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A Theory-Based Analysis of Null Causality between HRM Practices and Outcomes: Evidence from Four-Wave Longitudinal Data

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ABSTRACT The last three decades have seen a growing interest in understanding the influence of human resource management (HRM) practices on employee job satisfaction and organizational performance. While the results have been generally positive, most studies have utilized cross-sectional research designs, which limit causal inferences. Recently, several studies have used longitudinal data but have not consistently found significant causal links between HRM practices and outcomes after controlling for past outcomes. This points to a tension in the literature that merits further investigation. Drawing on general systems theory (GST), we explore this issue by proposing and testing a set of null causal relationships involving HRM practices, organizational performance (i.e., patient satisfaction), and job satisfaction. We show that average scores on HRM practices and outcomes remain relatively stable at the organizational level over time, such that any observed within-organization change is likely negligible or non-significant. Using four-wave longitudinal data (with two, four, and six-year time lags) from the public healthcare sector, we argue that the causal links between HRM practices and outcomes are indeed sensitive to the forces of dynamic equilibrium operating within a highly institutionalized context. We use GST to highlight the self-sustaining nature of HRM systems and discuss the ramifications of this stability for strategic HRM research and practice.

Keywords: HRM practices, organizational performance, job satisfaction, lag effects, reverse causality, null causality

INTRODUCTION

One of the key questions in strategic human resource management (HRM) research over the past 30 years has been whether (and to what extent) HRM practices affect

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organizational performance? The answer has largely been 'yes', with several published articles linking coherent systems of practices to mutual gains or shared benefits for both employees and organizations (Appelbaum et al., 2000; Combs et al., 2006; Jiang et al., 2012; Jiang and Messersmith, 2018; Kalmi and Kauhanen, 2008; MacDuffie, 1995; Ogbonnaya et al., 2017; Sun et al., 2007; Van De Voorde et al., 2012). Employee benefits include job satisfaction and positive feelings about key aspects of work, whereas organizational benefits include reduced sickness absence rates, improved customer service, and increased productivity levels. The literature has also developed strong theoretical explanations for the positive links between HRM practices and organizational performance. Work grounded in the resource-based view, for example, suggests that organizations can build firm-specific human and social capital stocks to deliver a sustainable competitive advantage (Becker and Huselid, 1998). Social exchange principles (Ogbonnaya and Valizade, 2018) and the ability-motivation-opportunity model (AMO: Appelbaum et al., 2000; Jiang et al., 2012) also indicate that organizational investments in human capital via high-performance work systems (HPWS) are related to employee attitudes and behaviours, which ultimately lead to improved performance.

Despite the theoretical appeal of these models, scholars have reported mixed findings regarding the effects of HRM practices on organizational performance in longitudinal studies, particularly when controlling for past performance levels (Birdi et al., 2008; Garmendia et al., 2021; Guest et al., 2003; Saridakis et al., 2017; Schmidt and Pohler, 2018; Shin and Konrad, 2017; Tregaskis et al., 2013; Wright et al., 2005). A recent meta-analysis of longitudinal studies by Saridakis et al. (2017) did find a significant effect over time with a variety of outcome variables, but the results were based on only eight studies, many of which did not control for prior performance. Using a large multi-industry dataset, Shin and Konrad (2017) also found an association between HPWS and productivity, but they noted that the effect size was much smaller when prior levels of productivity were included in the model. In contrast, Garmendia et al.'s (2021) four-year longitudinal study found no significant cross-lagged relationships between HRM practices and outcomes. Wright et al. (2005) reported similar weak correlations between HRM practices and past, current, and future performance. Likewise, Guest et al. (2003) found that controlling for previous or concurrent levels of performance virtually eliminated any significant correlations between HRM practices and future performance outcomes. Given these mixed findings, the literature has yet to fully discern whether HRM practices are sufficient to boost performance over time, or whether performance outcomes actually predict the use of HRM practices, as suggested by recent research on financial slack and HRM systems (Chadwick et al., 2015; Kim et al., 2021; Wright et al., 2005).

This body of work highlights a tension in the strategic HRM literature, as cross-sectional studies repeatedly report significant effects, whereas more robust longitudinal studies do not consistently link HR investments to performance over time. One reason for this tension is that both research designs speak to distinct research questions, one focusing on *between*-organization variance and the other on *within*-organization variance (Certo et al., 2017). Cross-sectional designs assess *between*-organization variance by providing snapshots of HR investments and their effects at specific points in time. Thus, they can only enable time-invariant conclusions about the relative value of HR investments in comparable organizations. Longitudinal studies can also capture *between*-organization

effects, but they primarily assess *within*-organization variance and demonstrate how HR investments at Time 1 influence outcomes at Time 1 + n. While both questions are important, they are fundamentally different, implying that researchers should not necessarily expect overlapping results. Further adding to this tension are contingency arguments (Boselie et al., 2003; Paauwe and Boselie, 2005), which suggest that HR investments are sensitive to institutional conditions and may *not* produce a measurable impact on performance in such contexts.

We step into this tension by posing a relatively simple research question: Is there a theoretical rationale for expecting null longitudinal findings between HRM practices and performance outcomes within an institutionalized context? To address this question, we draw on general systems theory (GST), an interdisciplinary framework for exploring how input and output processes within systems influence one another over time (Kast and Rosenzweig, 1972; Von Bertalanffy, 1968). In particular, we develop and test a model that seeks to determine whether a set of null causal hypotheses between HRM practices and outcomes can be accepted. A null relationship implies that the true value of the effect between variables of interest is small and not meaningfully distinguishable from zero (Greenwald, 1993). According to Cashen and Geiger (2004, p. 153), a null relationship represents 'no nontrivial effect', 'no nontrivial correlation', or 'no nontrivial difference' between two or more variables. It is, therefore, conceptually distinct from 'a nil relationship', which implies that the observed effect is precisely zero (Cortina and Folger, 1998). We argue that null relationships between HRM practices and outcomes are possible during periods of relative stability in an organization. This reflects GST's notion of dynamic equilibrium, a self-regulating process that allows the core practices and outcomes of a system to remain stable over time while striving to maintain optimal internal conditions (Romanelli and Tushman, 1994). We empirically illustrate this phenomenon by analysing a large longitudinal dataset derived from the institutionalized context of the British National Health Service (NHS).

In leveraging GST, we contribute a novel theoretical frame and a preliminary empirical test to address a critical tension in the strategic HRM literature. Failing to investigate possible null relationships between HRM practices and outcomes is a missed opportunity to advance the literature, not least because null findings are just as relevant as significant results (Gallistel, 2009) and may be theoretically expected in certain contexts. Recognizing this issue is important not only for the strategic HRM literature, but also for addressing the replication crisis in management studies (Anderson, 2020). Moreover, in the HRM field, exploring the nature of *within*-organization null relationships could enhance knowledge of how organizations operate during periods of relative stability. Indeed, the literature has repeatedly suggested that organizational systems are subject to strong equilibrating forces that assist cross-level functioning and bring about relative stability within complex systems over time (Gersick, 1991; Romanelli and Tushman, 1994). This stability is only interrupted during punctuated periods of significant organizational change, which are then followed by a return to systemic stability. One practical implication of this is that organizational activities and outcomes will exhibit relative stability over a sustained period (Romanelli and Tushman, 1994; Snell and Dean Jr., 1994). In the people-management context, this implies that the lag effects between HRM practices

and outcomes, or vice versa, could be negligible within a stable institutional system. However, scholars have not yet investigated this possibility.

In addition, while prior research has indicated the presence of non-significant relationships (Garmendia et al., 2021; Guest et al., 2003), the literature has not provided a compelling theoretical rationale for these null effects. Guest et al. (2003) speculated that the way in which HRM systems are measured may account for the difference between cross-sectional and longitudinal findings. Garmendia et al. (2021), on the other hand, attributed the lack of positive longitudinal effects to macroeconomic conditions that led to cuts in pay and hours for employees in the context of their particular study (a large retail chain in Spain). While both methodological and contextual differences are plausible explanations, we contribute further by providing a theoretical rationale (based on GST) for how HRM practices and outcomes may influence each other within a complex institutional system in a state of dynamic equilibrium.

Furthermore, by leveraging GST and a large longitudinal dataset, we are able to address the reverse causality issue within the strategic HRM literature. We accomplish this by proposing and testing the null hypothesis that after controlling for prior HRM activity, past levels of performance will not significantly predict subsequent changes in HRM utilization. These predictions emphasize the output-to-input side of GST, thus reflecting the notion that the causal arrow from HRM practices to outcomes may point in the opposite direction (Schmidt and Pohler, 2018; Shin and Konrad, 2017). GST reinforces the idea of feedback loops, which are created when outputs are routed back as inputs to maintain the system's basic levels of operation (Kast and Rosenzweig, 1972; Von Bertalanffy, 1972). In the context of the present study, patient reports about the quality of care, for example, can be routed back as inputs to improve the quality of employees' job satisfaction and, ultimately, the quality of future patient care provisions within healthcare systems. In systems under equilibrium, however, the rate of transition from outputs to inputs may remain constant, resulting in no net change in the feedback mechanism (Kast and Rosenzweig, 1972). In this light, we argue that the null causal effects of patient satisfaction on both HRM practices and job satisfaction might be expected based on GST.

Finally, while the literature has acknowledged the importance of context (or a contingency view) regarding the relationship between HRM practices and performance, the vast majority of studies in the strategic HRM area are rooted in a universalist philosophy (Delery and Doty, 1996; Saridakis et al., 2017). Using GST, we advance the contingency perspective by investigating the relationships between HRM practices and organizational outcomes in the institutionalized context of the British NHS. As a large public healthcare institution, the British NHS operates in a systematized environment with formalized administrative, professional, and regulatory structures (Knies et al., 2017). These factors generate a state of dynamic equilibrium, allowing the links between HRM practices and performance to become more stable over time. We focus on four HRM practices – staff training, performance appraisal, workplace participation, and role involvement initiatives (e.g., job autonomy), which reflect the British NHS' emphasis on employee skill enhancement and performance management activities. Our study is unique in its use of four-wave longitudinal data (with two, four, and six-year time lags) to account for potential equilibrium. Relying on GST, we

provide a theoretical basis for estimating the possible temporal lags wherein the relationship between HRM practices and outcomes is likely to remain relatively constant.

