

Comparisons of the effects of individual and collective performance-related pay on performance

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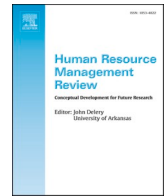
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Comparisons of the effects of individual and collective performance-related pay on performance: A review

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ABSTRACT

Debate on whether performance-related pay enhances organizational performance has centred on individual-based systems. This paper reviews studies that compare these with collective-based systems such as team bonuses and profit-sharing. Analysis of such comparisons – both field and experimental studies – reveals that collective systems, either alone or in conjunction with individual systems, are associated with higher performance. In no study do individual incentives outperform collective systems. Tests for moderators were rare but suggest that task interdependency may enhance collective systems' effects. Tests of mediators are also rare but point to enhanced levels of cooperation and idea generation under collective systems. This review examines how the included studies contribute to our understanding of key issues in payment-systems research – the roles of sorting effects and free riding under collective systems, and whether financial incentives may undermine intrinsic motivation – and finds it is limited, suggesting future work should concentrate on these areas.

1. Introduction

This review examines studies that compare individual and collective forms of performance-related pay, and particularly their effects on performance. Performance-related pay is defined as “any form of variable pay scheme which rewards employees on the basis of performance” (Gerhart & Newman, 2019: 715). It can be based on linking pay to performance at three levels – those of the individual, the group, or the organization. Typically, individual performance-related pay includes methods such as piece rate, merit pay and sales commission incentives, while collective performance-related pay is based on group or organizational performance and includes team-based pay, goal sharing, gain-sharing, profit-sharing and employee shared ownership plans.

The objective of the review is to assess which of collective and individual performance-related pay has been found to have greater positive effects on organizational and individual performance in studies that have directly compared the two. We use the word “effect”, which is widely used in studies of performance-related pay, and reviews of it, without assuming this is causal. The theories underlying the research assume causality, and hence the term is appropriate when used in that context; however, some of the field studies are cross-sectional, with results that do not rule out the possibility that the performance of an organization affects the selection of its payment system, or that the two are reciprocally related. A secondary objective is to assess the extent to which the studies shed light on longstanding controversies relating to the problems of performance-related pay and the reasons behind any performance differential. Particularly significant are whether performance-related pay leads to: a) a focus on quantity or speed of production over

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quality of output, b) employees restricting output, for example through gaming behavior, and c) reduction in workers' intrinsic motivation.

We first outline why we think a review is timely. Then we introduce the key problems associated with performance-related pay that may reduce its efficacy, and subsequent discussions questioning whether these problems are inevitable. We then outline our methodology: the review is systematic with five prespecified questions, the main one being "Which of individual or collective performance-related pay systems has the greater effect on performance?". We also compare the use of these systems in isolation with their use in combination, as a hybrid system. Finally, we report the findings of our analysis, concluding by drawing out the implications for theory, future research and practice.

2. The need for a review comparing individual and collective performance-related pay

A review comparing different types of performance pay is timely for several reasons. Firstly, evidence across OECD countries shows that use of collective systems has increased over the last decade. The diffusion of performance-related pay has perhaps been most striking in Japan, where the proportion of publicly traded firms using some form of performance-related pay rose from 20% in 2000 to 70% in 2012 (Kato & Kodama, 2015). Likewise, widespread adoption of collective performance-related pay has been observed in establishments in the UK and USA (Brown, 2020; CIPD, 2021; Gerhart, 2023; Mishel & Kandra, 2021; Wilmers & Massenkoff, 2020) but perhaps best documented for the European Union (see Table 1; Eurofound, 2015; Eurofound & Cedefop, 2020).

Secondly, past reviews have predominantly either considered only one type of performance-related pay, typically looking at the individual level (Gerhart & Fang, 2014; Jenkins Jr., Mitra, Gupta, & Shaw, 1998; Prendergast, 1999), or not differentiated between the two types, instead treating them as homogeneous (e.g., Burgess & Ratto, 2003; Hasnain & Pierskalla, 2012; Perry, Engbers, & Jun, 2009). Two reviews have focused on collective performance-related pay, including financial participation (Brown, 2020; Nyberg, Maltarich, Abdulsalam, Essman, & Cragun, 2018), while De Matteo, Eby, & Sundstrom (1998) reviewed empirical evidence relating to team-based rewards only.

Even where the differentiation between the two forms of performance-related pay has been made, each type is treated separately, with no attempt made to compare their relative performance effects. Instead, the emphasis has been on the potential weaknesses of each system (Bryson, Freeman, Lucifora, Pellizzari, & Perotin, 2013; Gerhart, Rynes, & Fulmer, 2009; Rynes, Gerhart, & Parks, 2005). Two meta-analyses and a narrative review, however, do compare the effect of the two forms, based on studies that concentrate on one or other of them. Condly, Clark, & Stolovitch (2003) examined 45 papers, of which only 9 deal with collective performance-related pay. However, their meta-analysis showed that the association of collective incentives with team performance was 48% stronger than that of individual incentives. Individual systems were found to be superior to flat-rate ones, but by 19%. Garbers & Konradt (2014) also found collective pay systems to have a greater positive effect on worker performance than individual incentives, based on an analysis of 30 studies. Honeywell-Johnson & Dickinson (1999), in their narrative review of small-group incentives, found performance effects for groups of 2 to 12 members to be comparable to those recorded for individual monetary incentives. They note in two studies that where rewards were divided unequally within the group, performance effects were greater than when they were evenly divided, a result that suggests a hybrid of individual and collective systems might be the most effective. None of the reviews, however, evaluate studies that directly compare the two systems, although they include some of the studies that do this.

Thirdly, while these prior reviews of performance-related pay have revealed its positive association with performance – perhaps reflecting a publication bias towards positive results – longstanding concerns about its efficacy remain unresolved. These concerns include the way it may: a) increase the quantity of output at the expense of quality or other outcomes (Jenkins Jr. et al., 1998); b) lead workers to restrict their effort in both individual performance-related pay systems (Collins, Dalton, & Roy, 1946; Levine, 1992; Roy, 1952) and collective ones (Nyberg et al., 2018), and; c) reduce the fulfilment of autonomy needs, and hence the positive effect that intrinsic motivation can have on performance (Amabile, Hill, Hennessey, & Tighe, 1994; Deci, Koestner, & Ryan, 1999; Fang & Gerhart, 2012; Gneezy & Rustichini, 2000). Much of the discussion of such issues has been based on individual systems, and the extent to which these factors apply to collective systems has attracted limited attention.

Finally, a comparison of forms of performance-related pay is relevant to wider concerns within management and economics. It is particularly relevant within management in the light of advocacy of the high-performance work system as the optimal management approach in the increasingly dynamic and competitive global economy (Huselid, 1995). For the high-performance work systems approach to be anything other than a tautology, it must be defined by a preformed set of practices, the extent of their adoption being the determinant of performance. If the concept is to make sense, practices must be assumed to be best-in-class, each practice playing a

Table 1
Percentage of establishments using performance-related pay in European Union in 2013 and 2019.

	European Company Survey 2013, EU28 Eurofound (2015)	European Company Survey 2019, EU27 Eurofound & Cedefop (2020)
Individual performance-related pay	43	52
Collective performance-related pay	25	40
Profit-sharing and shared ownership	35	39
Limited/no variable pay	46	32
Moderate/selective variable pay	44	55
Extensive/comprehensive variable pay	10	13

Source: Eurofound (2015), Eurofound & Cedefop (2020).

unique role that is not replicated by others (Wood, 2021). Performance-related pay has typically been included in a list of the human resource management practices that have been widely taken to constitute high-performance work systems, presumably on the basis that the concept's association with performance is established. Consequently, individual performance-related pay is typically included in aggregate indexes or scales used to measure high-performance work systems as one of the practices indicating its presence (e.g. Beltrán-Martín, Roca-Puig, Escrig-Tena, & Bou-Llusar, 2008; Wood & De Menezes, 2008; Wright, Gardner, & Moynihan, 2003) – although Huselid (1995) only includes collective pay systems and some include such collective systems as well as individual ones, with no differentiation between them (e.g. Guest, Michie, Conway, & Sheehan, 2003; Ramsey, Scholarios, & Harley, 2000).

The concepts of high-involvement management (Lawler, 1986) and high-commitment management (Walton, 1985) sit alongside that of high-performance work systems, to the extent that they have often been treated as synonymous. As the research on high-performance work systems developed, motivational devices like performance-related pay became more central to it, at the expense of the employee involvement that is crucial in both high-involvement management and high-commitment management. Despite its title, high-commitment management is not centered on motivational devices or simply on fostering commitment and engagement, and Wood (2020) has argued that conceptions of it are equivalent to high-involvement management, with its prioritization of intrinsic motivation and job designs that fulfil this motivation, as well as teamworking, cooperative relations and relational coordination. Moreover, having coupled them together, he argues, they should be decoupled from high performance work systems. A central reason for this separation is the increasing centrality given to pay and performance monitoring in characterizing high-performance work systems, because performance-related pay has long been seen as antithetical to high-involvement and high-commitment management, piecework being the quintessential example (Beer, Spector, Lawrence, Mills, & Walton, 1984; Wood, 1996). Lawler, Mohrman, & Ledford (1995: 18) claim, “Individual incentive plans are usually not very supportive of employee involvement”. Similarly, Beer et al. (1984) gauge that in most jobs employees do not have full control over the achievement of results, or independence from other functions or employees, both of which are required for individual performance-related pay to work. Indeed, the empirical work focusing directly on high-commitment management finds individual performance-pay systems to be disproportionately used as part of the alternative control approach (Arthur, 1994), or to be unconnected to the use of high-commitment practices (Wood & Albanese, 1995; Wood & De Menezes, 2008). High basic wage rates would, it might be argued (Foulkes, 1980), be most consistent with the high-involvement and high-commitment concepts, but a collective performance-related pay system may also be compatible, especially if employees are involved in its design. Assessing the comparative performance of different types of performance-related pay therefore contributes to identifying the superior form of modern management.

A comparison of individual and collective pay systems is also relevant to debates within economics. Economists who have entered the field of management practice have implicitly sided with the high-performance systems concept that motivational devices are the fulcrum of effective management, coining the term “the new empirical economics of management” (Bloom, Lemos, Sadun, Scur, & Van Reenen, 2014; Bloom & Van Reenen, 2007) to capture their endeavor. Following an agency theory framework, they argue that incentives should align the effort of agents to the level desired by the principal, and that employee monitoring, targets and incentives are “the essence of good management” (Van Reenen, 2017: 10). They focus on individual performance through monetary rewards, and imply that collective forms of performance-related pay will not significantly affect this. However, some economists have considered collective systems, and particularly profit-sharing, alongside the advocacy of high-involvement management aimed at harnessing trust and continuous improvement seen in the 1990s (Kruse, 1993; Weitzman & Kruse, 1990). They are seen as an adjunct to practices such as employee empowerment and teamworking. A meta-analysis of studies concentrating on profit-sharing showed it had a small but significant positive association with firm performance (O’Boyle, Patel, & Gonzalez-Mulé, 2016). Moreover, high-involvement management enhanced this association, consistent with the inclusion of profit-sharing in characterizations of this model. This reinforces the suggestion that high-involvement management is distinct from the directive performance management (Franco-Santos & Doherty, 2017: 2323) so central to the new economics of the firm that Bloom and colleagues are encouraging, which is focused on correcting the incompleteness of the employment contract through intensive monitoring.

