



Supportive management practice and intrinsic motivation go together in the public service

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Drawing on over 4,000,000 individual and 2,000 agency observations across five countries, this paper examines the relationship between features of an employee's work environment and intrinsic motivation in public agencies. It finds that practices which foster employees' sense of autonomy, competence, and relatedness are associated with substantially higher levels of intrinsic motivation across a broad range of settings. This is true both at the individual and agency level and when examining changes within agency over time. These patterns appear to be at least partially a result of differential selection in and out of the agency, with lower levels of supportive practices associated with greater desire to exit for employees with higher levels of intrinsic motivation. Nonfinancial elements of job design are strongly associated with intrinsic motivation, as are potentially more difficult to alter features of an agency, such as satisfaction with compensation and managerial quality. There is also suggestive evidence that the relationship between agency practices and employee intrinsic motivation is stronger when tasks are more difficult to monitor.

motivation | management practice | public sector | civil service

Employees' intrinsic motivation is an important determinant of the actions employees take and thus organizational performance. Intrinsic motivation is particularly important when it is difficult to monitor or write a complete contract specifying verifiable outputs or outcomes for the whole of what a given employee is expected to do (1, 2). The public sector is, relative to the private sector, typified by difficult-to-monitor jobs and agencies with multiple (and sometimes fuzzy) objectives and reporting lines (3–5). Thus, employee intrinsic motivation is even more likely to be an important determinant of individual and agency performance in the public sector than the private.

Civil service protections often make dismissing unmotivated employees more difficult in the public sector than the private. Thus, management practices that offer the potential of kindling employee intrinsic motivation are if anything even more critical determinants of performance in the public sector. Much theory and actual human-resource practice in the private and public sector is predicated on the idea that altering management practice will lead to changes in employee intrinsic motivation and effort—that motivation is mutable rather than a fixed feature of an individual (e.g., refs. 6–9). A substantial body of research on public agencies has focused in particular on public service motivation (PSM), a form of intrinsic motivation focused on “an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations” (10). Management practice has been associated with differing levels of PSM, with agency leaders and managers potentially able to nurture or suffocate the intrinsic motivational flame (11, 12). This is perhaps one important channel driving the observed connection between public-sector agency management practice and organizational performance (e.g., refs. 13–15).

However, there is little work that explores how the particulars of agency characteristics (such as the types of tasks agencies perform) condition these effects or examines the relative association of a range of management practices with intrinsic motivation at

scale. Specificity as to the relative importance of different management practices in nurturing or crowding out intrinsic motivation, and the types of agencies where those management practices are likely to matter, is critically important for turning general truths into specific managerial reforms. Should an agency seeking to foster employee intrinsic motivation focus on ensuring there are clear objectives for each employee? Focus on ensuring compensation is widely perceived as fair and equitable? Focus on improving managerial feedback? While the best path will and should depend on the particulars of the agency, research has yet to specify the relative magnitudes of the intrinsic motivational effect of altering different kinds of agency practices. Every government agency faces constraints of time, bandwidth, and capacity. These constraints are likely to be particularly salient in developing country public agencies, where fiscal and human capital constraints may make it even more difficult to, for example, improve supervisory quality or raise salary levels but where it may perhaps be possible to give employees greater autonomy, which requires no substantial financial outlay.

This paper examines the relationship between agency practices—those of managers, agency leaders, agency rules and policy, etc.—and employee intrinsic motivation. I focus on practices which plausibly encourage the central concepts of self-determination theory (9)—employee autonomy, competence, and relatedness. The analysis examines practices that relate to pay and extrinsic rewards (e.g., perceptions of fair reward and punishment), investment in staff and workplace (e.g., career and personal development), organizational culture and climate (e.g., psychological safety), managerial quality (e.g., the quality of one's supervisor), and nonfinancial elements of job design (e.g., autonomy). I refer

Significance

The intrinsic motivation of an agency's employees can and does appear to change over time, moving in concert with perceptions of management practice. This suggests there are a range of steps managers can take to foster workforce intrinsic motivation. Nonfinancial elements of job design are strongly associated with intrinsic motivation, suggesting even fiscally constrained agencies can substantially influence employee motivation. Work environments may have an even stronger relationship with employee motivation when tasks are more difficult to monitor. Where intrinsic motivation is important to performance, actions which foster intrinsic motivation may be an underutilized way to improve public-agency performance and contribute to citizen welfare.

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to these practices collectively as supportive management practices—by which I mean not just the actions of managers but also those of the agency as a whole, which influence the work conditions of employees.

This paper draws on evidence from existing government employee survey data sets from Australia, Canada, India, the United States, and the United Kingdom. These datasets jointly include over four million individual and two thousand agency observations. The breadth of the data assembled allows for stronger claims to external validity than in the existing literature and also for the examination of the relative strength of particular supportive management practices.

Both when looking across individuals and agencies and when comparing changes within agency over time, more supportive management practices are associated with substantially higher levels of intrinsic motivation for a broad range of practices. The analysis also provides suggestive evidence as to the mechanisms by which intrinsic motivation and supportive management practice are linked. It appears that changes in supportive management practice can influence intrinsic motivation both via treatment (i.e., altering the intrinsic motivation of currently serving employees) and via selection (i.e., differential retention of intrinsically motivated employees).

Heterogeneity across types of supportive management practices and the types of tasks agencies perform condition these effects. I find suggestive evidence that the less verifiable—that is, externally observable and quantifiably monitorable—are an agency's tasks, the stronger the relationship between supportive management practices and intrinsic motivation. This is particularly important given the difficulty of observing all the important elements of many—perhaps most—public sector tasks (4, 5).

Finally, there is substantial variation in the strength of the association of different supportive management practices with intrinsic motivation. Perceptions of the quality of management, the fairness of rewards and punishment, adequate resources to perform the work, and opportunities for personal and career development—potentially costly and difficult things for public agencies to alter—are associated with levels of intrinsic motivation and are differentially associated with the desire to remain or exit for more intrinsically motivated employees. But even larger effect sizes are observed for many nonfinancial elements that may be less expensive to alter—for example, setting clear objectives for staff and ensuring staff have sufficient autonomy to make decisions.

