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# Turnover Rates and Organizational Performance: A Meta-Analysis

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The authors conducted a meta-analysis of the relationship between turnover rates and organizational performance to (a) determine the magnitude of the relationship; (b) test organization-, context-, and methods-related moderators of the relationship; and (c) suggest future directions for the turnover literature on the basis of the findings. The results from 300 total correlations ($N$ = 309,245) and 110 independent correlations ($N$ = 120,066) show that the relationship between total turnover rates and organizational performance is significant and negative ($\rho$ = –.15). In addition, the relationship is more negative for voluntary ($\rho$ = –.15) and reduction-in-force turnover ($\rho$ = –.17) than for involuntary turnover ($\rho$ = –.01). Moreover, the meta-analytic correlation differs significantly across several organization- and context-related factors (e.g., types of employment system, dimensions of organizational performance, region, and entity size). Finally, in sample-level regressions, the strength of the turnover rates–organizational performance relationship significantly varies across different average levels of total and voluntary turnover rates, which suggests a potential curvilinear relationship. The authors outline the practical magnitude of the findings and discuss implications for future organizational-level turnover research.

*Keywords:* meta-analysis, organizational performance, turnover rates

The relationship between turnover rates and organizational performance has been examined from various disciplinary perspectives, including organizational psychology, sociology, economics, and human resource management. Perhaps because interest in the topic is highly dispersed, the research literature has provided little integration; indeed, some extant results seem conflicting. For example, some studies have shown a negative relationship between turnover rates and organizational outcomes such as sales (e.g., Baron, Hannan, & Burton, 2001; Batt, 2002; Huselid, 1995), customer service (e.g., Kacmar, Andrews, Van Rooy, Steilberg, & Cerrone, 2006; Plomondon et al., 2007), profit (e.g., McElroy, Morrow, & Rude, 2001; Van Iddekinge et al., 2009), and return on assets (e.g., Messersmith, Guthrie, & Ji, 2010; Shen & Cannella, 2002). But many studies have failed to find negative relationships (e.g., Arthur, 1994; Guthrie, 2001; Kesner & Dalton, 1994; Shaw, Duffy, Johnson, & Lockhart, 2005; Wagner, Pfeffer, & O'Reilly, 1984; Zimmerman et al., 2005), and some have even reported significantly positive associations (e.g., Keck, 1997; Virany, Tushman, & Romanelli, 1992).

As momentum in this area grows, three recent reviews have described the state of organizational-level turnover literature as "much less well developed" than individual-level turnover research (Shaw, 2011, p. 187), as an "area of inquiry [that] merits further investigation" (Holtom, Mitchell, Lee, & Eberly, 2008, p. 252), and as an area where "much remains to be learned" (Hausknecht & Trevor, 2011, p. 379). As a starting point for future research, it is worthwhile to consider and summarize what the existing empirical literature tells us about turnover rates and organizational performance. Practitioners may also benefit from a quantitative summary to judge whether they have correctly or over-stated their intuitive concerns about turnover's potential costs and benefits. Our purpose, therefore, is to perform a meta-analysis of the relationship between turnover rates and organizational performance to (a) determine the magnitude of the relationship between these variables; (b) test organization-, context-, and methods-related moderators of the relationship; and (c) suggest future directions for the turnover literature on the basis of the meta-analytic findings.

## Theoretical Perspectives on the Turnover Rates and Organizational Performance Relationship

The relationship between turnover rates and organizational performance has been examined, in general, under three alternative views: (a) turnover rates at any level disrupt organizational performance (e.g., Osterman, 1987); (b) turnover rates are most disruptive at low- to moderate-levels, but the disruptive effects are attenuated at high levels (e.g., Price, 1977); and (c) turnover rates

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enhance organizational performance at low- to moderate-levels, but disrupt performance at high levels (e.g., Abelson & Baysinger, 1984). We summarize the theoretical explanations for these views below.

## Model 1: Linear Negative Relationship View From Human and Social Capital Theories

Human and social capital theories suggest that turnover rates at any levels hurt organizational performance. Human capital theory proposes that more experienced employees perform better because they accumulate the knowledge and skills (i.e., human capital) necessary to perform the job (Strober, 1990). From this view, when experienced employees leave, an organization suffers because it loses stored/accumulated human capital (Osterman, 1987; Strober, 1990). Organizations may replace employees who leave, but time must pass before replacements accumulate similar levels of human capital. Moreover, turnover generates additional human resource management costs such as recruitment, selection, and training expenses.

Similar to human capital theory, social capital theory suggests that turnover is costly because it depletes social capital—"a resource reflecting the character of social relations within the organization, realized through members' levels of collective goal orientation and shared trust" (Leana & Van Buren, 1999, p. 540). Increases in turnover rates disrupt an organization's social fabric and its operational and collective functions (Dess & Shaw, 2001; Shaw, Duffy, et al., 2005). In addition, turnover engenders additional newcomer socialization costs. Human and social capital theories focus on increases in turnover rates and suggest that turnover rates are linearly and negatively related to organizational performance (Shaw, Gupta, & Delery, 2005).

This human and social capital theory perspective appears to have the most empirical support in the literature. For example, research has found increases in turnover rates to be negatively related to customer satisfaction (Morrow & McElroy, 2007), sales growth (Batt, 2002), return on equity (Cannella & Hambrick, 1993), and profit (Kacmar et al., 2006). In addition, Van Iddekinge et al. (2009) tested the causal direction of the turnover rates–performance relationship and showed that retention rates (the inverse of turnover rates) significantly and positively influenced the change in unit profitability over time.

In contrast, other theoretical and empirical extensions in the turnover literature provide a more nuanced picture of the turnover rates–organizational performance relationship; in particular, they suggest a curvilinear relationship. From these views, many previous empirical studies are limited because they fail to address possible curvilinearity. The form of the curvilinear relationship is disputed, however, depending on the root of theoretical viewpoints, whether from organizational learning and control theories or from cost-benefit theories. These two alternative models are discussed below.

## Model 2: Attenuated Negative Relationship View From Organizational Learning and Control Theories

Sharing some common elements of human capital theory, the organizational learning and control theories suggest an attenuated negative relationship between turnover rates and organizational performance. On average, organizations with low turnover rates have accumulated much human capital. When employees leave, replacement employees cannot equal the lost human capital until much time passes. In contrast, organizations with high turnover rates have workforces that lack accumulated human capital; replacements can quickly build equivalent capital and rapidly negate human capital losses. In addition, continuous workforce replacement becomes routine, so marginal turnover costs are reduced (Shaw, Duffy, et al., 2005; Shaw, Gupta, & Delery, 2005). From this viewpoint, an increase in turnover rates from low-to-moderate levels are more disruptive to organizational performance than an increase in turnover rates from moderate-to-high levels (Price, 1977; Shaw, Gupta, & Delery, 2005).

Several studies have found evidence supporting the attenuated negative relationship. Shaw, Gupta, and Delery (2005) studied the trucking and concrete pipe industries and found that the relationship between voluntary turnover rates and organizational performance was strongly negative initially but attenuated at higher turnover levels. Similarly, Ton and Huckman (2008), in a sample of bookstores, found severe performance decreases as turnover rates went from low to moderate levels, but the relationship was attenuated as the rates increased from moderate to high levels. Interestingly, Alexander, Bloom, and Nuchols (1994) hypothesized an inverted-U-shaped relationship, which we describe below, but their empirical results provided some support for the attenuated negative relationship pattern.

## Model 3: Inverted-U Relationship View From Cost-Benefit Theories

In contrast to the attenuated negative relationship, another curvilinear view on the turnover rates–performance relationship predicts that turnover rates are beneficial at low levels but costly at high levels. Specifically, these cost-benefit theories propose that turnover conveys greater benefits than costs at low to moderate turnover levels, but costs outweigh benefits at moderate to high levels where the turnover rates–organizational performance relationship becomes an inverted-U (Abelson & Baysinger, 1984; Dalton & Todor, 1979; Staw, 1980).

According to this perspective, some turnover benefits organizations by reducing compensation costs, revitalizing the workforce, and sorting out poor performers. Turnover reduces compensation costs related to base pay, vacation, sick leave, and insurance premiums (Alexander et al., 1994; Jeswald, 1974). In addition, turnover revitalizes organizations by introducing newcomers who bring current knowledge and skills (Alexander et al., 1994), reducing employee homogeneity, and increasing the diversity of ideas (Schneider, Goldstein, & Smith, 1995). Moreover, turnover can eliminate poor performers and misfits who disrupt the organization's culture and values (Abelson & Baysinger, 1984; Dalton & Todor, 1979). Hence, an optimal turnover rate is found at the point where benefits maximally exceed the costs. Specifically, at low to moderate levels where benefits are greater than costs, increased turnover rates can contribute to organizational performance, but as rates rise beyond moderate levels, they have negative effects.

Several studies have examined the inverted-U-shaped relationship between turnover rates and organizational performance, but the literature provides very little supportive evidence. Glebbeek

and Bax (2004) found a curvilinear form, but the relationship failed to conform to the predicted inverted-U shape; rather performance peaked at very high turnover rates. Siebert and Zubanov (2009) tested the inverted-U hypothesis, but their results failed to support the curvilinear relationship clearly (Shaw, 2011). The strongest evidence is found in Meier and Hicklin's (2007) study; using a sample of Texas school districts, they found that low levels of district-level turnover rates were positively related to district SAT and ACT scores, but the relationship was negative at higher levels (i.e., an inverted-U-shaped relationship).

## Organization- and Context-Related Moderators of the Relationship Between Turnover Rates and Organizational Performance

Researchers have identified several factors that influence the relationship between turnover rates and organizational performance (Hausknecht & Trevor, 2011; Shaw, 2011). We examine three major organization- and context-related factors that possibly moderate the relationship: (a) turnover rate types, (b) dimensions of organizational performance, and (c) organizational contexts and characteristics (e.g., employment system, entity size, industry, and region).

### Turnover Rate Types

Turnover researchers have often operationalized turnover rates as the number of departing employees divided by the total number of employees (e.g., Arthur, 1994; Guthrie, 2001). This operationalization, which we call *total turnover rates*, omits employees' reasons for leaving. A more refined approach is distinguishing *voluntary* and *involuntary* turnover rates based on reasons for leaving; voluntary turnover rates refer to the proportion of employee departure initiated by employees (e.g., resignations), and involuntary turnover rates refer to the proportion of departure initiated by organizations (e.g., firings, discharges, dismissals, terminations; Shaw, Delery, Jenkins, & Gupta, 1998). Voluntary turnover rates include resignations for higher wages, career opportunities, further education, and job dissatisfaction for example (Campion, 1991) and exclude discharges, retirements, transfers, and promotions (Batt, 2002). In contrast, involuntary turnover rates include resignations caused, for example, by failure to meet expectations and expired employment contracts (Campion, 1991; McElroy et al., 2001). Reduction-in-force (RIF) turnover (downsizing) is a separate category because "no replacement employees are planned and the departing employees are presumed to have been at least minimally competent" (McElroy et al., 2001, p. 1295).[1]

Researchers have often suggested that voluntary and involuntary turnover have different consequences (e.g., Hausknecht & Trevor, 2011; Holtom et al., 2008; Shaw, 2011). Highly skilled, high-performing employees may be more likely to leave voluntarily because they have external employment opportunities (Trevor, 2001). For an organization, voluntary quits are often surprising and unmanageable (Shaw et al., 1998). Thus, voluntary turnover rates are likely to be negatively related to organizational performance.

In contrast, the relationship between involuntary turnover rates and organizational performance has long been assumed to be positive because organizations choose to discharge employees for individual performance deficiencies or other behavioral problems (Holtom et al., 2008). Assuming that poor performers are properly replaced with better performers, the removal of poor performers should be associated with better organizational performance (Dalton, Todor, & Krackhardt, 1982; Hollenbeck & Williams, 1986). In addition, this sorting effect may help remedy poor hiring decisions (Shaw et al., 1998), and maintain performance-oriented norms among remaining employees (Trevino, 1992). Some researchers have, however, recently questioned the presumed positive relationship and have proposed that the involuntary turnover rates and organizational performance have a negative relationship instead. Hausknecht and Trevor (2011) argued that high involuntary turnover rates "may have little to do with the employee movement *per se* (which is the foundation for the voluntary turnover rate hypothesis) but may instead simply reflect a low-quality workforce and the subsequent poor performance that this group is expected to provide" (p. 369). From a somewhat different view, Batt and Colvin (2011) suggested that both voluntary and involuntary turnover disrupt organizational performance because both incur recruitment and training costs and disrupt social connections. Although their data failed to fully support the argument, the relationship was in a direction consistent with their expectation: in the customer satisfaction regression model the coefficient for involuntary turnover rates was negative although not statistically significant. In sum, the literature has predominantly focused on a positive relationship between involuntary turnover rates and organizational performance, but recent attention reports a negative relationship.

Views on the relationship between RIF turnover rates and organizational performance have also been equivocal. RIF objectives are often to enhance productivity and profitability by eliminating redundant or unnecessary jobs and employees (Dewitt, 1998; Freeman & Cameron, 1993). Thus, RIF proponents argue that RIF reduces organizational slack and operating costs, and enhances efficiency and profitability (e.g., Brookman, Chang, & Rennie, 2007; Cascio & Young, 2003; Chalos & Chen, 2002; Palmon, Sun, & Tang, 1997; Yu & Park, 2006). Yet, opponents argue that RIF hurts organizational performance because it increases employment instability and voluntary turnover rates among those remaining (Trevor & Nyberg, 2008). In addition, RIF disrupts social capital (Pfeffer, 1998) and engenders behavioral rigidity and risk aversion (Cameron, Whetton, & Kim, 1987; Cascio, 1993), which overturn the temporal benefits (Hallock, 1998). Recently, Datta, Guthrie, Basuil, and Pandey (2010) conducted a thorough qualitative review of the RIF turnover rates and organizational performance relationship and suggested that, despite somewhat equivocal empirical findings, the overall relationship was likely negative.

In sum, based on the existing literature, we can reasonably expect that voluntary turnover rates will be negatively related to organizational performance. Views are contradictory about involuntary and RIF turnover effects, but recent qualitative reviews

[1] Although many organizations classify turnover as voluntary, involuntary, and RIF turnover, some turnover types are not clearly voluntary or involuntary, such as retirement, health problems, pregnancy, and separation by mutual agreement. Accordingly, the turnover literature may benefit from the development and use of alternative classifications turnover rate types.

suggest that RIF turnover rates and organizational performance will also be negatively related.

## Dimensions of Organizational Performance

The broad concept of organizational performance comprises many operationalizations (e.g., P. J. Richard, Devinney, Yip, & Johnson, 2009). Turnover researchers have often categorized performance into proximal (workforce-related outcomes) and distal (financial, market, and shareholder return) outcomes. Turnover research has most often examined workforce-related performance such as productivity, partly because human and social capital theory foundations can be most directly applied to those proximal outcomes (Dess & Shaw, 2001; Osterman, 1987; Shaw, Gupta, & Delery, 2005). Financial and market-oriented organizational performances have been regarded as distal outcomes because several other factors, such as general economic conditions, may dilute the direct turnover effects. For example, Kacmar et al. (2006) proposed a turnover-efficiency-profit model showing that turnover reduces restaurant profits by lengthening customer wait-time. As such, the most proximal measures of organizational performance might be those related to employee interactions and attitudes such as customer satisfaction and absenteeism. Time must pass before the cycle of customer service and employee attitude changes affect customer spending, unit-level workforce productivity, and eventually unit profits. Indeed, the literature has generally assumed, and some evidence has found, that turnover rates will be more strongly related to workforce-related measures than financial measures (e.g., Huselid, 1995; Kacmar et al., 2006; Shaw, Gupta, & Delery, 2005). In this meta-analysis, we categorize the organizational performance dimensions into three broad categories—the most proximal, moderately proximal, and distal—and we expect that the turnover rates–performance relationship will be strongest for the most proximal measures (e.g., customer satisfaction, employee work attitudes, absenteeism), modest for moderately proximal measures (e.g., quality, safety, workforce productivity), and weak for distal ones (e.g., financial performance).

## Organizational Context and Characteristics

The relationship between turnover rates and organizational performance may be different depending on the context or environment in which turnover occurs (e.g., Arthur, 1994; Batt & Colvin, 2011; Shaw, Gupta, & Delery, 2005). The organizational literature frequently mentions several contextual factors as potentially important to the turnover rates–performance relationship. Next, we briefly discuss these factors: employment systems, entity size, industries, and region.