3. Questioning the efficacy of performance-related pay

The reasoning behind performance-related pay systems is akin to classical economic theory – that workers are motivated to maximize income and employers to maximize profits. The incentive effect of the system produces the maximum effort and output relative to a given wage. The principle is that there is a clear relationship between effort and reward, a relationship that can be described as “task work” (Lupton, 1966: 71). There is little in the theory to suggest whether individual or collective schemes will be more effective. However, the theory implies that tasks can be clearly defined, and that products are akin to the hypothetical unit of production in economics, the widget. It thus most readily applies to piecework and payment-by-results systems.

Debate about performance-related pay has centered on individual forms and the factors that detract from its efficacy, which are most commonly seen as: a) quality of output may be impaired by focusing on the quantity and speed of production; b) workers may deliberately restrict output, gaming the system or forsaking income in favor of lower effort, and; c) workers’ intrinsic motivation may be reduced, meaning its associated performance benefits may not materialize.

The first factor – the quantity-quality issue – arises from the fact that tasks are not unidimensional. The simplest case, as under piecework, is that tasks have to be completed as quickly as possible and to a certain standard. Workers under such systems may therefore seek to maximize quantity, at the expense of quality. More generally, it is argued, by gravitating to one priority, workers will in effect be defining the task as unidimensional. As Klein (1976: 7) observed, piecework operators narrowed perceptions of their job to such an extent that this simply meant the immediate task: “If a man (*sic*) was paid every time he made a half-inch cut, the implication was that this was what the firm considered his job to be – not making a good product or being in any way concerned with the wider

objectives of the firm". Kohn concludes that this limiting of horizons is a phenomenon common to all performance-related pay systems that, far from showing they do not work, means they work too well, leading people to "think of themselves as doing work *only* for the reward" (Kohn, 1988: 93). In effect, performance-related pay produces pay-related performance.

The second factor in the debate about performance-related pay's efficacy suggests that the operation of the pay system itself can lead to sub-optimal performance. Workers always have an element of discretion over their effort levels, even in routine and low-discretion jobs. Sociologists from the Hawthorne studies onwards, particularly in the 1950s and 1960s, observed the phenomenon of restriction of output, whereby effort standards in task or piecework systems were set below the limit that would maximize short-term income or cause fatigue, particularly in work groups (Baldamus, 1961; Lupton, 1963; Lupton & Cunnison, 1957; Roy, 1952). This could arise in piecework if the standards set were either too generous, or too stingy; the former leading, in Roy's study (1952) to "quota-restriction", and the latter to "goldbricking". Unlike the initial interpretations of the Hawthorne studies (Roethlisberger & Dickson, 1939), such behaviors were seen as reflecting rational economic behavior as part of the inevitable negotiated nature of the effort-reward bargain; as such they are not necessarily manifestations of group solidarity arising from workers' social needs – in self-determination theory terms, their relatedness need. Piecework systems are particularly prone to cat-and-mouse games between management and workers, especially in fluctuating product market conditions and when products, technology and production methods are changing (Milgrom & Roberts, 1992). Individual systems may also impede group processes, and therefore the assumed benefits of teamworking – information sharing, helping behaviors, and optimal work organization. In the case of collective systems, people may shirk or loaf as they free ride on the effort levels of others, as their income may only be marginally affected by reducing their effort level. Others may also reduce effort because they believe their pay will be diminished due to "performance lapses on the part of team members" (Condly et al., 2003: 50). Bandura's (1997) review of research on social loafing concluded it was quite widespread, at least at the time of his study.

The third factor – the limiting effect of performance-related pay on intrinsic motivation – arises from the possibility that workers' primary motivations are not financial. This argument, raised by Deci & Ryan (1985) in particular, suggests that workers are motivated by intrinsic and extrinsic factors, but that offering extrinsic rewards may undermine the motivational power of intrinsic ones (e.g., Deci, 1971; Deci et al., 1999), so that even when employees are focused on achieving the rewarded outcome, they are likely to perform sub-optimally. The foundation of the argument is that there are three universal needs which all people have to varying degrees – autonomy, competence and relatedness – and that the prospect of fulfilling these leads to intrinsic motivation. The need for self-determination is violated when pay is linked to performance, as it represents an external demand rather than addressing people's core needs. Some also argue that performance-related pay signals that control is in the hands of management rather than employees (Beer et al., 1984). Through these processes intrinsic motivation falls, and as this drives performance, so do effort and output. Experimental research offers support to this theory (Deci et al., 1999), while a field study of sales employees and a company survey of 304 employees from eight European countries showed that feelings of being controlled or losing autonomy explained the negative effect of performance-related pay on intrinsic motivation (Kuvaas, Buch, & Dysvik, 2020; Kuvaas, Buch, Gagné, Dysvik, & Forest, 2016). The policy implications are that priority should be given to designing jobs that directly fulfil the core needs; and moreover that a management approach centered on performance-related pay systems is a contradictory human resource management strategy to one based on job design aimed at such fulfilment.

4. Questioning the questioning of the efficacy of performance-related pay

Following the identification of its potential problems, the most salient discussion of performance-related pay has centered on the veracity and inevitability of these problems. Firstly, it can be argued that there is sufficient evidence of a positive link between performance-related pay and individual and organizational performance to suggest that even if such problems reduce its efficacy, it is still superior to flat-rate systems (Gerhart & Fang, 2014). Jenkins Jr. et al.'s (1998) review showed the effect of performance-related pay on quality to be neutral, suggesting that such a system did not inevitably reduce quality, while still having positive effects on speed of performance. The successful adoption of individual piece rates in a modern manufacturing context by Lincoln Electric has become a widely quoted example (and the subject of a Harvard Business School case) – as its quality and productivity levels are continually higher than competitors (Milgrom & Roberts, 1992) – and more generally Japanese manufacturing firms and other successful organizations use forms of performance-related pay alongside employee involvement practices.

Moreover, organizations may adopt practices that mitigate pay systems' anticipated problems. For example, potential quality issues may be alleviated by tight quality inspection and withholding payment for defective jobs or time taken in reworking (see the piecework system described in Hamilton, Nickerson, & Owan, 2003). Imposing a penalty for low output levels may act as a deterrent to free riding or widespread shirking in team-based systems (Holmstrom, 1982). Management's option to fire those producing low-quality work may also act as a deterrent. The multi-dimensional nature of tasks and performance criteria can be addressed by emphasizing certain goals and deemphasizing others, or adopting a balanced scorecard approach.

The inevitability of problems with performance-related pay is also questioned by research that reveals that the restriction of output by individuals or groups is contingent on the context. Lupton's (1963) study for example, some sixty years ago, highlighted the importance of the product market when showing that restriction of output was associated with instability of demand and a competitive market. More recently, Simms & Nichols (2014) have suggested that effort reduction is less likely when people feel their output can be readily measured and is visible to their manager, while peer pressure may limit shirking or free riding by individuals when pay is based on team or organizational performance, especially when groups are cohesive (Backes-Gellner, Werner, & Mohnen, 2014). Furthermore, the hybrid combination of individual and collective incentives may limit such social loafing (Condly et al., 2003).

The questioning of the universality of performance-related pay's undermining of the potentiality of intrinsic motivation has been

particularly significant. Firstly, the motivational assumptions of self-determination theory have been questioned, partly on the basis of evidence of a performance effect of monetary incentives, and partly on the basis of studies of people's orientations (Linke et al., 2010; Wang & Holahan, 2020). We might also question the assumption that pay may not fulfil the core needs associated with self-determination theory: since money is the perfect convertible asset, it can aid the fulfilment of these needs. It may help people achieve control over their goals, and thus enhance their autonomy at work – for example, income could be used to pay for childcare, increasing their autonomy over time. Likewise, people could invest in further education to master the skills needed for success. Additionally, it is argued that performance-related pay may have positive effects on autonomy and competence (Fang & Gerhart, 2012; Gagné & Forest, 2008; Kuvaas, Buch, & Dysvik, 2018; Landry et al., 2017), and that the mechanism explaining this may not be the fulfilment of core needs, but rather learning (Jovanovic & Matejevic, 2014).

Secondly, a series of experimental studies (Farr, 1976; Farr, Vance, & McIntyre, 1977; Feingold & Mahoney, 1975) and reviews of them (Cameron & Pierce, 1994; Eisenberger & Cameron, 1996) has questioned the inevitability of the positive effect of extrinsic rewards being swamped by the negative effect on intrinsic motivation (Gerhart & Fang, 2014). Initially Eisenberger & Cameron (1996) showed, on the basis of a review of 100 studies, that the diminution of performance that self-determination theory associates with incentive pay arises only when financial rewards are presented on a single occasion, before the task is performed, and where there is no consideration of the quality of performance. However, this is not necessarily inconsistent with self-determination theory, which implies that intrinsic motivation will be undermined only if workers know rewards in advance, rather than after a task is performed. Indeed, Eisenberger and colleagues have suggested that performance-related pay could even increase intrinsic motivation, depending on how it is presented – specifically, if performance requirements are high and well-specified, it may have a positive effect. Conversely, intrinsic motivation may decrease if tasks are ill-defined and trivial (Eisenberger, Pierce, & Cameron, 1999). Rewards play a largely symbolic role – if they enhance the significance of the task they increase intrinsic motivation, if they “communicate that the irrelevant or antithetical to needs” (*op cit*: 678) they will decrease it. This process is primarily through affecting the importance of being competent. This suggests that the extent to which intrinsic motivation is undermined by extrinsic reward systems is contingent on aspects of their design and the significance of the tasks. Attaching money to tasks may even increase their perceived significance, as was Henry Ford's intention in instigating the five-dollar day (Meyer, 1981).

Thirdly, clarifications and extensions of the undermining-of-intrinsic motivation thesis by Deci and colleagues have suggested that performance-related pay may in certain circumstances increase intrinsic motivation, while its effects on extrinsic motivation may also be positive. A core tenet of self-determination theory is that fostering autonomous motivation is significant, as it fulfils a basic need for autonomy. External regulation is the least autonomous end of the extrinsic–intrinsic motivation continuum (Deci, Olafsen, & Ryan, 2017), but other forms of external regulation may be closer to the autonomous end, notably identified regulation, which means that individuals identify with the value of their work role and thus the demands placed on them may be “accepted as their own rationale for acting” (*op cit*: 21). In so far as performance-related pay can generate this acceptance, it may not lead to feelings of being controlled with the associated undermining effect on intrinsic motivation, and may even increase it. Research involving employees in a range of countries has provided some evidence of a positive effect on performance of internalized autonomous behavior (Howard, Gagné, Morin, & Van den Broeck, 2016; Van den Broeck, Howard, Van Vaerenbergh, Leroy, & Gagné, 2021), though intrinsic motivation has a stronger impact on employees' proactivity.

