

## Main Manuscript for

Supportive Management Practice and Intrinsic Motivation Go Together in the Public Service

February 6, 2021

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*This is the Author's Final Version of this article, published in the Proceedings of the National Academy of Sciences (PNAS), 2021*

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Competing interest statement: The author declares no competing interest (as defined by PNAS policy).

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\* Many thanks to Henry Fung for his truly exceptional research assistance – this short paper would not have been possible without his efforts. Many thanks also to Gus Greenstein for his assistance in coding the verifiability of sectors, to Chau Hoang, Elizabeth Linos, Ryann Manning, and Sarah Thompson for their comments on earlier drafts, and to Mai Hassan and Martin Williams for their comments and wisdom in shaping this paper's pre-analysis plan.

## **Abstract**

Drawing on over 4,000,000 individual and 2,000 agency observations across 5 countries, this paper examines the relationship between features of an employee's work environment and intrinsic motivation in public agencies. It finds that agency and management actions which foster employees' sense of autonomy, competence, and relatedness are associated with substantially higher levels of intrinsic motivation across a broad range of practices and 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. Non-financial elements of job design are equally or more 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.

## **Significance statement**

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 the intrinsic motivation of their workforce. Non-financial elements of job design are equally or more strongly associated with intrinsic motivation as are potentially more expensive to alter features of an agency, 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.

## Introduction

Whether employees *want* to do – their 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 give 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 who must report to multiple principals. (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. 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. 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? 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 e.g. improve managerial quality or raise salary levels, but where it may perhaps be possible to change non-financial elements of job design.

This paper examines the relationship between agency practices - those of managers, agency leaders, agency rules & 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 & 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 non-financial elements of job design (e.g. autonomy). I refer 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.<sup>2</sup> These datasets jointly include over four million individual and two thousand agency observations. The breadth of the data assembled allow 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 via 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 quantifiable – 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 managerial quality, 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 non-financial elements of job design that may be less expensive to alter – e.g. setting clear objectives for staff and ensuring staff have sufficient autonomy to make decisions.

## **Theory & Hypotheses**

This paper's theory and analysis is pre-registered in a publicly available pre-analysis plan.<sup>3</sup> This section briefly presents the hypotheses and construction of the data, frequently referencing sections of the lengthy pre-analysis plan where more detail can be found.

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<sup>2</sup> See Table 1 for a full description of the data and the particular surveys employed.

<sup>3</sup> EGAP Registration ID 20191212AA, available at <https://osf.io/stvhe/>.

As specified in the pre-analysis plan, consistent with the literature I expect that more positive perceptions of management practice will be associated with greater levels of intrinsic motivation.<sup>4</sup> As one recent synthesis puts it, motivation is “changeable by both intended and unintended organizational and management practices.”<sup>5</sup> (16) That is

*H1: 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.*

The two main pathways via which I hypothesize such an effect flow are

- *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. (e.g. 9)<sup>6</sup>
- *Selection:* Prior research suggests that many individuals are attracted to the public sector by the intrinsic rewards of the job. (19) 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 the more supportive are management practices.<sup>7</sup>

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 and thus that

*H2: 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.*

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<sup>4</sup> PAP page 3, H1 and H2, cover H1 and H2 here but are framed more generally (H1 as the existence of equilibria, H2 regarding their change over time) in the PAP.

<sup>5</sup> 17 provides a broader overview of work motivation in the public sector, connecting intrinsic motivation to the broader psychology literature.

<sup>6</sup>This is far from the only psychological theory undergirding the work motivation literature, but the notion that supportive management practices alter intrinsic motivation arguably would be supported by many or even all mainstream work motivation theories, e.g. an expectancy-valence theory or a goal-directed theory (see 18 for a broader overview of psychological theories related to work motivation).

<sup>7</sup> I cannot rule out, given these data, that more intrinsically motivated employees may respond to supportive management practices for other reasons – e.g. 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.