Organizations use different *employment systems* in their approaches to human resource management. The strategic human resource management literature (e.g., Arthur, 1992, 1994; Shaw, Gupta, & Delery, 2005) suggests that organizations shape employee behaviors and work attitudes using two distinctive employment systems: (a) primary employment systems that forge psychological links between organizational and employee goals (also called commitment systems), and (b) secondary employment systems that emphasize labor cost reduction, efficiency improvement, and employee compliance with specified rules and procedures (also called control systems). The two employment systems often coexist in an organization (Lepak & Snell, 1999) depending on the employees (Bamberger & Meshoulam, 2000; Delery & Shaw, 2001; Lepak & Shaw, 2008; Lepak, Taylor, Tekleab, Marrone, & Cohen, 2007; Siebert & Zubanov, 2009). For example, full-time managers are more appropriately managed under primary or commitment-based employment systems because they need less supervision and have more discretion in their job tasks. Part-time employees are typically managed under secondary or control-based employment systems because they perform routine tasks with clearly specified rules and procedures.

Researchers have often suggested that turnover rates more strongly and negatively affect organizational performance under primary employment systems than under secondary employment systems (Arthur, 1994; Guthrie, 2001). Because organizations invest more in pay, training, benefits, and socialization programs for employees under primary systems, their turnover is more costly in terms of lost investments and human and social capital depletion. In contrast, organizations select secondary system employees less carefully and invest less in their services, so their departure depletes less human and social capital (Shaw, Dineen, Fang, & Vellella, 2009). For example, in a sample of retail chain employees, Siebert and Zubanov (2009) compared full-time employees under a commitment system and part-time employees under a control system and found that turnover rates were more strongly and negatively related to sales when the turnover occurred in commitment systems.

Executives strongly influence organizational performance because they make important strategic decisions (viz., upper echelon theory; Hambrick & Mason, 1984). Departures among executive team members may be the most strongly related to organizational performance because of lost information necessary for strategic decisions and altered executive team composition (Virany et al., 1992; Wagner et al., 1984). Executive turnover also incurs significant human resource management costs because executives are managed under distinctive and elaborate employment systems designed to carefully select, motivate, and retain them (e.g., Gerhart & Rynes, 2003). Thus, in our analyses, we separate executive- or top-management-team turnover rates from turnover rates of employees in primary and secondary systems. To summarize, we expect that turnover rates and organizational performance will be more strongly and negatively related in samples managed by primary and executive employment systems than in those managed by secondary employment systems.

The literature holds two contrasting views about the moderating effects of *entity size* on turnover rates–performance relationships. Some have proposed that larger organizations will show a weakened negative relationship because larger groups can buffer turnover's disruptions (e.g., Green, Anderson, & Shivers, 1996; Kozlowski & Bell, 2003). In addition, equivalent turnover rates will inflict less damage on larger organizations because they can better withstand the same proportional information losses (Carley, 1992). Others, in contrast, have argued that larger organizations will show stronger negative turnover rates–performance relationships because smaller entities can handle socialization and adjustment processes more efficiently (Hausknecht, Trevor, & Howard, 2009).

Thus, entity size is an important moderator, but the direction and magnitude of the effect remains unknown.

Moreover, we expect *industry* to moderate the turnover rates and organizational performance relationship. Strategic human resource management and human capital theory literature suggest that the importance of human capital varies across industries because organizations adopt different technology and work structures depending on the characteristics of their industries (e.g., Datta, Guthrie, & Wright, 2005; Dess & Shaw, 2001). For example, Datta et al. (2005) argued that in industries with high levels of capital intensity (e.g., manufacturing), organizational decision makers place greater emphasis on leveraging investments in technology, equipment, and physical resources and place relatively less emphasis on human capital development. In other industries (e.g., health care, hospitality) employees play a central role in the functioning of the organization and therefore human capital losses through high turnover rates may have substantial negative effects on performance. As such, it is reasonable to expect that the relationship between turnover rates and organizational performance will be stronger in industries where the leveraging of human capital is more important to organizational performance than in industries with high capital intensity. In support of this line of reasoning, Shaw, Park, and Kim (2012) found that the negative relationship between turnover rates on organizational performance were exacerbated among organizations that invested heavily in human capital (see also, Arthur, 1994; Guthrie & Datta, 2008).

Last, we anticipate that *region* may moderate the relationship between turnover rates and organizational performance. Labor market policies, regulations, and human resource management practices vary dramatically across regions of the world (Ahmad & Schroeder, 2003; Pfeffer, 1998). In particular, there are considerable differences in the rigidity of labor markets across regions. European labor markets tend to be less flexible than those in North America and Asia because of strict employment policies, heavy regulation, and emphasis on collective bargaining agreements. These characteristics likely not only reduce the frequency and the variance in voluntary and involuntary turnover rates—serving to reduce the bivariate relationship—but may also increase the predictability of turnover. The ability to plan and prepare for turnover events may lessen negative effects on organizational performance.

## Methods-Related Moderators of the Relationship Between Turnover Rates and Organizational Performance

We also explore possible differences in the turnover rates and organizational performance relationship by using methods-related moderators. We identify potential upward/downward biases on the turnover rates-performance correlations caused by variance in methods rather than true theoretical variance. Specifically, we examine three research design factors (unit of analysis, data structure, and source of turnover rates information) and three publication factors (role of turnover rates, hypothesized relationship, and publication status) that possibly moderate the turnover rates-performance relationship.

### Research Design

Research design-related factors may moderate the relationship between turnover rates and performance, including (a) unit of analysis (unit-level vs. organization-level), (b) data structure (cross-sectional vs. lagged vs. panel), and (c) source of turnover rates information (organizational record vs. key information).

Shaw (2011) and Hausknecht and Trevor (2011) suggested that considering distinctions between cross-organization samples (with different policies, practices, and organizational forms) and cross-unit samples (with similar policies, practices, and organizational forms) could potentially provide better understanding of the relationship between turnover rates and organizational performance. Cross-organization samples offer some advantages because the variation in turnover rates and organizational performance can be large, and such samples allow researchers to explore potential contextual moderators including industry dynamics (e.g., Guthrie & Datta, 2008) and staffing and employment policy differences (e.g., Bamberger & Philips, 1991; Lepak et al., 2007). In contrast to the cross-organization samples, cross-unit studies can be better for addressing causality issues by holding certain threats to internal validity constant (Shadish, Cook, & Campbell, 2001), and by ensuring consistent definition and measurement of turnover rates. We make no specific prediction about which unit of analysis produces stronger turnover rates-performance correlations, but it would be informative to examine whether and how the unit of analysis moderates the relationship.

Another possible design-related moderator is *data structure*: cross-sectional, lagged, and panel data structures. Meta analytic summary using zero-order correlations fails to ensure causality. Reverse causality concerns might be relatively more serious when turnover rates and organizational performance are measured concurrently than when a time-lagged performance variable is used. Panel data are another possible data structure. For regression-based data analysis, panel data might advantageously address reverse causality because panel data allow researchers to control for potential confounding factors. In terms of correlations for meta-analysis, however, correlations from panel data are similar to the correlations from cross-sectional data because the convention in the literature is for researchers to report a single between-organization correlation. For example, Siebert and Zubanov (2009) analyzed data from 325 retail stores over a 5-year window (1,625 store years), but reported a single between-store correlation ($N$ = 325) of –.24 between the full-time turnover rates and store performance. This correlation—the association between turnover rates averaged across the years of the study and organizational performance averaged across the years of the study—is similar to a cross-sectional correlation, albeit over a longer time window.

Last, the *source of turnover rates information* is a potential research design-related moderator. Unit-level research often relies on archival sources and/or key informants. A concern about using key informants is that few people can accurately report organizational information such as turnover rates and organizational performance. In addition, informants with inadequate knowledge and low motivation to provide accurate data will damage the accuracy and reliability of organizational information (Delery & Shaw, 2001). To examine the potential bias of using key information data (versus archival data), we examine the source of turnover rates information for its possible moderation effects.

### Publication Moderators

Standard practice for reporting meta-analysis results includes exploring potential publication-related moderators. When readily available studies differ from results of *all* other research in an area, readers and reviewers may draw wrong conclusions (Rothstein, Sutton, & Borenstein, 2005). Thus, we examine possible publication-related moderators, including the role of turnover rates (independent vs. dependent vs. moderator vs. mediator vs. control variables), hypothesized relationships (hypothesized vs. not hypothesized), and publication status (top journal vs. non-top journal). Note that we have no specific expectations regarding the research design-related moderators; we explore them for their effects on the pattern of the turnover rates and organizational performance relationship.

### Summary

To summarize, we use a meta-analytic review to examine the relationship between turnover rates and organizational performance. Based on the literature's theorizing and assumptions, we also outline several potential moderators of the relationship including turnover rate types, dimensions of organizational performance, employment systems, entity size, industry, and region. In addition, following prior researchers (e.g., Judge, Thoresen, Bono, & Patton, 2001), we also identify and test several other methods-related factors as potential moderators. Next, we report our criteria for inclusion in the meta-analysis and the results.

## Method

### Literature Search

We extensively searched the literature to identify studies published before or during February 2012. First, we searched the ISI Web of Knowledge, PsycINFO, EBSCO, JSTOR, and PROQUEST databases using keywords such as *turnover, quit, fire, discharge, layoff, slimming, resizing, rightsizing, retention, withdrawal, downsizing, performance, leaning-up, restructuring, productivity, re-engineering,* and *reduction-in-force*. Second, we perused the reference sections of several narrative reviews (e.g., Datta et al., 2010; Hausknecht & Trevor, 2011; Holtom et al., 2008; Shaw, 2011) to identify articles that our computer-based searches failed to capture. Third, we searched online for journals with turnover rates–performance studies still in press (e.g., *Journal of Applied Psychology, The Academy of Management Journal, Strategic Management Journal, Organization Science, Personnel Psychology, Journal of Management, American Sociological Review, Quarterly Journal of Economics, The International Journal of Human Resource Management,* and *Human Resource Management*). Fourth, we searched available conference programs for major associations including the Society for Industrial and Organizational Psychology, Strategic Management Society, and the Academy of Management. Fifth, we used e-mails to contact authors who have recently published in the areas of unit- and organization-level turnover, human resource management, and organizational performance. Our search yielded 255 articles and dissertations.

### Inclusion Rules and Sample

First, we included empirical papers that reported correlations between turnover rates of any type and organizational performance dimensions of any type, and we excluded theoretical and review articles and papers that lacked the needed data for calculating correlations or effect sizes between turnover rates and organizational performance. Second, we included studies that tested relationships at the unit (facility) or organizational levels of analysis. We excluded studies that dealt with individual-level turnover issues, such as the relationship between individual performance and turnover probability (e.g., Boswell, Boudreau, & Tichy, 2005; Hollenbeck & Williams, 1986) and studies involving individual-level turnover intent (e.g., Sheridan, 1985). Third, we included studies that used a rate or ratio measure for turnover or retention and excluded studies that used a dichotomous variable for turnover (e.g., Cascio, Young, & Morris, 1997; Hallock, 1998; Yu & Park, 2006). Fourth, we included studies that focused on turnover rates for employee groups (or all employees) and excluded organizational-level studies of chief executive officer (CEO) turnover or departures of single top executives (e.g., Puffer & Weintrop, 1991). A complete list of the studies considered but excluded can be found in Appendix B.

We separated the articles into those that were complete (articles meeting the inclusion criteria and containing all the necessary information for the meta-analysis), incomplete (articles meeting the inclusion criteria but missing some needed information), and others (articles failing to meet one or more of the inclusion criteria). After isolating 62 incomplete studies, we e-mailed their 57 authors and received 31 responses. Among the responses, 20 authors were unable to provide more information for various reasons such as a confidentiality contract and lost, expired, outdated, or unavailable data, but 11 provided the information we requested, which yielded 25 additional correlations from 12 studies. As a result of these combined efforts, we obtained an initial data set of 371 turnover rates–performance correlations from 110 sources. The summary of the studies and samples used in the meta-analysis is found in Appendix A. To calculate the overall correlation, we coded all the possible zero-order correlations between turnover rates and organizational performance from each study. For example, we coded five correlations from Shaw, Gupta, and Delery's (2005) Study 2 (revenue per drive, accident frequency ratio, out-of-service percentage, operating ratio, and ROE). In addition, when a dimension of organizational performance was measured such that a higher value indicated lower performance (e.g., accident frequency ratio in Shaw, Gupta, & Delery, 2005) we reversed the correlation by multiplying by –1. However, some of the data points were non-independent because some correlations were computed from the same sample. Thus, correlations based on multiple measures of the same criterion in the same sample, such as return on surplus and return on assets (financial performance) in Riordan, Vandenberg, and Richardson (2005), were considered to be non-independent and were subsequently averaged to form a single data point. Likewise, data points based on temporally repeated measures of the same or similar criterion for the same sample (e.g., cash margin first year, cash margin second year; Chadwick, Hunter, & Walston, 2004) were also considered to be non-independent and were subsequently averaged to form a single data point. If a study reported correlations for multiple dimensions

of organizational performance (e.g., customer satisfaction and financial performance), those correlations were considered to be independent even though they were based on the same sample; therefore, they were retained as separate data points. In all, 75 non-independent correlations were averaged. These combined efforts provided 110 samples (from 104 papers) and 300 turnover rate–performance correlations, for a combined sample size of 309,245.

Table 1 shows a stem-and-leaf display of the 300 correlations, showing that the correlations are fairly normally distributed with very few outliers.

## Organization- and Context-Related Moderators

Turnover rate types were categorized as voluntary turnover, involuntary turnover, RIF, and total turnover. *Voluntary turnover* indicated the rate of employee-initiated separations (e.g., resignations), *involuntary turnover* was the rate of organization-initiated separations (e.g., dismissals), *RIF* was the temporary or permanent separation rate of employees for business reasons (e.g., layoff, downsizing), and *total turnover* was the rate of total employee separations where the reasons were not included.

We classified organizational performance dimensions as workforce productivity, financial performance, overall performance, customer satisfaction, safety-related performance, employee work attitudes, and quality performance. *Workforce productivity* was employee-generated organizational performance including such measures as sales per employee, labor hours in a manufacturing company, and loan generation efficiency in a financial service company. *Financial performance* was cost-adjusted organizational performance, such as profit, return on investment (ROI), and return on assets (ROA). *Customer satisfaction* included customer service scores and customer service performance rating. *Safety-related performance* included measures such as accident rates and service violations. *Employee work attitudes* included measures such as absenteeism and grievance filings, and *quality performance* included measures such as defect density at semiconductor facilities. If the performance measures were omitted in any previously stated criteria, they were coded as *overall performance*, for example, for studies that included general measures of overall performance reported by key informants. In addition, we also categorized the organizational performance dimensions into three broad categories: the most proximal, moderately proximal, and distal performance. The *most proximal* performance included customer satisfaction, attitudes, and absenteeism; *moderately proximal* performance included quality, safety, and workforce productivity; and *distal* performance included financial performance.

Employment systems were identified as primary, secondary, executive, and all (Arthur, 1994; Bamberger & Meshoulam, 2000; Delery & Shaw, 2001; Siebert & Zubanov, 2009). We coded a sample as a *primary employment system* when authors explicitly mentioned that their sample comprised key employee groups who can be trusted to use their discretion to carry out job tasks, such as bank branch directors (Gelade & Ivery, 2003) and school teachers (Meier & Hicklin, 2007). *Secondary employment systems* addressed periphery groups governed with specified rules and procedures, such as part-time crew members in Food-Co restaurants (Detert, Trevino, Burris, & Andiappan, 2007), nursing assistants in nursing homes units (Donoghue, 2010), and customer-service employees in call centers (Batt, 2002). We coded *executive employment systems* if the study focused on executive- or top-management-team turnover and *all* if the turnover rate applied to all employees.

*Entity size* was coded as the average number of employees within the reported unit or organization. In addition, we classified each sample into one of 11 specific *industry* categories or as *cross industry* if the sample included multiple industries. Last, we identified *region* based on whether the sample came from North America, Europe, or Asia. We classified *all* region if a study used a sample of multiple units in different countries.

## Methods-Related Moderators

Following previous meta-analysis study recommendations (e.g., Freund & Kasten, 2012; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Judge et al., 2001), we coded several other aspects of the research design and publication-related factors for additional exploratory moderator analyses.