Moreover, performance-related pay has two dimensions. As well as a controlling aspect, it has an informational aspect, as it communicates to employee how they will be rewarded, as well as how competent they are perceived to be. It is when pay is tightly linked to performance outcomes that individuals feel they have no autonomy and develop a strong external locus of control (Balkin, Roussel, & Werner, 2015). The corollary of this is that payment systems based on clearly defined, narrow outcomes, offering outcome-contingent rewards, are particularly likely to reduce intrinsic motivation, making them “particularly problematic” for the architects of self-determination theory (Deci et al., 2017). They are also most likely to lead to gaming of the system. The negative effects of performance-related pay on performance through reduced intrinsic motivation are therefore contingent on the type of system. If, as in outcome-based systems, pay is on an ex-ante basis – where people know performance goals in advance, and what they need to do to achieve them – the effect will be greatest. Conversely, ex-post systems can increase motivation (Balkin et al., 2015). Other potential contingent factors that may reduce the undermining effect include jobs providing limited opportunities for intrinsic satisfaction, task interdependency that reduces individual discretion, and the contingent pay forming a low proportion of the total wage. Where in-role performance does not require much initiative or creativity, performance-related pay may not undermine intrinsic motivation by as much as the positive effects on performance predicted by the theory of extrinsic motivation and its controlling effects. Conversely where creativity is required, its achievement may be reduced by performance-related pay, which may therefore be relevant in stimulating in-role behavior where jobs are highly prescribed, but not in fostering extra-role behavior (Balkin et al., 2015). Using Griffin, Neal, & Parker's (2007) distinction between proficient performance and proactivity, it might be concluded, even within self-determination theory, that individual performance-related pay can increase proficiency while limiting proactivity. Wright, George, Farnsworth, & McMahan (1993) provide support for individual incentives reducing discretionary extra-role behavior, while others have shown that the undermining effect may extend to reducing prosocial behavior (Ariely, Bracha, & Meier, 2009; Bénabou & Tirole, 2006).

In a similar vein to the contingency theory of the effects of individual performance-related pay on intrinsic motivation advanced by Eisenberger and colleagues, others have identified moderators of its effects on performance relating to tasks or justice perceptions. These include task type (Bailey & Fessler, 2011), task interdependency (Shaw, Gupta, & Delery, 2002), and task complexity (Garbers & Konradt, 2014). The extent to which the operation of the performance-related system is perceived to be procedurally fair, and its outcomes and their distributions are felt to be just, may moderate the effect of motivation (Larsson, Eriksson, & Adolffson, 2022), and, one assumes in turn, performance. An empirical analysis on public employees in Germany by Wenzel, Krause, & Vogel (2019) showed

that fair and transparent design can reduce the people's perception that they are being controlled and may even foster employees' intrinsic motivation, while there is research suggesting that perceived organizational justice may play a mediating role between individual performance-related pay and performance (Gupta, Mittal, Ilavarasan, & Budhwar, 2022; Urieși, 2016). In light of the human resource management–performance debate, under the high-performance work systems perspective we might expect that the effects of performance-related pay will be greater when used in conjunction with other “high-performance practices”, but most studies so far have tested the effect of aggregate use of practices, rather than the interaction between them. Wood & De Menezes (2008), investigating the alternative high-involvement management concept, having found performance-related pay (of all types) to be separate from it, showed it enhanced the effects of high-involvement management on rate of productivity change, but not the level of productivity.

Arguments about the universality of problems with performance-related pay have been largely based on individual systems. The question then becomes the extent to which they apply to collective ones. Gomez-Mejia & Balkin (1989: 432) almost prejudge this when they say, “Aggregate [their term for collective] incentive schemes bypass many of the drawbacks associated with individual-based rewards”, going on to add only that free riding may be a downside. Farr (1976: 160) similarly states that “group incentive plans generally avoid [the] negative side effects” of individual incentive plans, such as restriction of output due to fears of layoffs or peer pressure. Nonetheless, the extent to which the problems of individual systems occur in collective ones is little discussed, and seems best treated as an open question for the moment.

On the one hand, the problems may apply to collective performance-related pay. Collectivities may still focus on one outcome, be subject to output restriction and free riding, and be motivated by intrinsic satisfaction that may be undermined by external demands. For example, profit-sharing could induce a focus on profit at the expense of quality and, more generally, long-term considerations. There is nothing inherent in profit-sharing or other forms of collective performance-related pay to prevent output reduction or discourage free riding and social loafing (Karau & Williams, 1993). Indeed, such behavior may be particularly pronounced when organizational-level schemes such as profit-sharing are used, since the larger the group covered by a scheme, the lower the impact of an individual's contribution, meaning individuals may see their own efforts as having a trivial association with the overall profit level, and feel they can hide in the crowd. Peer pressure, or mutual monitoring directed at mitigating free riding, may lead to suspicion, and reduce cooperation. Finally, according to Deci & Ryan's (1985) logic, we might expect collective schemes to reduce both the impact of intrinsic motivation on the collective's performance and individuals' contributions to this performance. More specifically, collective systems may reduce individuals' sense of control as the concept of peer pressure implies, although this may be mitigated by an increase in teams' autonomy levels. They may also reduce individuals' sense of competence, as working under a collective system can be seen as thwarting or frustrating “individual members' needs to have their contribution recognized and valued” (Fan & Gruenfeld, 1998: 47).

On the other hand, collective schemes may broaden workers' perceptions of their jobs by connecting them to a wider entity, may more readily achieve the fulfilment of the basic needs of connectedness and competence, and may induce peer pressure directed at increasing cooperative behavior, both within the group and towards management, rather than conflictual negotiations with management. The literature on collective systems has highlighted factors that may account for their superior effects that were not prominent in the individual performance-pay literature. Of particular importance is that they may encourage people to share ideas and help each other out in difficult situations (Fisher, Sprinkle, & Walker, 2008), and provide a disincentive to engage in uncooperative behaviors that block others' performance, such as hoarding resources, withholding information or help, or sabotaging group outcomes. It might also be argued, based on social learning theory, that collective pay systems incentivize people to attend to others' behavior more, one effect of which might be that they benefit from role modeling. In self-determination theory terms, they increase workers' fulfilment of their competency need, while if they foster social cohesion, they may also increase fulfilment of the relatedness need. Collective performance-related pay is also deemed to be particularly advantageous in work systems with high task interdependency that require high levels of cooperation (Young, Fisher, & Lindquist, 1993). Relatedly, Garbers & Konradt (2014) show that the effect of team-based rewards on performance is moderated by team size, such that in large groups the effect becomes weaker. Finally, Gomez-Mejia & Balkin (1989) suggest that the mechanics of collective systems are simpler, as individual contributors do not need to be identified and the timing of the rewards can be more flexible, and hence linked more closely to actual task accomplishment than individual rewards based on merit-rating systems.

Using individual performance-related pay in conjunction with collective systems may counteract the problems associated with them, particularly the free-riding problem. Nyberg et al. (2018) state that such hybrid systems may in fact be the most common arrangement. However, they are under-researched and, perhaps because of this, reviews of performance-related pay have neglected them. Even Nyberg et al. pay only cursory attention to them. Nonetheless, they report that some studies suggest they may have stronger performance effects than using individual or collective performance-related pay alone (Kozłowski & Ilgen, 2006). Specifically, the individual system may mean people increase their effort and counter free-riding behavior (Irlenbusch & Ruchala, 2008; Pearsall, Christian, & Ellis, 2010), although this may crowd out cooperative behavior (Irlenbusch & Ruchala, 2008) or undermine the sense of autonomy that individual systems provide. Such detrimental effects may be a result of the mixed messages to employees about performance requirements sent by hybrid systems. As Barnes, Hollenbeck, Jundt, De Rue, & Harmon (2011) argue, these mixed messages create a social dilemma for employees between maximizing personal interests and maximizing group interests.

5. Incentive versus sorting effects

The theory behind performance-related pay is that it not only incentivizes people to increase their effort, but may also influence overall organizational performance through affecting the composition of the workforce. This is known as the sorting effect. Performance-related pay signals that high performers will be rewarded and individuals will be judged on performance, so organizations offering it will be attractive to high performers and will end up, so the argument goes, with a superior human capital pool to

others. In the extreme case where the sorting effect fully explains improved performance, the performance-related pay system is akin to an efficiency wage system, reflecting the meritocratic, achievement-oriented culture it creates.

The sorting effect concept appears to be centered on individual performance-related pay and how its use can attract and retain high performers (Cadsby, Song, & Tapon, 2007; Lazear, 2000). Nonetheless, it might be argued – and indeed Kato & Kauhanen (2018: 10) do – that the sorting effect of collective pay systems means that high-performing workers leave the organization “in order to avoid being free ridden”, while low performers remain as the system gives them “the opportunity to free ride”. Kato & Kauhanen (2018) nonetheless add the caveat that the migration of high performers may not happen if free riding can be mitigated.

However, a sorting effect in the direction of collective systems may exist: in so far as social skills are either separate from or correlated with technical skills, it may be that “workers with high collaborative ability sort themselves into team working” (Hamilton et al., 2003: 472), which may explain some or all of any productivity effect caused by team incentives. We can hypothesize that favorable sorting effects could result from a cooperative culture which avoids a disproportionate focus on individual goals, and attracts those with cooperative values. In a collective setting, retaining skilled workers may also contribute to enhancing the skills and self-esteem of other workers, through what is known as the Kohler effect (Kerr, 2010).

Empirical assessment of the sorting effect, however, derives from measures of turnover rather than the attractiveness of performance-related pay systems (Nyberg et al., 2018). Little is known about possible sorting effects within collective schemes. Some studies show that under collective systems, particularly profit sharing, employees are less likely to leave their company. These systems are more attractive to potential employees; this results in a combination of better employees and greater motivation leading to higher collective performance (Nyberg et al., 2018). Given the possibility of either individual or collective systems influencing the composition of the workforce, the implication of our overview of the performance-related field is that we need to heed the calls to give more weight to the sorting effect of pay systems than has been the case in the past (Gerhart et al., 2009; Nyberg et al., 2018; Rynes et al., 2005).

6. Research questions

So far, the implication of this review is that the relative success of individual and collective schemes is an open question. The first research question for our review is therefore:

RQ1. *Which of individual and collective performance-related pay systems has the greater effect on performance?*

Given the use of hybrid payment systems, our second research question is:

RQ2. *Do hybrid systems have a greater effect than individual or collective performance-related pay systems used in isolation?*

Our discussion has pointed to the possibility that the effects of systems and their relative significance may be moderated by a variety of factors, so our third research question is:

RQ3. *Are the effects of individual, collective or hybrid performance-related pay systems on performance universal, or contingent on one or more moderating factors?*

In the light of the possibility of performance-related pay sorting effects yielding superior human capital compositions we will explore the extent to which the studies assess this effect relative to the incentive effect.