Following Wilson's *Bureaucracy*, 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".<sup>8</sup> (20)

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 – e.g. as a country becomes more fragile.<sup>9</sup> If there are greater returns to having autonomous field staff in control for non-verifiable 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 task or environment. I hypothesize it will indeed do so – that 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 employee's 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.<sup>10</sup>

As specified in the pre-analysis plan,<sup>11</sup> I expect that

*H3: Where tasks are more difficult to observe and verify, the relationship between supportive management practice and intrinsic motivation will be stronger.*

## **Conceptualization & Operationalization of Key Concepts**

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<sup>8</sup> 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.

<sup>9</sup> This has strong echoes of contingency theory (22) and the consideration of environmental uncertainty in understanding organizational processes. See 23-24 for more explicit theorizing of the connection between contingency theory, uncertainty, and task in organizational management in developing countries.

<sup>10</sup> 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" (p. 170) when outputs and outcomes cannot be observed. That is, Wilson implies that 'bad' management practice is likely to be worse for competence & autonomy, and more distortionary in the sense of the "folly of rewarding [or controlling] A while hoping for B" (25), when verifiability is lower.

<sup>11</sup> What is designated as H3 here is in the PAP called H4 (see pages 4 & 10 of the PAP). Please note that this paper does not include the results of what is designated in the PAP as H3, focused on peer effects. The peer effects hypothesis (PAP H3) 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.

Table 1 provides an overview of the data sources used to test these hypotheses. Data is 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 EPS, APS, and FEVS; organization-level models include data from the CSPS, FEVS, PSES, and CSS.

**Table 1: Data Sources**

Country or State	Survey Name	Level of Analysis	Sample size	# of Employees Per Group	Years
Australia	Australian Public Service Employee Census (APS)	Individual employees	99417 employees (2017)	1	2017-2018 (annual)
Canada	Public Service Employee Survey (PSES)	Departments	66 agencies (2017)	868 to 29,233	2011, 2014, 2017, 2018
India	Civil Services Survey (CSS)	Government services	10 services with 4808 total employees	110 to 900	2010
United Kingdom	Civil Service People Survey (CSPS)	Agency	101 agencies with 294905 total employees (2017)	Not provided	2014-2018 (annual)
United States	Federal Employee Viewpoint Survey (FEVS)	Individual employees	478578 employees (2017)	1	2010-2018 (annual)
		Agency	195 agencies (2017)	303 to 51,805	
Western Australia (State)	Employee Perception Survey (EPS)	Individual employees	3843 employees (2016)	1	2014-2016 (annual)

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 – e.g. intrinsic motivation and each supportive management practices – for each survey.

Of course, there are many “forking paths” in operationalizing –many potential ways to define variables, giving rise to multiple comparisons concerns. (26) This is arguably the single largest

reason for filing a pre-analysis plan and following it in operationalizing and testing these hypotheses – to commit myself to e.g. a particular construction of each variable ex-ante. The pre-analysis plan 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.<sup>12</sup> All supportive management practices and intrinsic motivation are measured on a 5-point likert-type scale.<sup>13</sup>

### *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).<sup>14</sup> I draw heavily on prior research in outlining 15 supportive management practices, whose conceptual foundations can be found in pre-analysis plan section 3.1 (pgs 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 theoretical justification and regarding which questions were present in the survey data.

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<sup>12</sup>The pre-analysis plan 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 Appendices B and G of the pre-analysis plan (pages 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.

<sup>13</sup> All surveys are already on a five point Likert-type scale save the Western Australia EPS, which uses a 7-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 Appendices B and G of the pre-analysis plan 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 numbers of items that are employed – and averaged – to generate the score of a given supportive management practice.

<sup>14</sup> In the PAP supportive management practices are defined as practices that 1) fulfill the psychological, physical, altruistic, and career-related needs of public employees and/or 2) increase the productivity of employees and help them make progress in their work, but is meant in the sense that those conditions fulfill self-determination theory.



**Table 2: Supportive Management Practices Examined In This Article**

<b>Supportive Management Practice</b>	<b>Definition</b>
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 & 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 contribute to the objectives of the organization.
Creativity & 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 & 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.