Theory and Hypotheses

This paper's theory and analysis are preregistered in a publicly available preanalysis plan (PAP) (16). This section briefly presents the hypotheses and construction of the data, frequently referencing sections of the lengthy PAP where more detail can be found.

As specified in the PAP and consistent with the literature, I expect that more positive perceptions of management practice will be associated with greater levels of intrinsic motivation.* As one recent synthesis puts it, motivation is “changeable by both intended and unintended organizational and management practices” (17) (see ref. 18 for fuller overview of work motivation in the public sector).

Accordingly, hypothesis one is as follows: There will be a strong and consistent positive association between supportive management practices and employee intrinsic motivation. This relationship will be present both when comparing across individuals and agencies and when comparing within agency over time.

*PAP p. 3, hypothesis one and hypothesis two, cover hypothesis one and hypothesis two here but are framed more generally (hypothesis one as the existence of equilibria, hypothesis two regarding their change over time) in the PAP.

The two main pathways by which I hypothesize such an effect flow are treatment and selection:

- Treatment: Supportive management practices directly lead to higher levels of employee intrinsic motivation by supporting an employee's ability to find their job meaningful and fulfilling (9, 19).
- Selection: Prior research suggests that many individuals are attracted to the public sector by the intrinsic rewards of the job (20). Supportive management practices attract and/or retain more intrinsically motivated employees who more strongly prefer supportive management practices. I hypothesize this is largely because more intrinsically motivated employees more highly value forwarding their agency's mission, which can be more successfully accomplished with more supportive management practices.†

This study cannot, and does not, fully distinguish between these pathways; it does ask whether individuals with a higher level of intrinsic motivation differentially respond to low levels of supportive management practices with a level of dissatisfaction sufficient to prompt them to wish to exit the organization. I hypothesize that a perceived lack of supportive management practices induce greater unhappiness in the more intrinsically motivated. Thus hypothesis two is as follows: There will be an interaction effect between intrinsic motivation and supportive management practice on employees' desire to exit an agency. The higher the level of employee intrinsic motivation, the more an increase in supportive management practice will diminish that employee's stated intent to leave the organization.

Following Wilson (5), I also examine if the relationship between management practice and intrinsic motivation depends on the observability of work process and outcome; whether the relationship between supportive management practice and intrinsic motivation is conditioned by the monitorability of tasks an employee, or agency, undertakes. As Wilson puts it, where outputs and outcomes can be observed, it is possible to design a “compliance system to produce an efficient outcome” (ref. 5, p. 160). This is a particularly important consideration for developing countries, which due to limitations of technology, infrastructure, and capacity are, on the whole, less able to effectively implement tight monitoring and compliance systems.

Honig (21) builds on Wilson and Dixit (4, 5) in separating tasks by verifiability—defined as “the tightness of the link between the best possible quantifiable output and project goals.” Honig (21) finds that relatively unverifiable tasks (e.g., delivering counseling services, as opposed to building a road) see greater returns to having individuals on the ground with the power to make consequential decisions in charge of delivery. This effect is stronger as environmental unpredictability increases—for example, as a country becomes more fragile.

If there are greater returns to having autonomous field staff in control for nonverifiable tasks, we might expect that there are also greater returns to employee intrinsic motivation for the job—and thus the desire to use autonomy in service of an agency's mission—for these tasks.

If task verifiability plays a role in mediating the relationship between supportive management practices and intrinsic motivation, this would serve to further increase the importance of supportive management practices for agency performance when monitoring and verification are difficult due to the nature of the

†I cannot rule out, given these data, that more intrinsically motivated employees may respond to supportive management practices for other reasons—for example, it may be that more supportive management practices are preferred by all employees, but more intrinsically motivated employees are in higher demand on the labor market all else equal and thus supportive management practices are differentially more important in attracting and retaining more intrinsically motivated employees.

Table 1. Data sources

Country or state	Survey name	Level of analysis	Sample size	No. of employees per group	Years
Australia	Australian Public Service Employee Census (APS)	Individual employees	99,417 employees (2017)	1	2017 to 2018 (annual)
Canada	Public Service Employee Survey (PSES)	Departments	66 agencies (2017)	868 to 29,233	2011, 2014, 2017, and 2018
India	Civil Services Survey (CSS)	Government services	10 services with 4,808 total employees	110 to 900	2010
United Kingdom	Civil Service People Survey (CSPS)	Agency	101 agencies with 294,905 total employees (2017)	Not provided	2014 to 2018 (annual)
United States	Federal Employee Viewpoint Survey (FEVS)	Individual employees	478,578 employees (2017)	1	2010 to 2018 (annual)
Western Australia (State)	Employee Perception Survey (EPS)	Agency Individual employees	195 agencies (2017) 3,843 employees (2016)	303 to 51,805 1	2014 to 2016 (annual)

task or environment. I hypothesize it will indeed do so—there will be an even stronger relationship between supportive management practice and intrinsic motivation when work is less verifiable. Supportive management practices will play an increasingly important role in employees' psychological sense of autonomy and competence when it is more difficult for managers and employees themselves to observe the objective, verifiable performance of their actions on the job.[‡]

As specified in the PAP,[§] I expect the following for hypothesis three: where tasks are more difficult to observe and verify, the relationship between supportive management practice and intrinsic motivation will be stronger.

Conceptualization and Operationalization of Key Concepts

Table 1 provides an overview of the data sources used to test these hypotheses. Data are on the individual level, organizational (agency/department/service) level, or both. The analysis below follows the data in this regard, fitting models both at the individual and organizational level. Individual-level models include data from the Employee Perception Survey, Australian Public Service Employee Census, and Federal Employee Viewpoint Survey; organization-level models include data from the Civil Service People Survey, Federal Employee Viewpoint Survey, Public Service Employee Survey, and Civil Services Survey.

There are very few survey questions common across these six surveys, and while all models include survey fixed effects (thus controlling for any fixed differences between surveys), large-N analysis requires operationalizing each concept—for example, intrinsic motivation and each supportive management practice—for each survey.