Table 1
*Stem and Leaf Display of 300 Correlations*

| Stem | Leaf |
|---|---|
| −.9 | |
| −.8 | 0 |
| −.7 | 8,5,3,1 |
| −.6 | 5 |
| −.5 | 8,7,6,5,2,2,1,0,0 |
| −.4 | 9,9,7,7,7,6,6,5,5,5,5,3,2,2,1,0 |
| −.3 | 8,7,7,7,6,6,6,5,5,5,4,4,3,2,2,2,1,1,1,1,1,0,0 |
| −.2 | 9,9,9,8,7,7,6,5,5,5,5,5,5,5,5, 4,4,4,4,4,4,4,4,4,3,3,3,3,3,3,3,3,2,2,2,2,2,1,1,1,1,1,1,0,0,0,0,0,0 |
| −.1 | 9,9,9,9,9,9,9,8,8,8,8,8,8,7,7,7,7,7,7,7,7,7,6,6,6,6,6,6,6,5,5,5,5,5,5,5,4,4,4,4,4,4,4,4,4,3,3,3,3,3,3,3,3,2,2,2,2,2,2,2,2,2,2,1,1,1,0,0,0,0,0,0,0,0,0,0,0 |
| −.0 | 9,9,9,9,9,9,9,9,9,9,9,9,8,8,8,8,8,8,8,8,7,7,7,7,7,7,7,7,7,7,7,6,6,6,6,6,6,6,5,5,5,5,5,5,5,5,5,5,5,5,4,4,4,4,4,4,4,4,4,3,3,3,3,3,3,3,3,3,2,2,2,2,2,2,2,2,2,1,1,1,1,1,1,1 |
| .0 | 0,0,0,0,0,0,1,1,1,1,1,1,1,1,2,2,3,3,3,3,4,4,5,5,5,5,5,5,6,6,6,6,7,7,8,8,8,8,8,9 |
| .1 | 0,0,0,0,1,2,2,2,2,3,3,5,5,5,6,7,9 |
| .2 | 1 |
| .3 | 4,7,8 |
| .4 | 0,0,8 |
| .5 | |

*Unit of analysis* was classified as organizational level or unit level. Unit level was further classified into units in one organization and units in multiple organizations. *Data structure* was cross-sectional (concurrent measures of turnover rates and organizational performance), lagged (time separation between the measurement of turnover rates and organizational performance), and panel (correlations between average turnover rates across times and average organizational performance across times). If turnover rates were obtained from archival sources, the variable was coded as *organizational record*; if informants provided turnover rates, it was coded *key informant*. *Role of turnover rates* was based on its role in a given study: whether independent variable, dependent variable, mediator, moderator, or control. Moreover, when researchers predicted the relationship between turnover rates and organizational performance, we coded the sample as *hypothesized*; the rest we coded as *not hypothesized*. Last, we identified *journal quality* based on whether the study was published in a top-level journal (e.g., *Journal of Applied Psychology*, *The Academy of Management Journal*, *Administrative Science Quarterly*, *Organizational Behavior and Human Decision Processes*, *Strategic Management Journal*, *Personnel Psychology*, and *Organization Science*); publications appearing in other journals were coded as *non-top journals*.

## Meta-Analysis Procedure

We assumed that sampling error and variability in the population of the correlations (unique differences in the set of true population correlations) caused the variability among turnover rates–performance correlations. Meta-analysis researchers recommend using a random effects model that assumes that sampling error causes variability between effect sizes (Aguinis, Dalton, Bosco, Pierce, & Dalton, 2011; Erez, Bloom, & Wells, 1996). Thus, rather than using a fixed effects model, we used a random effects model to consider heterogeneity among the studies. To perform the moderator analyses, we used a mixed-effects model, which allowed us to consider some excess individual correlation variability that the tested moderator fails to explain. Although conservative, these statistical models allowed us to extend our inferences to the universe of studies rather than restricting inferences to the studies included in the sample (Hedges & Vevea, 1998; Lipsey & Wilson, 2001). We weighted each correlation value by the sample size to ensure that correlations resulting from large sample sizes had greater weighting than correlations from smaller samples. Because reliability for turnover rates and organizational performance measures is not reported, we followed other macro-level meta-analysts (e.g., Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995; Dalton, Daily, Ellstrand, & Johnson, 1998; Dalton, Daily, Johnson, & Ellstrand, 1999) and used 0.8 for the reliability correction. When the same variable was measured at more than three time points (cf. Ployhart, Weekly, & Ramsey, 2009; Van Iddekinge et al., 2009), we calculated the reliability estimate following Harter, Schmidt, and Hayes's (2002) suggestion (also see Scenario 23 of Schmidt & Hunter, 1996). For example, in Ployhart et al.'s (2009) sample, reliability estimates were .89 for store productivity, .96 for adjusted controllable profit, and .72 for percentage of sales growth. In Van Iddekinge et al.'s (2009) sample, reliability estimates were .68 for turnover rates, .28 for customer service performance ratings, and .44 for profits.

We also calculated two estimates of variability—80% credibility intervals and 95% confidence intervals. Confidence intervals provide an estimate of the variability around the estimated average correlation, and credibility intervals estimate variability of the individual correlations in the population of studies. Thus, a 95% confidence interval excluding zero indicates that one can be 95% confident that the average true score correlation is different than zero (fewer than 2.5% are zero or less, and a maximum of 2.5% are larger than the upper bound of the interval). An 80% credibility interval excluding zero indicates that at least 80% of the correlations reported are different than zero. Thus, generalizability can be inferred if the credibility interval does not include zero. In addition, we calculated the percentage variance explained (%VE) to examine Hunter and Schmidt's (2004) 75% rule: A search for moderators is warranted if artifacts can explain less than 75% of the observed variance in observed correlations. Furthermore, we conducted homogeneity analysis (Lipsey & Wilson, 2001), which tests whether it is reasonable to assume that all effect sizes are estimating the same population mean. In particular, we used the $Q$ statistic, which indicates the level of variance across study results relative to the sampling error variance (Hedges & Olkin, 1985), and generates a decision rule specifying whether a statistically significant level of variability exists in correlation coefficients across studies. The $Q$ test is analogous to analysis of variance; calculating the categorical models results in the between-group goodness-of-fit statistic $Q_B$, which has an approximate chi-square distribution with $g - 1$ degrees of freedom, where $g$ is the number of groups, and the within-groups goodness-of-fit statistic $Q_W$, which has an approximate chi-square distribution with $k - 1$ degrees of freedom, where k is equal to the number of correlations in the group (Field, 2001; Hedges & Olkin, 1985; Lipsey & Wilson, 2001).

# Results

Table 2 shows the analysis of the relationship between turnover rates and organizational performance using the available correlations.

## Full Sample Results

The top panel of Table 2 shows the meta analysis results using all available independent correlations ($k_{corr} = 300$; $N = 309{,}245$). The average corrected correlation between turnover rates and organizational performance across all studies was negative ($\rho = -.15$) and a 95% confidence level did not include zero (95% CI [–.16, –.13]). However, the corrected correlation showed large variance; the sampling error and measurement error accounted for 67.21%; the credibility interval was rather large (–.33 to .04); and the homogeneity of effect sizes tests were significant across the analyses ($Q = 4{,}358.28$, $p < .01$). This justifies not only using the random effects model, but also indicates that moderators may be present for the relationship between turnover rates and organizational performance. A few studies in the full analysis contained extremely large samples because the authors obtained data from nationwide surveys or very large panels (Baron et al., 2001; Bingley & Westergaard-Nielsen, 2004; Siebert & Zubanov, 2009). In such cases, Hunter and Schmidt (2004) recommended removing extreme observations from the analysis for a robustness check to

Table 2
*Meta-Analysis of the Relationship Between Turnover Rates and Organizational Performance: Overall Analysis*

| Sample characteristics | $k$ | $k_{corr}$ | $N$ | $r$ | ρ | $SE_\rho$ | % VE | 95% CI | 80% CV | $Q$ |
|---|---|---|---|---|---|---|---|---|---|---|
| All correlations | | | | | | | | | | |
| All studies | 110 | 300 | 309,245 | −.10 | −.15 | .01 | 67.21 | (−.16, −.13) | (−.33, .04) | 4,358.28** |
| $N > 10{,}000$ studies dropped | 107 | 290 | 162,275 | −.11 | −.16 | .01 | 74.84 | (−.18, −.14) | (−.37, .06) | 3,676.65** |
| α = 1.0 | 110 | 300 | 309,245 | −.10 | −.10 | .01 | 55.60 | (−.11, −.09) | (−.24, .04) | 2,284.34** |
| α = .7 | 110 | 300 | 309,245 | −.10 | −.15 | .01 | 68.73 | (−.17, −.14) | (−.34, .03) | 4,661.92** |
| One correlation per study | | | | | | | | | | |
| All studies | 110 | 110 | 120,066 | −.10 | −.14 | .01 | 60.27 | (−.16, −.11) | (−.29, .02) | 1,044.02** |
| $N > 10{,}000$ studies dropped | 107 | 107 | 57,236 | −.11 | −.15 | .01 | 67.84 | (−.17, −.12) | (−.33, .04) | 858.30** |
| α = 1.0 | 110 | 110 | 120,066 | −.10 | −.10 | .01 | 50.52 | (−.12, −.08) | (−.23, .03) | 655.26** |
| α = .7 | 110 | 110 | 120,066 | −.10 | −.16 | .01 | 65.95 | (−.18, −.13) | (−.33, .01) | 1,337.26** |

*Note.* $k$ = number of studies; $k_{corr}$ = total number of correlations; $N$ = total sample size for all studies combined; $r$ = sample size weighted averaged observed correlation; ρ = averaged corrected correlation (corrected for measurement error in the predictor and criterion); $SE_\rho$ = standard error of ρ; %VE = percentage of variance in ρ accounted for by sampling error and measurement error in the criterion; 95% CI = 2.5% lower and 97.5% upper limits of 95% confidence interval of ρ; 80% CV = lower and upper bounds of the 80% credibility value for ρ; $Q$ = homogeneity statistic $Q$.
** $p < .01$.

evaluate whether they disproportionately influenced the results. As shown in the second row of Table 2, the robustness check eliminating the three studies with very large samples revealed that the correlation magnitude increased slightly to –.16 (95% CI [−.18, −.14]). In addition, because we used somewhat arbitrary number, .8, to correct for unreliability, we checked the robustness of the results by assuming perfect measurement reliability (1.0) and a lower reliability level of .7. The third and fourth rows of the upper panel of Table 2 show that the turnover rates–performance correlation was –.10 (95% CI [−.11, –.09]) when we used a reliability score of 1.0, and the correlation was –.15 (95% CI [−.17, –.14]) when we used a reliability score of .7.

To further examine robustness issues, we also considered whether using multiple correlations from one study (e.g., those that included multiple performance dimensions; viz., Arthur, 1994; Shaw, Gupta, & Delery, 2005) influenced the overall results. The bottom panel of Table 2 addresses this issue: it shows the results when we averaged multiple correlations and used only one correlation from each study. Even with this change, the rho and associated statistics were substantively identical to the results using all correlations in the top panel of Table 2. An alternative approach would be to randomly sample a single correlation from those studies that reported multiple correlations rather than averaging the results. Additional checks using this approach yielded nearly identical results. Although we combined non-independent correlations (e.g., correlations based on multiple measures of the same criterion in the same sample) in the full sample results, it is still possible that use of multiple correlations from the same sample can bias the confidence and credibility intervals. Thus, we use one correlation per study in the following moderator analyses. Note that the moderator analyses results were, like the overall analyses results, substantially similar when all available correlations (i.e., 300 correlations) were used.

## Organization- and Context-Related Moderators

Table 3 shows the tests of our organization-, context-, and methods-related moderators. The top panel rows show the moderating effect of the turnover rate types (voluntary, involuntary, RIF, and total turnover rates). The between-group goodness-of-fit statistic $Q_B$ shows that the correlations between turnover rates and organizational performance were not significantly different across turnover types, $Q_B(3) = 2.56$, *ns*. However, the results show that the size of the negative correlation between involuntary turnover rates and organizational performance (ρ = –.01, 95% CI [–.18, .16]) was smaller than the associated correlations with voluntary turnover rates and organizational performance (ρ = –.15, 95% CI [–.21, –.09]), RIF turnover rates and organizational performance (ρ = –.17, 95% CI [–.29, –.06]), and total turnover rates and organizational performance (ρ = –.14, 95% CI [–.19, –.10]).

The second set of results in Table 3 shows the moderation results for the dimensions of organizational performance. The variance of turnover rates–performance correlations was significantly different across performance types, $Q_B(6) = 12.75$, $p < .05$. Specifically, the negative turnover rates–performance correlations were large when we measured performance as customer satisfaction (ρ = –.28, 95% CI [–.38, –.19]) and quality (ρ = –.26, 95% CI [–.41, –.11]). The relationship was somewhat weaker but also significant and negative when we examined employee work attitudes (ρ = –.19, 95% CI [–.32, –.05]), workforce productivity (ρ = –.13, 95% CI [–.18, –.09]), and financial performance (ρ = –.11, 95% CI [–.17, –.06]). Because correlations for safety-related performance measures were fewer than four, we removed that from the list. Furthermore, we tested the moderation effects of the three dimensions of organizational performance: proximal, moderately proximal, and distal performance. The pairwise comparison results show stronger negative turnover rates–performance correlations when performance was measured as proximal performance (ρ = –.25, 95% CI [–.33, –.17]) than moderately proximal (ρ = –.15, 95% CI [–.19, –.10]), $Q_B(1) = 5.20$, $p < .05$, and distal (ρ = –.11, 95% CI [–.16, –.06]), $Q_B(1) = 7.53$, $p < .01$.

The third set of results in Table 3 shows the moderating effect of employment systems. The results show that the correlations between turnover rates and organizational performance were significantly different across different employment systems, $Q_B(3) = 8.92$, $p < .05$. The turnover rates–organizational performance correlation was significant and negative for primary employment systems (ρ = –.22, 95% CI [–.28, –.16]) and executive employment systems (ρ = –.13, 95% CI [–.22, –.03]). The pairwise

Table 3
*Meta-Analysis of the Relationship Between Turnover Rates and Organizational Performance: Moderator Analysis*

