Multi-Level Work Design

Integrating Work Characteristics Across Individual, Team, and Organizational Levels of Analysis

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Work design research has one of the longest histories in the organizational sciences. From its foundational works (Babbage, 1835; Gilbreth, 1911; Smith, 1776; Taylor, 1911) to its modern empirical science (Parker et al., 2017), work design has engaged scholars and impacted the lives of workers. Thousands of books and journal articles have documented how individual jobs can be designed to achieve a host of important outcomes (Humphrey et al., 2007). Studies focusing on job design represent the majority of research on work design. Such a focus on the individual level of analysis makes sense given the historical importance of individual jobs and the individual workers who perform those jobs.

The progress made in work design at the individual level of analysis is most clearly reflected in the work characteristic approach to work design. In fact, the Job Characteristic Model (JCM) (Hackman & Oldham, 1975, 1976, 1980) is the most well-known theory in work design and among the most cited theories in organizational behavior and human resource management (HRM) research (Parker et al., 2017). Scholars across disciplines have continued to develop the work characteristic approach, debating and expanding the scope of work characteristics under examination (Morgeson & Campion, 2003; Parker et al., 2001). A contemporary work characteristic approach yielded the Work Design Questionnaire (WDQ), a taxonomic approach to individual work characteristics that examines 18 work characteristics spanning the task, knowledge, social, and contextual domains of work (Morgeson & Humphrey, 2006).

Somewhat independently from research that explored the work characteristic approach, organizational scholars began to articulate the advantages of adopting a multi-level perspective (House et al., 1995; Roberts et al., 1978). This research suggested that focusing on (and ultimately integrating) different levels of analysis would produce more useful and accurate theoretical and empirical models. Reflecting on work design approaches that might span levels, Frederick

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P. Morgeson and Stephen E. Humphrey (2008, p. 42) noted that "the literatures on job and team design have evolved somewhat independently. This is unfortunate, as these literatures share many of the same constructs, suggesting a similarity that is not represented in current models of work design." Today, there is substantial research that has integrated job and team design constructs with enough studies for meta-analysis in some domains (e.g., Byron et al., 2023; Courtright et al., 2015; Ryu et al., 2022).

Less attention has been paid to work design at the organizational level of analysis. This is in part because of the lack of clarity about what constitutes work design at the organizational level. To address this gap, we reexamine several organizational work design approaches that present systematic principles for the deployment of sets of work characteristics. For example, the Toyota Production System (TPS) (Ohno, 1988) deploys autonomy and work simplification to achieve efficiency and quality outcomes (Campion, 1988; Campion & Thayer, 1985). Although little work design research to date has been conducted that invokes the organizational level of analysis, it is potentially important.

We seek to understand the nature of work design at the individual, team, and organizational levels of analysis. To accomplish this, we first draw from past research to define the range of work characteristics studied at the individual level of analysis (Morgeson & Humphrey, 2006). Focusing on the range of task, knowledge, social, and contextual work characteristics provides an integrating framework across levels. We offer definitions of each work characteristic at the individual level. Second, we perform a selective narrative review of the work design literature at the team level of analysis. The team level has received significant attention from work design researchers throughout its history which helps us recognize the important ways that the meaning of the individual work characteristics changes at the team level. We offer a definition of each work characteristic at the team level that reflects a dual concern for the existing definition at the individual level and the ways that researchers have conceptualized the work characteristics differently at the team level of analysis.

Finally, we clarify what work design represents at the organizational level of analysis. To do so, we reexamine organizational design research that discusses work characteristics. The individual and team work characteristics represent the building blocks for organizational work design. We identify organizational design approaches that systematically deploy sets of work characteristics to achieve specific outcomes, potentially bridging the micro-oriented individual and team level work design scholarship with the macro-oriented organizational level. We focus on three approaches to organizational design that have been particularly influenced, and at times guided, by work design: mechanistic approaches focused on the technical processes of the organization (e.g., scientific management), socio-technical systems approaches focused on the joint

optimization of technical and social processes, and strategic HR approaches that focus on bundles of HR practices that can achieve organizational performance outcomes.

This chapter makes four contributions to multi-level work design research. First, we clarify the meaning of work design at the organizational level of analysis. Second, we review the work design literature at the team level of analysis and offer insights into how the meaning of work characteristics changes at the team level versus the individual level. We define work characteristics at the individual level and then selectively review work design research that has expanded our understanding of the work characteristics at the team level. Third, we reassess the organizational design literature to identify sets of work characteristics that are deployed to achieve specific outcomes, connecting work characteristics across the individual, team, and organizational levels of analysis. Fourth, we conclude by identifying gaps in the work design literature at the higher levels of analysis. Although some have suggested that there is little new to learn about work design, we identify many opportunities for theoretical and empirical contributions at the team and organizational levels of analysis.