While not part of the pre-analysis plan, 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 & Punishment)
- 3) Investment in Staff & Workplace (Adequate Resources; Career & Personal Development; Workplace Safety)
- 4) Organizational Culture & Climate (Creativity & Innovation; Ethics Promotion; Psychological Safety; Well-Being)
- 5) Non-Financial Elements of Job Design (Autonomy; Clear Objective; Managerial Feedback; Skills Match)

These are heterogeneous categories on many fronts – not least in how mutable they are for any given organization.<sup>15</sup> 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 & 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 also 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 pre-analysis plan. 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 public service motivation (27), prosocial motivation (28), and the intrinsic motivation scale of the work preference inventory (29).<sup>16</sup>

### *Agency Performance Verifiability*

As outlined in the pre-analysis plan, both I and a Ph.D. student separately coded the verifiability of agencies in the sense of Honig (30), independently answering to what extent an agency’s tasks are those where 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

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<sup>15</sup> They are also contestable; e.g. managerial feedback is arguably both a non-financial element of job design and potentially a function of managerial quality. Focusing on psychological well-being is a feature of organizational culture, but also may involve costly investments in staff & the workplace. I intend these categories as one potentially helpful set of frames for making sense of results, but far from the only possible such set.

<sup>16</sup> This is not the only motivational concept specified in the PAP; substantially similar patterns are observed on other motivational concepts as well. Please see the pre-analysis plan for more detail on other types of motivation and the online appendix for empirical results.

coded as such in the data; 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.<sup>17</sup>

Agencies whose work is coded as “non-verifiable” include the UK’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 UK’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.<sup>18</sup>

## **Empirics**

Tables 3 and 4 summarize the data used in the analysis of individuals and organizations respectively, combining all surveys.<sup>19</sup> The publicly posted supplemental information includes a replication archive with all data, coding, and analysis.<sup>20</sup> Study-by-study summary statistics can be found in the appendix. Fuller information on variable construction for each variable, and detailed descriptions of each supportive management practice, can be found by referring to the pre-analysis plan.

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<sup>17</sup> In other words, if either coder was uncertain they did not assign a verifiability code to that agency, which 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 standard errors and less precise estimates observed in figures 4 and 5. A third party (a research assistant) integrated the coders’ lists and implemented the pre-agreed analysis, to reduce researcher degrees of freedom. Note this double-coding does not apply to the exploratory (US FEVS) data, which was coded only by the author; this coding appears in the PAP as Table C1.

<sup>18</sup> Full agency coding can be seen in the replication archive agency-level data by examining the *non\_ver\_cat* variable.

<sup>19</sup> Differences in the surveys as described in Table 1 mean that only one survey – the US 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.

<sup>20</sup> Available on the Harvard Dataverse at <https://doi.org/10.7910/DVN/1MVMN6>

**Table 3: Summary statistics for agency-level surveys: US FEVS, Canada PSES, UK CSPS, and India CSS**

Variable	Obs	Mean	Std. Dev.	Min	Max
Intrinsic Motivation	2352	4.111	.254	2.595	4.824
Adequate resources	2352	3.348	.278	2.444	4.56
Autonomy	2352	3.385	.36	2.158	4.613
Career & personal development	2342	3.464	.377	1.707	4.346
Clear objective	2342	3.834	.212	2.77	4.81
Creativity & innovation	2298	3.401	.354	1.744	5
Fair reward & punishment	2119	3.261	.215	2.12	4.173
Managerial feedback	2119	3.519	.225	2	4.64
Pay satisfaction	2234	3.217	.58	1.38	4.36
Psychological safety	2109	3.399	.391	1.64	5
Quality supervisor	2352	3.82	.251	1.782	4.81
Quality upper management	2341	3.063	.405	1.66	4.58
Recognition perception	2352	3.329	.446	1.912	4.92
Skills match	2352	3.602	.534	1.708	5
Well-being	2342	3.627	.273	1	4.58
Agencies with non-verifiable tasks	752	.327	.469	0	1