| Sample characteristics | $k$ | $N$ | $r$ | ρ | $SE_\rho$ | %VE | 95% CI | 80% CV | $Q_B$ | $Q_W$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Organization- and context-related moderators** | | | | | | | | | | |
| Turnover rate type | | | | | | | | | 2.56 | 125.80 |
| Voluntary | 37 | 10,985 | −.11 | −.15 | .03 | 79.97 | (−.21, −.09) | (−.40, .10) | | 31.83 |
| Involuntary | 5 | 9,017 | −.00 | −.01 | .09 | 80.91 | (−.18, .16) | (−.26, .23) | | 12.30 |
| RIF | 11 | 4,665 | −.13 | −.17 | .06 | 78.14 | (−.29, −.06) | (−.42, .08) | | 20.01 |
| Total | 67 | 97,435 | −.11 | −.14 | .02 | 80.87 | (−.19, −.10) | (−.39, .11) | | 61.67 |
| Dimensions of organizational performance | | | | | | | | | 12.75* | 170.56 |
| Workforce productivity | 61 | 56,761 | −.10 | −.13 | .03 | 81.37 | (−.18, −.09) | (−.39, .12) | | 51.60 |
| Financial performance | 53 | 76,159 | −.08 | −.11 | .03 | 80.34 | (−.17, −.06) | (−.37, .14) | | 48.85 |
| Customer satisfaction | 17 | 14,124 | −.21 | −.28 | .05 | 76.30 | (−.38, −.19) | (−.54, −.02) | | 29.05* |
| Employee work attitudes | 8 | 3,853 | −.15 | −.19 | .07 | 83.06 | (−.32, −.05) | (−.44, .06) | | 7.54 |
| Quality | 8 | 3,989 | −.19 | −.26 | .07 | 69.67 | (−.41, −.11) | (−.53, .01) | | 9.20 |
| Overall performance | 14 | 5,577 | −.16 | −.20 | .05 | 83.62 | (−.30, −.10) | (−.45, .05) | | 23.79* |
| | | | | | | | | | 8.70* | 159.08 |
| Proximal performance | 25 | 17,977 | −.19 | −.25 | .04 | 77.28 | (−.33, −.17) | (−.50, .00) | | 40.00* |
| Moderately proximal performance | 72 | 61,476 | −.11 | −.15 | .02 | 79.75 | (−.19, −.10) | (−.39, .10) | | 67.48 |
| Distal performance | 53 | 76,159 | −.08 | −.11 | .03 | 79.91 | (−.16, −.06) | (−.36, .13) | | 51.60 |
| Employment systems | | | | | | | | | 8.92* | 121.35 |
| Primary | 31 | 23,938 | −.16 | −.22 | .03 | 71.24 | (−.28, −.16) | (−.43, .00) | | 37.17 |
| Secondary | 10 | 17,223 | −.06 | −.09 | .05 | 86.05 | (−.18, .01) | (−.28, .11) | | 4.16 |
| Executive | 12 | 11,196 | −.09 | −.13 | .05 | 74.13 | (−.22, −.03) | (−.34, .08) | | 12.84 |
| All | 64 | 93,501 | −.09 | −.12 | .02 | 75.99 | (−.16, −.08) | (−.33, .09) | | 67.18 |
| Industry | | | | | | | | | 14.86 | 114.26 |
| Manufacturing | 13 | 27,512 | −.09 | −.13 | .04 | 69.78 | (−.22, −.04) | (−.34, .09) | | 17.02 |
| Service | 14 | 5,339 | −.11 | −.15 | .04 | 73.45 | (−.24, −.07) | (−.36, .06) | | 12.69 |
| Banking | 6 | 523 | −.23 | −.29 | .07 | 59.02 | (−.43, −.14) | (−.52, −.05) | | 13.65* |
| Education | 5 | 7,372 | −.19 | −.24 | .06 | 87.20 | (−.37, −.11) | (−.43, .05) | | 3.11 |
| Hospital | 7 | 1,591 | −.18 | −.23 | .06 | 65.39 | (−.35, −.10) | (−.45, −.01) | | 1.59 |
| Restaurant | 8 | 4,015 | −.13 | −.19 | .06 | 69.04 | (−.31, −.08) | (−.41, .02) | | 6.32 |
| Retail | 8 | 13,808 | −.01 | −.02 | .06 | 74.18 | (−.14, .09) | (−.23, .18) | | 17.55* |
| Cross industry | 43 | 58,824 | −.10 | −.12 | .02 | 80.50 | (−.17, −.08) | (−.32, .08) | | 38.56 |
| Region | | | | | | | | | 14.65** | 115.36 |
| North America | 67 | 37,569 | −.15 | −.19 | .02 | 70.56 | (−.23, −.15) | (−.40, .02) | | 60.32 |
| Europe | 23 | 67,621 | −.05 | −.06 | .03 | 83.12 | (−.12, −.00) | (−.26, .13) | | 40.28* |
| Asia | 17 | 11,762 | −.07 | −.09 | .04 | 74.21 | (−.17, −.02) | (−.30, .11) | | 12.31 |
| All | 3 | 3,114 | −.06 | −.09 | .09 | 80.33 | (−.26, .09) | (−.29, .11) | | 2.45 |
| **Methods-related moderators** | | | | | | | | | | |
| Unit of analysis | | | | | | | | | 1.77 | 112.94 |
| Organization | 67 | 90,349 | −.10 | −.13 | .02 | 79.00 | (−.17, −.09) | (−.35, .09) | | 52.03 |
| Units in one organization | 32 | 25,234 | −.12 | −.16 | .03 | 71.91 | (−.22, −.10) | (−.39, .07) | | 47.75* |
| Units in multiple organizations | 11 | 4,483 | −.15 | −.20 | .05 | 76.54 | (−.30, −.09) | (−.42, .02) | | 13.16 |
| Data structure | | | | | | | | | 18.56** | 122.28 |
| Cross-sectional | 81 | 70,512 | −.10 | −.13 | .02 | 73.86 | (−.17, −.10) | (−.34, .07) | | 81.34 |
| Lagged performance | 31 | 13,438 | −.18 | −.23 | .03 | 69.01 | (−.29, −.18) | (−.45, −.02) | | 31.55 |
| Panel | 7 | 42,467 | .01 | .02 | .05 | 87.89 | (−.08, .13) | (−.17, .21) | | 9.38 |
| Source of turnover rates information | | | | | | | | | 0.14 | 113.84 |
| Organizational record | 52 | 101,161 | −.11 | −.15 | .02 | 78.34 | (−.20, −.11) | (−.37, .07) | | 75.97* |
| Key informant | 58 | 18,906 | −.11 | −.14 | .02 | 75.22 | (−.19, −.10) | (−.36, .08) | | 37.86 |
| Role of turnover rates | | | | | | | | | 1.89 | 115.25 |
| Independent variable | 49 | 83,407 | −.11 | −.14 | .02 | 77.13 | (−.19, −.09) | (−.36, .08) | | 57.92 |
| Dependent variable | 44 | 21,253 | −.12 | −.16 | .03 | 72.27 | (−.21, −.11) | (−.38, .07) | | 36.95 |
| Mediator | 9 | 3,597 | −.13 | −.18 | .05 | 83.91 | (−.29, −.08) | (−.39, .03) | | 9.83 |
| Control | 8 | 9,072 | −.07 | −.09 | .06 | 85.37 | (−.21, .02) | (−.30, .12) | | 10.23 |
| Hypothesized | | | | | | | | | 0.02 | 113.90 |
| Hypothesized | 58 | 90,226 | −.11 | −.15 | .02 | 78.01 | (−.19, −.10) | (−.37, .07) | | 65.20 |
| Not hypothesized | 52 | 29,841 | −.11 | −.14 | .02 | 75.20 | (−.19, −.10) | (−.37, .08) | | 48.70 |
| Journal quality | | | | | | | | | 0.24 | 113.92 |
| Top journal | 45 | 35,519 | −.12 | −.16 | .03 | 74.50 | (−.21, −.10) | (−.38, .07) | | 45.79 |
| Non-top journal | 65 | 84,547 | −.11 | −.14 | .02 | 78.15 | (−.18, −.10) | (−.36, .08) | | 68.13 |

*Note*. $k$ = number of correlations from independent samples; $N$ = total sample size for all studies combined; $r$ = sample size weighted averaged observed correlation; ρ = averaged corrected correlation (corrected for measurement error in the predictor and criterion); $SE_\rho$ = standard error of ρ; %VE = percentage of variance in ρ accounted for by sampling error and measurement error in the criterion; 95% CI = 2.5% lower and 97.5% upper limits of 95% confidence interval of ρ; 80% CV = lower and upper bounds of the 80% credibility value for ρ; $Q_B$ = homogeneity statistic $Q$ between groups; $Q_W$ = homogeneity statistic $Q$ within groups; RIF = reduction-in-force.
* $p < .05$. ** $p < .01$.

comparison results show that the negative turnover rates–performance correlation was marginally significantly weaker for secondary employment systems (ρ = –.09, 95% CI [–.18, .01]) than for primary employment systems, $Q_B(1) = 3.66$, $p = .06$.

Because entity size was a continuous variable, we examined its moderating effect using weighted regression analysis (Hedges & Olkin, 1985; Lipsey & Wilson, 2001, p. 122; for examples also see Greenwald et al., 2009; Kirca et al., 2011). We took the natural log of the entity size variable to address distribution skewness before entering it into the regression equation. We used the available studies reporting entity size information but excluded three because they included alternative measures of entity size, such as supermarket square footage (Shaw et al., 2012), hospital bed counts (Shortell et al., 1994), and barrels produced at concrete companies (Keck, 1997). The weighted regression results using all turnover rates samples (regardless of turnover types) are shown in the top part of Table 4. As the table shows, entity size was significantly and positively related to the turnover rates–organizational performance correlation ($b = .04$, β = .41, $p < .01$). Thus, entity size significantly moderated the turnover rates–performance correlation so that the turnover rates and organizational performance correlation was negative but weaker in samples with larger entities.

Also in Table 3 are the moderation results for industries. In contrast to our expectation, the moderating effect of industry was not statistically significant, $Q_B(10) = 14.86$, *ns*. The turnover rates–organizational performance relationship was significantly different than zero in banking (ρ = –.29, 95% CI [–.43, –.14]), education (ρ = –.24, 95% CI [–.37, –.11]), hospitals (ρ = –.23, 95% CI [–.35, –.10]), restaurants (ρ = –.19, 95% CI [–.31, –.08]), services (ρ = –.15, 95% CI [–.24, –.07]), and manufacturing (ρ = –.13, 95% CI [–.22, –.04]) samples. The relationship was not significantly different than zero in retail samples (ρ = –.02, 95% CI [–.14, .09]). We removed computer technology, petroleum, and government industries moderation effects from the table because they had fewer than four correlations.

Table 4
*Meta-Analytic Regression Analysis: Entity Size Moderation*

| Moderators | Turnover–performance correlations (ρ) | | | |
|---|---|---|---|---|
| | *b* | β | (*p*) | *z* |
| Full sample ($k = 37$) | | | | |
| Constant | −.35 | .00 | (.00) | −4.92 |
| Entity size | .04 | .41 | (.00) | 2.95 |
| $R^2$ | .17 | | (.00) | |
| v [se(v)] | .01 | [.00] | | |
| Voluntary turnover sample ($k = 15$) | | | | |
| Constant | −.46 | .00 | (.00) | −3.60 |
| Entity size | .06 | .45 | (.04) | 2.10 |
| $R^2$ | .21 | | (.04) | |
| v [se(v)] | .01 | [.01] | | |

*Note*. Analyses were conducted using mixed-effects models (fixed predictor slopes, random intercepts) with maximum likelihood estimation. $k$ = number of correlations from independent samples in each analysis; $b$ = unstandardized regression coefficient; β = standardized regression coefficient; $z$ = critical ratio test for the regression coefficient; $p$ = two-tailed probability of $z$; v = maximum likelihood random effects variance component; se(v) = standard error of estimated variance component.

The fifth set of results in Table 3 shows that region had a significant moderating effect, $Q_B(3) = 14.65$, $p < .01$. As expected, the turnover rates and performance correlation was more strongly negative in North America (ρ = –.19, 95% CI [–.23, –.15]) than in regions that have relatively rigid markets (Asia, ρ = –.09, 95% CI [–.17, –.02]; Europe, ρ = –.06, 95% CI [–.12, –.00]).

## Methods-Related Moderators

The bottom half of Table 3 shows the results for methods-related moderators. The moderation results for unit of analysis showed that correlation sizes were not significantly different across unit of analysis, $Q_B(2) = 1.77$, *ns*. The turnover rates-organizational performance correlations were significantly different than zero in unit-level samples in single organizations (ρ = –.16, 95% CI [–.22, –.10]), for samples with units in multiple organizations (ρ = –.20, 95% CI [–.30, –.09]), and for organization-level samples (ρ = –.13, 95% CI [–.17, –.09]).

The next panel shows that data structure was a significant moderator, $Q_B(2) = 18.56$, $p < .01$; turnover rates–organizational performance correlation was significant when cross-sectional (ρ = –.13, 95% CI [–.17, –.10]) and lagged (ρ = –.23, 95% CI [–.29, –.18]) designs were used, but not when panel designs (ρ = .02, 95% CI [–.08, .13]) were used. As noted, the correlations from studies coded as "panel" were average correlations across organization-years. Thus, this represents a weak test of the moderating effect of a panel design.

The turnover rates–organizational performance relationship was not significantly moderated by the source of turnover rates, $Q_B(1) = 0.14$, *ns*, the role of the turnover rates variable, $Q_B(4) = 1.89$, *ns*, whether researchers predicted a relationship between turnover rates and organizational performance, $Q_B(1) = 0.02$, *ns*, or journal quality (top journals vs. non-top journals), $Q_B(1) = 0.24$, *ns*.

## Moderator Analyses for Voluntary Turnover Rates

Table 5 displays the results when only *voluntary* turnover rates samples were used for the meta-analysis. We analyzed voluntary turnover rates separately because voluntary turnover rates are the focal variable in the many macro-level turnover studies. We summarize the results below briefly, with a focus on the differences between the voluntary turnover rates results and those from the full sample. Although many results in Table 5 are similar to the total turnover rates results in Table 3, several notable differences appear.

In the voluntary turnover rates tests, the dimensions of organizational performance were significant moderators, $Q_B(6) = 15.89$, $p < .05$, but the patterns were somewhat different than with the full sample. The correlation between turnover rates and workforce productivity was similar for the full sample (ρ = –.13, 95% CI [–.18, –.09]) and the voluntary turnover rates-only sample (ρ = –.15, 95% CI [–.21, –.08]), but the correlation was not significant for voluntary turnover rates and financial performance (ρ = .01, 95% CI [–.08, .11]), whereas the corresponding financial performance results for the full sample was significant (ρ = –.11, 95% CI [–.17, –.06]). The moderation effects of the three dimensions of organizational performance—proximal, moderately proximal, and distal performance—were similar to the results from the full sample. The moderating role of employment systems was not significant in the voluntary turnover rates sample, $Q_B(2) = 3.80$, *ns*.

Table 5
*Meta-Analysis of the Relationship Between Voluntary Turnover Rates and Organizational Performance: Moderator Analysis*

| Sample characteristics | $k$ | $N$ | $r$ | ρ | $SE_\rho$ | %VE | 95% CI | 80% CV | $Q_B$ | $Q_W$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Organization- and context-related moderators** | | | | | | | | | | |
| Dimensions of organizational performance | | | | | | | | | 15.89* | 48.59 |
| Workforce productivity | 22 | 6,708 | −.11 | −.15 | .03 | 73.99 | (−.21, −.08) | (−.34, .05) | | 16.45 |
| Financial performance | 10 | 5,909 | .01 | .01 | .05 | 75.84 | (−.08, .11) | (−.18, .21) | | 9.92 |
| | | | | | | | | | 13.10** | 47.55 |
| Proximal performance | 7 | 807 | −.20 | −.25 | .06 | 64.37 | (−.37, −.13) | (−.46, −.04) | | 12.97* |
| Moderately proximal performance | 27 | 7828 | −.12 | −.15 | .03 | 73.62 | (−.21, −.10) | (−.35, .04) | | 24.72 |
| Distal performance | 10 | 5909 | .01 | .01 | .05 | 76.17 | (−.08, .11) | (−.18, .21) | | 9.86 |
| Employment systems | | | | | | | | | 3.80 | 40.11 |
| Primary | 9 | 1,289 | −.17 | −.23 | .06 | 64.12 | (−.34, −.12) | (−.45, −.01) | | 8.60 |
| Secondary | 4 | 919 | −.15 | −.19 | .08 | 76.99 | (−.35, −.04) | (−.39, .01) | | 1.51 |
| All | 24 | 8,777 | −.08 | −.11 | .03 | 74.94 | (−.17, −.05) | (−.31, .10) | | 30.00 |
| Industry | | | | | | | | | 14.73* | 41.71* |
| Manufacturing | 4 | 373 | −.10 | −.14 | .08 | 52.41 | (−.29, .01) | (−.34, .06) | | 10.84* |
| Service | 9 | 3,598 | −.13 | −.18 | .05 | 63.56 | (−.27, −.08) | (−.36, .00) | | 7.13 |
| Cross industry | 17 | 5,985 | −.11 | −.14 | .03 | 74.75 | (−.20, −.08) | (−.31, .03) | | 15.77 |
| Region | | | | | | | | | 4.00 | 41.90 |
| North America | 20 | 3,466 | −.15 | −.19 | .03 | 67.38 | (−.26, −.12) | (−.40, .02) | | 12.88 |
| Europe | 8 | 3,357 | −.07 | −.10 | .04 | 74.87 | (−.21, .00) | (−.30, .09) | | 25.13** |
| Asia | 8 | 1,803 | −.08 | −.11 | .05 | 75.42 | (−.21, .00) | (−.30, .09) | | 3.88 |
| **Methods-related moderators** | | | | | | | | | | |
| Unit of analysis | | | | | | | | | 2.21 | 38.39 |
| Organization | 20 | 4,496 | −.10 | −.12 | .04 | 77.50 | (−.19, −.05) | (−.33, .09) | | 11.87 |
| Units in one organization | 11 | 3,075 | −.15 | −.21 | .05 | 65.43 | (−.32, −.11) | (−.45, .02) | | 24.32** |
| Units in multiple organizations | 6 | 3,414 | −.09 | −.12 | .07 | 80.95 | (−.25, .01) | (−.32, .09) | | 2.20 |
| Data structure | | | | | | | | | 3.94* | 37.72 |
| Cross-sectional | 25 | 8,761 | −.10 | −.13 | .03 | 69.61 | (−.18, −.07) | (−.31, .05) | | 23.72 |
| Lagged performance | 8 | 1,332 | −.18 | −.24 | .05 | 62.42 | (−.35, −.14) | (−.43, −.06) | | 14.00 |
| Source of turnover rates information | | | | | | | | | 0.03 | 40.53 |
| Organizational record | 7 | 871 | −.09 | −.13 | .07 | 48.64 | (−.27, .00) | (−.28, .09) | | 18.12** |
| Key informant | 30 | 10,114 | −.11 | −.15 | .03 | 64.34 | (−.21, −.09) | (−.27, .05) | | 22.41 |
| Role of turnover rates | | | | | | | | | 0.45 | 40.22 |
| Independent variable | 13 | 4,106 | −.11 | −.16 | .05 | 72.79 | (−.25, −.06) | (−.37, .06) | | 25.56* |
| Dependent variable | 19 | 5,167 | −.1 | −.15 | .04 | 72.51 | (−.23, −.08) | (−.37, .07) | | 13.46 |
| Mediator | 5 | 1,712 | −.08 | −.10 | .07 | 87.40 | (−.24, .03) | (−.30, .10) | | 1.20 |
| Hypothesized | | | | | | | | | 0.00 | 40.46 |
| Hypothesized | 17 | 5,402 | −.10 | −.15 | .04 | 76.12 | (−.22, −.07) | (−.36, .07) | | 26.65* |
| Not hypothesized | 20 | 5,583 | −.11 | −.15 | .04 | 73.47 | (−.22, −.07) | (−.36, .07) | | 13.81 |
| Journal quality | | | | | | | | | 0.10 | 40.42 |
| Top journal | 11 | 3,988 | −.12 | −.16 | .05 | 68.61 | (−.26, −.06) | (−.39, .07) | | 30.47 |
| Non-top journal | 26 | 6,997 | −.11 | −.14 | .03 | 77.01 | (−.20, −.08) | (−.35, .07) | | 9.95 |

*Note.* $k$ = number of correlations from independent samples; $N$ = total sample size for all studies combined; $r$ = sample size weighted averaged observed correlation; ρ = averaged corrected correlation (corrected for measurement error in the predictor and criterion); $SE_\rho$ = standard error of ρ; %VE = percentage of variance in ρ accounted for by sampling error and measurement error in the criterion; 95% CI = 2.5% lower and 97.5% upper limits of 95% confidence interval of ρ; 80% CV = lower and upper bounds of the 80% credibility value for ρ; $Q_B$ = homogeneity statistic $Q$ between groups; $Q_W$ = homogeneity statistic $Q$ within groups.
* $p < .05$. ** $p < .01$.