In sum, our theoretical model offers a new perspective on the observed relationships between HRM practices and both employee and organizational outcomes by demonstrating the presence of null longitudinal relationships within a highly structured institutional framework at equilibrium. Figure 1 presents our conceptual model, and below we detail GST and discuss the nature of the relationships expected within the NHS over time.

Theoretical Background

As discussed above, the bulk of the strategic HRM literature appears to support a positive relationship between HRM and both employee and organizational outcomes in a 'greenfield' context. In other words, if an organization that has not previously utilized a high involvement or high performance HRM model chooses to implement one that integrates its various functions into a well-ordered system, we should expect long-term improvements in employee outcomes (attitudes, behaviours, etc.) and performance (operational and financial).

Further, *between*-firm effects suggest that organizations which invest more resources in their human capital will have better employee and operational outcomes relative to those with a lesser investment (Huselid, 1995). These relationships might be explained through social exchange mechanisms (Takeuchi et al., 2009; Zhang et al., 2019), whereby employees seek to reciprocate the organization's 'goodwill' or positive treatment demonstrated through HRM implementation by being more motivated and engaged in their work. Similarly, a resource-based perspective would argue that investments in employees' knowledge, skills and abilities result in human capital stocks, which are firm-specific resources (Jiang et al., 2012; Wright et al., 2001) that can be leveraged to achieve performance improvements.

Although these social exchange and resource-based perspectives are well established in the literature, we know that most organizational contexts are not necessarily 'greenfield'. In fact, from a practical perspective, it is not typically feasible to conduct HRM system research following an intervention; rather, the relationships of interest are measured within a dynamic system at discrete points in time. Thus, organizations cannot guarantee long-term improvements in employee and performance outcomes solely by developing HRM practices and incorporating them into a larger operational system. In reality, improvements may appear initially, but entropy will eventually set in, causing any further improvements to deteriorate. In such circumstances, one might expect null relationships

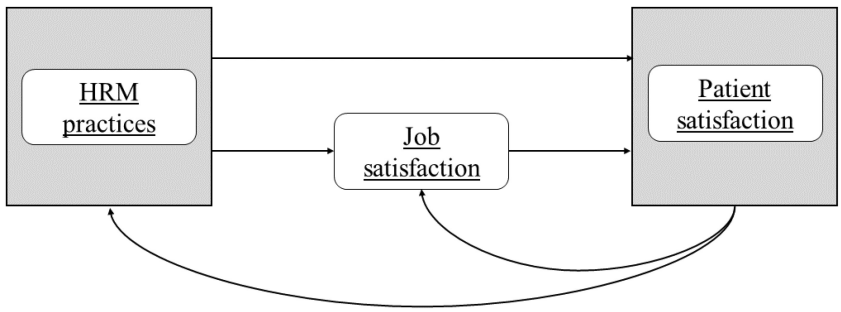

Figure 1. Conceptual model

between the variables of interest, particularly when examining within-organization relationships over time and controlling for prior levels of performance. We base this assertion on the fundamental principles of GST.

GST is a unifying framework for understanding how various components of a physical or social system operate and accomplish desired goals (Boulding, 1956; Von Bertalanffy, 1968). The theory's origins can be traced to the biological sciences, where it was used to investigate complex networks of living cells. It has since found useful application in the social sciences (e.g., Kast and Rosenzweig, 1972; Rousseau, 2015; Schneider and Somers, 2006) and, more recently, in HRM research (e.g., Shin and Konrad, 2017). GST proposes that systems comprise an organized collection of interacting parts, known as units or subsystems. Organizational systems, for example, include a wide variety of administrative and financial resources, human resources, products, and services that influence one another as a unified whole. A system's lifecycle, therefore, operates as a function of its constituent parts (Rousseau, 2015). If one component of the system changes, the entire system is likely to change as well, except under equilibrium conditions (Kast and Rosenzweig, 1972). In this vein, GST distinguishes between *inputs*, factors that directly or indirectly impact components of the system, and *outputs*, the tangible results generated after inputs have been processed (Wright and McMahan, 1992).

Our investigation focuses on the impact of the HRM system on both employee (job satisfaction) and organizational (patient satisfaction) outcomes. HRM practices, such as training, performance appraisal, workplace participation and autonomy at work are important inputs to the overall HRM system (Shin and Konrad, 2017; Wright and McMahan, 1992). When applied together as coherent bundles of practices, they improve employees' knowledge, skills, and abilities, thereby enabling the organization to generate desired outputs (Jiang et al., 2012; Ogbonnaya and Messersmith, 2019; Van de Voorde et al., 2012). Scholars have advanced various principles to explain the systems approach in HRM research. Delery's (1998) notion of 'internal fit', for example, describes the HRM system as a coherent set of practices aimed at aligning employees' interests more closely with organizational goals. This set of practices is complementary in that they strengthen one another and generate outcomes greater than the sum of their respective effects. Ogbonnaya et al.'s (2017) 'integrationist model' focuses on the unitary and mutually reinforcing nature of individual HRM practices. Accordingly, when HRM practices are used consistently together, they have mutually supportive characteristics that enable greater organizational gains. Grounded in these basic principles, research has explored HRM practices under various labels, such as 'high-performance work systems' (Appelbaum et al., 2000), 'high-commitment management' (Whitener, 2001), and 'high-involvement management' (Wood and Ogbonnaya, 2018).

In terms of systems outputs, job satisfaction and patient satisfaction represent employee- and organization-focused outcomes, respectively. Job satisfaction is defined as the positive emotional state resulting from employees' overall levels of contentment with various aspects of their jobs (Barling et al., 2003; Locke, 1976). It is a central component of employee well-being, with significant consequences for organizational effectiveness (Van Horn et al., 2004). Patient satisfaction, on the other hand, represents the overall feelings of contentment patients derive from the quality of care and services rendered by healthcare service providers. It is one of the most important performance indicators for

non-profit healthcare organizations (e.g., the British NHS) because it reflects the quality of clinical operations, safety, and service efficiency (Ogbonnaya and Babalola, 2020). Patient satisfaction is also a relatively clear and accessible performance metric that enables healthcare managers to evaluate various courses of action relative to the goals, interests, and values of the communities they serve (Andaleeb, 2001). Thus, compared to accounting-based performance indicators (e.g., financial performance and returns on invested capital), patient satisfaction – as a service-based organizational outcome – is more directly influenced by people management initiatives (Dyer and Reeves, 1995).

GST maintains the principle of a steady state or dynamic equilibrium, which suggests that most systems constantly adjust their input and output processes to maintain optimal levels of internal stability (Von Bertalanffy, 1968). This principle is rooted in the idea of feedback loops, a continuous self-regulatory mechanism that facilitates system maintenance and helps to preserve relative constancy within a system over prolonged periods of time (Rousseau, 2015; Von Bertalanffy, 1972). Thus, the system receives inputs that are processed internally to coordinate and generate relevant outputs. As more and more outputs are generated, they are fed back as inputs to help maintain the system's basic levels of operation (Von Bertalanffy, 1972). Eventually, the system reaches a steady state of dynamic equilibrium in which the total levels of outputs remain constant regardless of the amount of inputs received and processed (Romanelli and Tushman, 1994; Schwarz, 2012). At this point, the rate of change in the input–output relationship becomes self-stabilizing, returning any fluctuations to pre-existing levels. For instance, if organizations seek to improve employee job quality by consistently utilizing the same training, appraisals, and task involvement routines over time, the organization may fall into an established performance trajectory that is difficult to change. This principle does not imply that the system is dormant or inactive; rather, its input and output processes will remain relatively stable over time, unless significant change such as major restructuring occurs (Hannan and Freeman, 1984).

According to Hannan and Freeman (1984), organizations operating under such equilibrium conditions tend to maintain relative balance or operate at a stable level due to long-established patterns of activities and routines. Others describe this phenomenon as institutional inertia, which is characterized by standardized patterns of individual, social, and organizational processes throughout the entire organization (Kelly and Amburgey, 1991; Scott and Davis, 2016). It is, however, important to distinguish between institutional inertia (stagnation) and an organization's unwillingness to change. Organizational unwillingness to change is characterized by behaviours and actions that discredit or prevent the implementation of new initiatives designed to move the organization forward (Schwarz, 2012). Institutional inertia, on the other hand, relates to the tendency of a mature organization to maintain its existing balance of established processes, structures, and practices, despite relative changes in its operating environment. Such inertia is often triggered by institutional forces that create routine rigidity within organizations and tend to balance change with stability (Gilbert, 2005; Schwarz, 2012). Inertia thus indicates that an organizational system has achieved dynamic equilibrium and is able to produce repeatable results over time (Hannan and Freeman, 1984; Kelly and Amburgey, 1991).

Hypotheses Development

The four HRM practices examined in the present study – staff training, performance appraisal, workplace participation, and autonomy at work – have traditionally been regarded as important elements in developing employees' ability, motivation, and opportunity to contribute within organizations. Based on the AMO model, the general consensus in HRM research is that human capital represents an intangible asset for organizational success that can be built and amplified by such HRM practices (e.g., Combs et al., 2006; Jiang et al., 2012). Most studies supporting this argument, notably from a between-organization perspective, indicate that organizations can achieve competitive advantage by acquiring and deploying valuable and unique human resource policies and practices, yet most studies do not include the temporal nature of the relationship between HR systems and organizational outcomes. Wright et al. (2005) did investigate the long-term effects of an index measure of HRM practices on a variety of outcomes, such as productivity, quality, and financial performance. While Wright et al. (2005) found significant and positive effects on some of these performance indicators, they argued that these relationships disappear when controlling for past levels of outcomes. Given that autoregressive models rely on repeated measures to establish change (Schuurman et al., 2016), Wright and colleagues' findings suggest that the HRM–performance nexus becomes increasingly stable over time. Supporting this, Romanelli and Tushman (1994) argued that unless an organization adapts its system's input and output processes to changing contexts, that system will generally seek to maintain a steady state for extended periods of time.