**Table 4: Summary statistics for individual-level surveys: US FEVS, Western Australia EPS, and Australia APS**

Variable	Obs	Mean	Std. Dev.	Min	Max
Intrinsic Motivation	4136934	4.225	.684	1	5
Adequate resources	4136628	3.399	.93	1	5
Autonomy	4132524	3.301	1.041	1	5
Career & personal development	4137094	3.703	1.007	1	5
Clear objective	4137172	3.893	.806	1	5
Creativity & innovation	4113069	3.342	1.076	1	5
Ethics promotion	300552	3.971	.89	1	5
Fair reward & punishment	4135517	3.393	.906	1	5
Managerial feedback	4053306	3.662	1.16	1	5
Pay satisfaction	4013140	3.511	1.162	1	5
Quality supervisor	4084540	3.916	.96	1	5
Quality upper management	4005184	3.148	1.214	1	5
Recognition perception	3818280	3.137	1.081	1	5
Skills match	4040094	3.478	1.19	1	5
Well-being	4136305	3.701	.905	1	5
Workplace safety	4041851	3.928	.926	1	5
Intent to leave	3810672	.277	.447	0	1

### *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

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

Survey fixed effects account for fixed differences in the method of survey administration and respondent population, thus making all comparisons intra-survey. Year fixed effects absorb any fixed variation created by global events (e.g. the global financial crisis). As specified in the pre-analysis plan, 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

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

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 – as e.g. respondents report higher (lower) levels of autonomy, do they report higher (lower) levels of intrinsic motivation?<sup>21</sup>

### *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 model

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

### *Intent to Leave*

When examining employee intent to leave (which is only available for individual-level surveys), I fit models for individual  $i$  in agency  $j$  reported in survey  $k$  at time  $t$  of the form

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<sup>21</sup> A parallel investigation is not possible using the individual-level data, as the individual-level data is a repeated cross-section; that is, individuals do not in any study have unique identifiers, making it impossible to evaluate changes within-person over time.

Intent to Leave<sub>i,j,k,t</sub> = Supportive Management Practice<sub>i,j,k,t</sub> + Intrinsic Motivation<sub>i,i,k,t</sub> + Supportive Management Practice<sub>i,j,k,t</sub> \* Intrinsic Motivation<sub>i,i,k,t</sub> + Survey Fixed Effects<sub>k</sub> + Year Fixed Effects<sub>t</sub>.