The moderating effect of entity size using a weighted regression is shown in the lower part of Table 4. The pattern of findings was similar to the full sample results ($b = .06$, $\beta = .45$, $p < .05$).

Another notable difference in the voluntary turnover rates moderator results involved employment systems. The primary employment systems moderation effect was similar for the full sample (ρ = −.22, 95% CI [−.28, −.16]) and the voluntary turnover rates-only sample (ρ = −.23, 95% CI [−.34, −.12]). However, the secondary employment system moderation effect was significant and negative in voluntary turnover rates-only sample (ρ = –.19, 95% CI [–.35, –.04]), but the corresponding moderation effect for the full sample was not significant (ρ = –.09, 95% CI [–.18, .01]). Note, however, that many of the differences between results from the full sample (see Table 3) and the voluntary turnover rates sample (see Table 5) could be due to smaller number of correlations for the latter sample.

## Exploratory Sample-Level Regression Results: Average Turnover Rates Level and the Turnover Rates–Organizational Performance Correlation

For our final analysis, we examined whether the relationship between turnover rates and organizational performance varied in magnitude across samples based on the average levels of turnover reported (see Table 6). These do not directly test the alternative theories outlined in the introduction, because the alternative theo-

Table 6
*Meta-Analytic Regression Analysis: Average Sample-Level Turnover Rates and the Turnover Rates–Organizational Performance Correlation*

| Moderators | Turnover rates–organizational performance correlation (ρ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Step 1 | | | | Step 2 | | | |
| | *b* | β | (*p*) | *z* | *b* | β | (*p*) | *z* |
| Total turnover rates level moderation ($k = 103$) | | | | | | | | |
| Constant | −.12 | .00 | (.00) | −5.47 | −.13 | .00 | (.00) | −4.71 |
| Average turnover rates | −.12 | −.22 | (.02) | −2.28 | −.02 | −.05 | (.85) | −0.18 |
| Average Total Turnover Rates × Average Total Turnover Rates | | | | | −.06 | −.19 | (.44) | −0.76 |
| $R^2$ | .05 | | (.02) | | .05 | | (.05) | |
| v [se(v)] | .02 | [.00] | | | .02 | [.00] | | |
| Voluntary turnover rates level moderation ($k = 31$) | | | | | | | | |
| Constant | −.05 | .00 | (.19) | −1.31 | −.05 | .00 | (.45) | −0.75 |
| Average voluntary turnover rates | −.60 | −.46 | (.00) | −3.02 | −.58 | −.44 | (.45) | −0.75 |
| Average Voluntary Turnover Rates × Average Voluntary Turnover Rates | | | | | −.04 | −.01 | (.98) | −0.02 |
| $R^2$ | .21 | | (.00) | | .21 | | (.01) | |
| v [se(v)] | .01 | [.00] | | | .01 | [.00] | | |

*Note*. Analyses were conducted using mixed-effects models (fixed predictor slopes, random intercepts) with maximum likelihood estimation. $k$ = number of correlations from independent samples in each analysis; $b$ = unstandardized regression coefficient; β = standardized regression coefficient; $z$ = critical ratio test for the regression coefficient; $p$ = two-tailed probability of $z$; v = maximum likelihood random effects variance component; se(v) = standard error of estimated variance component.

ries reside at the organizational level (e.g., they were developed to test the relationship in between-organizations designs), whereas the sample level is the unit of analysis in these regressions. They do, however, provide some evidence illuminating the alternative models.

The top part of Table 6 shows the weighted regression results when sample-level average total turnover rates are the independent variable and the turnover rates–organizational performance correlations are the dependent variable. In Step 1, average total turnover rates were significantly and negatively related to the correlation between total turnover rates and organizational performance ($b = –.12$, $\beta = –.22$, $p = .02$). In Step 2, we entered the squared average turnover rate variable. The squared turnover rates term was not significant ($b = –.06$, $\beta = –.19$, *ns*). Thus, in terms of the sample-level conclusion with turnover rates of all types, the turnover rates and organizational performance relationship became more negative as average turnover rates increased.

In the bottom part of Table 6, we report the weighted regressions after restricting the sample to only those studies that examined voluntary turnover rates. In Step 1, the linear average sample-level voluntary turnover term was significantly and negatively related to the voluntary turnover rates–organizational performance correlations ($b = –.60$, $\beta = –.46$, $p = .00$). In Step 2, the squared average voluntary turnover rates term was not statistically significant ($b = –.04$, $\beta = –.01$, *ns*). Note, however, that when we restricted our sample to voluntary turnover only, average voluntary turnover rates ranged from near zero to .5, with no observation greater than .5. Thus, our results can be interpreted, at best, to show that the voluntary turnover rates and organizational performance correlation becomes more negative as average voluntary turnover rates increase from zero to .5.

These two sets of results generally suggest that the relationship between turnover rates and organizational performance is nonlinear; if the relationship at the organizational level were linear, we would expect a flat (nonsignificant) slope in the relationship between average turnover rates and the turnover rates-performance correlation. That is, the relationship should be invariant across average turnover rate levels. In terms of the voluntary turnover rates results, the results also contrast with the inverted-U formulation (Model 3), because the predicted correlations became *more* negative as voluntary turnover rates increased from zero to .5; in no case did we observe a predicted positive correlation. We cannot make strong conclusions about the attenuated negative view (Model 2), however, because of range restriction. We discuss the implication of these results further in the discussion section.

## Discussion

Most organizations regard employee turnover to be a critical concern in formulating strategies for better company performance and in countering the costs of degraded safety, productivity, customer satisfaction, and financial performance. Unsurprisingly, researchers have conducted hundreds of studies to discern why individuals quit their jobs and to design ways to control turnover (e.g., Holtom et al., 2008). Researchers have also studied how turnover rates relate to outcome at higher levels of unit and organizational analyses. We contend that we must now summarize understandings and set literature-level benchmarks for the relationship between turnover rates and organizational performance. In this study, we contribute to the literature by (a) meta-analyzing the relationship between turnover rates and organizational performance, (b) outlining and testing theoretically relevant moderators of the relationship, and (c) testing other moderating features related to contexts and methods for examining the relationship. We believe that researchers and practitioners can benefit substantially by having a reference point that characterizes the overall turnover rates–performance relationship—a point of departure for future endeavors to investigate and compare the relationship in specific contexts. In this discussion, we review our meta-analytic results and discuss future directions for macro-level turnover research.

## The Relationship Between Turnover Rates and Organizational Performance

Perhaps our most important contribution is validating the proposition that increased turnover rates damage organizational performance. After correcting for sampling and measurement artifacts across 300 turnover rate–organizational performance correlations and a sample of more than 300,000 organizations and units, the estimated meta-analytic correlation was –.15. Following Crook, Todd, Combs, Woehr, and Ketchen (2011), we interpreted this association as suggesting that a one standard deviation increase in turnover rates was associated with a –.15 standard deviation reduction in organizational performance. Per their work, we applied the overall meta-analytic result to a single sample in our analysis—Guthrie, Datta, and Wadhwa's (2010) large cross-industry and nationally representative sample of U.S. organizations that showed a mean and standard deviation of 0.22 and 0.58 for workforce productivity (firm sales growth) and 3.95 and 6.97 for financial performance (firm profitability). Based on our meta-analytic findings, we would expect their sample to show that a one standard deviation increase in turnover rates from 12% to 22% decreases workforce productivity from .22 to .13, a 40% reduction. In addition, we would expect a one standard deviation increase in turnover rates to lower financial performance from 3.95 to 2.90, a 26% reduction. Thus, a key finding from our quantitative review is that, despite some variation across moderators in our study, organizations should attempt to control turnover rates. Failing to do so may substantially reduce performance.

Detractors might point to the modest magnitude ($\rho = -.15$) of the association and highlight that turnover rates explain only a small amount of variance in organizational performance. From a qualitative standpoint, however, Prentice and Miller (1992) argued that small effects can be considered impressive when the outcome variable has many legitimate predictors and when the outcome is "difficult-to-influence" (p. 162). In the case of organizational performance, the literature offers dozens of established correlates (e.g., location, strategy, technology, organizational processes, physical resources, and unique products and services). Therefore we can reasonably expect that single predictors provide modest explanations compared with explanations from other phenomena with fewer antecedents. Our results are consistent with other meta-analytic reviews using organizational performance as a dependent variable that report similar or often smaller effect sizes (e.g., from .02 to .21; Crook et al., 2011; Dalton et al., 1998, 1999; Geyskens, Steenkamp, & Kumar, 2006; Heugens & Lander, 2009; Kirca et al., 2011). Moreover, many organizations compete where fixed expenses dominate cost structures. Consequently, they attempt to leverage higher performance by manipulating a few important variables, including the quality of their human resources. In such cases, minor declines in workforce productivity through higher turnover rates may make the difference between profit and loss and, potentially, success or failure.

## Organization- and Context-Related Moderators

Our meta-analysis results show that involuntary turnover rates and organizational performance correlations are quite different in size from voluntary/RIF turnover rates and organizational performance correlations. These findings validate researchers' arguments that careful conceptualization and operationalization of turnover rates are important because turnover types have different etiologies and consequences (Hausknecht & Trevor, 2011; Holtom et al., 2008; Shaw, 2011). Of note, the relationship between *involuntary* turnover rates and organizational performance is not statistically significantly different from zero, which refutes recent theorizing that *both* voluntary and involuntary turnover are harmful because involuntary turnover signals problems in workforce quality (Batt & Colvin, 2011; Hausknecht & Trevor, 2011). Instead, this result seemingly shows that involuntary turnover is less harmful because it occurs under organizational control and may serve functional purposes such as eliminating poor performers (Abelson & Baysinger, 1984; Holtom et al., 2008). However, such a view is also not fully supported because the involuntary turnover rates and organizational performance relationship was not positive. RIF turnover rates are strongly and negatively related with performance, which supports the proposition that RIF turnover may be dysfunctional because it increases employment instability, decreases social capital, encourages behavioral rigidity (e.g., Cameron et al., 1987), and negatively affects survivor's attitudes and behaviors.

Although these results answer some questions posed in the literature, several important unknowns remain. First, the meta-analysis fails to fully address reverse causality, and thus readers should approach our results with the same caution they use in interpreting qualitative review papers about turnover rates and organizational performance relationships (Datta et al., 2010; Hausknecht & Trevor, 2011; Shaw, 2011). In two recent qualitative reviews, Hausknecht and Trevor (2011) and Shaw (2011) concluded that the causal relationship between total/voluntary turnover rates and organizational performance is more likely than the reverse, partly because empirical studies that have examined reverse causality empirically find much stronger results for our presumed causal sequence (e.g., Glebbeek & Bax, 2004; Ton & Huckman, 2008; Van Iddekinge et al., 2009). Supporting this, we show that lagged performance samples have a stronger negative association between turnover rates and organizational performance than do cross-sectional samples.

The relatively less well-established nature and causality of the relationship between RIF/involuntary turnover and organizational performance deserve more future attention. In their qualitative review of the RIF turnover literature, Datta et al. (2010) noted that "an important limitation of extant research is the overreliance on static, cross-sectional designs" (p. 339). Thus, our results for these turnover types should be interpreted with caution in light of the potential for reverse causality and confounding factors. We believe that future studies can significantly extend the turnover literature by revealing the mechanisms (or mediators) of the RIF turnover and organizational performance relationship. Another way to extend the RIF turnover literature would be to explore contextual and moderating effects on the RIF turnover and performance relationship (Datta et al., 2010). Furthermore, although RIF turnover studies are increasing, many have used RIF announcements rather than RIF turnover *rates* in deriving their predictions and tests (e.g., Ahmadjian & Robinson, 2001; Cascio et al., 1997; Chalos & Chen, 2002; Flanagan & O'Shaughnessy, 2005; Hallock, 1998; Love & Nohria, 2005; Perry & Shivdasani, 2005; Wayhan & Werner, 2000; Worrell, Davidson, & Sharma, 1991). Examining the effects of RIF turnover rates on organizational performance

can significantly extend our understanding because it informs both researchers and practitioners about appropriate degrees or levels of RIF turnover. For example, Lee (1997) suggested a curvilinear relationship between RIF turnover rates and organizational financial performance; negative RIF turnover effects strengthen as RIF turnover rates increase. We found no follow-up studies that examined potential curvilinearity between RIF turnover rates and organizational performance. Future studies could take a major step forward by incorporating process issues such as announcements, implementation factors, and RIF turnover levels or rates.

Similarly, we believe our results present a good point of departure for future studies to theorize and empirically examine *involuntary* turnover effects, perhaps the least-studied consequences in the turnover literature. We located only seven studies of involuntary turnover issues: Two investigated antecedents of involuntary turnover, not consequences (Guthrie et al., 2010; Shaw et al., 1998), and only five examined consequences (Batt & Colvin, 2011; Chi & Wang, 2009; McElroy et al., 2001; Simon, De Sivatte, & Olmos, 2012; Subramony & Holtom, 2011a). Thus, more evidence is needed. In addition, research into potential contextual factors that make the relationship more or less negative may extend our understanding of involuntary turnover effects. We can reasonably expect that the conditions that cause companies to make and implement involuntary turnover decisions would significantly moderate the involuntary turnover effects on organizational performance. Moreover, future studies must address possible confounding factors in the involuntary turnover and performance relationship; for example, poor selection might be responsible for both high involuntary turnover rates and poor organizational performance. Furthermore, future studies should clarify operationalization and measurements. Involuntary turnover may be too crude a classification; diverse forms of leaving such as dismissals, disabilities, and retirements might exert different effects.[2] It is also possible that organizations report involuntary turnover information inaccurately for legal reasons. Thus, we encourage future researchers to theorize and rigorously examine the involuntary turnover and organizational performance relationship.

Recently, some researchers proposed an alternative conceptualization of turnover rather than voluntary, involuntary, and RIF turnover. Hausknecht and Holwerda (2012) considered timing aspects of turnover, and suggest five alternative conceptualizations of turnover rates: leaver proficiencies, time dispersion, positional distribution, remaining member proficiencies, and newcomer proficiencies. In addition, Nyberg and Ployhart (2012) defined unit-level turnover as emerging from knowledge, skills, abilities, and other characteristics (KSAOs), and suggested that turnover rates effects should be understood by considering the mix of the quantity and quality of KSAOs depletion. As such, our understanding of turnover rates effects will be extended further by considering alternative conceptualizations of turnover types.

We expected our meta-analysis to show that the turnover rates–organizational performance relationship would be stronger when performance was measured as proximal performance dimensions (e.g., customer satisfaction, employee work attitudes) rather than as moderately proximal (e.g., safety, quality, workforce productivity) or distal (e.g., financial performance). Consistent with our expectation, the results showed the strongest negative relationship for proximal performance and the weakest for distal performance. This result is consistent with Kacmar et al.'s (2006) and Shaw's (2011) propositions that turnover impacts financial performance through workforce performance. In addition, this implies that turnover researchers should cautiously use financial performance as an organizational outcome measure because other confounding factors weaken turnover's direct effects.

