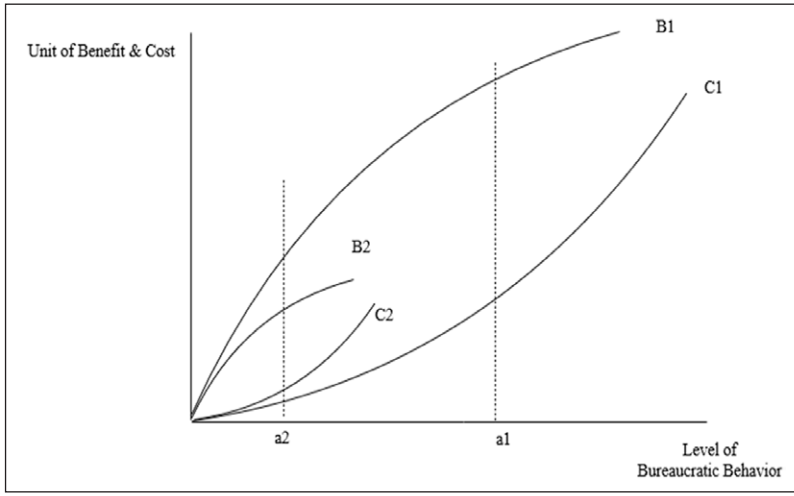

Figure 2. Different bureaucratic behavior on two types of citizens.

processing citizen 1's request than that of citizen 2. Therefore, one can expect that higher benefits and lower costs result from dealing with client 1's needs, while dealing with client 2's needs would generate lower benefits but at a higher cost. In formal terms, one can say $\mathrm{MB}_1 > \mathrm{MB}_2$ and $\mathrm{MC}_1 < \mathrm{MC}_2$ at the same time. Here, MB*i* (*i*=1 and 2) and MC*i* (*i*=1 and 2) are simplified from: $\frac{\partial B_1}{\partial a_1} = \mathrm{MB}_1$, $\frac{\partial B_2}{\partial a_2} = \mathrm{MB}_2$,: $\frac{\partial C_1}{\partial a_1} = \mathrm{MC}_1$, and $\frac{\partial C_2}{\partial a_2} = \mathrm{MC}_2$.

The case is illustrated by two sets of graphs in one dimension (see Figure 2). In each case, the street-level bureaucrat determines the level of their behavior when the marginal benefit and marginal cost becomes equal. Here, we also ignore the terms, $\lambda_1(\cdot) + \lambda_2(\cdot)$. In Figure 2, a1 shows the bureaucrat's level of behavior with public demand, whereas a2 shows his or her level of behavior in regards to client 2's case.

In the real world, we can easily recognize that frontline bureaucrats draw a distinction among multiple clients and behave differently. Such client differentiation appears salient when citizens are seeking the same public service assistance. Even though their behavior does not break the rules, how much bureaucrats engage into each client is not always equal. Sometimes, we could observe an extreme case when a street-level bureaucrat solely serves a certain citizen and ignores the other one's request. This behavioral mechanism can be explained by the assumption that the former would bring far greater net benefits than the latter from the perspectives of the bureaucrats. It is salient when the constraint condition such as resource shortfall is coupled with the bureaucrat's coping strategies.

Bounded rationality

The second extension of the model considers the fact that street-level bureaucrats' rationality is bounded by some limitations. In the real world, bureaucrats may confront their lack of knowledge or limited capacity in making decisions. Theories of bounded rationality imply that bureaucrats' decision making would be influenced by the uncertain external environment. Simon (1947: 241) articulated the concept, demonstrating that human behavior is determined by "the irrational and non-rational elements that bound the area of rationality." By demonstrating that people are not omniscient calculators, bounded rationality softened the assumptions of the theory of subjective expected utility. Simon (1947, 1956) posited that people often "*satisfice*" (satisfy and suffice), in lieu of maximizing their utility in decision-making.

Simon (1947) distinguishes administrators from economic men (*homo economicus*) with the concepts of bounded rationality and satisficing. He defines the rationality as selecting effective and appropriate means to reach designated ends. Goodsell (1981: 764) describes human service bureaucracy as follows: "Bureaucracy is neither entirely dispassionate nor primarily exploitive. . .. But it is itself under stress with unexpected pro-client consequences." Simon's idea on the limits of rational adaptations compelled scholars in many social science disciplines to delve into the area of bounded rationality and explore its implications (e.g. Kahneman, 2003; March, 1978).