HRM practices and patient satisfaction. Following GST's principle of dynamic equilibrium, we argue that adopting a similar set of HRM practices over time will have negligible observable causal effects on the quality of patient care. Over time, such practices become institutionalized or deeply embedded in the minds of employees, resulting in greater stability, and as a result, these practices are less able to contribute to significantly different outcomes (König et al., 2021; Snell and Dean Jr., 1994). The broader literature has indeed acknowledged that routinized patterns of organizational practices have a tendency to develop inertial characteristics in the long run (Feldman and Pentland, 2003; Schwarz, 2012). This principle, known as routine rigidity (Gilbert, 2005), implies that HRM practices can become deeply embedded in an organization's bureaucratic framework, reducing their capacity to change outcomes in a causal sense (Wright and Snell, 1998). Unless such practices are regularly updated (e.g., through year-to-year HRM restructuring), their net effects on organizational performance are likely to remain relatively stable (Snell and Dean Jr., 1994; Wright and McMahan, 1992). For these reasons, we present the following null hypothesis:

Hypothesis 1: After controlling for previous levels of patient satisfaction, past levels of HRM practices will not predict subsequent changes in patient satisfaction.

HRM practices and job satisfaction. Researchers have further emphasized the relevance of job satisfaction and other employee outcomes (such as psychological engagement and

commitment) in determining the benefits of HRM practices (Guest, 2017; Kalmi and Kauhanen, 2008; Sun et al., 2007; Van De Voorde et al., 2012). Based on social exchange theory (Blau, 1964), HRM practices, such as training, performance management, and employee involvement, convey important signals about an organization's willingness to invest in the quality of workplace relationships. Employees rely on these signals to improve the quality of their work and better align their personal interests with the organization's values. Viewed in this light, HRM practices promote positive employee attitudes at work. Nonetheless, the question of whether HRM practices predict subsequent changes in job satisfaction remains unanswered. Following GST's dynamic equilibrium principle, we argue that adopting similar HRM practices over time may lead employees to view such practices merely as organizational routines, which, in turn, produce negligible long-term improvements in job satisfaction levels. Over time, such practices would become more formalized within the system (Wright and Snell, 1998), making them less effective in influencing how employees feel about their jobs. Against this backdrop, we again present a null hypothesis representing this equilibrating process:

Hypothesis 2a: After controlling for previous levels of job satisfaction, past levels of HRM practices will not predict subsequent changes in job satisfaction.

Mediating role of job satisfaction. Prior work in this area also suggests that job satisfaction may be an important mediator between HRM practices and operational outcomes (Karatepe, 2013; Messersmith et al., 2011; Takeuchi et al., 2009). The key argument is that systems of HRM practices send positive signals that motivate employees and influence their workplace attitudes, which are then carried on to customers (or patients) via a service–performance chain. Through this chain, investing in HRM practices improves organizational outcomes because employees are happier and more capable of carrying out their service responsibilities with greater care and dedication (Karatepe, 2013). However, under GST, we expect this relationship to reach a state of dynamic equilibrium, such that subsequent levels of patient service performance via HRM practices will be driven by relatively stable levels of job satisfaction. This raises the possibility that the long-term effects of HRM practices on patient care quality via job satisfaction may be trivial or negligible. We therefore hypothesize a null mediation relationship as follows:

Hypothesis 2b: After controlling for previous levels of job satisfaction and patient satisfaction, the relationship between HRM practices and patient satisfaction via the mediating role of job satisfaction will be non-significant.

Reverse causal relationship between performance and HRM practices. The possibility of reverse causality exists within organizational systems; in other words, outputs can affect inputs via feedback mechanisms. Scholars within the strategic HRM field have also argued that performance may precede investments in more robust HRM systems (rather than – or

in addition to – such systems improving performance; Guest et al., 2003; Shin and Konrad, 2017; Wright et al., 2005). For example, Roca-Puig et al. (2018) made the salient point that organizations rarely invest in additional pay, benefits, training, or hiring when performance is poor during an economic downturn. Rather, they are likely to cut such provisions during times of weak performance and invest when slack resources allow for additional investments in human capital.

Leveraging GST, Shin and Konrad (2017) argued that the relationship between HRM systems and performance within complex systems includes a feedback loop through which gains from prior HR investments generate the slack resources necessary to make further investments in HPWS. In this way, the complex system linking inputs to throughputs and then outputs is regenerative (Shin and Konrad, 2017). Accordingly, an important consideration in effective people management is the potential for past performance to influence future developments in HRM practices. Because the development of HRM activities requires time, effort, and substantial financial resources, evidence of past success can be fed back into the system to inspire future improvements in such activities. Patients' reports on the quality of care, for example, can be transmitted back into healthcare systems as inputs, which signal the benefits of investments in HRM systems for key organizational outcomes. This relative success in building patient satisfaction then motivates organizational leaders to seek ways to continue to invest in the design of HRM practices, so as to reinforce the quality of future healthcare services. In this light, evidence of previous success in patient outcomes provides compelling cues to determine whether HRM utilization adds value not only to patients but also to employees and the organization as a whole. The organization is, therefore, able to detect potential problems within its patient care provisions, make better decisions, and move its operations away from their initial state towards a more desirable future state. This process is continuous; in other words, the feedback loops will recur as long as the system continues to achieve desired results (Roca-Puig et al., 2018).

Still, the key question is whether Shin and Konrad's (2017) arguments hold true under equilibrium conditions. According to GST, the answer is that a steady state does not necessarily imply inactivity or the lack of mutual influence between input and output processes (Kast and Rosenzweig, 1972). Rather, it implies that these processes occur at equal rates, producing no observable net change in the system as a whole (Hannan and Freeman, 1984). In other words, the system learns to exist in equilibrium, such that the rate of transition from outputs to inputs remains unchanged, despite the constant motion of different forces (Smith and Lewis, 2011). During equilibrium, for example, patient satisfaction feedback may not result in any further developments in the nature of HRM practices because the organization's basic patterns of activity are likely to have become institutionalized. This is especially true for most public hospitals in the UK, which are governed by the patient care standards promulgated by the Care Quality Commission (CQC, 2013). Once these standards have been met, hospitals will no longer implement changes but rather strive to maintain a consistent level of patient care services year after year. At this point, average levels of patient satisfaction feedback thus may not produce any further developments in the nature of HRM activities. From this perspective, one could argue that the causal links between past patient satisfaction and subsequent levels

of HRM utilization will be negligible once the system reaches equilibrium. Therefore, we hypothesize as follows:

Hypothesis 3: After controlling for previous levels of HRM practices, past levels of patient satisfaction will not predict subsequent changes in HRM practices.

Furthermore, GST proposes that systems are defined by closely aligned subsystems that work together to achieve a common goal (Kast and Rosenzweig, 1972). This implies that the same feedback mechanism that exists between patient satisfaction (as an output) and HRM practices (as an input) may also apply to other sub-components of the system, such as job satisfaction. While evidence suggests that (customer or patient) service performance can be intrinsically motivating, resulting in positive emotions and feelings of satisfaction among employees (Lawler III and Porter, 1967; March and Sutton, 1997; Ryan et al., 1996; Schneider et al., 2003), this dynamic may not persist during equilibrium conditions. In public healthcare organizations, for example, the system will tend to maintain a generally consistent level of patient care performance once the organizations have met the standards set by regulatory bodies (Oikonomou et al., 2019). In this situation, patient satisfaction feedback will not necessarily lead to increased job satisfaction among employees who have previously provided high-quality patient care; instead, job satisfaction may be derived from other stable aspects of work. Addressing the question of null causality between patient satisfaction and job satisfaction, therefore, we apply GST's principle of a steady state to predict that the lag effect of patient satisfaction on job satisfaction will not be large enough to be considered nontrivial:

Hypothesis 4: After controlling for previous levels of job satisfaction, past levels of patient satisfaction will not predict subsequent changes in job satisfaction.

METHODOLOGY

We obtained data for this study from two archival sources: the NHS Staff Survey for data on HRM practices and job satisfaction and the NHS Adult Inpatients Survey for data on patient satisfaction. Both data sources are publicly available for academic and research purposes. We examined data collected over four time periods: 2008, 2010, 2012, and 2014. By utilizing archival data with up to a six-year lag, our study accounts for possible equilibrating factors influencing different HRM practices relative to job satisfaction and performance in healthcare. Taking lagged patient satisfaction measures over four time periods also enabled us to make stronger inferences concerning forward and reverse causal effects than has hitherto been the case in other studies.

Research Context

The context for this study is the British NHS, a public healthcare institution characterized by several internal equilibrating factors such as established safety protocols, strict requirements for healthcare reporting, organizational norms, bureaucratic

controls, and hierarchical decision-making. Other stabilizing forces are external, including government regulations, political interests and coalitions, public spending, and multiple layers of accountability measures by governing bodies (Welbourne and Andrews, 1996). Owing to these factors, public healthcare organizations are likely to maintain the same HRM infrastructure for long periods of time, irrespective of relative changes to the surrounding clinical environment (Kelly and Amburgey, 1991; Scott and Davis, 2016). Moreover, during the period of data collection (2008–14), UK Government spending on the NHS was relatively static, averaging a real-terms increase of 1.9 per cent per annum from 2008 to 2014, and 0.75 per cent from 2010 to 2014 (The Kings Fund, 2022), thereby acting as a brake on investments in staff, technology or other innovations.

The NHS Staff Survey provides data on employees' perceptions of working conditions, employment relationships, attitudes, occupational health, and well-being in NHS Trusts. Data were gathered through self-completion questionnaires distributed to a random selection of employees in the participating NHS Trusts. A total of 159,529 respondents from 287 NHS Trusts completed the survey in 2008 (response rate 55 per cent); 164,916 respondents from 386 NHS Trusts completed the survey in 2010 (response rate 53 per cent); 101,169 respondents from 259 NHS Trusts completed the survey in 2012 (response rate 50 per cent); and 255,150 respondents from 287 Trusts completed it in 2014 (response rate 42 per cent). The range of respondents in sampled NHS Trusts was 44 to 751. Due to the British NHS' strict data protection policy, demographic information on individual respondents is not available for public use. However, we were able to include aggregate-level demographic data as control variables in our analysis.

The Adult Inpatients Survey is a comprehensive dataset on patients' overall perceptions about the quality of care and treatment received during admission to hospital. The topics covered include patients' assessments of the hospital environment, the quality of their interpersonal interactions with healthcare workers, the care and treatment they received during admission, and the efficiency of hospital operations and surgical procedures. All adult patients in the participating NHS Trusts (except psychiatry patients, maternity patients, and patients whose hospital admission was less than two nights) were invited to participate in the survey. Approximately 139,857 patient respondents from 165 NHS Trusts completed the survey in 2008 (response rate 54 per cent); 136,460 patient respondents from 161 NHS Trusts completed it in 2010 (response rate 50 per cent); 131,978 patient respondents from 156 Trusts participated in 2012 (response rate 51 per cent); and 59,083 patients from 154 Trusts completed it in 2014 (response rate 47 per cent). The range of patient respondents in sampled NHS Trusts was 396 to 853. As with the NHS Staff Survey, aggregate-level demographic data on individual patients were included as control variables in our analysis.