The results also show that employment systems significantly moderate the turnover rates–performance relationship: the turnover rates and organizational performance relationship is more negative under primary than secondary employment systems. This finding confirms previous propositions that the emphasis on human resource management systems influences the relationship (e.g., Arthur, 1994; Guthrie, 2001; Shaw, Gupta, & Delery, 2005). Because it takes employees significant time to reach adequate performance levels under primary systems, human and social capital losses through turnover are greater than under secondary employment systems. Extending the HRM-moderated approach, future researchers may benefit by considering various types of employee–organization relationships (Hom, Tsui, Wu, & Lee, 2009; Shaw et al., 2009; Tsui, Pearce, Porter, & Tripoli, 1997) when they examine turnover rates–performance relationships. For example, the direction and magnitude of the relationship may be different when organizations emphasize different levels of offered inducements (high training investments) and expected contributions (e.g., use of pay-for-performance).

Also, our results show that entity size plays a role in determining the magnitude of the turnover rates–performance correlation. This is somewhat consistent with the argument that larger entities can buffer turnover's negative effects (Green et al., 1996; Kozlowski & Bell, 2003) and better withstand the same proportional information losses (Carley, 1992). The literature provides few tests of entity size moderation, however, so we need more data before dismissing the view that turnover is less costly in smaller entities (e.g., Hausknecht et al., 2009).

Moreover, our meta-analysis results imply that the disruptive impacts of turnover, especially voluntary turnover, on organizational performance differ across industries. In general, the results show a relatively stronger negative relationship between voluntary turnover rates and organizational performance in industries with higher human capital emphasis (e.g., service industries) compared with industries with lower human capital emphasis (e.g., manufacturing). This is consistent with the contingency framework in strategic human resource management literature; an organization's industrial context alters the relative effectiveness of employment relationship policies such as downsizing (e.g., Guthrie & Datta, 2008). From a practical standpoint, the meta-analysis results imply that practitioners in service industries may need to pay more attention to turnover rates management or hiring and staffing management than those in manufacturing/production-related industries.

Last, our results suggest regional differences in the turnover rates–organizational performance relationship; the North American samples showed a more strongly negative relationship than did the European samples. European labor markets are known for high rigidity, controlling legislation, generous unemployment benefits, and strong unionization (Nickell, 1997). Thus, the negative impacts of turnover on organizational performance may be weaker in

[2] We thank an anonymous reviewer for this suggestion.

European organizations than in North American organizations because their turnover occurs for more legitimate reasons or is more predictable. Cultural differences across regions, such as collectivism versus individualism, provide another potential explanation (e.g., Hofstede, 1980). Turnover may be more disruptive for organizational performance in individualistic cultures than in collectivistic cultures because work processes are more easily disrupted in individualistic culture where each individual is encouraged to take their own unique roles. Also, organizations in individualistic cultures may have more difficulty finding internal replacements than those in collective cultures because existing employees will feel less peer pressure to complete the tasks of the departing individual. Most research on the turnover rates–performance relationship has been conducted in individualistic countries; we lack rigorous empirical evidence from collectivistic countries. Future research capturing the moderating role of cultural variances (e.g., multinational company samples) may extend our understanding about the impacts of turnover rates.

## Sample-Level Regressions

In exploratory weighted regressions, we show that turnover rates-organizational performance correlations are significantly different across samples with differing average turnover rates levels. Specifically, when we used all available correlations (regardless of turnover type), the turnover rates-organizational performance correlation became more strongly negative as the average turnover rates increased. The results were similar when we analyzed samples using only voluntary turnover rates; the nature of the relationship between sample-level average voluntary turnover rates levels and the corrected correlation was linear and negative, despite the restricted range for the average voluntary turnover rates variable.

These sample-level tests provide some information regarding the veracity of alternative views that, although not relevant as direct tests of the alternative models, can provide useful information regarding the nature of the relationship. First, these results show that average turnover rates are significantly related to the magnitude of the correlation, a finding that contradicts the linear negative view (Model 1), which presumes an invariant relationship across average turnover rates. Second, the predicted correlation between turnover rates and organizational performance was never positive and failed to support Model 3, which assumes a positive relationship between turnover rates and organizational performance as turnover rates increase from low to moderate levels. Indeed, *in toto*, we find no turnover *benefits*; the average turnover rates–performance correlation was always negative across all tests, types of turnover, and moderators. Thus our sample-level regressions contradict Model 1 (because the correlation between turnover rates and organizational performance varies across average turnover rates) and Model 3 (because turnover rates never show positive effects on organizational performance). These results provide evidence of more potent effects of voluntary turnover rates on performance at low to moderate levels, but range restrictions in average voluntary turnover rates prohibit us from drawing conclusions about attenuation effects at high levels.

## Conclusion

Our meta-analysis shows that turnover rates and organizational performance are significantly and negatively related. We encourage future researchers examining the turnover rates–organizational performance relationship to (a) distinguish types of turnover (e.g., voluntary vs. involuntary) when they measure turnover rates (Shaw, 2011; Shaw et al., 1998); (b) examine possible curvilinearity in the relationship—for example, by including a squared turnover term in regression-based analyses; and (c) consider organization- and context-related factors. From a practitioner's viewpoint, the most straightforward implication is that turnover rates are negatively associated with organizational performance; our post hoc calculations on a single sample imply substantial negative effects on workforce and financial performance. Despite diverse views on the role of turnover (e.g., benefits vs. costs), we show that turnover rates of any type can damage organizational performance under any contextual conditions. Hence, organizations must recognize that when turnover rates rise, their workforce and financial performance are at risk. They should search for strategies to mitigate and eliminate turnover, recognizing that lower turnover is always better.