Of course, there are many “forking paths” in operationalizing—many potential ways to define variables, giving rise to multiple comparisons concerns (22). This is arguably the single largest reason for filing a PAP and following it in operationalizing and testing these hypotheses—to commit myself to a particular construction of each variable *ex ante*. The PAP was prepared after

gaining access to the data dictionaries of each survey (and thus the ability to identify available variables/survey questions) but before undertaking any analysis of four of the six datasets.[¶] All supportive management practices and intrinsic motivation are measured on a five-point Likert-type scale.[#]

Supportive Management Practices. Building from self-determination theory (9), I define supportive management practices as practices—whether flowing from the decision of a direct supervisor, agency leadership, agency-wide rules or policy, or some other source—that increase employee autonomy (an individual's ability to be effective causal agents exercising discretion/making judgments), competence (control and a sense of mastery—of being good at what one does), and relatedness (connection to others).

I draw heavily on prior research in outlining 15 supportive management practices, whose conceptual foundations can be found in PAP section 3.1 (pp. 4–10). These supportive management practices are outlined in Table 2. I took a broad and inclusive approach to identifying supportive management practices, including any practice for which I was aware of prior to theoretical justification and regarding which questions were present in the survey data.

While not part of the PAP, for ease of presentation/discussion I group these supportive management practices into five categories:

- 1) Managerial Quality (Quality Supervisor; Quality Upper Management)
- 2) Pay & Extrinsic Rewards (Pay Satisfaction; Recognition Perception; Fair Reward and Punishment)
- 3) Investment in Staff & Workplace (Adequate Resources; Career and Personal Development; Workplace Safety)
- 4) Organizational Culture and Climate (Creativity and Innovation; Ethics Promotion; Psychological Safety; Well-being)
- 5) NonFinancial Elements (Autonomy; Clear Objective; Managerial Feedback; Skills Match)

[‡]Wilson (5) suggests this in saying that managers are more likely to “focus their efforts on the most easily measured (and thus most easily controlled) activities of their operators” (page 170) when outputs and outcomes cannot be observed. That is, Wilson implies that “bad” management practice is likely to be worse for competence and autonomy and more distortionary in the sense of the “folly of rewarding [or controlling] A while hoping for B” (26), when verifiability is lower.

[§]What is designated as hypothesis three here is in the PAP called hypothesis four (see pp. 4 and 10 of the PAP). Please note that this paper does not include the results of what is designated in the PAP as hypothesis four, focused on peer effects. The peer effects hypothesis (PAP hypothesis three) is also supported by the empirics; it is excluded from this paper for narrative clarity, not because the findings are contrary to the expectations articulated in the PAP.

[¶]The PAP lays out construction of each variable and empirical specifications for analysis. The specific wording of each and every survey question and its mapping to key concepts can be found in Appendixes B and G of the PAP (pp. 26–35; 97–120). Two of the datasets were used for exploratory analysis. Results are robust to the inclusion or omission of the exploratory data—see online appendix for detailed results.

[#]All surveys are already on a five-point Likert-type scale save the Western Australia Employee Perception Survey, which uses a seven-point scale; in this case variables are normalized so they are on a comparable five-point scale to all others. Normalization is not strictly necessary, as the survey fixed effect employed in each regression is sufficient to account for any fixed differences in scales by survey—normalization, however, eases the interpretation of point estimates. Not all surveys have items that map onto each and every supportive management practice—see Appendixes B and G of the PAP for details on specific surveys and items. All items that map onto a given concept (e.g., managerial feedback) from a given survey are then averaged. Different surveys may also have a differing number of items that are employed—and averaged—to generate the score of a given supportive management practice.

Table 2. Supportive management practices examined in this article

Supportive management practice	Definition
Adequate resources	Employees are given adequate resources and training to accomplish their tasks.
Autonomy	The extent to which employees are given the freedom to decide how work should be done.
Career and personal development	Employees are given opportunities to acquire new skills and progress in their careers.
Clear objective	The management clearly communicates its expectation of employees and how their work contributes to the objectives of the organization.
Creativity and innovation	The management promotes employee creativity and innovation.
Ethics promotion	The extent to which the management promotes ethical behavior in the workplace and manages conflicts of interest.
Fair reward and punishment	The level of meritocracy in the hiring/promotion process, and the extent to which reward/punishment of employees is based on performance.
Managerial feedback	Constructive feedback and useful performance appraisal from the manager.
Pay satisfaction	How satisfied are employees with their compensation.
Psychological safety	The extent to which employees can raise complaints or offer feedback to their managers without retribution, as perceived by the employee.
Quality supervisor	The leadership, people management, and communication skills of direct supervisors, as perceived by their employees.
Quality upper management	The quality of senior management/agency and the degree to which the agency/upper management provides support to increase employee performance, as perceived by the employees.
Recognition perception	The extent to which high-performing employees are recognized by the management, as perceived the employees.
Skills match	The extent to which managers assign work to employees based on their skills, talent, and abilities.
Well-being	The extent to which the management focuses on the psychological well-being of employees and work–life balance.
Workplace safety	The extent to which the management focuses on health and safety hazards in the workplace.

These are heterogeneous categories on many fronts—not least in how mutable they are for any given organization. I intend these categories as one potentially helpful set of frames for making sense of results but far from the only possible such set.

While increasing satisfaction in pay may require raising salaries—which can be costly in financial terms or, in the public service, dependent on politicians over which managers have little influence—ensuring what rewards there are flow to those who perform best (fair reward and punishment) may (or may not) be substantially less difficult and financially costly. Setting clear objectives for employees or giving employees the autonomy to make consequential decisions may not involve any financial costs at all but may (or may not) be difficult for an agency to change depending on their broader operating environment. Additionally, not all agencies will find improving on the same dimension equally financially costly. Achieving skills match may require costly investment in employees’ skills in some agencies and simply improved assignment of existing employees in others. Nonetheless, I hope that these groupings can be useful in helping structure comparisons of the relative magnitude of employee perceptions of types of supportive management practices and their association with intrinsic motivation.