RQ4. *Is the effect on organizational performance primarily due to the incentive effect or the sorting effect?*

Having identified various problems surrounding pay systems – the quantity–quality trade-off, gaming and shirking, and undermining of intrinsic motivation issues – we will finally explore what light the studies shed on these issues, specifically:

RQ5. *How significant are the problems associated with payment systems in influencing their performance effects?*

7. Methodology

Our review is systematic, as we address prespecified research questions and define clear inclusion criteria – specifically, that the research involves direct comparison of the effects of individual and collective pay systems on either individual, team or organizational performance, and is reported in peer-reviewed journals published in English. We thus excluded books and gray literature, and articles exploring different types of only one of collective and individual systems (e.g. Dlamini, Sutherland, & Werbeloff, 2015; Griffith & Neely, 2009; Robinson & Wilson, 2006). However, we included articles that compared hybrid schemes with either individual or collective schemes.

The bibliographic databases used were Elsevier’s Scopus, EBSCO’s Business Source Premier, and Google Scholar. The search terms used were: “performance-related pay”, “performance-related pay and performance”, “incentives and performance”, “individual and collective incentives”, “individual vs. collective performance-related pay”, “comparing individual and collective performance-related pay” and “contingency pay”. No publication date was specified. The search was completed in April 2022. In addition to using search engines, we used the citations in papers found through them and in papers included in prior reviews. We also examined specific journals with a high impact factor in the management area, for example: *Journal of Management*, *Labour Economics*, *Journal of Applied Psychology*, *Personnel Psychology* and *Academy of Management Journal*.

The digital search returned 410 papers, but the vast majority did not directly compare the effects of the two payment systems, and

Table 2
Summary of research design and results of studies.

#	Authors	Comparison	Level of analysis	Research Design	Performance Measure(s)	Optimal pay system	Moderators
1	Aakvik, Hansen, & Torsvik (2017)	Individual incentives and team bonus	Organizational (firm)	Longitudinal Field	Individual and team sales defined as the number of units sold per logged work hour	Collective (unable to distinguish pure team effect from hybrid effect)	
2	Babcock, Bedard, Charness, Hartman, & Royer (2015)	Individual and team bonus (on top of individual bonus)	Individual	Longitudinal Quasi-experimental	Visits to library and gym	Collective (team effect in hybrid isolated)	
3	Barnes et al. (2011)	Group-based and individual & group (hybrid)	Individual	Cross-sectional Experiment	Completion of task and completion time	Hybrid associated with faster but less accurate performance	
4	Beersma et al. (2009)	Move from competitive to cooperative system	Individual	Cross-sectional Experiment	Computer simulation score (including errors)	Collective Participants moving from individual to collective performed worse than those with history of collective system	Team-role discussion – negative effect of move from individual to collective only occurred when no discussion
5	Beersma et al. (2003)	Competitive and cooperative system	Individual	Cross-sectional Experiment	Computer simulation score (including errors)	Differs between outcomes Competitive system associated with faster performance Cooperative system associated with more accurate performance	Extroversion, agreeableness and performance levels of participants moderates relationships
6	Blazovich (2013)	Individual, team bonus and hybrid	Individual	Cross-sectional Experiment	Individual and team output of a truck-loading task, net of cost of effort chosen by participants	Hybrid	Team identity – no effect on hybrid and individual-related performance effects but when identity low collective system had greater effect on performance Intra-team heterogeneity enhances performance when payment system is collective but reduces it when it is individual
7	Chan, Li, & Pierce (2014)	Individual-based commissions and team-based commissions	Organizational (counters)	Longitudinal Field	Sales	Collective	
8	Chen, Williamson, & Zhou (2012)	Individual (intra-group) tournament pay and group (inter-group) tournament pay	Individual	Cross-sectional Experiment	Group creativity - ideas developed to solve a real campus problem rated by a panel	Collective	
9	Danilov, Biemann, Kring & Sliwka (2013)	Individual commission and group commission	Individual	Cross-sectional Experiment with financial service professionals participating in a university seminar	Quality of recommended product	Contingent on team affiliation – but individual system performs either better or the same as collective in all cases	Individual and collective systems perform the same when team affiliation is lower. Individual system produces higher quality recommendations than collective when team identity is high
10	De Spiegelaere, Van Gyes, & Van Hootegem (2018)	Individual performance-related pay, collective performance-related pay, hybrid, no performance-related pay	Individual	Cross-sectional Employee survey	Innovative work behavior	Collective	
11	Dohmen & Falk (2011)	Individual piece rate, winner-takes-all tournament, revenue-sharing scheme, flat rate	Individual	Cross-sectional Experiment	Number of (multiplication) problems solved and time employed	All variable pay systems (> flat-rate)	

(continued on next page)

Table 2 (continued)

#	Authors	Comparison	Level of analysis	Research Design	Performance Measure(s)	Optimal pay system	Moderators
12	Drago (1991)	Piece rate, group pay, profit-sharing, stock ownership	Individual	Cross-sectional Field	Self-reported effort based on willingness to work 20 minutes past scheduled time	Collective	
13	Fan & Gruenfeld (1998)	Individual, team, and mixed bonus	Individual	Cross-sectional Experiment	Points earned from card game; rounds of games played; time to solution	Hybrid	Hybrid has higher effect when resource interdependence is high
14	Farr (1976)	Piece rate, equal distribution, mixed system, no incentive	Individual	Cross-sectional Experiment	Units of production (based on card allocation task)	Hybrid All variable > no incentive	
15	Freeman, Pan, Yang, & Ye (2022)	Individual piece rate, winner-takes-all tournament, equal sharing	Individual	Cross-sectional Experiment	Sliders correctly positioned in a computer-based task	Collective (equal sharing)	
16	Gjedrem & Kvaløy (2020)	Individual piece rate, team incentives	Individual	Cross-sectional Experiment	Tasks solved correctly	Contingent	Collective system has positive effect on performance when relative performance feedback is given; absolute performance feedback has no effect
17	Gomez-Mejia & Balkin (1989)	Merit pay, individual bonus, team bonus, profit-sharing, stock ownership	Individual	Cross-sectional Field	Self-assessed individual and collective performance	Collective	
18	Hamilton et al. (2003)	Individual and group piece rate	Organizational (firm)	Longitudinal Quasi-experimental	Individual efficiency relative to standard minutes taken to produce garments	Collective	
19	Hatcher & Ross (1991)	Piecework, organization-wide gainsharing	Organizational (firm)	Longitudinal Quasi-experimental	Percentage of customer returns	Collective	
20	Irlenbusch & Ruchala (2008)	Team bonus, team plus low individual tournament bonus for highest performer and team bonus plus high individual tournament bonus for highest performer	Individual	Longitudinal Experiment	Effort choice based on number choice	Hybrid team bonus plus high individual tournament bonus induces higher effort	
21	Jones & Kato (1995)	Individual bonus and stock ownership	Organizational (firms)	Longitudinal Field	Firm value-added	Hybrid	
22	Kato & Kauhanen (2018)	Individual incentives and group incentives	Organizational (firms)	Longitudinal Field	Enterprise productivity	Collective	Share of performance-related pay in total compensation
23	Klindžić & Galetić (2020)	Profit-sharing, hybrid (of subjectively assessed individual bonus, employee share ownership plan, stock options)	Organizational (firms)	Cross-sectional Field	Productivity, profitability, quality of products or services, innovativeness	Differs between outcomes Collective related to productivity and profitability Hybrid related to quality of products or services and innovativeness	
24	Kuvaas (2006)	Base pay, collective bonus system, hybrid of collective and individual bonus	Organizational (firm units)	Cross-sectional Field	Scale of individual performance based on five items in individual questionnaire	Flat-rate pay	
25	Ladley, Wilkinson, & Young (2015)	Individual pay system and group pay systems	Individual	Agent-based modeling	Individual payoffs and group payoffs	Collective	
26	Libby & Thorne (2009)	Individual incentives, group incentives, hybrid of individual and group incentives	Individual	Cross-sectional Experiment	Number of good tasks completed (quality LEGO castles)	Contingent Collective only superior in team production system No difference in assembly situation	Effect of pay systems vary depending on team production system

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Table 2 (continued)

#	Authors	Comparison	Level of analysis	Research Design	Performance Measure(s)	Optimal pay system	Moderators
27	London & Oldham (1977)	Individual system, collective system based on the performance of the highest performer in the group, collective system based on the performance of the lowest performer, collective system based on the performance of the lowest performer or average performance	Individual	Cross-sectional Experiment	Cards sorted	The individual and a collective system based on the performance of the highest performer in the group yielded the highest performance	
28	Miller & Hamblin (1963)	Differential reward system and equal group rewards	Individual	Cross-sectional Experiment	Time to solve problem (number-guessing), individual and average of group	Contingent	Task interdependency moderated the reward systems' effect, collective system yielded better performance while differential rewarding of participants was negative related to performance at high levels of interdependency. The differential-rewarding system was positively related to performance at low levels of interdependency
29	Pearsall et al. (2010)	Individual incentives, cooperative payment system, mixed incentives	Individual	Cross-sectional Experiment	Team score from computer simulation task	Hybrid	
30	Pendleton & Robinson (2017)	Individual performance pay, group performance pay, profit-sharing	Organizational (firms)	Cross-sectional Employer survey	Labor productivity	Hybrid, with profit-sharing a crucial ingredient	Task variety and discretion
31	Ravenscroft & Haka (1996)	Competitive and cooperative incentive plans	Individual	Cross-sectional Experimental	Average number of correct responses to tasks	Contingent	Collective system yields better performance when groups have opportunity to share information than when they do not This opportunity makes no difference in individual system
32	Román (2009)	Individual piece rate and individual attendance bonus (combined), team performance scheme, plant-wide performance scheme	Organizational (firm units)	Longitudinal Quasi-experimental field study	Productivity and quality	Collective	
33	Roos, Reale, & Banning, 2022	Individual bonus, group bonus, flat rate	Individual	Agent-based model	Output	Flat rate	
34	Rosenbaum et al. (1980)	Competitive (highest-performer-takes-all tournament, independent (group distribution in team based on performance), cooperative (equal distribution)	Individual	Cross-sectional Experiment	Group performance measured as number of a) blocks in each tower; b) times tower collapsed; c) efficiency – ratio of blocks used to total blocks handled	Collective (cooperative and independent systems) but Contingent	Collective systems outperform individual and hybrid when task independence is high. Individual and hybrid lower in all task systems
35	Wageman (1995)	Individual system, group system and hybrid	Organizational (firm)	Longitudinal Field	Customer satisfaction, parts costs, response time, repair time, machine reliability	Contingent	Reward interdependence has no effect when task independence is low. Collective system superior when interdependence is high
36	Wageman & Baker (1997)	Low and high reward interdependence	Individual	Cross-sectional Experiment	Group number of points earned by identifying and correcting errors in scientific papers	Collective	

our final sample covers 15 field studies, 19 experimental studies and 2 computational agent-based studies. The majority of studies originated in the USA, using data on USA-based companies or experiments conducted in American universities. Table 2 summarizes the research design and results of the studies.