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## Appendix A

## Summary of Studies and Samples Included in the Meta-Analysis

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Allen et al. (2010) | Publicly traded HR outsourcing firms | 67 | −.25 | .14 | Total | Sales growth (WP) | All | Service |
| Angle & Perry (1981) | Bus service firms in western United States | 22 | .15 | | Voluntary | Operating expense per revenue vehicle hour (FP) | All | Trucking |
| | | 20 | .05 | | Voluntary | Operating expense per employee (FP) | All | Trucking |
| Armstrong et al. (2010) | Irish Times 1,000 companies | 179 | −.37 | | Voluntary | Revenue per employees (WP) | All | Multiple |
| Arthur (1994) | U.S. steel minimills | 25 | −.16 | .05 | Total | Scrap rate (Q) | Primary | Manufacturing |
| | | 28 | −.08 | .05 | Total | Labor hours (WP) | Primary | Manufacturing |
| Baron et al. (2001) | Young, high-tech firms in California | 58 | .03 | .14 | Total | Annual revenue growth (WP) | All | IT |
| Batt (2002) | Call center | 326 | −.10 | .14 | Voluntary | Sales (WP) | Secondary | Service |
| Batt & Colvin (2011) | U.S. call centers | 339 | −.14 | .15 | Voluntary | Customer satisfaction (CS) | Secondary | Service |
| | | 339 | −.12 | .10 | Involuntary | Customer satisfaction (CS) | Secondary | Service |
| | | 339 | −.16 | .25 | Total | Customer satisfaction (CS) | Secondary | Service |
| | | 339 | .21 | .41 | Executive | Customer satisfaction (CS) | Secondary | Service |
| Bingley & Westergaard-Nielsen (2004) | Denmark IDA (labor market data) | 28,265 | .00 | .37 | Total | Profit per worker (FP) | All | Multiple |
| | | 28,265 | .00 | .37 | Total | Value added per worker (FP) | All | Multiple |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Bird & Beechler (1995) | Japanese subsidiaries in the United States | 64 | −.31 | .06 | Total | Performance on parent objectives (OP) | Executives | Multiple |
| | | 64 | −.23 | .06 | Total | Subsidiary profit (FP) | Executives | Multiple |
| | | 64 | −.08 | .06 | Total | Subsidiary sales (WP) | Executives | Multiple |
| | | 64 | −.24 | .06 | Total | Overall subsidiary performance (OP) | Executives | Multiple |
| | | 64 | −.25 | .06 | Total | Performance vs. competitors (OP) | Executives | Multiple |
| | | 64 | .05 | .11 | Total | Performance on parent objectives (OP) | Primary | Multiple |
| | | 64 | −.17 | .11 | Total | Subsidiary profit (FP) | Primary | Multiple |
| | | 64 | .03 | .11 | Total | Subsidiary sales (WP) | Primary | Multiple |
| | | 64 | −.31 | .11 | Total | Overall subsidiary performance (OP) | Primary | Multiple |
| | | 64 | −.11 | .11 | Total | Performance vs. competitors (OP) | Primary | Multiple |
| Boselie et al. (2003) | Companies in the Netherlands | 132 | −.02 | .12 | Total | % absence due to illness (EWA) | All | Multiple |
| | | 132 | .16 | .12 | Total | Average number of days of absence (EWA) | All | Multiple |
| Boyne et al. (2011) | English local governments | 587 | −.17 | .19 | Total (t-1) | Core service performance score (OP) | Executives | Government |
| | | 587 | −.18 | .19 | Total (t-1) | Core service performance score (OP) | Executives | Government |
| | | 587 | −.14 | .18 | Total (t-2) | Core service performance score (OP) | Executives | Government |
| | | 587 | −.21 | .18 | Total (t-2) | Core service performance score (OP) | Executives | Government |
| Brown et al. (2009) | Establishments in the United Kingdom | 1,900 | −.05 | .13 | Voluntary | Financial Performance (FP) | All | Multiple |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Cannella & Hambrick (1993) | Post-acquisition firms in the United States | 96 | −.25 | .49 | Total | Profitability (t) (FP) | Executives | Multiple |
| | | 96 | −.25 | .49 | Total | Profitability (t + 4) (FP) | Executives | Multiple |
| | | 96 | −.03 | .49 | Total | Profitability change (FP) | Executives | Multiple |
| | | 96 | −.14 | .51 | Total | Profitability (t) (FP) | Executives (more-senior) | Multiple |
| | | 96 | −.25 | .51 | Total | Profitability (t + 4) (FP) | Executives (more-senior) | Multiple |
| | | 96 | −.12 | .51 | Total | Profitability change (FP) | Executives (more-senior) | Multiple |
| | | 96 | −.29 | .44 | Total | Profitability (t) (FP) | Executives (less-senior) | Multiple |
| | | 96 | −.08 | .44 | Total | Profitability (t + 4) (FP) | Executives (less-senior) | Multiple |
| | | 96 | .13 | .44 | Total | Profitability change (FP) | Executives (less-senior) | Multiple |
| Chadwick et al. (2004) | Hospitals in the United States | 58 | −.07 | .05 | RIF | Cash margins (t) (FP) | Primary | Hospital |
| | | 58 | −.07 | .05 | RIF | Cash margins (t + 1) (FP) | Primary | Hospital |
| Chi & Wang (2009) | Chinese firms | 8,291 | .01 | .02 | Involuntary | Workforce performance (WP) | Executives | Multiple |
| | | 8,291 | −.05 | .02 | Involuntary | Financial performance (FP) | Executives | Multiple |
| Chow et al. (2008) | Chinese firms | 241 | −.17 | .12 | Total | Innovation (OP) | All | Multiple |
| | | 241 | −.06 | .12 | Total | Sales growth (WP) | All | Multiple |
| | | 241 | −.01 | .12 | Total | Profit growth (FP) | All | Multiple |
| Chow & Liu (2009) | Chinese companies | 451 | −.18 | .15 | Total | Overall performance (OP) | All | Multiple |
| Cooil et al. (2009) | Retail grocery superstore in Europe | 107 | −.21 | .11 | Total | Customer satisfaction (CS) | All | Retail |
| | | 107 | .10 | .11 | Total | Revenue (WP) | All | Retail |
| Detert et al. (2007) | U.S. Food-Co restaurants | 265 | −.03 | .14 | Total | Food loss (WP) | Secondary | Restaurant |
| | | 265 | −.10 | .14 | Total | Operating profit (FP) | Secondary | Restaurant |
| | | 265 | −.19 | .14 | Total | Customer satisfaction (CS) | Secondary | Restaurant |
| | | 265 | −.07 | .02 | Total | Food loss (WP) | Primary | Restaurant |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 265 | .02 | .02 | Total | Operating profit (FP) | Primary | Restaurant |
| | | 265 | −.04 | .02 | Total | Customer satisfaction (CS) | Primary | Restaurant |
| Donoghue (2010) | Nursing homes in the United States | 1,051 | −.14 | .14 | Total | Average occupancy (WP) | All | Hospital |
| | | 1,039 | −.06 | .13 | Total | Average occupancy (WP) | Secondary | Hospital |
| | | 1,028 | −.11 | .19 | Total | Average occupancy (WP) | Secondary | Hospital |
| Eriksen (2011a) | Danish firms | 2,926 | −.10 | .17 | Total | Value added (FP) | All | Manufacturing |
| Eriksen (2011b) | Danish firms | 2,921 | −.04 | .17 | Total | Labor productivity (WP) | All | Manufacturing |
| | | 2,921 | −.01 | .17 | Total | ROA (FP) | All | Manufacturing |
| Ericksen (2011) | Units of a large home improvement retailer | 808 | −.17 | .28 | Total | Productivity (WP) | All | Retail |
| Faems et al. (2005) | Belgian small and medium enterprises | 416 | −.08 | .12 | Voluntary | Value added (FP) | All | Multiple |
| | | 416 | −.03 | .12 | Voluntary | Personnel costs over value added (FP) | All | Multiple |
| | | 416 | −.05 | .12 | Voluntary | Acid ratio test (FP) | All | Multiple |
| | | 416 | −.07 | .12 | Voluntary | Degree of auto-financing (WP) | All | Multiple |
| | | 416 | .02 | .12 | Voluntary | Net profitability (FP) | All | Multiple |
| Flood et al. (2010) | Irish organizations | 132 | −.17 | .01 | Voluntary | Sales revenue (WP) | All | Multiple |
| Galang (2004) | Companies in the Philippines | 103 | −.22 | .08 | Voluntary | Overall performance (OP) | All | Multiple |
| Gelade & Ivery (2003) | Branch Director Group members in bank branches | 136 | −.32 | .08 | Total | Sales (WP) | Primary | Banking |
| | | 137 | −.57 | .08 | Total | Customer satisfaction (CS) | Primary | Banking |
| | | 137 | −.78 | .08 | Total | Overall performance (OP) | Primary | Banking |
| George & Bettenhausen (1990) | Retail stores | 33 | −.25 | .32 | Voluntary | Sales (WP) | Primary | Retail |
| Ghebregiorgis & Karsten (2007) | Eritrea firms | 82 | −.03 | .05 | Voluntary | Absenteeism (EWA) | All | Manufacturing |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 82 | −.09 | .05 | Voluntary | Grievance filing (EWA) | All | Manufacturing |
| | | 82 | .01 | .05 | Voluntary | Productivity (WP) | All | Manufacturing |
| Glebbeek & Bax (2004) | Temporary job agency | 110 | −.23 | .16 | Total (95–98) | Profitability 95–98 (FP) | Primary | Service |
| | | 110 | −.21 | .14 | Total (95–96) | Profitability 95–98 (FP) | Primary | Service |
| | | 110 | −.19 | .16 | Total (95–98) | Profitability 95 (FP) | Primary | Service |
| | | 110 | −.12 | .14 | Total (95–96) | Profitability 95 (FP) | Primary | Service |
| | | 110 | −.21 | .16 | Total (95–98) | Profitability 96–98 (FP) | Primary | Service |
| | | 110 | −.22 | .14 | Total (95–96) | Profitability 96–98 (FP) averaged with 97–98 | Primary | Service |
| | | 110 | −.18 | .16 | Total (95–98) | Profitability 97–98 (FP) | Primary | Service |
| | | 110 | −.15 | .14 | Total (95–96) | Profitability 97–98 (FP) | Primary | Service |
| Goins & Gruca (2008) | U.S. petroleum industry firms | 57 | .01 | .07 | RIF | 1-day stock price (FP) | All | Petroleum |
| | | 57 | −.20 | .07 | RIF | 10-day stock price (FP) | All | Petroleum |
| Griffith (2006) | Elementary schools | 117 | −.07 | .24 | Voluntary | Aggregated job satisfaction (EWA) | Primary | Education |
| | | 117 | −.27 | .24 | Voluntary | Achievement test score (WP) | Primary | Education |
| Guest et al. (2004) | U.K. companies | 1,308 | −.26 | .03 | Total | Workforce performance (WP) | All | Multiple |
| Guest et al. (2003) | U.K. companies | 366 | −.08 | | Total | Productivity 00–01 (WP) | All | Multiple |
| | | 366 | −.09 | | Total | Productivity 97–99 (WP) | All | Multiple |
| | | 366 | −.05 | | Total | Profit 00–01 (FP) | All | Multiple |
| | | 366 | −.12 | | Total | Profit 97–99 (FP) | All | Multiple |
| Guthrie (2001) | Companies in New Zealand | 164 | −.05 | .13 | Total | Productivity (WP) | All | Multiple |
| Guthrie & Datta (2008) | U.S. publicly traded firms (Compustat) | 122 | −.29 | .26 | Executive | ROA (FP) | All | Manufacturing |
| Guthrie et al. (2010) | U.S. firms | 124 | .10 | .12 | Voluntary | Sales growth (WP) | All | Manufacturing |
| | | 124 | −.07 | .12 | Voluntary | ROA (FP) | All | Manufacturing |
| | | 124 | .07 | .06 | Involuntary | Sales growth (WP) | All | Manufacturing |
| | | 124 | −.10 | .06 | Involuntary | ROA (FP) | All | Manufacturing |
| Guthrie et al. (2009) | Companies from Irish Top 1,000 companies | 149 | .05 | .14 | Total | Productivity (WP) | All | Multiple |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Hansson (2007) | European companies | 4,078 | −.01 | .10 | Total | Prior profit (FP) | All | Multiple |
| | | 4,313 | .00 | .10 | Total | Top 10% profitability (FP) | All | Multiple |
| Hatch & Dyer (2004) | Semi-conductor facilities | 702 | −.05 | .21 | Total | Defect density (Q) | Primary | Manufacturing |
| Hausknecht et al. (2009) | A large leisure and hospitality organization | 75 | −.31 | .26 | Voluntary | Customer perception of service quality (CS) | Secondary | Service |
| Holman et al. (2009) | Call centers in 17 countries | 2,359 | −.01 | .64 | Total | Labor costs (FP) | All | Service |
| | | 2,359 | .10 | .23 | Total | Sales change (WP) | All | Service |
| | | 2,359 | −.04 | .05 | Total | Call abandonment (WP) | All | Service |
| Huselid (1995) | Publicly held U.S. firms | 816 | −.24 | .18 | Total | Productivity (WP) | All | Multiple |
| | | 816 | −.10 | .18 | Total | Tobin's q (FP) | All | Multiple |
| | | 816 | −.03 | .18 | Total | GRATE (FP) | All | Multiple |
| Keck (1997) | Cement stable | 438 | .03 | .07 | Total | 2-year ROA growth (FP) | Executives | Manufacturing |
| | Cement turbulent | 280 | −.04 | .11 | Total | 2-year ROA growth (FP) | Executives | Manufacturing |
| | Minicomputer | 18 | −.50 | .27 | Total | 2-year ROA growth (FP) | Executives | Manufacturing |
| Kim & Park (2011) | Korean start-up firms | 515 | .15 | .50 | Total | Change in ROA (FP) | All | Multiple |
| Koslowsky & Locke (1989) | Large retail outlets in a national chain | 290 | −.02 | .80 | Total | Profit (FP) | Secondary | Service |
| | | 290 | .04 | .80 | Total | Sales per square foot (WP) | Secondary | Service |
| Koys (2001) | Regional restaurants | 28 | .00 | 1.05 | Total | Profit/sales (FP) | All | Restaurant |
| | | 28 | −.20 | 1.05 | Total | Profit/sales t + 1 (FP) | All | Restaurant |
| | | 28 | −.28 | .86 | Total (t + 1) | Profit/Sales t + 1 (FP) | All | Restaurant |
| | | 28 | .10 | 1.05 | Total | Profit (FP) | All | Restaurant |
| | | 28 | −.22 | 1.05 | Total | Profit t + 1 (FP) | All | Restaurant |
| | | 28 | −.24 | .86 | Total (t + 1) | Profit t + 1 (FP) | All | Restaurant |
| | | 24 | −.10 | 1.05 | Total | CS | All | Restaurant |
| | | 24 | −.32 | 1.05 | Total | CS t + 1 (CS) | All | Restaurant |
| | | 24 | .08 | 86 | Total (t + 1) | CS t + 1 (CS) | All | Restaurant |
| Krishnan et al. (2007) | U.S. firms | 174 | −.41 | .04 | Total | Return on sales (FP) | All | Multiple |
| Leveck & Jones (1996) | Inpatient nursing units in hospitals | 63 | −.24 | .33 | Total | Quality of care (Q) | Primary | Hospital |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Lynn (2002) | Casual-dining restaurants in the United States | 59 | −.30 | 1.12 | Total | Annual sales (WP) | All | Restaurant |
| | | 59 | −.34 | 1.12 | Total | Service quality (CS) | All | Restaurant |
| | | 59 | −.14 | 1.12 | Total | Charge tip percent (WP) | All | Restaurant |
| | Casual-dining restaurants in the United States (low-volume) | 29 | −.01 | | Total | Annual sales (WP) | All | Restaurant |
| | | 29 | −.04 | | Total | Service quality (CS) | All | Restaurant |
| | | 29 | −.36 | | Total | Charge tip percent (WP) | All | Restaurant |
| | Casual-dining restaurants in the United States (high-volume) | 30 | −.40 | | Total | Annual sales (WP) | All | Restaurant |
| | | 30 | −.44 | | Total | Service quality (CS) | All | Restaurant |
| | | 30 | .11 | | Total | Charge tip percent (WP) | All | Restaurant |
| MacKenzie et al. (2011) | Limited-menu restaurants in the United States | 150 | −.35 | 1.99 | Total | Work group task performance (EWA) | All | Restaurant |
| | | 150 | −.23 | 1.99 | Total | Sales (WP) | All | Restaurant |
| | | 150 | −.20 | 1.99 | Total | Profit (FP) | All | Restaurant |
| McElroy et al. (2001) | National financial service company units | 31 | −.47 | .34 | Voluntary | Profitability (FP) | All | Banking |
| | | 31 | −.43 | .34 | Voluntary | Productivity (WP) | All | Banking |
| | | 31 | −.46 | .34 | Voluntary | Customer satisfaction (CS) | All | Banking |
| | | 31 | −.49 | .34 | Voluntary | Profitability t + 1 (FP) | All | Banking |
| | | 31 | −.56 | .34 | Voluntary | Productivity t + 1 (WP) | All | Banking |
| | | 31 | −.58 | .34 | Voluntary | Cost per loan t + 1 (FP) | All | Banking |
| | | 31 | −.47 | .05 | Involuntary | Profitability (FP) | All | Banking |
| | | 31 | −.35 | .05 | Involuntary | Productivity (WP) | All | Banking |
| | | 31 | −.65 | .05 | Involuntary | Customer satisfaction (CS) | All | Banking |
| | | 31 | −.36 | .05 | Involuntary | Profitability t + 1 (FP) | All | Banking |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 31 | −.42 | .05 | Involuntary | Productivity t + 1 (WP) | All | Banking |
| | | 31 | −.52 | .05 | Involuntary | Cost per loan t + 1 (FP) | All | Banking |
| | | 31 | −.73 | .07 | Executive | Profitability (FP) | All | Banking |
| | | 31 | −.31 | .07 | Executive | Productivity (WP) | All | Banking |
| | | 31 | −.75 | .07 | Executive | Customer satisfaction (CS) | All | Banking |
| | | 31 | −.80 | .07 | Executive | Profitability t + 1 (FP) | All | Banking |
| | | 31 | −.45 | .07 | Executive | Productivity t + 1 (WP) | All | Banking |
| | | 31 | −.71 | .07 | Executive | Cost per loan t + 1 (FP) | All | Banking |
| Meier & Hicklin (2007) | Schools in Texas | 4,315 | −.04 | .14 | Total | TAAS (WP) | Primary | Education |
| | | 4,315 | −.07 | .14 | Total | SAT/ACT (WP) | Primary | Education |
| | | 3,844 | −.09 | .14 | Total (t-1) | TAAS (WP) | Primary | Education |
| | | 3,844 | −.11 | .14 | Total (t-1) | SAT/ACT (WP) | Primary | Education |
| | | 3,369 | −.16 | .14 | Total (t-2) | TAAS (WP) | Primary | Education |
| | | 3,369 | −.16 | .14 | Total (t-2) | SAT/ACT (WP) | Primary | Education |
| | | 2,892 | −.24 | .58 | Total (4yr) | TAAS (WP) | Primary | Education |
| | | 2,892 | −.19 | .58 | Total (4yr) | SAT/ACT (WP) | Primary | Education |
| Meier et al. (2006) | Schools in Texas | 3,117 | −.12 | .17 | Total | TAAS (WP) | Primary | Education |
| | | 2,610 | −.13 | .17 | Total | SAT/ACT (WP) | Primary | Education |
| | | 2,897 | −.03 | .17 | Total | SAT dropouts (Q) | Primary | Education |
| Messersmith & Guthrie (2010) | U.S. companies from NETS | 215 | −.08 | .09 | Voluntary | Sales growth (WP) | All | Multiple |
| | | 215 | −.21 | .09 | Voluntary | Innovation (WP) | All | Multiple |
| | | 215 | −.17 | .09 | Voluntary | Product innovation (WP) | All | Multiple |
| | | 215 | −.13 | .09 | Voluntary | Process innovation (WP) | All | Multiple |
| | | 215 | −.18 | .09 | Voluntary | Organizational innovation (WP) | All | Multiple |
| Messersmith et al. (2010) | Single industry firms in the United States | 554 | −.22 | .11 | Total | ROA (FP) | Executives | Multiple |
| Miah & Bird (2007) | South Asian local companies | 182 | −.03 | | Total | Firm performance (OP) | All | Multiple |
| | Japanese companies in Japan | 139 | −.01 | | Total | Firm performance (OP) | All | Multiple |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | Japanese companies in South Asia | 176 | −.05 | | Total | Firm performance (OP) | All | Multiple |
| Mohr et al. (2012) | Outpatient care at medical centers | 114 | −.21 | .11 | Total | Customer service (CS) | Primary | Hospital |
| | | 114 | −.20 | .11 | Total | Waiting times (WP) | Primary | Hospital |
| Mueller & Price (1989) | Work units in hospitals | 115 | −.13 | .42 | Total | Unit-level job satisfaction (EWA) | Primary | Hospital |
| | | 115 | −.33 | .42 | Total | Unit-level behavioral commitment (EWA) | Primary | Hospital |
| Nixon et al. (2004) | U.S. firms from Compustat and CRSP | 364 | −.10 | | RIF | Cumulative abnormal daily stock returns (FP) | All | Multiple |
| Park & Shaw (2011) | Business units in a large Korean company | 75 | −.05 | .08 | Total | Productivity (WP) | All | Multiple |
| | | 48 | −.13 | .08 | Total | ROA (FP) | All | Multiple |
| | | 48 | −.29 | .08 | Total | ROE (FP) | All | Multiple |
| Paul & Anantharaman (2003) | Indian software companies | 34 | −.51 | .02 | Total | Productivity (WP) | Primary | IT |
| | | 34 | −.46 | .02 | Total | Quality (Q) | Primary | IT |
| | | 34 | −.38 | .02 | Total | Speed of delivery (WP) | Primary | IT |
| | | 34 | −.23 | .02 | Total | Operating cost (FP) | Primary | IT |
| | | 34 | −.40 | .02 | Total | Growth in sales/net profit/ROI (FP) | Primary | IT |
| Peterson & Luthans (2006) | Fast-food franchises in the United States | 21 | −.47 | 2.12 | Total | Gross profits (FP) | All | Restaurant |
| | | 21 | −.49 | 2.12 | Total | Drive-through times (WP) | All | Restaurant |
| Ployhart et al. (2011) | Quick service franchises | 238 | −.07 | 1.43 | Total | Sales per labor hour (WP) | All | Service |
| | | 238 | −.50 | 1.43 | Total | Receipts vs. flow-through (FP) | All | Service |
| | | 238 | −.45 | 1.43 | Total | Unit service performance (CS) | All | Service |
| Ployhart et al. (2009) | Retail service associates | 1,036 | .11 | .63 | Total | Productivity (WP) | All | Service |
| | | 1,036 | .08 | .63 | Total | Productivity t + 1 (WP) | All | Service |
| | | 1,036 | .15 | .63 | Total | Productivity t + 2 (WP) | All | Service |
| | | 1,036 | .01 | .63 | Total | Profit (FP) | All | Service |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 1,036 | .00 | .63 | Total | Profit t + 1 (FP) | All | Service |
| | | 1,036 | .03 | .63 | Total | Profit t + 2 (FP) | All | Service |
| | | 1,036 | −.05 | .63 | Total | Sales (WP) | All | Service |
| | | 1,036 | −.06 | .63 | Total | Sales t + 1 (WP) | All | Service |
| | | 1,036 | −.06 | .63 | Total | Sales t + 2 (WP) | All | Service |
| O. C. Richard & Johnson (2001) | Banks in California and Kentucky | 73 | −.19 | .16 | Total | Net income (FP) | All | Banking |
| | | 73 | .01 | .16 | Total | ROE (FP) | All | Banking |
| Richardson & Vandenberg (2005) | Work units in U.S. organizations | 167 | −.23 | .14 | Voluntary | Absenteeism (WP) | All | Multiple |
| Riordan et al. (2005) | Insurance companies | 92 | −.23 | .17 | Total | ROA (FP) | All | Banking |
| | | 92 | .09 | .17 | Total | Gain from net premiums (FP) | All | Banking |
| | | 92 | .08 | .17 | Total | Return on surplus (FP) | All | Banking |
| | | 92 | −.03 | .17 | Total | Log ROA (FP) | All | Banking |
| | | 92 | .09 | .17 | Total | Log gain from net premiums (FP) | All | Banking |
| | | 92 | −.09 | .17 | Total | Log return on surplus (FP) | All | Banking |
| Ryan et al. (1996) | Branches of a large financial service | 131 | −.13 | .08 | Total (92) | Customer satisfaction (CS) | All | Banking |
| | | 131 | .15 | .08 | Total (92) | Profit (FP) | All | Banking |
| | | 131 | −.03 | .08 | Total (92) | Market share (OP) | All | Banking |
| | | 131 | .12 | .08 | Total (92) | Volume (WP) | All | Banking |
| | | 131 | −.13 | .08 | Total (92) | Operating costs (FP) | All | Banking |
| | | 131 | .01 | .08 | Total (92) | Probability of payment under 85% (FP) | All | Banking |
| | | 131 | −.12 | .08 | Total (92) | Credit losses (FP) | All | Banking |
| | | 131 | −.18 | .08 | Total (92) | Repossession ratio (FP) | All | Banking |
| | | 131 | −.18 | .08 | Total (92) | 30 day delinquency (FP) | All | Banking |
| | | 131 | −.20 | .08 | Total (92) | 60 day delinquency (FP) | All | Banking |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 131 | −.45 | .06 | Total (93) | Customer satisfaction (CS) | All | Banking |
| | | 131 | .10 | .06 | Total (93) | Profit (FP) | All | Banking |
| | | 131 | −.25 | .06 | Total (93) | Market share (OP) | All | Banking |
| | | 131 | .02 | .06 | Total (93) | Volume (WP) | All | Banking |
| | | 131 | −.06 | .06 | Total (93) | Operating costs (FP) | All | Banking |
| | | 131 | −.14 | .06 | Total (93) | Probability of payment under 85% (FP) | All | Banking |
| | | 131 | −.11 | .06 | Total (93) | Credit losses (FP) | All | Banking |
| | | 131 | −.15 | .06 | Total (93) | Repossession ratio (FP) | All | Banking |
| | | 131 | −.27 | .06 | Total (93) | 30-day delinquency (FP) | All | Banking |
| | | 131 | −.23 | .06 | Total (93) | 60-day delinquency (FP) | All | Banking |
| Sacco & Schmitt (2005) | U.S. quick-service restaurants | 2,373 | .00 | | Total | Profitability (FP) | Secondary | Restaurant |
| Sels et al. (2006) | Belgian companies | 416 | −.19 | .10 | Voluntary | Labor productivity (WP) | All | Multiple |
| | | 416 | .04 | .10 | Voluntary | Personnel costs over value added (FP) | All | Multiple |
| | | 416 | .06 | .10 | Voluntary | Acid ratio test (FP) | All | Multiple |
| | | 416 | .06 | .10 | Voluntary | Degree of auto-financing (WP) | All | Multiple |
| | | 416 | .08 | .10 | Voluntary | Profitability (FP) | All | Multiple |
| Shaw, Duffy, et al. (2005) | Stores of a restaurant chain | 38 | −.32 | .46 | Total | Productivity (WP) | All | Retail |
| | | 38 | −.09 | .46 | Total | In-role performance (EWA) | All | Retail |
| | | 38 | −.25 | .46 | Total | Change in productivity (WP) | All | Retail |
| | | 38 | −.20 | .46 | Total | Change in sales (WP) | All | Retail |
| Shaw, Gupta, & Delery (2005) | Concrete pipe plants in the United States | 120 | −.05 | .17 | Voluntary | Labor hours per ton (WP) | Primary | Manufacturing |
| | | 120 | −.02 | .17 | Voluntary | Accident rate (SR) | Primary | Manufacturing |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | Trucking companies | 325 | .06 | .41 | Voluntary | Revenue per driver (WP) | Primary | Trucking |
| | | 347 | −.09 | .41 | Voluntary | Accident frequency ratio (SR) | Primary | Trucking |
| | | 356 | −.30 | .41 | Voluntary | Out-of-service percentage (WP) | Primary | Trucking |
| | | 325 | −.08 | .41 | Voluntary | Operating ratio (FP) | Primary | Trucking |
| | | 325 | .12 | .41 | Voluntary | ROE (FP) | Primary | Trucking |
| Shaw et al. (2012) | Supermarkets in the United States | 259 | −.03 | .18 | Voluntary | Productivity (WP) | Primary | Restaurant |
| | | 259 | −.18 | .18 | Voluntary | Accident rate (SR) | Primary | Restaurant |
| | Korean companies | 365 | −.17 | .14 | Voluntary | Productivity (WP) | All | Multiple |
| Sheaffer et al. (2009) | Tel Aviv stock exchange traded firms | 196 | .05 | .49 | RIF | Current ratio (FP) | All | Multiple |
| | | 196 | .15 | .49 | RIF | Market cap (FP) | All | Multiple |
| | | 196 | .12 | .49 | RIF | ROS (FP) | All | Multiple |
| Shen & Cannella (2002) | Large, publicly traded U.S. corporations | 228 | −.18 | .17 | Total | ROA (FP) | Executives | Multiple |
| Shevchuk et al. (2007) | Elementary schools in a large U.S. district | 593 | −.25 | .32 | Total | Achievement sores (WP) | Primary | Education |
| | | 182 | −.36 | .23 | Total | Achievement sores 04–05 (WP) | Primary | Education |
| Shortell et al. (1994) | 42 ICUs at U.S. nonfederal hospitals | 42 | −.02 | .19 | Total | Risk-adjusted mortality (WP) | Primary | Hospital |
| | | 42 | −.20 | .19 | Total | Risk-adjusted length of stay (WP) | Primary | Hospital |
| | | 42 | −.32 | .19 | Total | Quality of care (Q) | Primary | Hospital |
| | | 42 | −.41 | .19 | Total | Ability to meet family needs (Q) | Primary | Hospital |
| Siebert & Zubanov (2009) | U.K. clothing retailers | 325 | −.24 | .05 | Total | Productivity (WP) | Primary | Retail |
| | | 325 | −.02 | .08 | Total | Productivity (WP) | Secondary | Retail |
| Siebert & Zubanov (2010) | U.K. retailers | 245 | .17 | .15 | Total | Productivity (WP) | Primary | Retail |
| Simon et al. (2012) | Spanish fashion retail group establishments | 232 | .38 | .68 | Voluntary | Sales per square meter (FP) | All | Retail |
| | | 232 | .19 | .68 | Voluntary | Sales per hour worked (WF) | All | Retail |
| | | 232 | .34 | 2.64 | Involuntary | Sales per square meter (FP) | All | Retail |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 232 | .40 | 2.64 | Involuntary | Sales per hour worked (WF) | All | Retail |
| | | 232 | .40 | 3.32 | Total | Sales per square meter (FP) | All | Retail |
| | | 232 | .37 | 3.32 | Total | Sales per hour worked (WF) | All | Retail |
| Sowinski et al. (2008) | Automotive service stores | 129 | −.36 | .44 | Voluntary | Customer satisfaction (CS) | All | Service |
| | | 129 | −.14 | .44 | Voluntary | Profitability (FP) | All | Service |
| Stavrou (2005) | Organizations in EU | 2,811 | .01 | .09 | Total | Organizational performance (OP) | All | Multiple |
| | | 2,811 | .01 | .09 | Total | Absenteeism (EWA) | All | Multiple |
| Subramony & Holtom (2011a) | Regional offices of a temporary help services firm | 46 | −.41 | .17 | Voluntary | Customer communication (CS) | Primary | Service |
| | | 46 | −.42 | .17 | Voluntary | Customer innovation (CS) | Primary | Service |
| | | 46 | −.43 | .17 | Voluntary | Customer satisfaction (CS) | Primary | Service |
| | | 46 | .05 | .17 | Voluntary | Profit per employee (FP) | Primary | Service |
| | | 46 | −.47 | .07 | Involuntary | Customer communication (CS) | Primary | Service |
| | | 46 | −.46 | .07 | Involuntary | Customer innovation (CS) | Primary | Service |
| | | 46 | −.43 | .07 | Involuntary | Customer satisfaction (CS) | Primary | Service |
| | | 46 | −.24 | .07 | Involuntary | Profit per employee (FP) | Primary | Service |
| Subramony & Holtom (2011b) | Regional offices of a temporary help services firm | 64 | −.23 | .31 | Voluntary | Customer orientation (WP) | Primary | Service |
| | | 64 | −.52 | .14 | RIF | Customer Orientation (WP) | Primary | Service |
| | | 64 | −.14 | .14 | RIF | Customer service evaluations (CS) | Primary | Service |
| | | 64 | −.01 | .14 | RIF | Service brand attributes (CS) | Primary | Service |
| | | 64 | .48 | .14 | RIF | Unit profitability (FP) | Primary | Service |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Sun et al. (2007) | Hotels in China | 81 | −.09 | .16 | Voluntary | Productivity (WP) | All | Service |
| Takeuchi et al. (2009) | Business units from Japanese firms | 76 | −.126 | .04 | Voluntary | Employee performance for the unit (WP) | All | Multiple |
| Temkin-Greener et al. (2009) | Nursing homes in New York | 160 | −.24 | .84 | Total | Work effectiveness (OP) | Primary | Hospital |
| Ton & Huckman (2008) | Borders stores | 11,325 | .00 | .04 | Total | Customer service (CS) | Primary (full-time) | Retail |
| | | 12,717 | −.05 | .04 | Total | Profit margin (FP) | Primary (full-time) | Retail |
| | | 11,325 | −.01 | .07 | Total | Customer service (CS) | Secondary (part-time) | Retail |
| | | 12,709 | −.07 | .07 | Total | Profit margin (FP) | Secondary (part-time) | Retail |
| | | 11,325 | .01 | .05 | Total | Customer service (CS) | All | Retail |
| | | 12,717 | −.06 | .05 | Total | Profit margin (FP) | All | Retail |
| | | 11,325 | −.03 | .02 | Total | Customer service (CS) | Primary (manager) | Retail |
| | | 12,717 | −.00 | .02 | Total | Profit margin (FP) | Primary (manager) | Retail |
| Tremblay & Chenevert (2008) | Canadian private companies | 252 | −.04 | .09 | Voluntary | Productivity (WP) | All | Multiple |
| | | 252 | −.16 | .09 | Voluntary | Market performance (OP) | All | Multiple |
| Trevor & Nyberg (2008) | Companies applied to employee-friendly companies in Fortune | 267 | −.21 | | Voluntary | Commitment (EWA) | Primary (full-time) | Multiple |
| | | 267 | −.27 | | RIF | Commitment (EWA) | Primary (full-time) | Multiple |
| Van der Vegt et al. (2010) | Production teams in a Volvo plant | 47 | −.55 | .40 | Voluntary | Quality (Q) | Primary | Manufacturing |
| Van Iddekinge et al. (2009) | A large fast-food organization | 861 | −.12 | .13 | Total | Customer service (CS) | Primary | Restaurant |
| | | 861 | −.12 | .13 | Total | Customer service t + 1 (CS) | Primary | Restaurant |
| | | 861 | −.05 | .13 | Total | Customer service t + 2 (CS) | Primary | Restaurant |
| | | 861 | −.11 | .13 | Total | Customer service t + 3 (CS) | Primary | Restaurant |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 861 | −.01 | .13 | Total | Customer service t + 4 (CS) | Primary | Restaurant |
| | | 861 | −.09 | .13 | Total | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.10 | .13 | Total | Profit | Primary | Restaurant |
| | | 861 | −.06 | .13 | Total | Profit t + 1 (FP) | Primary | Restaurant |
| | | 861 | −.10 | .13 | Total | Profit t + 2 (FP) | Primary | Restaurant |
| | | 861 | −.09 | .13 | Total | Profit t + 3 (FP) | Primary | Restaurant |
| | | 861 | −.11 | .13 | Total | Profit t + 4 (FP) | Primary | Restaurant |
| | | 861 | −.13 | .13 | Total | Profit t + 5 (FP) | Primary | Restaurant |
| | | 861 | −.13 | .12 | Total (t + 1) | Customer service t + 1 (CS) | Primary | Restaurant |
| | | 861 | −.13 | .12 | Total (t + 1) | Customer service t + 2 (CS) | Primary | Restaurant |
| | | 861 | −.21 | .12 | Total (t + 1) | Customer service t + 3 (CS) | Primary | Restaurant |
| | | 861 | −.09 | .12 | Total (t + 1) | Customer service t + 4 (CS) | Primary | Restaurant |
| | | 861 | −.13 | .12 | Total (t + 1) | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.08 | .12 | Total (t + 1) | Profit t + 1 (FP) | Primary | Restaurant |
| | | 861 | −.16 | .12 | Total (t + 1) | Profit t + 2 (FP) | Primary | Restaurant |
| | | 861 | −.14 | .12 | Total (t + 1) | Profit t + 3 (FP) | Primary | Restaurant |
| | | 861 | −.10 | .12 | Total (t + 1) | Profit t + 4 (FP) | Primary | Restaurant |
| | | 861 | −.20 | .12 | Total (t + 1) | Profit t + 5 (FP) | Primary | Restaurant |
| | | 861 | −.19 | .12 | Total (t + 2) | Customer service t + 2 (CS) | Primary | Restaurant |
| | | 861 | −.20 | .12 | Total (t + 2) | Customer service t + 3 (CS) | Primary | Restaurant |
| | | 861 | −.11 | .12 | Total (t + 2) | Customer service t + 4 (CS) | Primary | Restaurant |
| | | 861 | −.13 | .12 | Total (t + 2) | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.17 | .12 | Total (t + 2) | Profit t + 2 (FP) | Primary | Restaurant |
| | | 861 | −.14 | .12 | Total (t + 2) | Profit t + 3 (FP) | Primary | Restaurant |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| | | 861 | −.11 | .12 | Total (t + 2) | Profit t + 4 (FP) | Primary | Restaurant |
| | | 861 | −.19 | .12 | Total (t + 2) | Profit t + 5 (FP) | Primary | Restaurant |
| | | 861 | −.23 | .14 | Total (t + 3) | Customer service t + 3 (CS) | Primary | Restaurant |
| | | 861 | −.12 | .14 | Total (t + 3) | Customer service t + 4 (CS) | Primary | Restaurant |
| | | 861 | −.13 | .14 | Total (t + 3) | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.12 | .14 | Total (t + 3) | Profit t + 3 (FP) | Primary | Restaurant |
| | | 861 | −.07 | .14 | Total (t + 3) | Profit t + 4 (FP) | Primary | Restaurant |
| | | 861 | −.16 | .14 | Total (t + 3) | Profit t + 5 (FP) | Primary | Restaurant |
| | | 861 | −.15 | .15 | Total (t + 4) | Customer service t + 4 (CS) | Primary | Restaurant |
| | | 861 | −.14 | .15 | Total (t + 4) | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.02 | .15 | Total (t + 4) | Profit t + 4 (FP) | Primary | Restaurant |
| | | 861 | −.15 | .15 | Total (t + 4) | Profit t + 5 (FP) | Primary | Restaurant |
| | | 861 | −.15 | .14 | Total (t + 5) | Customer service t + 5 (CS) | Primary | Restaurant |
| | | 861 | −.18 | .14 | Total (t + 5) | Profit t + 5 (FP) | Primary | Restaurant |
| Vandenberg et al. (1999) | Insurance companies in the United States/ Canada | 49 | −.16 | .26 | Total | ROE (FP) | All | Banking |
| Van Jaarsveld & Yanadori (2011) | Call centers in Canada | 179 | −.34 | .09 | Voluntary | CSR absenteeism (EWA) | Secondary | Service |
| | | 179 | .08 | .09 | Voluntary | Call abandonment rate (CS) | Secondary | Service |
| | | 179 | −.07 | .09 | Voluntary | Meeting target time (Q) | Secondary | Service |
| | | 179 | −.12 | .09 | Voluntary | Average call handle time (Q) | Secondary | Service |
| Verburg et al. (2007) | Companies in the Netherland | 140 | −.04 | .07 | Total | CEO-rated performance (OP) | All | Multiple |
| Watrous et al. (2006) | Work units adopted ProMES intervention | 53 | −.19 | .49 | Total | Performance improvement (OP) | All | Multiple |
| | | 53 | −.37 | .23 | Total | Performance improvement (OP) | Primary | Multiple |