Data Management Strategy

Given the varied temporal and multilevel nature of our data sources, we applied a systematic data management strategy. To begin, we split data from the 2008, 2010, 2012, and 2014 NHS Staff Surveys randomly into two groups so that half of the respondents

provided information on HRM practices and the other half provided data on self-reported job satisfaction. For example, we created a grouping variable in the 2008 sample (N = 164,916) that randomly divides respondents into even (value = 0; N = 79,764) and odd (value = 1; N = 79,765) numbered cases. Respondents in the 'value = 0' group provided information on job satisfaction, whereas respondents in the 'value = 1' group provided information on HRM practices. Using split data ensured that the same respondents did not provide data for the same measures in the same calendar year. Together with patient satisfaction data collected from different sources and staff self-report data collected in different years, our split data approach minimized concerns over common method bias (Podsakoff et al., 2003).

Before creating organizational-level proxies for HRM practices and job satisfaction, we tested intraclass correlation coefficients 1 and 2 (ICC1 and ICC2) to verify the degree of interrater consistency among individual respondents and justify the use of data aggregation (Bliese, 2000; LeBreton and Senter, 2008). ICC1 estimates for individual HRM items ranged from 0.02 to 0.06, while the estimates ranged from 0.04 to 0.06 for job satisfaction. ICC2 estimates for the same set of HRM items ranged from 0.76 to 0.95, and the range for job satisfaction was 0.80 to 0.92. Thereafter, we computed interrater agreement index ($r_{WG(J)}$) scores to ascertain the degree of absolute consensus among individual respondents (Bliese, 2000; LeBreton and Senter, 2008). The mean $r_{WG(j)}$ scores for the observed items – both HRM practices and job satisfaction measures across relevant time periods – ranged from 0.69 to 0.96; thus, providing sufficient justification for data aggregation.

As with HRM practices and job satisfaction, we created aggregated mean scores as proxies for patient satisfaction at the NHS Trust level. ICC1 values for patient satisfaction data ranged from 0.02 to 0.04 across four waves, whereas ICC2 values ranged from 0.60 to 0.95. The mean $r_{WG(j)}$ score for patient satisfaction across four waves ranged from 0.75 to 0.78. These estimates provide sufficient justification for data aggregation.

We merged the data from all sources into a single, organizational-level dataset using unique NHS Trust identifiers. We used the 2008 NHS Staff Survey as the baseline data for merging other datasets. The sample size for the combined dataset was 160 NHS Trusts (see full variable details in Table I). The unit of our analysis is therefore the NHS Trust, allowing us to match and aggregate individual-level data over time, and generate a longitudinal dataset at the organizational level. Although individual workers and patients may have changed from year to year, the corresponding organizational system (or NHS Trust) remained the same. In addition, the ICC1, ICC2 and $r_{WG(j)}$ statistics reported above indicate that the collective experiences of respondents consistently coalesce around an organizational consensus (for a comparable analysis see Pining et al., 2013).

Before proceeding with further analyses, we applied Little's missing completely at random test to the data. The result indicated that our data were not missing completely at random ($\chi^2 = 112.89$, df = 82, $p < 0.05$). However, eight Trusts did not supply either patient or staff data in 2012 or 2014, which meant that the Trusts had merged with other Trusts. Excluding these eight Trusts ensured that the data were missing completely at random ($\chi^2 = 81.75$, df = 70, $p > 0.15$). Therefore, as a robustness check, we tested our hypotheses with and

Table I. Study variables, items and response scale

Variables	*Items*	*Response scale*
HRM practices		
Staff training	My training, learning and development have helped me to do my job better	1 = 'Strongly disagree' 5 = 'Strongly agree'
	My training, learning and development have helped me stay up-to-date with my job	
	My training, learning and development have helped me stay up-to-date with professional requirements	
Performance appraisal	Did the appraisal you had in the last 12 months help you improve how you do your job	0 = 'No' 1 = 'Yes'
	Did the appraisal you had in the last 12 months help you identify clear objectives for your work	
	Did the appraisal you had in the last 12 months leave you feeling valued by your employer	
Workplace participation	Communication between senior management and staff is effective	1 = 'Strongly disagree' 5 = 'Strongly agree'
	Senior managers here try to involve staff in important decisions	
	Senior managers act on staff feedback	
Autonomy at work	There are frequent opportunities for me to show initiative in my role	1 = 'Strongly disagree' 5 = 'Strongly agree'
	I am able to make improvements happen in my area of work	
	I am able to do my job to a standard I am personally pleased with	
Job satisfaction	How satisfied are you with the recognition you get for good work	1 = 'Very dissatisfied' 5 = 'Very satisfied'
	How satisfied are you with the support you get from your manager	
	How satisfied are you with the freedom you have to choose your own method of working	
	How satisfied are you with the support you get from work colleagues?	
	How satisfied are you with the amount of responsibility you are given?	
	How satisfied are you with the opportunities you have to use your abilities?	
	How satisfied are you with the extent to which your employer values your work?	
Patient satisfaction	Overall, how would you rate the care you received?	0 = 'I had a very poor experience' 10 = 'I had a very good experience'

Note: Sample size (N) = 160 NHS Trusts.

without these eight Trusts. The analyses converged with nearly equivalent coefficients. Thus, we based all subsequent analyses on the full sample of 160 NHS Trusts.

MEASURES

HRM practices were measured based on four HRM activities: staff training, performance appraisal, workplace participation, and autonomy at work. While not as robust as some measures of HRM systems, these four practices are consistently considered to be elements of the skill-, motivation-, and opportunity-enhancing practices assessed in the strategic HRM literature (i.e., Jiang et al., 2012). Training is consistently held to be a skill- or ability-enhancing practice, performance-appraisal is viewed as a motivation-enhancing practice, and workplace participation and autonomy are regarded as opportunity-enhancers (Jiang et al., 2012). Consistent with previous cross-sectional analysis of the NHS Staff Survey (e.g., Ogbonnaya et al., 2017), each HRM practice comprised three items coded such that high values reflected high scores on the construct (see Table I).

Job satisfaction was measured with seven items capturing employees' level of contentment with different aspects of their work. Example items are as follows: 'How satisfied are you with the recognition you get for good work?', 'How satisfied are you with the freedom you have to choose your own method of working?', and 'How satisfied are you with the opportunities you have to use your abilities?'. Items were measured on a five-point Likert scale (see Table I).

Patient satisfaction was measured via the Adult Inpatients Survey, which assessed respondents' overall experience of high-quality care while admitted to hospital. The measurement item was assessed on a scale from 0 = 'I had a very poor experience' to 10 = 'I had a very good experience'.

Control variables: In all models where HRM practices and job satisfaction were estimated as criterion variables, we controlled for employees' age (four categories with reference of '51 years and above'), working experience (four categories with reference of '11 years and more') and hours worked. Scholars have studied these controls as important determinants of employees' attitudes and behaviours at work (e.g., Wood and Ogbonnaya, 2018). In models where patient satisfaction was estimated as a criterion variable, we controlled for the extent of employees' face-to-face contact with patients as well as patients' length of stay in hospital. All control variables were measured as aggregated proxies at the NHS Trust level. Their inclusion introduced no significant variations in our conclusions. They were, therefore, excluded from our main analysis to minimize overfitting and ensure more parsimonious models.

ANALYSIS PROCEDURE

We analysed the data using structural equation modelling implemented through the Mplus software program. We applied robust maximum likelihood estimation in all analyses to account for non-normality in the data and Mplus default settings for estimation with missing data. Mplus procedures for handling missing data assume data missing at random or data missing completely at random. Hypothesis testing was conducted using

manifest variables for job and patient satisfaction across time periods, whereas individual HRM practices were estimated as latent variables to establish a coherent bundle of practices.

We analysed HRM practices for each year by estimating all four practices (staff training, performance appraisal, workplace participation, and autonomy at work) as a single latent factor. The latent factor for each year thus represented the HRM bundle (MacDuffie, 1995), or the extent to which all four practices were integrated coherently, with high values indicating an integrated system (Ogbonnaya et al., 2017). The residual of each HRM practice was allowed to covary over time, independently from the latent factor. For example, the residuals for staff training in 2008 through 2014 were allowed to covary separately from the latent factor for each year. Allowing residuals to correlate in this way accounted for year-on-year features that influenced the stability of individual HRM practices, independent of their inclusion in a bundle. The model demonstrated an acceptable fit for the data: $\chi^2 = 98.30$, df = 74, $p < 0.05$, confirmatory fit index (CFI) = 0.99 and root mean square error of approximation (RMSEA) = 0.05. All practices for each year loaded on their respective latent factors in the hypothesized direction ($p < 0.01$). Average variance extracted ranged from 0.68 to 0.70 for the factors representing each year. Composite reliabilities ranged from 0.87 to 0.89.

Subsequently, we tested for measurement invariance to verify that survey items for individual HRM practices were measured consistently and meaningfully across respondents over time. We tested metric invariance by constraining factor loadings for each HRM practice to be equal in each year ($\chi^2 = 105.34$, df = 83, $p < 0.05$, CFI = 0.99, RMSEA = 0.05). We observed no significant change in χ^2 between the models ($\Delta\chi^2 = 7.04$, df = 9, $p > 0.10$), and the change in CFI was less than 0.01, indicating metric invariance (Byrne, 2012). However, constraining item intercepts to be equal over time (strong invariance) significantly reduced the model fit ($\chi^2 = 668.13$, df = 95, $p < 0.05$, CFI = 0.65, RMSEA = 0.19). In this instance, we did not consider a change in intercepts over time problematic, however, because it may have reflected externalities that influenced changes in HRM practices; for example, restrictions in spending on practices such as staff training and workplace participation due to public sector budget constraints or government austerity measures could have affected the quality of these practices irrespective of whether they were implemented as part of the HRM bundle or not. In all measurement models assessed, HRM practices loaded on each years' latent factor significantly and in the hypothesized direction ($p < 0.001$).