The limits of rationality suppose some situations: (1) complexity, risk, and uncertainty influence either the benefit or cost, or both, of actors' behavior; or (2) actors have incomplete information on alternatives or consequences (Simon, 1972). Individual bureaucrats are also bounded by their own values and experiences that would influence their decision-making process. Here, we proceed with a model in which street-level bureaucrats' rationality is bounded due to their lack of information or uncertain environments that constrain or possibly prevent them from calculating the best course of their behavior. Suppose that appropriate information is not transmitted immediately, which might make frontline bureaucrats have difficulties in calculating their precise net benefits. Street-level bureaucrats may find it more difficult to expect benefits because those personal rewards such as promotions, reputation, or overtime pay at the workplace would occur in the future, compared to the costs, such as expense or time, which explicitly occur in the present. This implies that some type of discounting is perceived by the street-level bureaucrats.

Moreover, it is possible to assume that street-level workers voluntarily "satisfice" themselves to serve their clients at the expense of maximizing their expected benefit. In other words, street-level bureaucrats tend to discount benefits to a large extent than those in equation (1). In the real world, for example, a teacher (a public service bureaucrat) even spent her own

money to allow her student (client) to buy what is required for in-class activity (e.g. Kelly, 1994).

Let δ represent the discount factor benefits that ranges from 0 to 1. The range of the discount depends on the bureaucrat's degree of bounded rationality. Formally, the bureaucrat's net benefit can be expressed as follows:

$$\begin{aligned} &U = \delta\{B(r(a), p(a), k(a)) + Z(w(a))\} - S(a) - T(a) - I(a) \\ &\text{subject to } M(a) \le \bar{M},\ A(a) \le \bar{A}, \text{and } 0 < \delta < 1. \end{aligned} \tag{7}$$

Proposition 5. If a street-level bureaucrat's rationality is bounded because of a high future discount, he/she will less move toward the citizen.

Proof. The first-order condition to maximize the equation above is given as:

$$\delta\left(\frac{\partial B}{\partial a} + \frac{\partial Z}{\partial a}\right) = \frac{\partial S}{\partial a} + \frac{\partial T}{\partial a} + \frac{\partial I}{\partial a} + \lambda_1\left(\frac{\partial M}{\partial a}\right) + \lambda_2\left(\frac{\partial A}{\partial a}\right). \tag{8}$$

Comparing the above condition with the first-order condition in the basic model (see equation (2)), one would find that bounded rationality decreases street-level bureaucrats' behavior. Denote the solution for the above equation as a^{**}. Then, a^{**} is always less than a^{*} because δ is between 0 and 1.

We depict the above proposition graphically in Figure 3. When frontline bureaucrats discount future benefits, the benefit curve shifts down from B1 to B2. Then, the optimal level of their behavior will decrease from a^{*} to a^{**}. Furthermore, one may think of an extreme case where street-level bureaucrats who are boundedly rational do not expect any benefits at all from their dealing with public demand. In other words, they only consider the cost when they deal with public demand. In this case, the discount factor (δ) becomes to 0. We can find this extreme case from the real world where street-level bureaucrats neither respond nor intervene (that is, they overlook citizens' requests in practice) because they think dealing with citizens will only result in costs to them. Although it is not a common case, one example is a social worker who is routinely overlooking the children neglected by their parents. It also reflects the situation when law enforcement officers think about intervening the situation or backing off, while they are off duty.

Social optimality

In this section, we extend the model of street-level bureaucrats' behavior by considering its relationship to interests of a wider public. Provided that

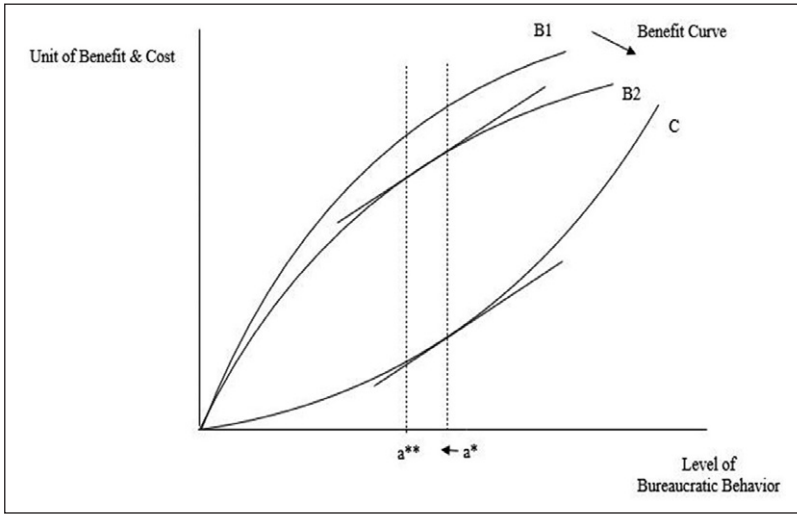

Figure 3. Bounded rational street-level bureaucrats' behavior.

street-level bureaucrats' behavior is determined at an individually optimal level, can it be socially optimal as well? To seek an answer to this question, suppose that we have a social utility function *V*. Mostly, street-level bureaucrats' behavior cannot be scaled up to the socially optimum level, even if each bureaucrat is assumed to behave rationally. Formally, the function looks as:

$$V = w(\mathrm{a}) - sc(\mathrm{a}) \tag{9}$$

where w is client's satisfaction and *sc* is the social cost from behavior a.