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

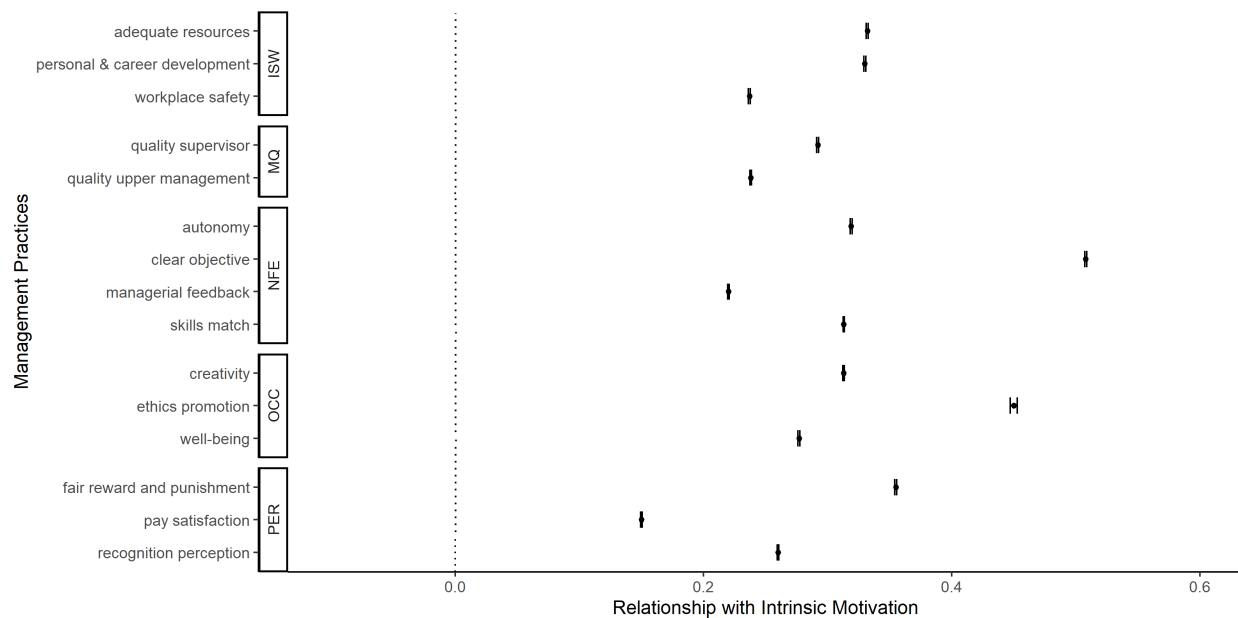
## Results

This section presents figures summarizing statistical analyses. The online appendix presents the full regression tables from which all figures in this paper 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 pre-analysis plan).

### *Intrinsic Motivation and Supportive Management Practice*

Figure 1, drawn from 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 & extrinsic rewards (PER), investment in staff & workplace (ISW), organizational climate & culture (OCC), and non-financial elements of job design (NFE).

All supportive management practices have a positive, and statistically significant, association with intrinsic motivation. These effects are substantial; e.g. 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 60<sup>th</sup> percentile of the distribution.



*Figure 1: Association of Supportive Management Practices and Intrinsic Motivation (Individual-Level Results; DV: Intrinsic Motivation)*

Results suggest that most of the variation is within, rather than between, the groups of supportive management practices - managerial quality (MQ), pay & extrinsic rewards (PER), investment in staff & workplace (ISW), organizational culture & climate (OCC), and non-financial elements of job design (NFE). Some difficult-to-change features of organizations (e.g. those related to pay, managerial quality, or otherwise requiring potentially costly investments in staff) are associated with higher levels of intrinsic motivation. However non-financial 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.

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. 19) 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 amongst the supportive management practices most strongly associated with intrinsic motivation.

Figure 2, drawn from 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 not eliminate) concerns that omitted variables may be driving the results in figure 1 by examining whether within-agency changes in perceptions of supportive management practice and associated with within-agency changes in employees' intrinsic motivation.

The results in figure 2 are substantively very similar to figure 1's above. 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.<sup>22</sup> 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 amongst 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 99<sup>th</sup> 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

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<sup>22</sup> 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 online appendix.

association with changes in intrinsic motivation amongst 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.