Intrinsic Motivation. I construct a measure of intrinsic motivation, drawing in a similar manner from available questions from each survey, with the specific questions employed outlined in detail in the PAP. There is, of course, a wealth of literature on motivation in general and intrinsic motivation in particular; this analysis cannot do justice to that literature’s level of nuance and sophistication. One tradeoff of drawing from multiple surveys—the “cost” to be paid for the benefit of the dataset’s breadth—is the inability to make fine-grained theoretic distinctions. I define intrinsic motivation as

“motivation to perform one’s task not dependent on monitoring and incentives,” and draw on questions in the surveys that speak to a range of forms of intrinsic motivation, including PSM (ref. 10, p. 368), prosocial motivation (23), and the intrinsic motivation scale of the work preference inventory (24).^{||}

Agency Performance Verifiability. As outlined in the PAP, both I and a Ph.D. student separately coded the verifiability of agencies in the sense of Honig (ref. 21, p. 8), independently answering to what extent an agency’s tasks are those in which performance can be externally observed and verified by supervisors. This coding was not done based on detailed knowledge of the internal workings of each agency but based on an arms-length impression of each agency, aided by publicly available resources (e.g., from the agency’s website). Only agencies regarding which both coders were confident are coded; as a result, comparisons of verifiability only compare the 752 agencies (of 2,352 agencies in the full sample) for which this is the case.^{**}

^{||}This is not the only motivational concept specified in the PAP; substantially similar patterns are observed for other motivational concepts as well. Please see the PAP for more detail on other types of motivation and the *SI Appendix* for empirical results.

^{**}In other words, if either coder was uncertain, they did not assign a verifiability code to that agency, it is consequently dropped from the analysis. The much-reduced sample and reliance on general impression for coding, in addition to the mapping of a task-level concept (verifiability) to the agency level, all add noise and lower the power of this analysis, likely contributing to the greater SEs and less precise estimates observed in Figs. 4 and 5. A third party (a research assistant) integrated the coders’ lists and implemented the preagreed analysis, to reduce researcher degrees of freedom. Note this double coding does not apply to the exploratory (United States FEVS) data, which was coded only by the author; this coding appears in the PAP as *SI Appendix*, Table C1.

Table 3. Summary statistics for agency-level surveys: US Federal Employee Viewpoint Survey, Canada Public Service Employee Survey, UK Civil Service People Survey, and India Civil Services Survey

Variable	Observation	Mean	SD	Minimum	Maximum
Intrinsic motivation	2,352	4.111	0.254	2.595	4.824
Adequate resources	2,352	3.348	0.278	2.444	4.56
Autonomy	2,352	3.385	0.36	2.158	4.613
Career and personal development	2,342	3.464	0.377	1.707	4.346
Clear objective	2,342	3.834	0.212	2.77	4.81
Creativity and innovation	2,298	3.401	0.354	1.744	5
Fair reward and punishment	2,119	3.261	0.215	2.12	4.173
Managerial feedback	2,119	3.519	0.225	2	4.64
Pay satisfaction	2,234	3.217	0.58	1.38	4.36
Psychological safety	2,109	3.399	0.391	1.64	5
Quality supervisor	2,352	3.82	0.251	1.782	4.81
Quality upper management	2,341	3.063	0.405	1.66	4.58
Recognition perception	2,352	3.329	0.446	1.912	4.92
Skills match	2,352	3.602	0.534	1.708	5
Well-being	2,342	3.627	0.273	1	4.58
Agencies w/nonverifiable tasks	752	0.327	0.469	0	1

Agencies whose work is coded as “non-verifiable” include the United Kingdom’s Cabinet Office, as the contingent nature of the work means it is very difficult to estimate the counterfactual; very little of what a high-level policy office does results in verifiable performance that can be attributed to particular employees. Agencies whose work is coded as “verifiable” include the United Kingdom’s Submarine Delivery Agency, as this agency is tasked with producing a physically observable object according to a pre-specified plan, making attribution of performance much easier.

Empirics

Tables 3 and 4 summarize the data used in the analysis of individuals and organizations, respectively, combining all surveys. [Differences in the surveys as described in Table 1 mean that only one survey—the US Federal Employee Viewpoint Survey (FEVS)—can be used at both the organizational (Table 2) and individual (Table 3) level. All other surveys are used in only one of the two levels of analysis. Regression tables make clear which data are used in each survey.]

The publicly posted supplemental information includes a replication archive with all data, coding, and analysis. Study-by-study summary statistics can be found in the *SI Appendix*. Fuller information on variable construction for each variable, and detailed descriptions of each supportive management practice, can be found by referring to the PAP (16).

Empirical Models. Intrinsic motivation serves as the primary dependent variable for both the organizational and individual analysis. For analyzing individual-level data, I fit models for individual, i , in agency, j , reported in survey, k , at time, t , of the general form:

$$\text{Intrinsic Motivation}_{i,j,k,t} = \text{Supportive Management Practice}_{i,j,k,t} + \text{Survey Fixed Effects}_k + \text{Year Fixed Effects}_t$$

Survey fixed effects account for fixed differences in the method of survey administration and respondent population, thus making all comparisons intrasurvey. Year fixed effects absorb any fixed variation created by global events (e.g., the global financial crisis). As specified in the PAP, supportive management practices are examined sequentially given the potential risk of correlation between supportive management practices and thus multicollinearity if simultaneously included in a model.

For organization-level data, I fit models of the general form:

$$\begin{aligned} \text{Intrinsic Motivation}_{i,j,k,t} = & \text{Supportive Management Practice}_{i,j,k,t} \\ & + \text{Agency Fixed Effects}_{j,k} \\ & + \text{Survey Fixed Effects}_k \\ & + \text{Year Fixed Effects}_t. \end{aligned}$$

Note the organizational models also include agency fixed effects, thus allowing these models to examine how changes in independent variables are associated with changes in intrinsic motivation. (A parallel investigation is not possible using the individual-level data, as the individual-level data are a repeated cross-section; that is, individuals do not in any study have unique identifiers, making it impossible to evaluate changes within the person over time.)

Agency Performance Verifiability. To examine heterogeneity in the relationship between supportive management practice and intrinsic motivation, I add the coding of agency verifiability as an interaction term to the organizational-level model, fitting the following model:

$$\begin{aligned} \text{Intrinsic Motivation}_{i,j,k,t} = & \text{Supportive Management Practice}_{i,j,k,t} \\ & + \text{Supportive Management Practice}_{i,j,k,t} \\ & * \text{Agency Performance Verifiability}_{j,k} \\ & + \text{Agency Fixed Effects}_{j,k} + \text{Survey Fixed Effects}_k \\ & + \text{Year Fixed Effects}_t. \end{aligned}$$

Intent to Leave. When examining employee intent to leave (which is only available for individual-level surveys), I fit models of the form:

$$\begin{aligned} \text{Intent to Leave}_{i,j,k,t} = & \text{Supportive Management Practice}_{i,j,k,t} \\ & + \text{Intrinsic Motivation}_{i,i,k,t} \\ & + \text{Supportive Management Practice}_{i,j,k,t} * \text{Intrinsic Motivation}_{i,i,k,t} \\ & + \text{Survey Fixed Effects}_k + \text{Year Fixed Effects}_t \end{aligned}$$

This allows for an examination of whether those with greater levels of intrinsic motivation are differentially affected by changes in supportive management practice.