We estimated a series of nested models to test our hypotheses and determine possible temporal lags beyond which any causal links between HRM practices and outcomes (or vice versa) might cease to exist. Our baseline model (autoregressive model) included first-order autoregression coefficients between variables and the residual within-year correlations along with correlations between the residuals of individual HRM practices in each year.

Next, we estimated our first model (Model 1), which included all elements of the baseline model, plus two-year cross-lagged regression coefficients between HRM practices (i.e., the latent factor), on one hand, and job satisfaction and patient satisfaction, on the other. This model assessed whether changes in outcome variables

over a two-year period were associated with other variables measured at the start of that two-year period. Our second model (Model 2) assessed whether changes between HRM practices and outcomes, or vice versa, were delayed longer than two years and by up to four years. This model included all elements of the baseline model plus the following cross-lagged estimates: 2014 outcomes regressed on 2010 predictors and 2012 and 2010 outcomes regressed on 2008 predictors. Our final model (Model 3) assessed whether changes between HRM practices and outcomes, or vice versa, were delayed longer than two and four years and by up to six years. This model built on the baseline model and included the cross-lagged estimates of 2014, 2012, and 2010 outcomes regressed on 2008 predictors. Although changes between HRM practices and outcomes, or vice versa, were most likely to occur in the shorter rather than the longer term, Models 2 and 3 allowed us to specify all possible temporal lags for significant and null effects.

To validate the hypotheses, we compared the fit of the baseline autoregressive model with the fit of the three cross-lagged models (Models 1–3). A significant difference would suggest support for relationships over time, at the expense of the hypothesized null effects (Hypothesis 1–4). Individual coefficients were evaluated in three ways: (i) by examining the standardized regression coefficients to give an indication of the size of the predictive relationship between predictors and outcomes; (ii) by assessing the statistical significance; and (iii) by estimating the 95% confidence intervals around the regression coefficients. Small but statistically significant outcomes would suggest that any predictive effects were trivial and, hence, that greater equilibrium exists.

RESULTS

Table II reports the means, standard deviations, coefficients of reliability (alpha), and correlations for the study variables. Table III presents the goodness-of-fit comparison between the baseline model and each of the cross-lagged models (Models 1–3), and Tables IV–VII show the results pertaining to our hypotheses tests.

As reported in Table III, each of the cross-lagged models showed a slight improvement in model fit compared to the baseline model. This suggests that at least some components of the relationships between HRM practices, job satisfaction, and patient satisfaction did not fully support our hypothesized null relationships (Hypothesis 1–4). The best fitting model was Model 1, which modelled cross-lagged relationships over a two-year period, implying that any significant effects are most likely to manifest themselves over a two-year period or less.

Hypothesis 1 examined HRM practices and subsequent changes in patient satisfaction after controlling for previous levels of this outcome. The results displayed in Tables V–VII indicate support for a null – rather than significant – relationship (Hypothesis 1) between HRM practices and subsequent levels of patient satisfaction. Not only did we observe large standardized autoregressive coefficients, indicating a greater degree of stability in patient satisfaction over time, but we also found no evidence in any of the cross-lagged models of HRM practices' direct effects on subsequent changes in patient satisfaction. This indicates that in the British NHS at least,

Table II. Means (M), standard deviations (SD), coefficients of reliability (alphas shown on primary diagonal in bold) and correlations

	M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Staff training 08	3.69	0.45	**0.92**											
2. Performance appraisal 08	0.62	0.09	0.40**	**0.84**										
3. Workplace participation 08	2.80	0.05	0.42**	0.64**	**0.96**									
4. Autonomy at work 08	3.47	0.17	0.43**	0.57**	0.76**	**0.80**								
5. Job satisfaction 08	3.46	0.10	0.29**	0.44**	0.65**	0.64**	**0.88**							
6. Patient satisfaction 08	7.67	0.08	−0.05	−0.01	0.22**	0.12	0.34**	**0.94**						
7. Staff training 10	3.70	0.48	0.26**	0.32**	0.29**	0.33**	0.22**	−0.03	**0.95**					
8. Performance appraisal 10	0.64	0.10	0.17*	0.46**	0.35**	0.36**	0.25**	−0.07	0.59**	**0.83**				
9. Workplace participation 10	2.79	0.06	0.17*	0.42**	0.58**	0.43**	0.43**	0.24**	0.51**	0.65**	**0.96**			
10. Autonomy at work 10	3.49	0.18	0.20**	0.41**	0.51**	0.54**	0.39**	0.13	0.58**	0.69**	0.81**	**0.82**		
11. Job satisfaction 10	3.50	0.10	0.24**	0.44**	0.49**	0.46**	0.52**	0.22**	0.45**	0.48**	0.66**	0.60**	**0.88**	
12. Patient satisfaction 10	7.62	0.09	−0.05	0.09	0.28**	0.17**	0.35**	0.88**	0.06	0.03	0.33**	0.28**	0.30**	**0.93**
13. Staff training 12	3.71	0.35	0.22**	0.22**	0.21**	0.16**	0.13	−0.12	0.27**	0.32**	0.27**	0.28**	0.18*	−0.08
14. Performance appraisal 12	0.64	0.10	0.26**	0.46**	0.46**	0.40**	0.33**	−0.10	0.31**	0.63**	0.51**	0.51**	0.38**	−0.01
15. Workplace participation 12	2.88	0.05	0.10	0.32**	0.50**	0.30**	0.33**	0.15	0.33**	0.54**	0.65**	0.54**	0.45**	0.19*
16. Autonomy at work 12	3.72	0.17	0.16	0.34**	0.41**	0.39**	0.29**	0.04	0.37**	0.52**	0.58**	0.58**	0.48**	0.13
17. Job satisfaction 12	3.58	0.10	0.22**	0.25**	0.47**	0.42**	0.39**	0.18*	0.25**	0.41**	0.55**	0.51**	0.49**	0.20**
18. Patient satisfaction 12	7.89	0.10	−0.05	0.14	0.35**	0.19**	0.34**	0.81**	0.08	0.16	0.35**	0.28**	0.28**	0.82**
19. Staff training 14	3.72	0.36	0.02	0.08	0.20*	0.07	0.23**	0.12	0.16	0.18*	0.34**	0.20*	0.30**	0.07
20. Performance appraisal 14	0.65	0.45	0.21**	0.41**	0.34**	0.24**	0.25**	0.05	0.29**	0.45**	0.40**	0.41**	0.37**	0.09
21. Workplace participation 14	2.93	0.09	0.11	0.32**	0.43**	0.27**	0.29**	0.20*	0.24**	0.42**	0.52**	0.47**	0.39**	0.22**
22. Autonomy at work 14	3.73	0.05	0.11	0.35**	0.41**	0.37**	0.32**	0.18*	0.29**	0.38**	0.45**	0.47**	0.42**	0.24**

(Continues)

Table II. (Continued)

	M	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
23. Job satisfaction 14	3.62	0.17	0.11	0.18*	0.36**	0.24**	0.33**	0.39**	0.30**	0.39**	0.34**	0.46**	0.34**	0.17*
24. Patient satisfaction 14	8.06	0.10	−0.08	0.20*	0.36**	0.20*	0.38**	0.83**	0.09	0.18*	0.39**	0.31**	0.32**	0.82**

	13	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*
13. Staff training 12	**0.94**											
14. Performance appraisal 12	0.47**	**0.85**										
15. Workplace participation 12	0.51**	0.71**	**0.98**									
16. Autonomy at work 12	0.58**	0.66**	0.76**	**0.79**								
17. Job satisfaction 12	0.43**	0.59**	0.71**	0.68**	**0.89**							
18. Patient satisfaction 12	−0.02	0.09	0.26**	0.19*	0.24**	**0.96**						
19. Staff training 14	0.28**	0.22**	0.43**	0.38**	0.43**	0.10	**0.95**					
20. Performance appraisal 14	0.23**	0.55**	0.47**	0.43**	0.44**	0.15	0.38**	**0.84**				
21. Workplace participation 14	0.26**	0.48**	0.61**	0.50**	0.52**	0.27**	0.48**	0.73**	**0.98**			
22. Autonomy at work 14	0.25**	0.42**	0.52**	0.55**	0.54**	0.25**	0.54**	0.71**	0.80**	**0.81**		
23. Job satisfaction 14	0.17**	0.34**	0.52**	0.44**	0.49**	0.32**	0.51**	0.55**	0.71**	0.68**	**0.93**	
24. Patient satisfaction 14	0.01	0.12	0.30**	0.21**	0.29**	0.87**	0.20**	0.17**	0.33**	0.35**	0.41**	**0.96**

Note: Sample size (N) = 160 NHS Trusts.
*p < 0.05; **p < 0.01.

Table III. Fit comparison between autoregressive model and cross-lagged models

Models	χ^2	$\Delta\chi^2$	*df*	Δdf	*CFI*	ΔCFI	*RMSEA*	$\Delta RMSEA$
Baseline model (first-order autoregressive model)	524.25	–	226	–	0.89	–	0.09	–
Model 1 (two-year cross-lagged model)	446.07	78.18	208	18	0.92	0.03	0.09	0
Model 2 (cross-lagged model with change delayed longer than two years and by up to four years)	472.19	52.06	208	18	0.91	0.02	0.09	0
Model 3 (cross-lagged model with change delayed longer than two and four years and by up to six years)	465.43	58.82	208	18	0.91	0.02	0.09	0

Note: Change in model fit (Δ) is based on comparison between each cross-lagged model and the baseline model. Sample size (N) = 160 NHS Trusts.