The studies are either at the individual level – involving employees or student participants (in experiments) – or the organizational level – typically a firm or business unit (Table 2). Reward systems vary across the studies, with piecework or individual bonuses dominating individual incentives and group or team incentives and organization-wide schemes, such as profit-sharing and employee share ownership, included in collective systems (Jones & Kato, 1995; Klindžić & Galetić, 2020; Pendleton & Robinson, 2017). In experiments, rewards were given on both individual and group bases. For example, Pearsall et al. (2010) gave the highest achiever in the teams in their experiment \$160, with members sharing it equally regardless of their contribution, whereas those working alone were told the highest performer would receive \$40. More abstract characterizations of pay systems were used in several studies. Wageman & Baker (1997) used a continuum measuring the extent of reward interdependence, where a low level represents an individual system and a high level a collective one, so a medium level denotes a mixed or hybrid system. A distinction between competitive and cooperative systems is used in several experimental studies (Beersma et al., 2003; Beersma et al., 2009; Rosenbaum et al., 1980). A competitive system is defined as one where pay depends on individual performance, and hence in a team situation individuals may be competing with each other. A cooperative system is one with a team-based approach, in which all group members are equally rewarded.

The range of performance measures varied extensively, reflecting the specifics of each study's setting, with few using productivity or profits (see Table 2). For example, Gomez-Mejia & Balkin (1989: 437), in their survey of R & D employees, measured team performance by asking the respondents to rate on a five-point scale, "whether each project on which they participated had performed above, below, or at a level expected of the R & D team, given the particular technical difficulties of the project", and measured individual performance using adaption of a scale from Gupta & Govindarjan (1984) which asked participants to indicate the rating on each item that most closely matched their most recent appraisal. Hatcher & Ross (1991), in their study of a transformation from a piecework system to a gainsharing one in a US manufacturing plant, measured quality as the percentage of products shipped returned by customers. Measures of productivity include Aakvik et al. (2017) sales per logged hours in their study of telephone sales staff and Hamilton et al.'s (2003) output relative to the piece rate standard, with values greater than 100 indicating performance above the standard level, in their study of a garment plant moving from an individual production system to a modular one. Performance measures in experiments include the quality of the recommendation by financial advisors on a 6-point scale by participants in Danilov et al. (2013)'s experiment, with 1 the worst and 6 the best; visits to the library and gym in Babcock et al. (2015)'s experiment based on incentivizing students to use the library and exercise; and the number of good-quality castles completed by groups in Libby & Thorne's (2009) experiment involving building castles with LEGO.

8. Results

8.1. RQ1: Which of individual and collective performance-related pay systems has the greater effect on performance?

Of the 36 papers, 15 (42%) show that collective performance-related pay yields superior performance to individual systems and, in some cases, to hybrid ones (Table 3). In no case is individual performance-related pay associated with higher performance. In 14 studies, the comparison does not result in a clear or significant difference in favor of one or other of the two types of system. A hybrid performance-related system outperforms a non-hybrid one in seven studies (19%); in two cases a flat-rate system outperforms an individual or collective one; while in seven (19%) the optimal method is contingent – it depends on a third factor. In three cases (8%) the effects of the two systems vary between two outcomes, while in two there is no clear differentiation between individual and collective systems. Dohmen & Falk (2011) show that all performance-related systems outperform flat-rate systems, but do not show the differences between the various performance-related systems they study. London & Oldham (1977) show that performance is better in both individual and collective systems where reward is based on the highest performer in the group compared to those where collective pay is based on the performance of the lowest performer or the group average.

Of the three studies in which the effects vary across outcomes, two are experimental. Beersma et al. (2009) find that the individual (competitive) system is associated with faster performance, while the collective (cooperative system) is associated with more accurate performance. Barnes et al. (2011) find a similar differentiation, but that it is hybrid systems that lead to faster performance, at the cost of reduced accuracy. Klindžić & Galetić (2020), in their study of private sector firms in Croatia, found that collective systems were associated with higher levels of productivity and profitability, but that hybrid systems had more effect on both innovation and product quality. Additionally, Irlenbusch & Ruchala (2008), in a longitudinal experiment, found that a hybrid system comprising team bonus plus high individual tournament leads to high effort levels, but a different type of hybrid, team bonus plus low individual tournament, was most closely related to cooperation, although this is not a performance measure.

While in no study do individual systems outperform collective ones, in one paper, by Danilov et al. (2013), classified here as showing the optimal system to be contingent, the individual system is superior to or equal to the collective system across both the contexts constructed in their experiment – high team affiliation and low team affiliation. The study shows that when team affiliation is high, the individual system outperforms the collective one, while when it is low both perform equally well. Another reason this is not a straightforward case is that the performance of the collective system is gauged as worse in the high team affiliation environment because the team tends to recommend low-quality financial products – but in the short-term, we might argue, this may increase revenue or profit, albeit potentially at the expense of long-term reputation and business.

The variety of performance measures means it is difficult to compare across different types of studies, but there is no significant

difference in the results of field studies between those using qualitative and quantitative measures, or between those using financial indicators, such as sales, profits (e.g. Aakvik et al., 2017; Anderson, Banker, & Ravindran, 2000), and non-financial ones, such as product quality, number of complaints, customer satisfaction (Chen et al., 2012; Hatcher & Ross, 1991), and scores on tasks performed during laboratory experiments (London & Oldham, 1977; Pearsall et al., 2010).

The proportions of each type of result are not, however, particularly consistent between the field and experimental studies (Table 3); and in the case of the two agent-based modeling studies, while one concluded in favor of the collective system, the other found performance to be better under flat-rate payment. There are no obvious explanations for these differences. Most authors of papers supporting collective payment systems mention potential advantages of collective systems (and in some cases disadvantages and advantages of individual ones) based on previous literature. However, in discussing the results they tend to add little to our knowledge of why this might be so, or at least to our confidence in past judgments. Arguments are primarily based on conjectures rather than tests of the mechanisms they present, and the dominant emphasis is on increased cooperation, which manifests through sharing ideas, helping others, and developing improved methods of working, as well as reducing constraints associated with individualized working such as bottlenecks in production systems. Libby & Thorne (2009), following Deutsch (1990: 69–70) see the mechanism underlying these outcomes as goal interdependence: “when group members can provide useful information about how to perform the task better ... group incentives will motivate group members to interact, share information and learn from each other, resulting in higher group performance than under individual or mixed incentives.”

8.2. RQ2: Do hybrid systems have a greater effect than individual or collective performance-related pay systems used in isolation?

Of the 11 studies including hybrid systems, seven (64%) find them to be associated with higher performance, although this represents only 19% of all studies. In two studies, the effect of hybrid systems is assessed through the interaction between individual and collective ones. Jones & Kato (1995) found that employee share ownership schemes yield a 4–5% addition to productivity while an individual bonus produced a more modest increase – however, the interaction effect between the two suggested the yield from the share ownership schemes was enhanced by use of individual bonuses. Pendleton & Robinson (2017), using data from the British Workplace Employment Relations Survey of 2004, found hybrid systems to be associated with higher labor productivity (as assessed by managerial respondents), as the effects of individual incentives increased when used with profit-sharing, and, to a lesser extent, when used with group incentives. Of the three methods, profit-sharing had the strongest effect when used alone. The reasons behind the findings are not investigated directly, but the authors’ theoretical introduction implies that profit-sharing may avoid the negatives associated with individual schemes, and reduce their incidence when individual schemes are used. Similarly, group schemes may reduce free riding and encourage people to link their individual performance to collective outcomes. Profit-sharing, despite being an incentive in which the link between individual effort and reward is weak, helps to address the multiple-goals issue, and is thus especially valuable in jobs involving multitasking and high levels of discretion.

Two experimental studies using the reward-interdependence concept measured a hybrid system as a mid-grade in the continuum between individual and collective schemes. One found the hybrid system to be the most successful; Fan & Gruenfeld (1998), having found that participants performed best in a problem-solving exercise involving a card game when receiving mixed rewards, reasoned that they may foster “a dual attention to both individual and group outcomes” (p.54). In contrast, Rosenbaum et al. (1980), using a tower-building exercise, showed that adding an individual (competitive) reward to a collective (cooperative) one reduced the efficacy of the collective system. The individual element increased arousal, so the researchers argue, at the expense of the care and precision needed to perform the task well.

In one of the experimental studies where the optimum result depends on the outcome, Barnes et al. (2011) show how the hybrid pay system made participants perform faster, but less accurately, than those working under group incentives. They conclude that hybrid systems are not the best of both worlds, but rather support their contention that the mixed messages they send create social dilemmas for employees. Their finding suggests that individuals may resolve these in favor of their own interest, and therefore that hybrid systems may not eliminate the tendency of individual systems to encourage people to focus on their own work at the expense of team output.

Perhaps the most detailed attempt to explain the value of hybrid systems is given by Pearsall et al. (2010) who argue that the motivation of individual effort is a separate process from ensuring individuals attend to the group goals “required for the completion of complex tasks” (p.188) – they are two disparate demands that may conflict, but hybrid systems ensure that workers do not split their attention between the two. Hybrid systems focus “team member motivation on working collaboratively while maintaining a sustained, directed effort toward their responsibilities” (p.188). Consequently information sharing and other aspects of teamwork fostered by collective pay systems combines with the way individual systems disincentivize free riding. Yet, while team incentives may generate social cohesion and team identification, Pearsall et al. argue that they alone may not be sufficient to totally eliminate free riding.

Two studies unequivocally found that hybrid systems did not outperform collective systems. Libby & Thorne (2009), in their experimental study based on a LEGO task that could be completed in a simulated individualized (assembly line) or collective (team) production environment, found performance in the team setting was higher when group incentives existed. The group payment system incentivized people to discover and use the superior task strategy that was made available in the experimental design. The mixed-incentive group were not as coordinated, and thus less able to exploit this better method. The performance of participants in the assembly-line environment was unaffected by the reward system. Libby and Thorne argue that the mixed system, rather than leading to equal attendance to individual and group goals, resulted in individual goals crowding out group ones, making performance more akin to that under the individual system.

Similar conclusions are drawn by Wageman (1995) from her quasi-experiment involving Xerox machine technicians. The cues from

the collective pay system were designed to engender group norms in ways that did not happen in the individualized tasks and rewards system. In the hybrid system, neither the advantages of the collective system nor the individual one materialized. Group members were sometimes required to act as a group, and sometimes as individuals, yet the latter dominated in practice: “the individual part came naturally, acting as a group was relatively new” (p.175). The group-level elements were seen as “an add-on”, and were approached in a half-hearted way, reinforced by the mixed signals in the hybrid task system. Because individual elements crowded out group ones, cooperation norms and interpersonal processes were weak.