Table 4. Summary statistics for individual-level surveys: US Federal Employee Viewpoint Survey, Western Australia Employee Perception Survey, and Australia Australian Public Service Employee Census

Variable	Observation	Mean	SD	Minimum	Maximum
Intrinsic motivation	4,136,934	4.225	0.684	1	5
Adequate resources	4,136,628	3.399	0.93	1	5
Autonomy	4,132,524	3.301	1.041	1	5
Career and personal development	4,137,094	3.703	1.007	1	5
Clear objective	4,137,172	3.893	0.806	1	5
Creativity and innovation	4,113,069	3.342	1.076	1	5
Ethics promotion	300,552	3.971	0.89	1	5
Fair reward and punishment	4,135,517	3.393	0.906	1	5
Managerial feedback	4,053,306	3.662	1.16	1	5
Pay satisfaction	4,013,140	3.511	1.162	1	5
Quality of supervisor	4,084,540	3.916	0.96	1	5
Quality of upper management	4,005,184	3.148	1.214	1	5
Recognition perception	3,818,280	3.137	1.081	1	5
Skills match	4,040,094	3.478	1.19	1	5
Well-being	4,136,305	3.701	0.905	1	5
Workplace safety	4,041,851	3.928	0.926	1	5
Intent to leave the agency	3,810,672	0.277	0.447	0	1

Results

This section presents figures summarizing statistical analyses. The *SI Appendix* presents the full regression tables from which all figures are drawn and confirms that these findings are robust to the exclusion of the exploratory data (that is, these effects persist when limiting the analysis to only data not examined until after the submission of the PAP).

Intrinsic Motivation and Supportive Management Practice. Fig. 1, drawn from *SI Appendix, Tables A8 and A9*, presents the individual-level results with point estimates and confidence intervals (which are extremely small, given the large number of observations). The variables are grouped using the categories defined above—managerial quality (MQ), pay and extrinsic rewards (PER),

investment in staff and workplace (ISW), organizational culture and climate (OCC), and nonfinancial elements of job design (NFE).

All supportive management practices have a positive, and statistically significant, association with intrinsic motivation. These effects are substantial; for example, a one-point improvement (on a five-point scale) in autonomy is associated with a change in intrinsic motivation sufficient to move an individual from the median level of intrinsic motivation to the 60th percentile of the distribution.

Nonfinancial elements like higher levels of autonomy, ethics promotion, and clear objective are all also associated with substantially higher levels of intrinsic motivation. Clear objective is the supportive management practice with the strongest relationship to intrinsic motivation.

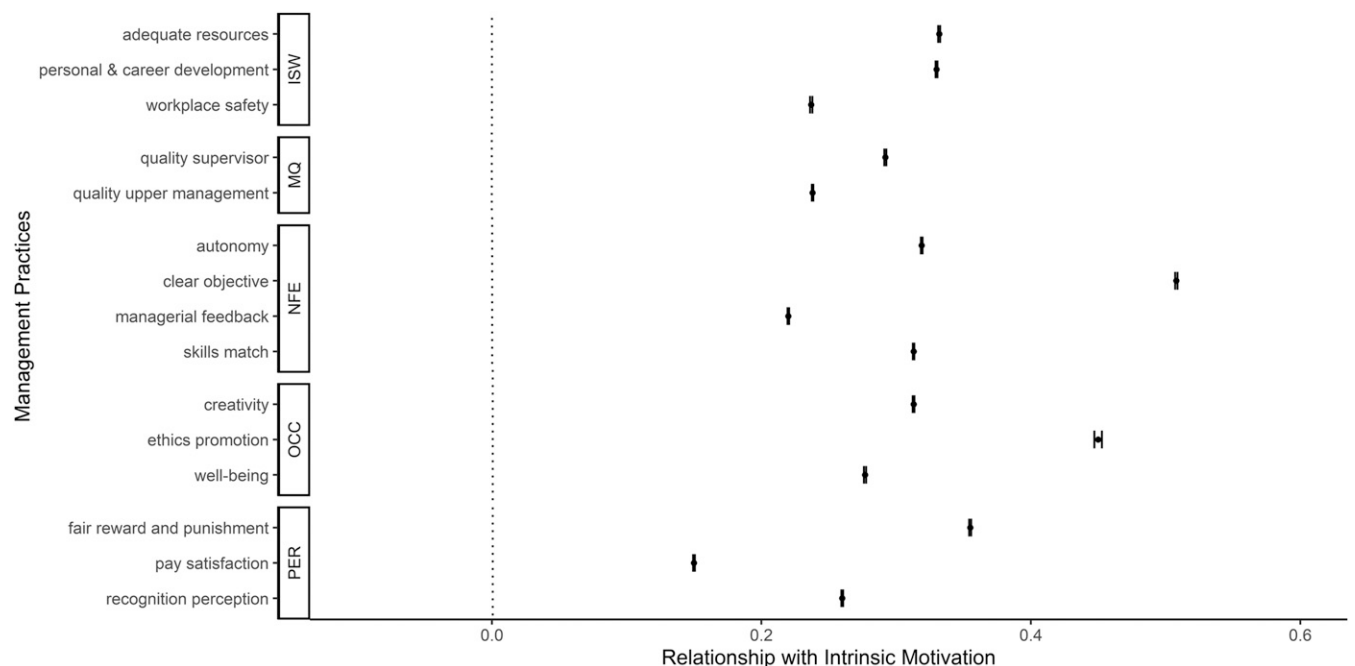


Fig. 1. Association of supportive management practices and intrinsic motivation (individual-level results; dependent variable: intrinsic motivation).