(*Appendices continue*)

Appendix A (*continued*)

| Article[a] | Sample | Sample size | Correlation | Turnover rates | Turnover type[b] | Performance dimensions | Employment system | Industry |
|---|---|---|---|---|---|---|---|---|
| Way (2002) | Establishments in the United States | 386 | −.09 | | Total | Labor productivity (WP) | All | Multiple |
| | | 386 | −.09 | | Voluntary | Labor productivity (WP) | All | Multiple |
| | | 386 | −.09 | | Total | Capital intensity (FP) | All | Multiple |
| | | 386 | −.13 | | Voluntary | Capital intensity (FP) | All | Multiple |
| Wiersema & Bantel (1993) | Large manufacturing companies in the United States | 85 | −.25 | .09 | Total | ROA (FP) | Executives (second-tier) | Manufacturing |
| | | 85 | −.11 | .24 | Total | ROA (FP) | Executives (top-tier) | Manufacturing |
| | | 85 | −.22 | .20 | Total | ROA (FP) | Executives | Manufacturing |
| Wiersema & Bird (1993) | Japanese companies | 40 | −.02 | .64 | Total | Relative ROE (FP) | Executives | Multiple |
| Yanadori & Kato (2007) | Japanese publicly traded, private firms | 330 | −.10 | .06 | Voluntary | Productivity 2002 (WP) | All | Multiple |
| | | 301 | −.04 | .05 | Voluntary | Productivity 2003 (WP) | All | Multiple |
| Yanadori & Kato (2009) | Publicly traded Japanese companies | 266 | −.06 | .06 | Voluntary | ROA (FP) | All | Multiple |
| Zatzick & Iverson (2006) | Workplace and employee survey | 3,044 | −.14 | .08 | Executive | Revenue minus expense 2001 (FP) | All | Multiple |
| | | 2,942 | −.13 | .08 | Executive | Revenue minus expense 2002 (FP) Combined with 2001 | All | Multiple |
| Zheng (2009) | Asia Pacific MNCs | 281 | .13 | .02 | Voluntary | Firm growth (OP) | All | Multiple |
| | | 281 | −.01 | .02 | Voluntary | Productivity (OP) | All | Multiple |
| | | 281 | .12 | .02 | Voluntary | Service capacity (OP) | All | Multiple |

*Note*. HR = human resources; IDA = Integrated Database for Labor Market Research; NETS = National Establishment Time-Series; CRSP = Center for Research in Security Price; ICU = intensive-care unit; EU = European Union; ProMES = Productivity Measurement and Enhancement System; MNC = MultiNational Company; WP = workforce productivity; FP = financial performance; Q = quality; IT = information technology; CS = customer satisfaction; OP = overall performance; EWA = employee work attitudes; ROA = return on assets; GRATE = Gross Rate of Return on Capital; TAAS = Texas Assessment of Academic Skills; ROE = Return on Equity; ROI = return on investment; RIF = reduction-in-force; SR = safety-related; CSR = Customer Service Representative; CEO = chief executive officer.

[a] Complete references can be found in the reference section. [b] Numbers in parentheses indicate the timing that the variable is measured; t = time.

(*Appendices continue*)

## Appendix B

## References of the Studies Considered but Excluded

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