In this case, street-level bureaucrats' personal benefit is not counted as social benefit because the latter only includes the citizens' satisfaction with the public service. For the same reason, the bureaucrats' personal cost such as occupation-related stress, time, or efforts to deal with public demand is not counted as a social cost. Social costs, *sc*, are those incurred from the bureaucratic behavior. If there is no cost from the bureaucrats' behavior, the *sc* term would be removed.

By maximizing equation (1), the following condition is derived as:

$$\frac{\partial \mathrm{w}}{\partial \mathrm{a}} = \frac{\partial \mathrm{sc}}{\partial \mathrm{a}}. \tag{10}$$

Equation (10) implies that the social optimal level of bureaucratic behavior is determined when the marginal social benefit becomes equal to the marginal social cost. Let's denote a^{**} the solution of equation (10). We can easily see that a^{**} is different from a^{*} in equation (2), the street-level bureaucrats' solution to maximize their net benefits. In consequence, street-level bureaucrats might not engage in any activities for helping their citizens up to the socially optimum level, although each behavior is carried out with an individual bureaucrat's optimality.

Discussion and conclusion

This study presents a model of street-level bureaucrats' behavior in their interactions with citizens. The basic model produces the simplest possible model to generate the main insights on the motivational bases of street-level bureaucrats when they deal with public demand. In the real world, street-level bureaucrats need to process heavy workloads expeditiously, and efficiently in order to assist their clients. Although street-level workers already possess considerable expertise in the field, they often make extra efforts or even struggle to fully grasp a situation and understand what citizens want from them. Moreover, additional information is often required for these practitioners to interpret unclear laws and to guide their exercise of discretionary behavior (Davis, 1969). Such condition is embedded in various types of bureaucratic behaviors at the frontline.

In our model, we revisit two classic texts on the study of public bureaucracies—Lipsky's (1980) *Street-level bureaucrats: Dilemmas of the individual in public services* and Downs's (1967) *Inside bureaucracy*. By concentrating on the relationship between service providers and recipients, the model offers insights into the various frontline bureaucrats' behavior in their interactions with citizens. We aim to elucidate how street-level bureaucrats are motivated to move toward the public and the extent to which they are engaged in dealing with citizens' demand. We also explore a variety of extensions drawn from theories such as people-processing, bounded rationality, and social optimality. By bringing such consideration to frontline public servants, our model contributes to identifying street-level bureaucrats' motivational bases and deepening the understanding of their behavior in the eyes of citizens.

This study makes several implications. First of all, it sheds light on the lowest echelon of the bureaucracy. Although there has been much progress in the development and extension of formal models of public bureaucracies in their relation to political institutions or authorities, relatively little effort has been made to examine low-level bureaucrats who are working at the

frontlines of the government. We acknowledge that prior research on street-level bureaucracies has made significant progress and further developed in the field of sociology, public policy, and administration, but there is lack of scholarly outputs on formalization of public service bureaucrats' behavior toward the general public (but see Prendergast, 2007). It is salient when we look further into previous formal model studies on bureaucracy. Much of formal literature of bureaucracies has focused on their relations to political authorities, information asymmetries, and principal-agent relationships. Implicit in the public service bureaucracy perspective is the fact that they represent the government by having direct interactions with the general public in street-level environment. Therefore, how these field bureaucrats deal with people's demand is important to improving public service provision and enhancing government accountability in democratic governance.

Second, the model extends the theoretical framework set forth by Lipsky (1969, 1971, 1980, 2010). His basic rationale for street-level bureaucrats' behavior rests on high caseloads, resource constraints, and the conflicting demands from multiple citizens they face in their course of job. Following Lipsky's theoretical definition, scholars have explored how street-level bureaucrats have coped with public demand in various ways (Evans, 2013; Lipsky, 1980, 2010; Maynard-Moody and Musheno, 2003; Tummers et al., 2015). In the real world, we can find that frontline bureaucrats are developing routines such as prioritizing citizens or rationing the service to lessen their heavy workloads. However, Lipsky's discussion emphasizes relatively one side of street-level bureaucrats' behavior as their self-defense mechanism—a way of handling their job stress. This possibility arises when street-level workers voluntarily use their personal resources to serve their needy citizens (e.g. Dubois, 2010; Kelly, 1994) or bend a rule to grant more benefits as a quid pro quo for clients who are seeking public service assistance (e.g. Gofen, 2014; Maynard-Moody and Musheno, 2003).