Pay satisfaction matters least to intrinsic motivation, consistent with a body of scholarship that suggests the intrinsically motivated are differentially unresponsive to extrinsic rewards (e.g., ref. 20). Indeed, pay satisfaction and recognition perception—arguably the two mechanisms on which the existing public performance literature has focused the most—are two of the supportive management practices with the relatively weakest association with intrinsic motivation. Interestingly, while pay satisfaction has a relatively weak association with intrinsic motivation, perceptions of fair reward and punishment are among the supportive management practices most strongly associated with intrinsic motivation.

Fig. 2, drawn from *SI Appendix, Tables A12 and A13*, presents a parallel figure for agencies when including agency fixed effects, thus examining changes within agency over time. This specification helps reduce (though does not eliminate) concerns that omitted variables may be driving the results in Fig. 1 by examining whether within-agency changes in perception of supportive management practices is associated with within-agency changes in employees' intrinsic motivation.

The results in Fig. 2 are substantively very similar to those in Fig. 1. As civil servants in a given agency report an increase in the presence of a given supportive management practice, they also report an increase in their own intrinsic motivation. [When running models without agency fixed effects (and thus allowing for comparisons between agencies included in the same survey) the results are substantively unchanged; these tables are available in the *SI Appendix*.]

Within-agency changes over time in perceptions of elements of job design that might be altered without substantial fiscal outlays (e.g., autonomy and clear objective) are also among the management practices most strongly associated with changes in intrinsic motivation. These effects are substantively very large; a change of one point (on a five-point scale) in clear objective for an agency is associated with a difference in intrinsic motivation sufficient to shift an agency at the median of intrinsic motivation to the 99th percentile of the distribution.

To the extent that a great deal of the empirical work on motivation in the public sector has focused on extrinsic rewards (e.g., pay for performance schemes), it is notable that—while perceptions of overall fairness in reward and punishment has a strong association with intrinsic motivation—changes in employees' level of pay satisfaction is the item with the lowest association with changes in intrinsic motivation among those examined. This suggests that changing levels of pay, in addition to being fiscally costly, may not be the most promising way to alter the intrinsic motivation of an agency's workforce.

Intention to Leave. Fig. 3, drawn from *SI Appendix, Tables A20 and A21*, demonstrates that individuals reporting higher levels of intrinsic motivation see a differentially greater effect of supportive management practices on their intention to leave an agency. More intrinsically motivated individuals are more sensitive to supportive management practice in assessing whether they wish to leave their positions than their less intrinsically motivated coworkers, all else equal. Higher levels of supportive management practices have more of an association with reduced intent to exit the higher an individual's level of intrinsic motivation. This suggests that low levels or reductions in supportive management practices may induce adverse selection out of an agency, with the more intrinsically motivated differentially likely to exit. The inverse is also true; these results suggest supportive management practices are differentially likely to retain more intrinsically motivated employees.

Fig. 3 shows a pattern of relationships which is similar to Figs. 1 and 2 above in some ways but interestingly different in others. Perceptions of a clear objective at work and of fair reward and punishment are two of the supportive management practices most strongly associated with differential desire to exit by the intrinsically motivated, in parallel to their strong associations with level of intrinsic motivation in Figs. 1 and 2. However, there are some notable differences in the effect patterns as well—for example, perceptions of ethics promotion has a strong association with intrinsic motivation but is relatively weakly associated with differential desire to exit by more intrinsically motivated employees. There are supportive management practices in every

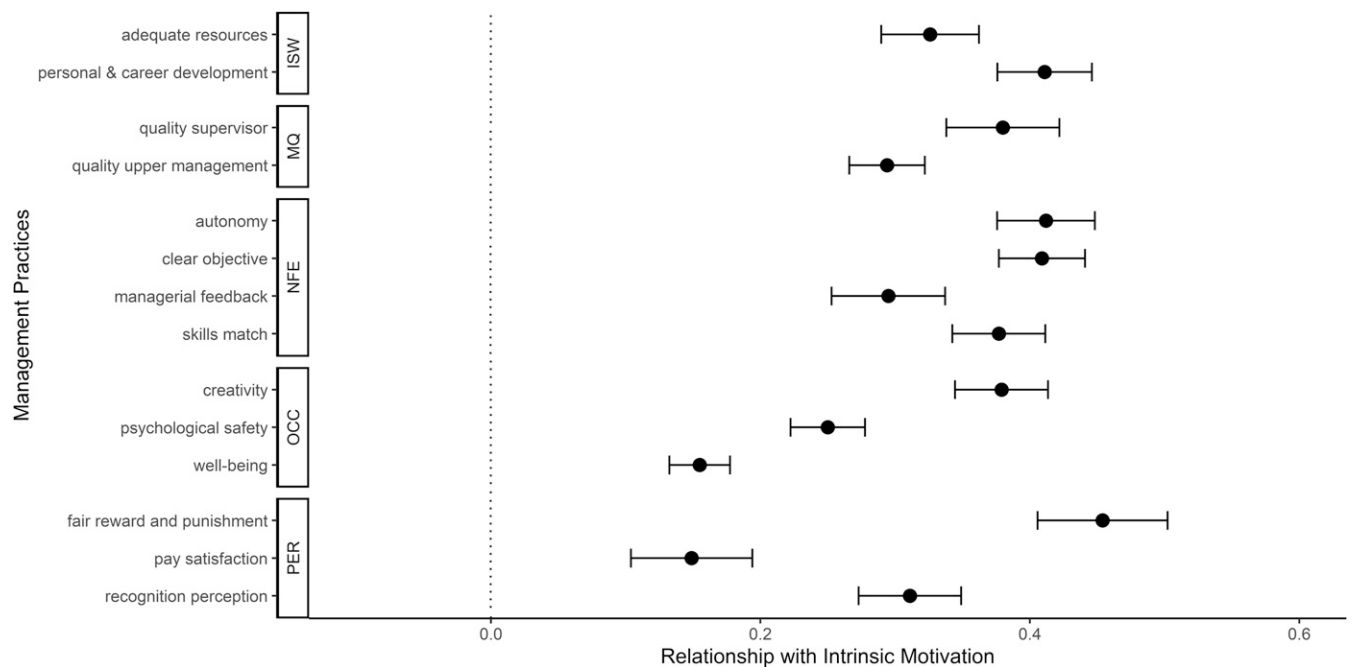


Fig. 2. Association of supportive management and intrinsic motivation (organization-level results with agency, year, and survey fixed effects; dependent variable: intrinsic motivation).