TABLE IV. Baseline model: Standardized regression coefficients and 95% confidence intervals for the autoregressive model

	Job satisfaction			*Patient satisfaction*			*HRM practices*		
	2010	*2012*	*2014*	*2010*	*2012*	*2014*	*2010*	*2012*	*2014*
	β	β	β	β	β	β	β	β	β
Variables	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*
HRM practices 08	–	–	–	–	–	–	0.49** (0.35, 0.60)	–	–
HRM practices 10	–	–	–	–	–	–	–	0.57** (0.44, 0.69)	–
HRM practices 12	–	–	–	–	–	–	–	–	0.52** (0.40, 0.62)
Patient satisfaction 08	–	–	–	0.87** (0.83, 0.91)	–	–	–	–	–
Patient satisfaction 10	–	–	–	–	0.81** (0.75, 0.86)	–	–	–	–
Patient satisfaction 12	–	–	–	–	–	0.86** (0.81, 0.90)	–	–	–
Job satisfaction 08	0.48** (0.36, 0.58)	–	–	–	–	–	–	–	–
Job satisfaction 10	–	0.40** (0.27, 0.51)	–	–	–	–	–	–	–
Job satisfaction 12	–		0.37** (0.21, 0.51)	–	–	–	–	–	–
R^2	0.23**	0.16**	0.14**	0.76**	0.66**	0.73**	0.24**	0.33**	0.27**

Note: The above results do not include control variables (aggregated scores of employees' age, work experience and hours worked); we excluded these variables to minimize overfitting and ensure a more parsimonious model. Nevertheless, the inclusion of these control variables resulted in no significant variations in the regression coefficients. Sample size (N) = 160 NHS Trusts.
*p < 0.05; **p < 0.01.

Table V. Model 1: Standardized regression coefficients and 95% confidence intervals for cross-lags of up to two years

	Job satisfaction			*Patient satisfaction*			*HRM practices*		
	2010	*2012*	*2014*	*2010*	*2012*	*2014*	*2010*	*2012*	*2014*
	β	β	β	β	β	β	β	β	β
Variables	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*
HRM practices 08	0.35** (0.17, 0.53)	–	–	0.09 (−0.01, 0.20)	–	–	0.57** (0.43, 0.69)	–	–
HRM practices 10	–	0.44** (0.25, 0.63)	–	–	0.06 (−0.08, 0.19)	–	–	0.69** (0.53, 0.83)	–
HRM practices 12	–	–	0.31** (0.07, 0.54)	–	–	−0.01 (−0.15, 0.14)	–	–	0.47** (0.24, 0.66)
Patient satisfaction 08	0.02 (−0.07, 0.23)	–	–	0.87** (0.82, 0.93)	–	–	0.06 (−0.11, 0.20)	–	–
Patient satisfaction 10	–	0.02 (−0.13, 0.17)	–	–	0.80** (0.73, 0.87)	–	–	−0.10 (−0.24, 0.03)	–
Patient satisfaction 12	–	–	0.21** (0.07, 0.35)	–	–	0.85** (0.79, 0.90)	–	–	0.12 (−0.01, 0.24)
Job satisfaction 08	0.32** (0.13, 0.52)	–	–	−0.01 (−0.11, 0.11)	–	–	0.04 (−0.18, 0.26)	–	–
Job satisfaction 10	–	0.17 (−0.03, 0.36)	–	–	−0.01 (−0.13, 0.12)	–	–	0.04 (−0.10, 0.19)	–
Job satisfaction 12	–	–	0.20 (−0.08, 0.48)	–	–	0.09 (−0.06, 0.24)	–	–	0.19 (−0.04, 0.43)
R^2	0.25**	0.32**	0.31**	0.77**	0.66**	0.75**	0.33**	0.49**	0.43**

Note: Model 1 assessed whether changes between HRM practices and outcomes, or vice versa, were delayed for up to two years. The results do not include control variables (aggregated scores of employees' age, work experience and hours worked); we excluded these variables to minimize overfitting and ensure a more parsimonious model. Nevertheless, the inclusion of these control variables resulted in no significant variations in the regression coefficients. Sample size (N) = 160 NHS Trusts.
*p < 0.05; **p < 0.01.

Table VI. Model 2: Standardized regression coefficients and 95% confidence intervals for cross-lags of up to four years

	Job satisfaction			*Patient satisfaction*			*HRM practices*		
	2010	*2012*	*2014*	*2010*	*2012*	*2014*	*2010*	*2012*	*2014*
	β	β	β	β	β	β	β	β	β
Variables	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*
HRM practices 08	0.35** (0.16, 0.53)	0.24** (0.07, 0.39)	–	0.10 (−0.01, 0.20)	0.05 (−0.08, 0.18)	–	0.59** (0.45, 0.73)	–	–
HRM practices 10	–	–	0.12 (−0.10, 0.34)	–	–	0.07 (−0.07, 0.20)	–	0.62** (0.48, 0.76)	–
HRM practices 12	–	–	–	–	–	–	–	–	0.53** (0.41, 0.65)
Patient satisfaction 08	0.08 (−0.07, 0.23)	0.07 (−0.10, 0.23)	–	0.87** (0.82, 0.93)	–	–	0.07 (−0.10, 0.23)	−0.13 (−0.28, 0.01)	–
Patient satisfaction 10	–	–	0.23** (0.10, 0.37)	–	0.79** (0.72, 0.86)	–	–	–	0.11 (−0.03, 0.25)
Patient satisfaction 12	–	–	–	–	–	0.85** (0.79, 0.90)	–	–	–
Job satisfaction 08	0.32** (0.12, 0.52)	–	–	−0.01 (−0.12, 0.11)	0.03 (−0.11. 0.17)	–	0.01 (−0.21, 0.22)	0.13** (0.03, 0.24)	–
Job satisfaction 10	–	0.30** (0.16, 0.44)	–	–	–	0.02 (−0.07, 0.23)	–	–	0.07 (−0.06, 0.20)
Job satisfaction 12	–	–	0.31** (0.12, 0.51)	–	–	–	–	–	–
R^2	0.25**	0.21**	0.22**	0.77**	0.66**	0.75**	0.36**	0.40**	0.33**

Note: Model 2 assessed whether changes between HRM practices and outcomes, or vice versa, were delayed longer than two years and by up to four years. The results do not include control variables (aggregated scores of employees' age, work experience and hours worked); we excluded these variables to minimize overfitting and ensure a more parsimonious model. Nevertheless, the inclusion of these control variables resulted in no significant variations in the regression coefficients. Sample size (N) = 160 NHS Trusts.
*p < 0.05; **p < 0.01.

Table VII. Model 3: Standardized regression coefficients and 95% confidence intervals for cross-lags of up to six years

	Job satisfaction			*Patient satisfaction*			*HRM practices*		
	2010	*2012*	*2014*	*2010*	*2012*	*2014*	*2010*	*2012*	*2014*
	β	β	β	β	β	β	β	β	β
Variables	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*	*(95% CI)*
HRM practices 08	0.35** (0.16, 0.53)	0.24** (0.07, 0.42)	0.04 (−0.13, 0.20)	0.10 (−0.01, 0.20)	0.05 (−0.08, 0.19)	−0.05 (−0.19, 0.08)	0.59** (0.46, 0.73)	–	–
HRM practices 10	–	–	–	–	–	–	–	0.61** (0.48, 0.75)	–
HRM practices 12	–	–	–	–	–	–	–	–	0.51** (0.38, 0.64)
Patient satisfaction 08	0.08 (−0.07, 0.23)	0.07 (−0.09, 0.23)	0.32** (0.18, 0.46)	0.88** (0.82, 0.93)	–	–	0.06 (−0.10, 0.23)	−0.13 (−0.28, 0.02)	0.12 (−0.03, 0.27)
Patient satisfaction 10	–	–	–	–	0.79** (0.72, 0.86)	–	–	–	–
Patient satisfaction 12	–	–	–	–	–	0.83** (0.78, 0.89)	–	–	–
Job satisfaction 08	0.32** (0.12, 0.52)	–	–	−0.01 (−0.12, 0.10)	0.03 (−0.11, 0.17)	0.13* (0.01, 0.26)	0.00 (−0.21, 0.21)	0.14** (0.03, 0.25)	0.05 (−0.10, 0.21)
Job satisfaction 10	–	0.30** (0.16, 0.44)	–	–	–	–	–	–	–
Job satisfaction 12	–	–	0.32** (0.16, 0.49)	–	–	–	–	–	–
R^2	0.25**	0.21**	0.24**	0.77**	0.66**	0.76**	0.36**	0.39**	0.29**

Note: Model 3 assessed whether changes between HRM practices and outcomes, or vice versa, were delayed longer than two and four years and by up to six years. The results do not include control variables (aggregated scores of employees' age, work experience and hours worked); we excluded these variables to minimize overfitting and ensure a more parsimonious model. Nevertheless, the inclusion of these control variables resulted in no significant variations in the regression coefficients. Sample size (N) = 160 NHS Trusts.
*p < 0.05; **p < 0.01.

using similar HRM practices over long periods of time has negligible causal effects on the quality of patient care. The results also provide evidence of equilibrium in the HRM–performance relationship.

Hypothesis 2a considered HRM practices and subsequent changes in job satisfaction after controlling for previous job satisfaction levels. Compared to Hypothesis 1, the results displayed in Tables V–VII support positive links between HRM practices and subsequent increases in job satisfaction, thus refuting Hypothesis 2a. More specifically, seven of the nine cross-lagged coefficients involving job satisfaction were statistically significant and reliably different from zero. All five of the regression coefficients between HRM practices and two-year lag levels of job satisfaction were significant ($p < 0.01$, lower-bound 95% confidence intervals for these coefficients $\beta \geq 0.07$, upper-bound 95% confidence intervals $\beta \geq 0.39$). This indicates that the lag effects of HRM practices on job satisfaction across time periods were large enough to be considered nontrivial (no support for Hypothesis 2a).

Hypothesis 2b posited a null indirect relationship between HRM practices and subsequent levels of patient satisfaction via job satisfaction. We adopted three criteria to assess whether job satisfaction mediated this relationship (see e.g., MacKinnon et al., 2002): a significant relationship between HRM practices and subsequent job satisfaction; a significant relationship between job satisfaction and subsequent patient satisfaction; and significant indirect effects of HRM practices on patient satisfaction via job satisfaction. The first two criteria needed to be met before proceeding to the third. While Tables V–VII indicate significant relationships between HRM practices and subsequent levels of job satisfaction (first criterion, Hypothesis 2a), only one significant relationship appeared between job satisfaction in 2008 and patient satisfaction in 2014 (second criterion; see Table VII). However, we could not estimate the indirect effect of this one significant relationship due to lack of data on HRM practices prior to 2008. For all other possible indirect relationships, the third criterion for mediation was not fulfilled, and Hypothesis 2b was, therefore, supported.