Another finding, in an experimental study by [Farr \(1976\)](#), further suggests the need to be cautious about extolling the virtues of the hybrid system – he found that despite the hybrid system producing the best performance, it was perceived as the least fair scheme (though pay satisfaction did not vary by system). He did not, however, assess the interaction effect to see if this depressed the performance effect of the hybrid system.

Taken together, the answers to the first two research questions reveal that in a majority of studies collective systems have a greater impact on performance than individual ones, either when used alone or in combination with an individual system.

8.3. RQ3: Are the effects of individual, collective or hybrid performance-related pay systems on performance universal, or contingent on one or more moderating factors?

The majority of studies that found one of the systems to perform better than the other(s) did not test for moderators, so we cannot be certain that the effects found are universal, or that the effects of the system shown to perform best in the study do not vary significantly across contexts. Only seven studies found moderated effects, representing just 19% of the total – but the majority of the papers that tested interactions. These studies focus on whether one system yields better performance in certain contexts, while the other is superior in others. Moderators in these studies relate to aspects of the task or team structure, and particularly the degree of task interdependence. In some studies, the comparison of reward system is subordinate to the issue of team design.

[Wageman \(1995\)](#), in her study of Xerox technicians, found performance effects under the group pay system to be greater on average than those of either individual or hybrid systems over three grades of task interdependence, with, as we have seen, hybrid reward systems performing considerably worse than either collective or individual ones. The combinations of group work and reward systems and individual work and reward systems performed especially highly, although the combination of group rewards with a hybrid reward system fared equally well. The pure combination of hybrid work and reward systems did not stand out in the same way. The focus of Wageman’s study is on work design as a driver of performance, making reward systems, essentially, the moderator of this effect, but the results show this does not operate as a simple linear interaction.

[Miller & Hamblin \(1963\)](#) also found that task interdependency moderated the reward systems’ effect – the collective system where rewards were allocated equally yielded better performance, while rewarding participants differentially was negatively related to performance at high levels of interdependency. In contrast, the differential reward system was positive related to performance at low levels of interdependency.

Feedback on team performance is the moderator in [Gjedrem & Kvaløy’s \(2020\)](#) experiment involving decoding numbers into letters, which found incentives to have no effect where feedback did not exist. They found that team incentives had a positive effect where feedback was given, and even that the absence of feedback had a negative effect. Both teamwork and feedback had limited impact where the other was not used.

[Pendleton & Robinson \(2017\)](#), having tested interactions to establish the superiority of hybrid systems, focus on the moderating effects of both the task discretion and task variety involved in the core job in the workplace. The effects of profit-sharing, used either alone or with other incentives, are greater where jobs are designed with high levels of discretion, and where task variety is high. Individual payment systems are found to have negative effects on labor productivity in high discretion jobs; however, these effects become positive when group incentives are added, and even more positive when profit-sharing is used. Where job discretion is low, individual incentives may have positive effects on productivity, [Pendleton & Robinson \(2017\)](#) surmise this to be due to limited opportunities for workers to manipulate or distort the system.

Finally, as we have seen, group affiliation is the moderator in their experiment with professional financial advisors conducted by [Danilov et al. \(2013\)](#), which found that advisors in groups receiving group incentives are more likely to recommend inferior quality products to clients, because it benefitted them financially, than when receiving individual incentives where group affiliation is high, but not where it is low.

In four cases, one system performs best in certain situations and equally well as other pay systems in other situations. From a policy perspective, it might be justified to assume that the safe option is for most organizations to use this system; nonetheless, we have classified this as revealing that the optimal system is contingent. [Fan & Gruenfeld \(1998\)](#) confirmed hybrid systems to enhance the effect of high resource interdependency, but found no difference between levels of reward interdependency in other resource–interdependency situations. [Libby & Thorne \(2009\)](#), who compared assembly line and team production systems, found group incentives to enhance performance in the team situation but not the assembly-line one. [Ravenscroft & Haka \(1996\)](#) showed collective systems to yield better performance when groups had the opportunity to share information than when they did not, but that individual systems had no effect even if the team had this opportunity. Finally, [Rosenbaum et al. \(1980\)](#) found, in their tower-block study, that collective and independent systems (rather than competitive ones) only had a differential effect relative to competitive systems when task interdependence was high, while no reward system outperformed others under low task interdependence.

Interactions between individual characteristics and reward systems are included in some studies. [Beersma et al. \(2003\)](#), having found that variation in the effects of payment systems differed between outcomes, additionally showed that extraversion and agreeableness moderated the effect of payment systems in their experiment, as the strength of the relationships involving collective

Table 3
Optimal pay system across studies.

Optimal pay scheme/sample	All (%)	All excluding hybrids (%)	Hybrids only (%)	Base pay included (%)	Field studies	Experimental
Individual performance-related pay	0 (0)	0 (0)	0		0	0
Collective performance-related pay	15 (42)	14 (56)	1 (9)	1 (25)	9	5
Hybrid performance-related pay	7 (19)		7 (64)		2	5
Contingent	7 (19)	6 (24)	1 (9)		2	5
Flat rate	2 (6)	2 (8)		2 (50)	1	0
Effects vary across outcomes	3 (8)	1 (4)	2 (18)		1	2
All performance-related pay (no distinction made between types)	1 (3)	1 (4)		1 (25)	0	1
Variable based on highest performer in group	1 (3)	1 (4)			0	1
Total	36	25	11	4	15	19

systems – which had a positive effect on performance – were stronger when these factors were high. The performance level of participants also moderated systems' effects, which were stronger for low performers. Gomez-Mejia & Balkin (1989) considered individuals' willingness to take risks and tolerance of ambiguity, but found only one interaction effect across their four outcome measures – that between risk-taking and withdrawal cognition, a measure of intention to quit.

The number of studies including moderators is too limited to question the earlier conclusion that collective systems may have a stronger effect than individual ones. Moreover, variation in the moderators makes it hard to gauge the factors that might be significant in reducing their power across situations. Task interdependency within teams seems the most likely starting point for a contingency theory, but there is insufficient evidence to support the claim in Beersma et al.'s (2003) introduction that there is a consensus that collective systems perform better when interdependency is high, while individual systems have greater positive impact when it is low.

8.4. RQ4: Is the effect on organizational performance primarily due to the incentive effect or the sorting effect?

There are two ways in which the composition of the workforce may explain a performance differential between payment systems. Typically, a sorting effect is associated with high performers being attracted to individual performance-related pay as it is their own abilities that drive productivity and therefore their income. This may also explain lower quit rates under individual systems. However, the preferences of low performers may also be significant – they may prefer collective or flat-rate systems, and be induced to quit employment in piecework systems when their wages are low, with quitting acting a marker of revealed preferences. Five studies offer some evidence on these two processes. Two are experimental, two quasi-experimental, and one cross-sectional. No study reports that an individual system had a stronger effect than a collective scheme, one shows no strong performance differential between collective and individual systems, and the other four, in contrast to the assumed sorting effect, show collective systems to produce higher performance than individual ones.

Dohmen & Falk (2011), in the study that found no strong performance differential between types of incentive schemes, created an experiment involving a simple task (a multiplication problem) that allowed them to make precise estimates of sorting effects. Although they found no significant variation in productivity between three variable pay systems – equal reward sharing within a team, piece rate, and a winner-takes-all tournament – they found the performance of those under a variable pay system was superior to those under a flat-rate system, and established that the sorting effect accounted for the majority of the differential. For example, it explained 89% of the higher output under the piecework pay system, with only 11% reflecting the incentive effect. There was also a productivity gain where people were working under their preferred pay system. Preferences varied depending on the rate set in the flat-rate system – the least productive increasingly opted for a fixed rate as that rate increased, but highly productive performers only responded to such rate changes when the rate became very high, and above what they could earn under a piece rate. Preferences also differed according to the type of variable system. Perceptions of their own productiveness dominated preferences for variable pay over a flat rate, and were most significant for piecework. Personal factors were more significant for revenue-sharing, but the most important ones varied across individuals. Risk-averse individuals often preferred the fixed-rate system to any variable one. The experimental design enables assessment of the effect of team incentives unaffected by teamworking, as tasks are performed independently. The study clearly shows that the sorting effect accounts for some of variable pay systems' greater effect on performance compared to flat rate ones. However, it also suggests that both preferences for systems and the impact these have on composition of groups are moderated by the size of the flat-rate scheme.

The studies that show collective systems to outperform individual ones emphasize their effects on low performers, or stress that high performers will not be put off by free riders, and may also benefit from the factors affecting team performance such as increased cooperation and feedback. In a similar experiment to Dohmen & Falk's (2011), involving a computer slider task, Freeman et al. (2022) compared an equal-sharing team system with a piece rate system and a tournament-style winner-takes-all system; but they did not include a flat rate. The equal-sharing collective system produced the highest performance, even though 60% of participants stated (after they had performed in randomly assigned groups) that they preferred the piece rates. Freeman et al.'s focus when explaining the collective system's positive effect is on the lower-performing participants; they argue that collective payments increased their performance, primarily because they wanted to avoid letting team partners down, which would have led to feelings of guilt. High performers were more likely to opt for piece rates as their preferred method, but the performance of others that moved from their randomly assigned piece rate group to their preferred team system improved. The tournament system was unpopular and did not yield high performance. The effects discovered by the study focus on the improvement of low performers under a team system, and how they may prefer such a system as their pay is positively affected by high performers.

Hamilton et al. (2003), in a quasi-experiment in an American garment factory which moved to team incentives (when they introduced module work production system as a response to the advent of just-in-time manufacturing) found that productivity increased by 14% on average across all teams. Allocation to teams was initially voluntary, and high performers (defined by performance in the piecework system) disproportionately volunteered for the first phase of the transition, and were no more likely to leave the firm as the firm moved to fully modular production than others. This implies they were not put off by the fear of free riders lowering their output. Nonetheless, we cannot take this as indicative of an inherent attraction for high performers to team incentives. Firstly, while the payment system change was integral to the production system change, it may be features of teamworking per se that influenced their choice. Secondly, although management did not necessarily plan at the outset to abandon the piecework system totally, it is possible that high performers may have gauged that a move to full modular production was going to happen at some stage (although this was not mentioned by the authors) and were attracted by the prospect of being leaders pioneering the new system, increasing fulfilment of their competency and social needs.

Sorting high performers into particular groups within the firm had little impact on team performance differentials. While the first

groups – presumably those disproportionately including high performers – continued to have higher performance than those formed later throughout the study, groups with a greater diversity of abilities performed better. The authors explain this result by a fusion of their general argument – that teamworking enhances performance through learning within the group and chances for people to exercise their social skills – with a suggestion that high performers set higher standards as group norms, helping the development of low performers – what we earlier called a Kohler effect. To square these two results – the first teams’ and diverse teams’ superior performance – we must presumably assume learning also takes place amongst the high performers.