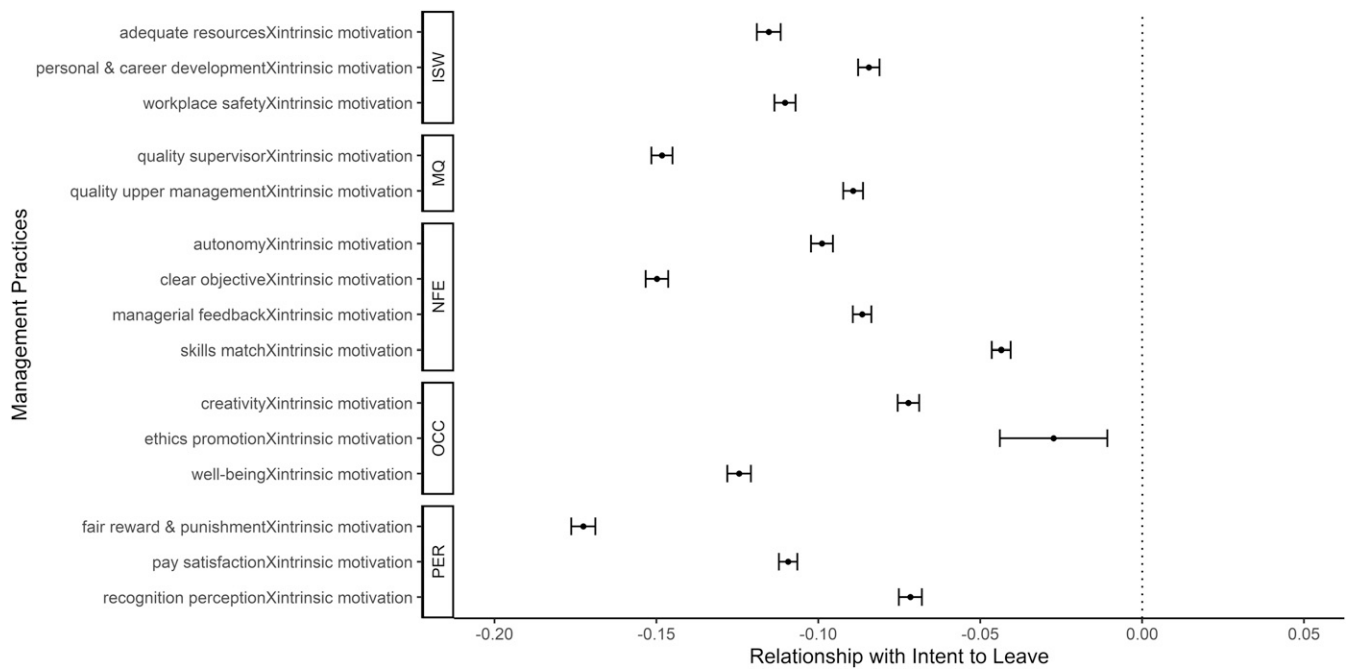


Fig. 3. Interaction of supportive management practice and intrinsic motivation on intent to leave (individual-level data, survey and year fixed effects; dependent variable: intent to leave).

category with relatively stronger associations with differentially greater desire to exit of the intrinsically motivated, suggesting once again that agencies seeking to kindle intrinsic motivation still may have tools at their disposal even if they lack the ability to make fiscally costly investments.

Agency Performance Verifiability. Whether the verifiability—the extent to which an agency’s tasks can be effectively monitored—affects the relationship between supportive management practice and intrinsic motivation is explored in Figs. 4 and 5, which are drawn from *SI Appendix, Tables A24 and A25*.^{††}

Verifiability takes the value of “1” when an agency’s tasks are largely unverifiable and “0” when they are largely verifiable. As a result, positive effect sizes imply that nonverifiability leads to a stronger association between supportive management practices and intrinsic motivation.

There is suggestive evidence that level of intrinsic motivation is more strongly associated with supportive management practice for agencies whose work is less verifiable. Figs. 4 and 5 show a consistent pattern both when looking at changes within agency (Fig. 4) and across agencies (Fig. 5). That said, both analyses find at least some practices for which the interaction with nonverifiability has a relationship with intrinsic motivation that cannot be distinguished from 0 at conventional thresholds of statistical significance. Indeed, when examining changes within agency over time (Fig. 4), only half of these management practices are above the 90% significance level.^{‡‡}

^{††}Analysis is done with the supportive management practices that exist in all four agency-level surveys, to maximize power given the relatively small (752) agencies coded as verifiable or unverifiable. While Fig. 4 includes agency and time fixed effects—thus allowing it to be interpreted as the change within agency over time—whether and when multiway fixed effects are appropriate is currently contested (see, e.g., refs. 27 and 28). As such, I also include Fig. 5’s more parsimonious specification, which additionally have the advantage of allowing across-agency (rather than only within agency over time) comparisons.

^{‡‡}CIs displayed graphically are the 95% CI. Three of Fig. 4’s six supportive management practices are significant at the 90% level, reference *SI Appendix, Table A24* for more detail.

This is cause for caution in placing too much weight on these results. [These noisier findings may be a product of the great number of agencies which one of the coders found ambiguous (and thus were dropped from the analysis, decreasing sample size), and the inherent imprecision of attempting to summarize a task-level concept like “verifiability” at the agency level.]

Discussion

Drawing from over four million individual and two thousand agency observations across five countries, this paper provides evidence of supportive management practice and intrinsic motivation moving in concert with one another. More supportive management practices are associated with higher levels of intrinsic motivation when looking across individuals, across agencies, and at changes within agencies over time.

Within-agency changes in the level of supportive management practices over time are associated with changes in levels of employee intrinsic motivation. Given the low level of annual turnover in the great majority of agencies, this suggests treatment effects: that changes in management practice can alter an individual employee’s intrinsic motivation. That is not to say there is no exit from the civil service, of course, and indeed, more intrinsically motivated employees are differentially likely to want to exit the firm in response to low levels of, or reduction in, supportive management practices. This suggests selection effects, with lower levels of supportive management practices leading to a less intrinsically motivated workforce via differential entry and exit.