Hypothesis 3 and 4 tested for null reverse causality. First, we examined the relationship between prior patient satisfaction and subsequent changes in HRM practices after controlling for past utilization of HRM practices. The results were not significant in any of the cross-lagged models; thus, Hypothesis 3 was fully supported (see Tables V–VII). In contrast, we did find a consistent relationship between prior patient satisfaction in all years and job satisfaction in 2014 across Models 1–3. The lower-bound confidence intervals were comfortably above zero ($\beta \geq 0.07$), suggesting that the effect was not trivial. However, no significant relationship between patient satisfaction and subsequent levels of job satisfaction appeared in any year other than 2014. The results thus do not offer unequivocal support for Hypothesis 4. Rather, they suggest a more complex picture – perhaps related to possible moderator variables (e.g., policy changes) associated with specific events.

Post Hoc Analyses

We conducted a set of post hoc analyses to further validate our findings. First, to determine whether modelling cross-sectional and lagged relationships would reveal

different conclusions from the cross-lagged analyses, we examined a model in which patient satisfaction was regressed on contemporaneous values of HRM practices and job satisfaction, including autoregressive components. For example, patient satisfaction in 2014 regressed on HRM practices in 2014 while controlling for patient satisfaction in 2012. The model also included the regression of job satisfaction on contemporaneous values of HRM practices while controlling for autoregressive components. In this analysis, we found HRM practices to be associated with changes in job satisfaction across the four time periods, but we observed no changes in relation to patient satisfaction, except for HRM practices in 2010, which were associated with changes in patient satisfaction in 2010 ($\beta = 0.13$, $p < 0.05$). Because job satisfaction was not related to changes in patient satisfaction in any year, we found no evidence of mediation in the relationship between HRM practices and changes in patient satisfaction via job satisfaction. These results effectively replicated those reported in Tables V–VII.

Second, we re-estimated the models presented in Table V (the best fitting model) and described in the previous paragraph but this time included controls for HRM practices and job satisfaction in 2008. This allowed us to determine whether changes in HRM practices from 2008 to each subsequent year were associated with patient and job satisfaction and whether changes in job satisfaction from 2008 were related to changes in patient satisfaction. We found that changes in HRM practices from 2008 were associated with changes in job satisfaction (range of βs: 0.20 to 0.46, $p < 0.01$), but neither HRM practices nor job satisfaction were associated with patient satisfaction in any of the analyses. Again, these results effectively replicated those reported across Tables V–VII. Because some of the analyses revealed relationships between changes in HRM practices and subsequent levels of job satisfaction, the analyses provide further evidence to contradict Hypothesis 2a.

Third, we replicated Models 1–3 without including autoregressive terms. In other words, we modelled our hypothesized relationships over time without estimating any change elements in the criterion variables. The goal was to determine whether the failure to analyse changes in criterion leads to alternative conclusions regarding the causal relationships between HRM practices and outcomes. With patient satisfaction as a criterion, HRM practices in 2008 were associated with lower levels of patient satisfaction in subsequent years (2010, 2012, and 2014), whereas job satisfaction in 2008 was associated with higher levels of patient satisfaction in 2010, 2012 and 2014. The specificity of the results involving HRM practices in 2008 suggests possible moderators, such as the financial crisis of 2008 and subsequent UK government austerity measures may have adversely affected the performance of NHS Trusts. Future studies can develop more contingency driven models to better understand the performance effects of HRM practices over time. Furthermore, in four out of five possible instances in the models, job satisfaction in 2008 was associated with subsequent patient satisfaction in 2010, 2012, and 2014 (range of βs: 0.49 to 0.54, $p < 0.01$). However, no data were available to estimate mediation for HRM practices prior to 2008.

Although Tables V–VII reveal no significant change between prior levels of patient satisfaction and future HRM practices, omitting autoregressive components led some relationships to be significant. These results indicate that lower levels of patient satisfaction

were associated with subsequently higher levels of HRM practices (range of βs: −0.44 to −0.31, $p < 0.05$). They also confirm that the autoregressive components of our models were critical in determining the presence or absence of change between variables.

Finally, we re-estimated the model shown in Table V (the best fitting model) using specific HRM practices rather than a single latent variable (i.e., the HRM bundle). Because the practices were highly correlated, we examined separate models for each HRM practice. Although this makes it difficult to disentangle the mutually supporting effects of co-occurring HRM practices, divergence between these results and the results reported in Table V could indicate which specific practices are associated with greater or lesser system stability. For example, performance appraisal in 2008 predicted patient satisfaction in 2010 ($\beta = 0.09$, $p < 0.05$), making it the only practice to predict this outcome. In addition, performance appraisal in 2008 and 2010 predicted job satisfaction in 2010 and 2012, respectively (range of βs: 0.24 to 0.28, $p < 0.01$), and workplace participation and autonomy at work in all years predicted subsequent job satisfaction (range of βs: 0.18 to 0.32, $p < 0.05$). Therefore, three out of four HRM practices had consistent effects on job satisfaction. However, job satisfaction remained unrelated to subsequent patient satisfaction in all models, implying that specific HRM practices have no significant indirect relationships with patient satisfaction via job satisfaction.

Examining the effects on HRM practices themselves, we found that job satisfaction in 2008 and 2012 predicted subsequent levels of staff training in 2010 and 2014, respectively. We also found that job satisfaction in 2010 and 2012 predicted subsequent levels of autonomy at work in 2012 and 2014 respectively (range of βs: 0.20 to 0.37, $p < 0.05$). Patient satisfaction in 2012 predicted subsequent levels of autonomy at work in 2014 ($\beta = 0.12$, $p < 0.05$).

The results with regard to specific practices suggest that performance appraisal, workplace participation and autonomy are particularly beneficial for job satisfaction as part of a larger system of HRM practices. For staff training and autonomy, we found greater volatility for reverse causation in some years. This finding may imply that, while improvements in training and employee job discretion are easier to implement in positive organizational conditions, as indicated by job satisfaction and/or patient satisfaction, other factors (e.g., management allocation of financial resources to HR) may also influence the implementation of training and job discretion.

DISCUSSION

Guided by the principles of GST, this study offers a first step in exploring the nature of null causal relationships involving HRM practices, patient satisfaction and job satisfaction in a large, longitudinal study of Trusts within the British NHS. We argue that the effectiveness of HRM systems arrives at a state of dynamic equilibrium over time, which suggests that inputs, throughputs, and outputs will exist within a relatively steady state. This has implications for how observable the relationships between HRM practices and outcomes will be when controlling for previous levels of the same outcomes. In developing this theoretical and empirical test, we address a critical tension in the literature regarding whether a coherent set of HRM practices – staff training,

performance appraisal, workplace participation, and autonomy at work – is causally related to employee and organizational outcomes over time within a relatively stable institutional context. Our robust estimates include forward and reverse null causal hypotheses, allowing us to test the directionality of the connection between HRM practices and organizational performance. Further, the longitudinal data allow us to test the effects of different lag structures, including two, four, and six-year lags between the variables of interest.

The results show that using similar HRM practices over time yields negligible observable effects on subsequent changes in the quality of patient care. These null findings challenge conventional wisdom while also addressing a critical tension in the literature regarding whether HRM practices and outcomes really do have a long-term influence on each other. The field remains focused on whether and how systems of HRM practices contribute to performance at various organizational levels (Huselid, 1995; Jackson et al., 2014; Jiang and Messersmith, 2018). Despite evidence that more sophisticated systems of HRM practices are routinely correlated with improved organizational performance, the prevalence of cross-sectional designs continues to hinder claims of causality (Becker and Gerhart, 1996; Tregaskis et al., 2013; Wright et al., 2005). The picture is further complicated by longitudinal studies that fail to find significant effects after controlling for prior performance (Guest et al., 2003; Shin and Konrad, 2017; Wright et al., 2005). The present study takes a step in resolving this tension by providing a theory-driven explanation for expecting null effects from HR investments.

In part, the contradictory findings between the body of cross-sectional work linking HRM systems to performance and the longitudinal work trying to do the same stem from the slightly different questions that each seeks to address. In cross-sectional research, the question about the efficacy of HRM systems is focused on *between*-organization effects: Do organizations that make greater investments in HRM systems have better employee and operational outcomes? To this question, the literature to date has largely demonstrated a consistent association between firms that have implemented more robust HRM systems and those that have not (Combs et al., 2006; Jiang et al., 2012). Of course, this does not tell us whether the association is time-invariant, let alone causal. That is, cross-sectional designs may not answer the question of whether HRM systems are sufficient in and of themselves to improve performance over time, whether performance leads to more HR investments, or whether there is another unmeasured variable (or variables) that boosts both HR investment and performance simultaneously.

Longitudinal studies, on the other hand, are able to effectively address both *between*- and *within*-organization variance (Certo et al., 2017), but the question of causality is largely a *within*-organization question: Do investments in HR at T1 induce greater employee and performance outcomes at T1 + n? This question can only be addressed using repeated measures with some degree of temporal separation. The challenge, however, is that if the time periods are arbitrarily selected without direct evidence of a new HR intervention, then not only is causality still an open question, but we may not even observe a statistically significant relationship. Observing such null effects may then lead us

to the conclusion that HR investments do not have a significant effect on employee or organizational outcomes, but is this conclusion warranted?

The results of our analysis revealed that the effects of HRM practices and subsequent outcomes tend to be negligible or non-significant in a relatively stable organizational context when assessed using longitudinal data and controlling for autoregressive components. Based on the principles of GST, we argue that this null longitudinal effect does not imply that HRM practices are ineffective in influencing organizational performance; rather, it suggests that this effect becomes more and more complicated over time as the HRM system approaches dynamic equilibrium. Our results provide preliminary evidence, on the basis of GST, that HRM systems are likely to reach a state of dynamic equilibrium when an organization consistently adopts the same routines over time, thereby balancing inputs and outputs to maintain relative constancy within the system. If this is the case, then we have theoretical reasons *not to* expect statistically significant effects. This is particularly true in an institutional setting where the system's external environment is relatively stable.

Overall, the paper points to an important divide in how we compare studies in the field based on their baseline methodologies. Cross-sectional and longitudinal studies may yield different results as they ask different questions. Such realities ask researchers to be more precise in the theoretical language used to establish hypotheses. Are we assessing between- or within-organization effects? Developing a robust set of replicable findings will require specificity in study design. In addition, the study points to the need to meaningfully consider time in our models, particularly models that might aspire to describing causal mechanisms. What are the temporal and lag effects of HR system implementation and how stable are these effects over time? Is there a possibility of a monotonic increase over time or is the relationship curvilinear? Or do HR investments produce periods of punctuated equilibrium, where successive investments boost performance to a new level that then remain relatively stagnant until some change occurs within the HRM system? Future work is needed to help address these important questions.