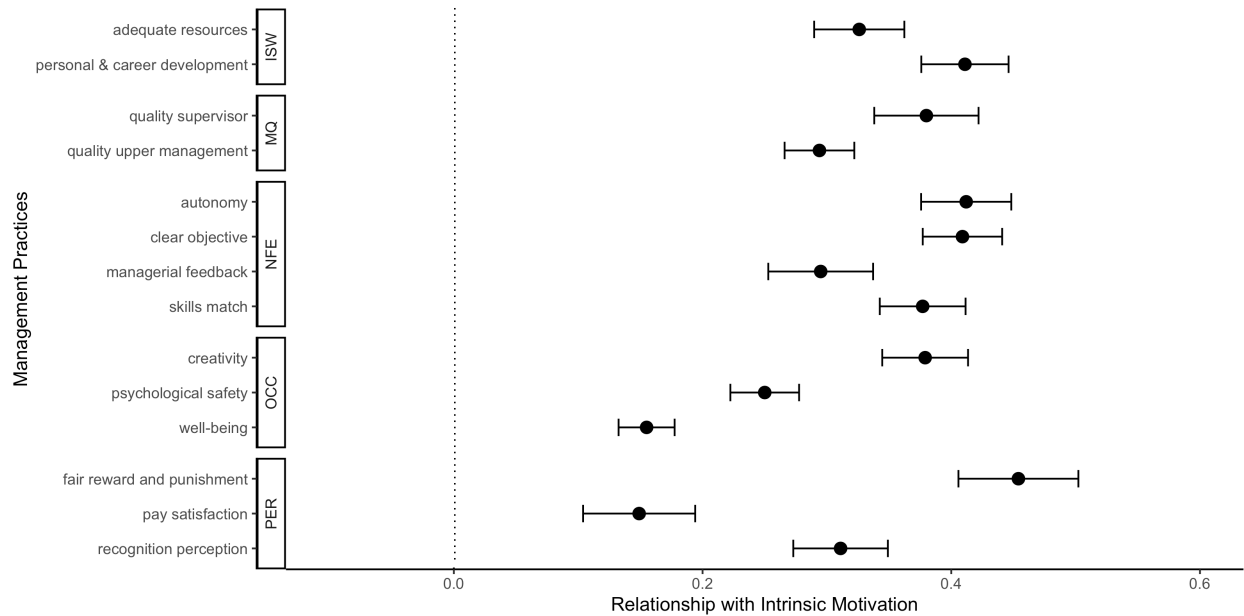


Figure 2: Association of Supportive Management and Intrinsic Motivation (Organization-Level Results with Agency, Year, and Survey Fixed Effects; DV: Intrinsic Motivation)

### Intention to Leave

Figure 3, drawn from 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.



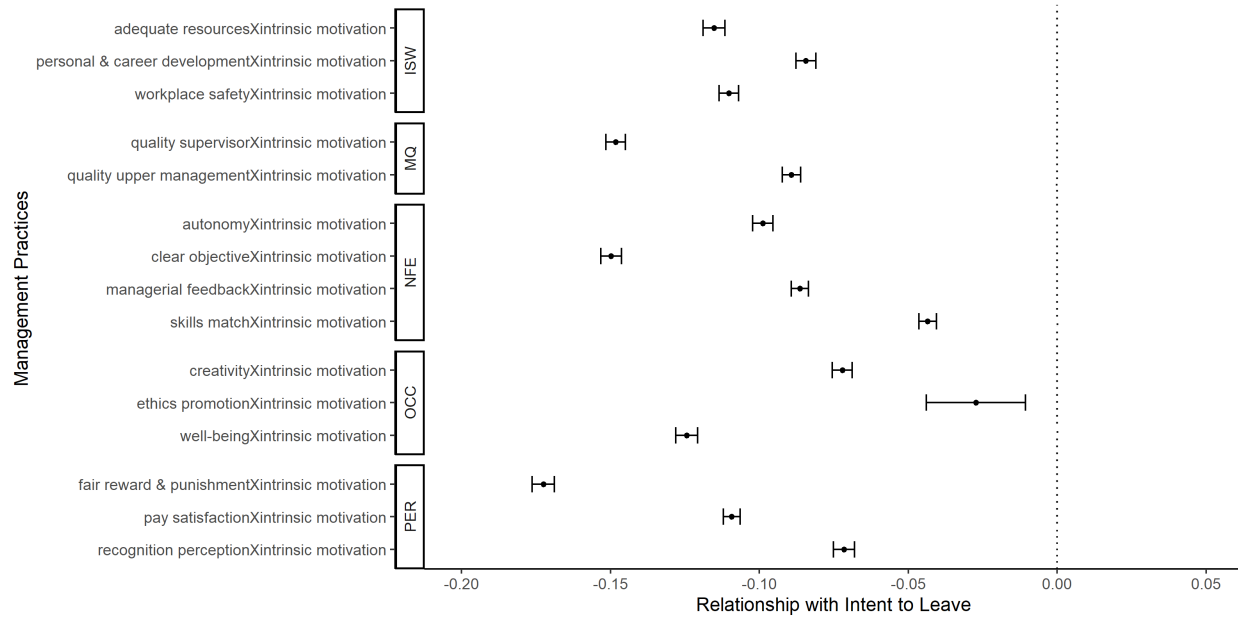


Figure 3: Interaction of Supportive Management Practice and Intrinsic Motivation on Intent to Leave (Individual-Level Data, Survey and Year Fixed Effects. DV: Intent to Leave)

Figure 3 shows a pattern of relationships which is similar to Figures 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 figures 1 and 2. However, there are some notable differences in the effects patterns as well – e.g. 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 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.