Supportive practices in each of the five categories examined—investment in staff and workplace, pay and extrinsic rewards, organizational culture and climate, managerial quality, and nonfinancial elements of job design show a positive relationship with employee intrinsic motivation. Interestingly, the nonfinancial elements—particularly autonomy, clear objective, and skills match—have among the strongest associations with intrinsic motivation. This suggests that even financially constrained agencies may be able to take concrete steps to improve intrinsic motivation by, for example, setting clear objectives for employees or increasing

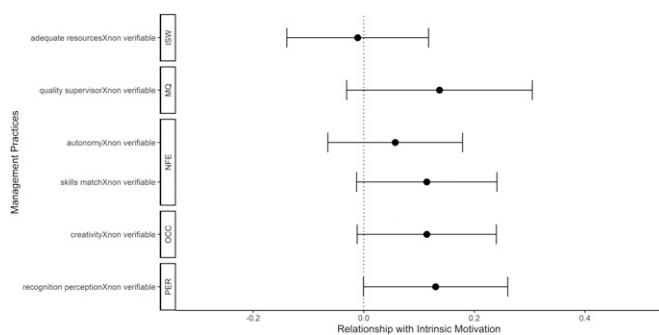


Fig. 4. Effect of nonverifiability on the relationship between supportive management practices and intrinsic motivation (organization-level data; with year, agency, and survey fixed effects; dependent variable: intrinsic motivation).

employees. Both agency leaders and individual supervisors may be able to contribute to fostering greater levels of intrinsic motivation.

Across country, agency, and unit of analysis (agency or individual), reported levels of intrinsic motivation and perceptions of supportive management practice move together. Intrinsic motivation appears to be mutable over time. Actions undertaken by managers and agency leaders can and do appear to influence employees' level of intrinsic motivation for their work.

There is also suggestive, if weaker, evidence that when tasks are harder to monitor, the association between supportive management practices and intrinsic motivation is even stronger. Where performance is harder to directly observe and verify, intrinsic motivation is likely all the more important to performance, and in these settings supportive management practices appear to have an even stronger association with intrinsic motivation. This in turn suggests that where monitoring of employee behavior is more difficult—due to the nature of tasks or broader environment (e.g., a given agency or country's monitoring capacity)—focusing on supportive management practices is all the more valuable. While the comparatively weaker findings regarding task verifiability are plausibly the result of a smaller sample and necessarily noisy coding scheme, further research might usefully confirm the robustness of these results.

Two more general sources of caution in interpreting these results are this paper's reliance on observational data and specifically survey data. The breadth of survey coverage—and the fact that results hold when looking at changes within agency over time—provides some confidence that artifacts of survey design or question construction are not driving results but certainly cannot account for all potential confounds. That these data rely

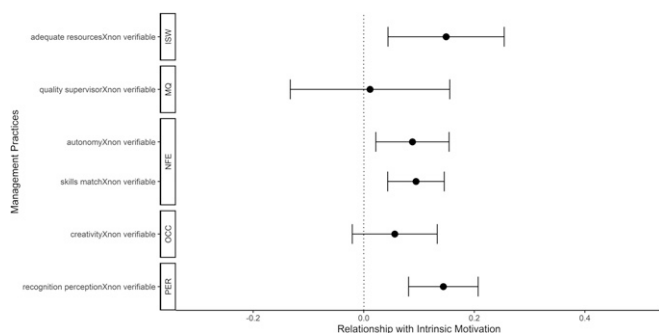


Fig. 5. Effect of nonverifiability on the relationship between supportive management practices and intrinsic motivation (organization-level data; survey fixed effects, but no year or agency fixed effects; dependent variable: intrinsic motivation).

on employee perceptions additionally raises the possibility of mismeasurement stemming from misperception; individuals may be wrong as to the objective level of a supportive management practice in their agency or work unit. For example, to the extent that individual-level characteristics may contribute both to intrinsic motivation and to a more positive perception of supportive management practices, some of the positive association may be an artifact of individual type (though the within-agency findings suggest it is not merely this, as changes in supportive management practice within agency are also associated with changes in intrinsic motivation). That said, inasmuch as intrinsic motivation is an internal cognitive state, it is arguably perceptions of supportive management practice that matter rather than the practice itself in influencing intrinsic motivation.

Inasmuch as observational data are generally subject to potential confounds, the causal implication—that managers and agency leaders may be able to influence employee motivation through intentional action—is necessarily speculative, relying on the assumption that the relationship observed in these data would hold for interventions. Further experimental work might confirm this for a range of public agencies. Future research might also productively explore agency and employee heterogeneity, the extent to which perceptions and reality of supportive management practice differ, and whether and when perceptions of both supportive management and intrinsic motivation are driven by underlying cognitive or other individual characteristics.

Additional research might also usefully examine the extent to which these findings are unique to the public sector or whether they hold in more general terms for private sector employees. While previous work has suggested differences in the intrinsic motivation of public and private sector employees in small samples (e.g., ref. 25), exploring differential responsiveness of individuals and organizations' intrinsic motivation to supportive management practice is a fertile area of potential future research. Lastly, these data—broad though they might be—are only from five countries. Future work might fruitfully examine whether these findings hold across additional countries and agencies.

Agencies change over time, and perceptions of supportive management practice and intrinsic motivation move in concert as they do. The findings suggest that rather than ask, “when does supportive management practice impact public servants' intrinsic motivation?” the question ought to be, “when does supportive management practice *not* impact public servants' intrinsic motivation?” Where intrinsic motivation is important to performance—which is arguably most public sector tasks—supportive management practice may directly impact performance via kindling or suffocating employees' intrinsic motivational fire. Supportive management practices are even more strongly associated with intrinsic motivation when monitoring and verifying performance is more difficult, which are also contexts in which we might expect intrinsic motivation to have an even greater performance effect.

Inducing greater levels of intrinsic motivation need not require expensive changes for financially constrained government agencies. There are many supportive management practices strongly associated with greater levels of intrinsic motivation which may require little or no financial outlays. Fostering the intrinsic motivation of the many dedicated public servants who want to serve the public is a potentially important untapped margin for improving public sector performance and thus citizens' welfare.

Data Availability. The analysis dataset has been deposited in Harvard Dataverse (<https://doi.org/10.7910/DVN/1MVMN6>).

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