From a methodological standpoint, the field of strategic HRM could benefit significantly from additional quasi-experimental designs that allow researchers to collect data both before and after the introduction of more sophisticated models of HRM systems (see Tregaskis et al., 2013). Snapshot studies, even studies with lagged dependent variables, are not sufficiently strong to infer causality. To demonstrate a valid and true causal relationship, the field requires additional intervention-based studies with pre- and post-test measures. Simply measuring HRM practices at time T and outcomes at T + 1 does not guarantee that the actual effect is causal. Rather, the unmeasured outcome at T − 2 may be predictive of HRM practices at time T. In other words, until we have a good sense that the system of practices was reconfigured meaningfully, we cannot infer that the relationship between HRM practices and outcomes is causal, and we may be led astray by simply taking a snapshot of two variables at various points in time. For instance, the analysis of individual HR practices demonstrated a positive effect between performance appraisal and job satisfaction, while other practices did not. This suggests that changes to this particular practice may have been implemented to drive job satisfaction while other factors remained steady. Testing for the effects of interventions within the HR system will

lead to benefits in understanding the true effects that HR systems can have on employee and organizational outcomes. Although intervention-based studies necessarily have small sample sizes, such studies may be warranted to triangulate findings from the survey studies with larger sample sizes that are prevalent in the field.

Furthermore, our null findings for patient satisfaction (our organizational outcome variable) highlight the need for more nuanced contingency models and systems-level perspectives, which run counter to the universalist philosophy underlying much of the work in the strategic HRM field. We argue that systems of HRM practices exist within and amidst other complex socio-technical systems (Cherns, 1987); thus, understanding causal relationships between such practices and important employee and organizational outcomes may require an assessment of how these relationships interact with operational capabilities within the larger organizational system. As input processes, HRM practices certainly feed into an organization's operational capabilities in multiple ways, but the manner in which work is structured and human capital is deployed to improve organizational performance are also likely to exert independent effects. Without proper alignment of operational and HRM processes, organizational performance is likely to suffer. In other words, scholars must consider critical moderators of the relationship between HRM practices and performance outcomes, including the level of stability within the industries and organizations being examined. True positive effects may be more likely to occur when greater dynamism is present.

Nevertheless, our second test indicates consistent non-trivial links between HRM practices at one time point and job satisfaction in subsequent time periods. The robust findings across lag intervals do suggest that the manner in which HRM practices are configured and implemented relates to employees' satisfaction with the work they are doing. While deviating from GST's dynamic equilibrium, this result underscores previous cross-sectional work in strategic HRM, suggesting that employee attitudes are linked in meaningful ways to the kinds of signals that HRM practices convey about the quality of employment relationships (e.g., Ogbonnaya and Valizade, 2018; Townsend et al., 2012). It also highlights the role of HRM practices in promoting positive feelings and behaviours among employees (Kehoe and Wright, 2013) at least in the short term. Overall, the results suggest that the components of HRM systems remain predictive of proximal employee outcomes (i.e., job satisfaction), even within a stable system. Nevertheless, our subsequent analysis revealed that job satisfaction did not mediate the link between HRM practices and organizational performance after controlling for prior performance levels. Following GST, this null mediation relationship implies that, under equilibrium conditions, any indirect link between HRM practices and subsequent patient satisfaction is driven by relatively stable levels of job satisfaction.

The study also revealed null causal effects when tracing outcomes back to inputs – i.e., the output-to-input side of GST. Tests for reverse causality are gaining traction in the strategic HRM field (Roca-Puig et al., 2018; Schmidt and Pohler, 2018; Shin and Konrad, 2017) as it becomes accepted that past performance levels generate the slack resources required for future investments in HRM practices (Shin and Konrad, 2017). While not directly analogous to financial performance, our data strongly support null effects between patient satisfaction and subsequent levels of HRM practices after

controlling for autocorrelation. Broadly speaking, these findings reinforce GST's underlying principle that the rate of change from output to input is relatively stable under equilibrium conditions, resulting in negligible feedback loop transitions (Kast and Rosenzweig, 1972). From a contingency standpoint, this finding challenges the reverse causality view by showing that reverse causation between past performance and subsequent HRM levels is dependent on the equilibrating factors operating within the organizational system. When an organization reaches equilibrium, its patterns of activity and outcomes are relatively stable over time, even across a six-year window. Thus, exploring reverse causation without addressing equilibrium effects may ignore the possibility of institutional inertia.

In sum, addressing both *between*- and *within*-organization effects is valuable. We should not dismiss all of the papers showing that organizations with greater HR investment outperform those with less investment. Similarly, we cannot lean too uncritically on longitudinal studies and assume that null relationships mean that HRM systems have no effect on employee outcomes, particularly if we are measuring HR investments and outcomes at arbitrary intervals. Rather, the results of the study indicate that we need to consider important contingency elements when evaluating the effectiveness of HRM systems, most notably the effect of time and environmental stability when attempting to draw causal inferences.

Practical Implications

This study's most important practical implication is that HRM practices have the ability to influence employee outcomes, at least in the short to medium term. More specifically, the increased use of HRM practices appears to be directly related to employees' perceptions of their jobs and the level of satisfaction they experience as a result. Healthcare administrators seeking to improve staff well-being should, therefore, consider implementing a cogent system of HRM practices that includes staff training, performance appraisal, workplace participation, and autonomy at work. The caveat, however, is that relative to job satisfaction, less proximal performance indicators (e.g., patient satisfaction) are likely influenced by a host of other factors, which reduces support for the overall contribution of HRM practices to operational performance outcomes. That said, coherent systems of HRM practices are likely influenced by important operational processes within the organization and should be understood as a component of a broader organizational system.

While HRM practices clearly add value to organizations, our study suggests that the institutional context matters. When investing in HRM practices, healthcare administrators must consider the unique characteristics of the public sector as well as the challenges inherent in implementing people-management activities in a highly institutionalized context. The literature suggests that organizations gradually become structurally inert over time; in other words, repeated patterns of workplace activities become self-reinforcing and thus difficult to change (Schwarz, 2012). Consistent with this assertion, our results underscore the power of equilibrating factors that contribute to unchanging patterns between HRM practices, employee attitudes and performance. These factors can be internal (e.g., strict safety requirements) or external (e.g.,

government regulations), but they ultimately limit an organization's ability to deviate from the status quo (Scott and Davis, 2016). Thus, while service performance may require a significant reconfiguration of input and output processes within the healthcare system, we should consider the various institutional characteristics that balance change and stability.

These results also suggest that organizations need to remain mindful of equilibrating forces and routinely consider ways to reconfigure the HRM system to continue to improve employee ability and motivation. Repeating similar patterns over time may lose effectiveness in the HRM system; or, to put it another way, organizations that maintain static HRM systems are likely to produce similar results over time. It is therefore critical for practitioners to consider new practices that might help to reinvigorate employees and spark the development of human capital. If performance benefits are needed, then structural shifts in the HRM system may be warranted to help boost motivation and productivity.

Limitations and Future Research

This study represents an early attempt to understand whether HRM systems are significantly associated with performance outcomes over time. As such, while our study offers a number of theoretical and practical implications, it is important to consider the findings in light of the limitations of the data and the study. First, our measure of HRM practices was not as robust as many others in the literature. We assessed the HRM bundle using only four practices: staff training, performance appraisal, workplace participation, and autonomy at work. The archival data did not capture compensation- or selection-related variables, which are common components of HPWS (Huselid, 1995; Jiang et al., 2012). This may be one reason why the practices produced mainly null causal effects – our study omitted too many practices to produce a true representation of the effects of HRM practices on patient satisfaction and job satisfaction. However, because we analysed HRM practices as a latent variable rather than as an index (where the latent variable is assumed to be a cause of individual HRM practices), the omission of some practices should not have affected our analysis. Nevertheless, we are bounded by the limits of the archival data, and future research should explore similar research questions using a more robust and extensive set of practices.

Second, it is possible that the null causal relationships we uncovered appeared primarily because the lag times were excessively long. While a strength of our study was its use of a lagged dependent variable, the two, four, and six-year time spans between measuring the independent and dependent variables may be too great to infer non-trivial causal effects. Nonetheless, the above-mentioned arguments about GST's dynamic equilibrium require sufficient time lags to be valid. More specifically, the highly institutionalized environment in which public healthcare institutions operate generates significant inertial pressures, which can be effectively captured only by estimating long time lags. On a related note, it may be that in this particular public healthcare environment, there was a relatively low amount of employee turnover, which would

make it more likely to observe a system at equilibrium. Contexts that feature higher levels of employee turnover may exhibit more robust causal relationships as employee churn renews the efficacy of HRM practices. Given that the NHS data did not capture the number of employees who left or remained in the organization during the investigation period, we were unable to control for employee turnover. However, even if there was a large amount of turnover, replacement staff would have similar professional training and have to adhere to the same professional guidance and operational procedures as their predecessors. Such factors would reinforce inertia regardless of change in staff.

Finally, our sample consisted of workers employed within the British public healthcare sector, a highly institutionalized context with a relatively dispersed workforce. The British NHS is primarily funded through general taxation and government public spending schemes, implying that it is a not-for-profit organization, and thus, our performance measure related to service quality rather than return on investment. While the British NHS provides a useful context to study the proposed theoretical relationships, it may limit the study's generalizability to profit-oriented contexts. It may be that the consequences and antecedents of HRM practices vary between public and private organizations, as well as between national and regional contexts. Future longitudinal studies are needed to test these relationships across time and in and in various institutional, sectoral, and industrial contexts.

CONCLUSION

The relationships between HRM investments and organizational outcomes are complex and multifaceted. The results of this longitudinal study further support evidence in the extant literature showing that HRM practices enhance employees' job satisfaction. In this way, our findings offer salient evidence for practitioners and scholars alike. However, our results also underline the importance of considering equilibrating forces in organizational systems, which could significantly affect the ability of HRM practices to generate benefits for both organizations and employees. This study highlights the importance of measuring multiple components of organizational systems across time to more fully grasp the mutual gains that may be achieved from investing in HRM practices.

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CONFLICT OF INTEREST

The authors whose names are listed above have read and understood *Journal of Management Studies*' policy on declaration of interests and declare that we have no conflicting interests.

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