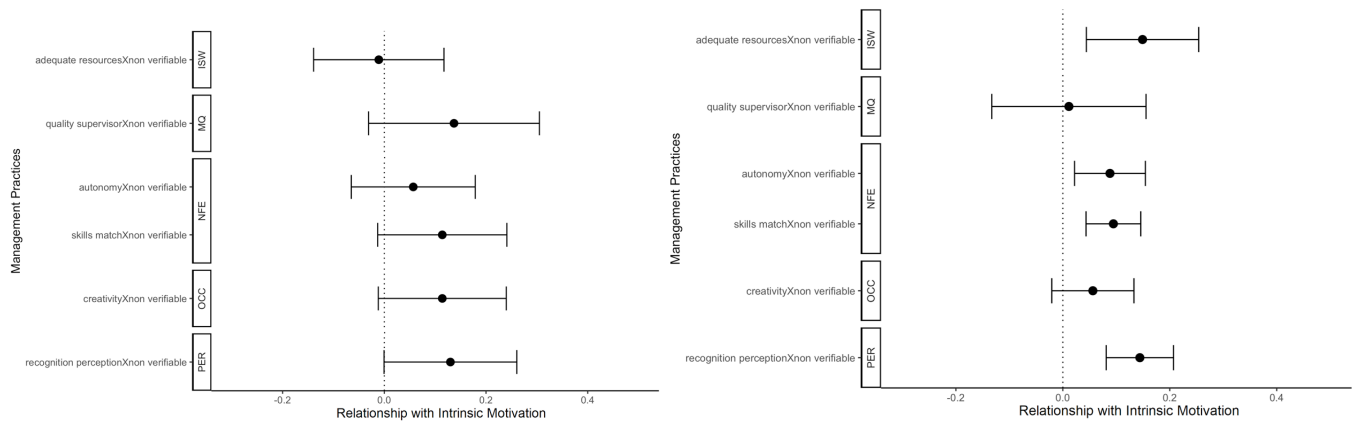
### Agency Performance Verifiability

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 Figures 4 and 5, which are drawn from Appendix Tables A24 and A25.<sup>23</sup> Verifiability takes the value of “1” when an agency’s tasks are largely unverifiable and “0” when

<sup>23</sup> Analysis is done with the supportive management practices that exist in all 4 agency-level surveys, to maximize power given the relatively small (752) agencies coded as verifiable or unverifiable. While figure 4 includes agency and time fixed effects – thus allowing it to be interpreted as the change within-agency over time – whether and when multi-way fixed effects are appropriate is currently contested (see e.g. 31-32). As such I also include Figure 5’s more parsimonious specification, which additionally have the advantage of allowing across-agency (rather than only within-agency over time) comparisons.

they are largely verifiable. As a result positive effect sizes imply that non-verifiability 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. Figures 4 and 5 show a consistent pattern both when looking at changes within agency (figure 4) and across agencies (figure 5). That said, both analyses find at least some practices for which the interaction with non-verifiability 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 (figure 4), only half of these management practices are above the 90% significance level.<sup>24</sup> This is cause for caution in placing too much weight on these results.<sup>25</sup>



*Figures 4 & 5: Effect of Nonverifiability on the Relationship Between Supportive Management Practices and Intrinsic Motivation (Organization-level data; Left panel Fig 4 with Year, Agency, & Survey Fixed Effects, Right Panel Fig 5 with only Survey Fixed Effects. DV: Intrinsic Motivation)*

## 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

<sup>24</sup> Confidence intervals displayed graphically are the 95% confidence interval. Three of figure 4’s six supportive management practices are significant at the 90% level; see appendix table A24 for more detail.

<sup>25</sup> 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.

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 & workplace, pay & extrinsic rewards, organizational culture & climate, managerial quality, and non-financial elements of job design – show a positive relationship with employee intrinsic motivation. Interestingly, the non-financial elements of job design – particularly autonomy, clear objective, and skills match – have amongst 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 e.g. setting clear objectives for employees or increasing 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 – provide some confidence that artefacts of survey design or question construction are not driving results, but certainly cannot account for all potential confounds. That these data rely 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 artefact 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. 33), 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 *doesn't* supportive management practice 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 where 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.

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