In addition to Lipsky's articulations of the self-defense mechanism, this study takes a more comprehensive perspective, considering Downs's (1967) five types of public officials. As stated, we view street-level bureaucrats' behavioral mechanism as their cognitive or behavioral way of dealing with work-related stress, but also factors in other concerns such as the desire to serve the general public and further the employee's personal aims. To this end, we extend the meaning of the utility by considering the nature of frontline bureaucrats as boundary actors between the government and citizens. In short, this study reconsiders the underlying premise that street-level bureaucrats always suffer from job frustration in their daily encounters with citizens; it aims to extend and encompass what Lipsky and other early scholars have reported. This enables us to consider both self-interested and self-serving but sometimes altruistic aspects of public service bureaucrats.

Overall, this study is the formalization of street-level bureaucrats' behavior based on both Lipsky's (1980, 2010) and Downs's (1967) classic texts. We believe that our model could be used as a foundation on which to develop a more comprehensive model that explains the interactions between street-level bureaucrats and citizens. We also hope that our model would encourage further empirical examinations of street-level bureaucrats' behavior at the frontlines of government. One suggestion for future research is to consider bureaucrats' altruism which will not be constant over time. Perhaps studies using cross-sectional data can empirically test how each component of benefits and costs of bureaucratic behavior would shape utility maximizing officials' interactions with citizens over time. Moreover, future research should closely look into how individual bureaucrats deal with myriad unexpected events and their improvisational judgments in the face of uncertainties. Despite their discretionary power, street-level bureaucrats' task is highly scripted and skill-based to achieve government policy objectives. Given the complex settings and cross-sector collaborations, one question would be how street-level bureaucrats operate within the rule of law while they improvise to situations and need to be responsible for their clients. It is evident that street-level bureaucrats' behavior will either enhance or undermine the predictability of administrative practices in the eyes of citizens.

As a final note, we point to two possible extensions for future research. One possible direction would be to allow for the presence of multiple actors in different sectors. Researchers can consider top-level officials, elected politicians, and citizen volunteers who are directly or indirectly involved in making policy decisions and delivering public service. Although all these actors are supposed to pursue the public interest to fulfill citizens' demand, each actor is likely to attempt to stake out, maintain, and expand its own self-interest at the same time. Another extension of interest is to consider street-level bureaucrats' work condition. Future research can explore how street-level environment would crowd out certain motivations of bureaucrats and modify their behavioral response to citizens. Such extensions can contribute to developing a more comprehensive model of behaviors that street-level bureaucrats employ in their encounters with citizens. Future research can take up these interesting research questions.

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Notes

1. A dictionary definition of "action" is the process of doing something to deal with situation or make something happen while "behavior" means the way someone functions or behaves toward other people. The term "action" is not always observable, while the "behavior" is observable since it arises as a response to a stimulus (Becker, 2004). It is difficult to make a sharp distinction between the two in this study, but in the context of street-level bureaucracies, we distinguish their behavior from the action by the existence of citizen-evoked stimuli (regardless of citizens' intention) on public service provision.
2. A similar logic is applicable to how resource problems—insufficiency or inadequacy—imply the degrees of street-level bureaucrats' behavior ($M(a) = \bar{M}$).
3. Here, we simplify the equation (2) from the following condition: $\frac{\partial B}{\partial r}\frac{\partial r}{\partial a} + \frac{\partial B}{\partial p}\frac{\partial p}{\partial a} + \frac{\partial B}{\partial k}\frac{\partial k}{\partial a} + \frac{\partial Z}{\partial w}\frac{\partial w}{\partial a} = \frac{\partial S}{\partial a} + \frac{\partial T}{\partial a} + \frac{\partial I}{\partial a} + \lambda_1\left(\frac{\partial M}{\partial a}\right) + \lambda_2\left(\frac{\partial A}{\partial a}\right)$. The second order condition for maximization is assumed to be satisfied. That is, $\frac{\partial^2 B}{\partial a^2} + \frac{\partial^2 Z}{\partial a^2} - \frac{\partial^2 S}{\partial a^2} - \frac{\partial^2 T}{\partial a^2} - \frac{\partial^2 I}{\partial a^2} - \lambda_1\left(\frac{\partial^2 M}{\partial a^2}\right) - \lambda_2\left(\frac{\partial^2 A}{\partial a^2}\right) < 0.$
4. It is assumed that $\frac{\partial M}{\partial a}$ and that $\frac{\partial A}{\partial a}$ are constants, or (linearly) increasing function of a.

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