While the study sheds light on the question of whether high performers do not necessarily leave firms who forsake individual schemes for collective ones, we cannot really conclude that high performers may find team incentives or teamworking attractive. Moreover, an incentive element did exist – in the team incentive system the piece rate was 11 % higher than in the individualized system. However, the authors minimize the importance of this differential, because it was consistent across groups and some high performers lost income.

Another quasi-experiment examining the effect of a change from piece rates to a team-based incentive system in a manufacturing plant case study gives some weight to the sorting effect in explaining that productivity and quality increased with the change to the team system (Román, 2009). However, the study implies that the sorting effect is of lesser importance than either the motivational effect of the incentive system or organizational changes similar to those in Hamilton et al.’s (2003) study. Román, having showed that improved performance reflected three factors – workers increasing their effort, being given more feedback, and exerting peer pressure on each other – added the sorting effect as a possible fourth factor. However, having no data on individual performance, he relied on supervisors pointing out that the new incentive plan had “some effect in attracting (repelling) more (less) productive employees” (p.614).

Finally, in a cross-sectional study using data from R & D employees in the Boston MA area, Gomez-Mejia & Balkin (1989) show that three forms of collective systems – profit-sharing, stock-based systems, and team bonuses – have a greater impact on employees’ intention to stay with their company than individual forms. Team bonuses have a greater effect than the other two on retention, and was the only scheme to influence performance. The implication is that profit-sharing and stock-based systems may add to employees’ commitment to the firm, but not to their performance, and moreover that such commitment is less important for retention than being in a productive team yielding good bonuses. The study does not differentiate employees on the basis of their performance, but examines their risk-aversion, finding that risk-averse employees are more likely to stay at firms with flat-rate systems than those with variable pay (of any type). While this study does not directly establish a sorting effect, if we assume that willingness to take risks may be associated with higher performance in a creative environment, the results may be taken to suggest that collective systems have a sorting effect.

The first conclusion we can draw from our subset of payment–performance studies is that neglect of the sorting issue remains. The six studies that broach related issues provide limited but valuable insights into sorting, although only one assesses its importance to performance relative to the incentive effect. Dohmen & Falk’s (2011) experimental study provides the most precise evidence of a sorting effect, but this is confined to its role in explaining the beneficial impact on performance of variable over fixed pay rates. Without this comparison with flat-rate systems, Freeman et al. (2022) find that low performers may sort themselves into jobs with collective pay systems, and that implicit peer pressure improves their performance. The advantage of such experiments is that they can isolate a pay-system effect as tasks are individualized, meaning the collective payment effect is purely based on rewards from the task. Nonetheless, group processes may also be operating, as Freeman et al. show. The disadvantage of the experimental studies reviewed is that tasks are simple, and the lack of task interdependency is unrealistic, leading to limited applicability in practice. They are also sensitive to the parameters inserted in the models – for example, Dohmen & Falk’s (2011) set rates to make it profitable for a high performer (defined as someone able to solve more than 80 problems in 10 minutes) could opt for revenue-sharing even if they believe the low performer will produce nothing, in order to ensure sorting could occur in all of the three pay systems they studied. A core finding of the quasi-experiments is that production from low performers is increased, although they were not alone in doing this. They also suggest either that high performers under collective systems are not put off by free riders, or that their possible existence is not salient to them. In both studies, the explanations for the performance advantage of collective systems lie largely in team processes, including peer pressure and enhanced feedback, role modeling, and learning. Sorting may have played a role in the Román (2009) case, as he mentions the possibility of teamworking repelling less productive workers, although this is based solely on supervisors’ assessments. Increased effort may be the result of team processes.

However, Hamilton et al.’s (2003) study in particular alerts us to additional factors to effort and sorting that might explain any higher performance associated with collective systems: the changes in work organization and the learning – and the combination of them – as the team’s communication and increasing knowledge contributes to refining work organization. Additionally, this new level of organization provides the ferment for the Kohler effect and enhanced fulfilment of social needs. Such explanations imply that work intensification, and hence the direct effect of the payment system, is of minimal significance – and, moreover, that the effects are largely due to the teamworking system. The payment system may nonetheless have played a role in providing an incentive to make the modular team system work, and for individuals to cooperate. In this way, the payment system is integral to the modular system, and we can surmise that it helped define the cultural change precipitated by the new just-in-time concept. This mirrors the way in which the piecework pay systems were integral to piecework production before the change, and how in one of the firms in Wood’s (1996: 66) study, the pay system was, in the words of a director, a “personnel and production management technique”, enabling management to control both people and production levels, as well as costs. However, this means we may not be able to isolate the impact of incentives from that of the production system, at least in case studies.

Hamilton et al. (2003) conclude by mentioning that the success of teamworking may also reflect the role of complementary employment practices, such as employment security and flexible job assignments. Assessing this fell outside the scope of their study,

but our interpretation of it implies that focus should initially fall on how the payment system complements the production system. The suggestion is that team incentives will have a unique effect on the yield from teamworking or modular production, compared to other payment systems, and that if there is any sorting effect it is the ability of either the production or pay system to be attractive to individuals with high social skills. The sorting effect of team or collective systems will only have an impact to the extent that they are used in conjunction with teamwork or a culture that values collaboration.

8.5. RQ5: How significant are the problems associated with payment systems in influencing their performance effects?

8.5.1. Over-focused behavior

References to the negative effects of incentive systems on performance are commonplace in the studies under review. Particularly widespread are references to the restriction of output and manipulation of task times associated with individual performance-related pay (Pendleton & Robinson, 2017), and the potential for free riding associated with collective systems. References are also made to distortions in the direction of effort under individual schemes, as workers focus on exactly what is rewarded, which may be less important aspects of the job. The incentive scheme may not reward the outcomes desired by managers, particularly if these entail innovation. Pendleton & Robinson (2017) use these distortions to theorize that hybrid systems may be able to overcome the problems associated with the multi-dimensional nature of performance. However, the majority of the studies raising these issues do not directly examine gaming, distortions or restrictive practices, instead inferring their relative incidence from their results

No study directly examines the potential for payment systems to cause workers to concentrate on a single aspect of their job, because this is what the system targets. However, there are nine studies examining multiple outcomes that allow us to assess whether one outcome is achieved at the expense of another, as in the oft-quoted speed–quality conflict. Three studies test the differential effect of payment systems on the speed and accuracy of performance, and none show that incentives work in favor of speed over quality. Rather, two experiments by Beersma et al. (2003, 2009) indicate that competitive (individual) pay has positive effects on performance speed, while cooperative (collective) systems had positive effects on quality, measured in this case by the accuracy of solutions in simulation exercises. Similarly, Barnes et al. (2011) showed, as we saw earlier, that hybrid systems made participants perform faster, but less accurately, than those working under group incentives. This trade-off did not exist for individual incentives. However, they do not conclude that tensions should only be expected under hybrid systems, suggest that all schemes have their strengths and weaknesses. Also, Danilov et al. (2013) found, in their experiment with professional financial advisors, that workers in cohesive groups under team incentives recommended inferior quality products to clients but as we said earlier in a way that may have reduced the quality of service. Short-term revenues were maintained, but potentially at the cost of long-term customer satisfaction and profits.

The five remaining studies with multiple outcomes reveal either that associations between payment systems and outcomes are consistent across outcomes, or that some are significant and others are not. No relationships with differing directions between outcomes were found. Román (2009), for example, found team-based incentives to have a positive effect on all four outcomes examined: labor productivity, product quality, absenteeism and labor turnover. Klindžić & Galetić (2020) found a bundle comprising individual bonus and two shared-ownership practices to positively influence non-financial indicators, while individual performance appraisal and profit-sharing had positive effects on quantitative indicators.

8.5.2. Free riding

The studies considering free riding consistently show it to have a limited effect. In their experiment using a copy-editing task, Wageman & Baker (1997) examine the extent of free riding under different reward systems by positing that when task interdependence is zero – that is, tasks are performed solely by isolated individuals – any effect of increasing collective systems (in their terms, placing high levels of reward interdependence on output) will reflect free riding, and hence be negative. This effect may continue at low levels of task interdependency, but as this level increases, its effect on cooperation dominates over that of free riding. However, the experiment revealed that changes in the degree of reward interdependence had no effect when controlling for task interdependence, and hence free riding was not significant in explaining performance. As we saw earlier, the interaction of reward interdependence and task interdependence jointly affected performance. Cooperation was solely influenced by task interdependence (consistent with Roos et al., 2022). However, the effect of cooperation on performance is moderated by reward interdependence, having no effect when rewards are individual. Wageman and Baker suggest their experiment can be used to hypothesize where we might find free riding: low task-interdependency cases where people are not co-located, or meet rarely, where rewards are collective.

Similarly, Hamilton et al. (2003: 493) conclude from their study focused on team composition that free riding did not appear to be “the dominant response” to the new team system. This reflected mutual monitoring by team members. However, this only really explains why productivity did not fall under a team system; the roles of collaborative skills, high-ability workers, and learning, which they demonstrated, are needed to explain the increased productivity. Román (2009) includes anti-free riding measures amongst three explanations for the improvement of a range of performance indicators when a collective incentive scheme replaced an individual one, arguing that shirking did not occur because of peer pressure. However, he has to rely on a limited number of interviews, and includes a quote from one of them stating that if team members are “not pulling their weight” (p.613), the team demands “extra effort” or the supervisor disciplines them. Such pressure was not exerted in the earlier piece rate individual incentive regime.

Similar results were found by Aakvik et al. (2017), who concluded that team processes which included an element of pressure enhanced cooperation, and that feedback on team and individual performance contributed to better performance under team incentives than individual ones, and consequently that “free-rider effects are not a serious problem” (p.117), at least in the customer service center that they studied. Amongst the non-field studies, Ladley et al. (2015), using an agent-based model akin to Roos et al. (2022), also show that free riding does not survive peer pressure, at least in the medium- to long-term. They compare groups selected

and rewarded on the basis of group performance, which are therefore heterogeneous, with groups composed on the basis of individual performance who are rewarded individually. They show that free riders may survive longer in groups with collective pay systems, but that eventually they will become more cooperative or be forced out of the group or organization. The Kohler effect operates in group settings, so even the performance of the median worker will improve. However, high performers' productivity may be reduced, as to some extent they sacrifice themselves to the group, e.g., through mentoring. Under individual reward systems, high performers may also produce less, as they have to interact more with others, meaning a "reverse Kohler" effect occurs and the whole group's performance declines.

An experiment by [Chen et al. \(2012\)](#), comparing collective and individual versions of tournament and piece rate reward systems, focuses on group cohesion as an antidote to free riding. It is one of the few studies that tests potential mediators of the reward system–outcome relationship. Having found that the collective (inter-group) tournament led to superior creative solutions for renovating an old house, they show this to be explained by group cohesion, with individuals building on each other's ideas; individuals in cohesive groups are more likely to share ideas to achieve group goals but also to exert more cognitive effort "to process synthesize and build on ... others' ideas" ([Chen et al., 2012: 1886](#)) – and, by implication, that obstacles such as free riding are overcome. The individual (intra-group) tournament fostered higher levels of individual effort without this translating to highly creative solutions.

The single study considering free riding that includes hybrid pay systems also explored group processes as mediators of group performance. The experimental study (by [Pearsall et al., 2010](#)) involved a simulation exercise, and showed that teams operating under a hybrid reward system produced the highest performance levels. When only a collective system was used, groups performed less well than under the hybrid system but outperformed those where only an individual system was in place. Information-sharing and reduced social loafing mediate the relationship between pay systems and performance. [Pearsall et al. \(2010\)](#) argue that the motivation of individual effort is a separate process from ensuring individuals pay the attention to the groups' goals "required for the completion of complex tasks" (p.188). These are two disparate demands that may conflict, but hybrid systems ensure that workers do not concentrate on one at the expense of the other. Individual-pay element is needed as the positive benefits of teamwork for cooperation may not be sufficient to eliminate free riding.

Only one study – by [Drago \(1991\)](#), of Australian employees – concludes that free riding reduced the effects of collective systems (which were still found to enhance performance). However, it uses the association between group systems and a weak measure of free riding: whether people are inclined not to go to work when not feeling well. The association is itself rather weak. The performance measure associated with group incentives and employee stock ownership schemes (but not profit-sharing or individual incentives) is also a weak proxy, as it is based on asking people the extent to which they are "willing to work an extra 20 minutes unpaid beyond the scheduled work time" (p.1437). Moreover, two other measures of performance based on subjective assessments of effort are not significant.

8.5.3. *The undermining effect of incentives on intrinsic motivation*

The vast majority of the studies reviewed do not consider the potential for performance-related pay to undermine intrinsic motivation. It is mentioned in the introduction to two papers, but in both cases the issue is not incorporated in the empirical or experimental study ([Irlenbusch & Ruchala, 2008](#); [Klindžić & Galetić, 2020](#)). For example, [Klindžić & Galetić \(2020: 143\)](#) refer to intrinsic motivation as subject to "crowding out" by extrinsic incentives, but they deliberately designed it out of their experiment as they wished to focus on the crowding out of voluntary cooperation. [Kuvaas \(2006: 369\)](#) uses self-determination theory to argue that performance is higher under flat rates than either form of incentive pay, as this signals to employees that they "are trusted to perform well without being externally regulated or controlled", enhancing their feelings of competence and fulfilling their need for autonomy. Consequently, he tested for intrinsic motivation as a mediator of the flat rate–performance relationship, and found support for this role.

Only [Roos et al. \(2022\)](#) include intrinsic motivation in their investigation; we saw earlier that it plays a role in their model. Shirking is reduced to a minimum by a management style environment that gives employees high levels of autonomy, while in controlling environments lack of fulfilment of the autonomy need reduces intrinsic motivation, consistent with self-determination theory. However, the pay system plays no role in these processes. Rather, it plays a role, through the fulfilment of self-determination's relatedness need, in affecting cooperation. Groups systems foster it to the extent that excessive levels of cooperation lead to lower group production norms; while individual systems crowd out cooperation. Effectively, in the individual system, the undermining of relatedness need is the issue, while in collective ones it is the power of this need. Payment systems' effect on cooperation may then be stronger than that of the management style and so [Roos et al. \(2022\)](#) conclude that flat rates are superior to incentives, which is not that dissimilar to what some conclude from the undermining-of-intrinsic motivation argument. Similarly they stress the importance of a trusting management style so the organizational culture fits the individuals' needs for autonomy.

[Roos et al. \(2022\)](#) also differ from Deci et al. in not treating high autonomy needs as universal. They posit four types of personal need structure: O-type agents have a strong desire for autonomy and self-determination, conforming to the general model of human nature in self-determination theory; C-types particularly value security and are extrinsically motivated; SE-types have a high need for power and achievement; and ST-types are driven by self-transcendence values such as being altruistic. Consideration of such differences adds nuance to their results. For example, O-type employees work more and shirk less in trusting environments, while C-types perform better in controlling environments, as they feel more secure with "clear rules and instructions" (p.11). This shows that cooperation is more significant than shirking, meaning the relatedness need is significant, as is fulfilment of the autonomy need, assuming O-types are a sizeable proportion of employees.

Wageman's research (1995) opens up the possibility that preferences may be malleable. She does not directly consider whether extrinsic rewards undermine the power of intrinsic motivation, but rather shows that needs play a subordinate role to the work design and reward system in explaining performance. She shows that those with a high preference for autonomy at work ultimately help other

workers less and learn less from them. Individual work systems are congruent with such preferences. However, preferences change over time when employees experience more interdependent work systems, and the reward system acts as a trigger for this change, reinforcing the cues employees get from their tasks and affecting the intensity and character of their motivation, rather than directly influencing their behavior. The individual work system, where technicians work independently, reinforces norms allocating high levels of personal responsibility for the performance of the machines they service. In contrast, under group working, cues from a collective system foster norms supporting high levels of cooperation and performance. Wageman (p.173) observed that, "As people gain experience with interdependence, they grow more accepting of it, and even come to prefer it". This process was not found to operate when the group reward system was used in an individual work context, as group processes were poor, even though performance was good. Congruence between work and reward systems is crucial – Wageman defines work design as "the pivot" of performance, and the role of payment systems as supporting or opposing the culture they define, and therefore affecting individuals' motivations. The implication of Wageman's study, although she does not draw it out, is that pay systems may not undermine self-determination needs, as individual work systems provide the opportunity for people to fulfil their autonomy needs, but perhaps at the expense of their relatedness need; while collective systems may engender a change in priorities in favor of fulfilment of the relatedness need. The strength of the competence need may not change when moving from one system to another, but the means of fulfilment might.

9. Conclusions

In all but two studies, collective payment systems outperform individual ones, either when used alone or in conjunction with individual systems. However, we cannot conclude unequivocally in favor of their superiority. Most significantly, 64% of studies considering hybrid systems found them to produce greater performance effects than collective or individual systems used alone. Also, flat-rate systems perform best in half of the rare cases where they are included in the analysis. The prevalence of moderating effects in the studies testing for them also limits the extent to which we can decisively conclude about the relative advantage of collective systems. We can be more certain about recommending that individual pay systems are unlikely to be optimal.

The implication for future theoretical and empirical work is the need to include hybrid and flat-rate systems when comparing individual and collective pay systems, and to explore boundary conditions in greater depth. This might start with differentiation between individualized and team-based work organization. The implication of our review is that collective incentives have less effect in more individualized systems where task interdependency is low, but a greater impact where task interdependency is high, and that the effect is stronger when collective incentives are accompanied by feedback and mentoring. Other aspects of teams may be important, especially following leads in the "sorting" studies. For example, team size may affect high performers' orientations towards free riders, as the larger the team, the lower the impact of low performers on team output, while the nature of teams may affect the extent to which low performers fear ostracization or losing face through underperformance.

The sorting studies suggest greater focus is needed on low performers than has previously been the case. Also, the potential gains from improving the performance of middle-ranking performers may be the most readily achieved, and be disproportionately large. Our discussion of sorting also suggests the need to control for the level of wages in any analysis, treating it as a potential moderator of the effects of pay systems on the sorting effect on performance. Hamilton et al.'s study (2003) also advocates that changes in work organization must be included, along with the incentive and sorting effects, as underlying mechanisms explaining the impact of collective systems.

The limited exploration of mediators of the effect of payment systems within the studies, and absence of tests of the undermining effect of performance-related pay on intrinsic motivation, also highlight the need for more theoretical development. Discussion of results relating to the effect of collective systems focuses on their positive effect on group processes and cooperation within the workplace. References are made to a variety of mechanisms, including idea-generation and -sharing, helping behaviors, improved methods of working, and goal interdependence. Future theoretical and empirical research needs to incorporate such mediators to establish their relative importance, and ultimately determine whether they are themselves moderated. Hatcher & Ross (1991) also called for mediators to be considered in greater depth over 30 years ago (although they focused on individual-level factors such as cathexis and inducibility), while Beersma et al. (2003) explicitly draw attention to this issue as a weakness of their experimental study. The literature's neglect of the issue of intrinsic motivation being undermined also needs addressing. The focus of this issue has typically been on the thwarting of fulfilment of the autonomy need. However, we extended the discussion by suggesting that pay systems may have implications for the other two needs: relatedness and competence. Comparisons of performance-related pay also fail to address the role of organizational justice perception as potentially beneficial in promoting intrinsic motivation.

Our review has implications for the broader human resource management–performance research stream, as it implies that if high-performance work systems are identified by evidence-based high performing practices then collective payment systems should be included within them, and the focus on individual systems should be abandoned. If, however, the assumed model of good management is, as Van Reenen (2017) states, built around directive performance management, then individual performance-related pay could be included in measures of it. The study offers some encouragement for the use of collective systems to support high-involvement or -commitment management, since their effect may be through enhancing cooperation and relational coordination. Yet, no study has tested whether an interactive effect on performance between collective performance-related pay and high-involvement management exists. These suggested implications must be qualified by the fact our study is inconclusive about the relative effects of hybrid systems (and even flat-rate systems). Their inclusion in measures of high-performance work systems, or as supports for high-involvement management, may yet be warranted.

We are unable to make decisive judgments about the influence of methods on results. All have their strengths. The experimental studies have unearthed potential differences in effects across outcomes, illustrating the precision of their analysis. Equally, the

assumptions made in some studies – for example, that in individual production systems workers cannot confer with each other – raise questions about how transferable the results are to real situations. Given the sensitivity of experiments and agent-based modeling to the parameters used in the model, the minimum requirement is that such investigations need to be grounded in real data. Case studies of the kind used in the quasi-experiments, as rich and revealing as they are, may be limited due to the way certain incentive systems may be integral to particular production arrangements. Instead, as they are not completely correlated, incentive system effects could be isolated through large survey samples. Complementary case studies in organizations strategically selected from participants in such surveys could then explore the extent to which payment systems operate through their influence on the culture and supportive role in human resource and work design practice, rather than through directly incentivizing effort.

Above all else, the priority must be longitudinal studies, over longer periods than is typically the case in the literature we have reviewed – firstly, in order to test mediation models, and secondly, to test whether any payment system–performance relationship is durable or fades over time. Given the costs and problems involved with collecting data and performing experiments with the same participants over time, simulation studies provide a promising way forward, as multiple time periods can easily be built in to such studies. Overall, this review reinforces the opinion of Wall & Wood (2005), who concluded their review of the more all-embracing human resource management–performance studies by stating that big-science programs taking a comprehensive perspective on the theoretical and methodological issues, and a big data approach to empirical research, are required.

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