From the Individual and Team Levels to the Organizational Level of Analysis

Work design scholars have integrated the individual and team levels of analysis into a holistic conceptualization of work design that spans these levels (Morgeson et al., 2020; Morgeson & Humphrey, 2008; Parker, 2014). For example, Morgeson and Humphrey (2008, p. 42) defined work design as the "study, creation, and modification of the composition, content, structure, and environment within which jobs and roles are enacted." Despite this, it is unclear how these conceptualizations apply at even higher levels of analysis. As such, it is important to clarify what work design means at the organizational level beyond being the environmental context in which work is designed for individuals and teams. To clarify work design at the organizational level of analysis, we consider work design's role in the organizational design literature (Donaldson, 2001).

Following research on the organizational contingencies in which certain work design principles are more appropriate than others (Parker et al., 2001), we start by examining the role of work design from the contingency theory perspective on organizational design (Donaldson, 2001). Tom Burns and George M. Stalker (1961, pp. vii–viii) first articulated this contingency view, stating that, "if the form of management is properly to be seen as dependent on the situation the concern is trying to meet, it follows that there is no single set of principles for

'good organization,' an ideal type of management system which can serve as a model to which administrative practice should, or could in time, approximate."

This perspective is appropriate for discussing work design at the organizational level given the many unique outcomes organizations seek to achieve by accomplishing work (e.g., efficiency, quality, satisfaction, financial performance). The work of Michael A. Campion and colleagues (Campion, 1988; Campion & McClelland, 1993; Campion & Thayer, 1985; Morgeson & Campion, 2002, 2003) explicates the breadth of outcomes that different work design approaches influence, identifying potential tradeoffs associated with choosing one approach over another. Organizations may be concerned with efficiency, motivation, or health, among many other outcomes and combinations of outcomes (Campion & Thayer, 1985). Each desired outcome indicates a different approach to work design that is reflected in a set of work characteristics (e.g., low job complexity and high autonomy to achieve efficiency and quality outcomes). In this view, work design at the organizational level is an element of organization design (i.e., one of several processes of structuring the organization), specifically where sets of work characteristics are systematically deployed to achieve desired outcomes. Therefore, we define work design at the organizational level as sets of work characteristics focused on achieving desired organizational goals.

To situate work design at the organizational level relative to the individual and team levels, we suggest that the design of individual jobs and roles reflects organizational design principles relating to the implementation of "rules and programs" for "job-related situations that can be anticipated in advance and to which an appropriate response can be identified" (Galbraith, 1973, pp. 10–11). In situations where organizational complexity is high, planning takes the form of "specifying outputs, goals, or targets . . . employees select behaviors that lead to goal accomplishment" (Galbraith, 1974, p. 29). Work design at the organizational level of analysis is part of this type of planning. Organizational managers bring attention to, shape, align, and coordinate work design throughout the organization by identifying desired outcomes (Katz & Kahn, 1966; March & Simon, 1958).

The selection and implementation of work design principles at the organizational level is a strategic imperative, with certain principles being beneficial or harmful given the specific organizational contexts (Delery & Doty, 1996). Moreover, these are strategic decisions that managers must make. Work design is often an implicit role of the manager that is not always articulated (Morgeson & Campion, 2003). For example, an organizational design decision to create a C-level purchasing director role may indirectly remove autonomy from individual purchasing jobs, although the decision does not explicitly invoke the design of work in any way.

The following sections on work design at the individual and team levels of analysis define the "raw material" of work design from which sets of work characteristics can be constructed at the organizational level. These sets of work characteristics are combinations of work characteristics that are deployed together to achieve desired goals. Although earlier work design and work redesign research considered a narrow set of task characteristics at the individual level, later research expanded this perspective to increase the raw material of work design to incorporate knowledge, social, and contextual characteristics (Morgeson & Campion, 2003) and team roles (Morgeson & Humphrey, 2008). We articulate and integrate these insights across domains and levels to introduce a multi-level framework of work design across individual, team, and organizational levels of analysis.

Work Design at the Individual Level of Analysis

Work design research at the individual level of analysis is at a mature stage of development. The work characteristic approach to work design is well established (Hackman & Oldham, 1975, 1976, 1980) and has expanded its focus into the broader context of work (Morgeson & Campion, 2003; Morgeson & Humphrey, 2006). The empirical database is considerable, with hundreds of empirical tests and multiple meta-analyses of the broad consequences of the work characteristics (Carter et al., 2024; Fried & Ferris, 1987; Humphrey et al., 2007). Because of its mature standing and the existence of many excellent reviews, we have chosen to define the work characteristics at the individual level of analysis in Table 3.1 rather than repeat past reviews.

Importantly, work design research at the team level of analysis is relatively less mature than at the individual level. In some cases, the teams literature discusses constructs that are clearly the same as constructs at the individual level, with the referent shifted from the individual to the team. At other times, researchers have added important conceptual developments to the work characteristics at the team level, changing their meaning and nature. Table 3.1 offers definitions for the work characteristics at the individual and team levels. We indicate where we see both literatures using the same definitions but different referents (i.e., a referent shift). Additionally, we indicate when research has provided insights that have expanded our understanding of how specific work characteristics change at the team level of analysis (i.e., conceptual development). As work design at the team level of analysis is less mature, we offer a historic narrative and selectively review this literature in the following section.

Table 3.1 Individual and Team Work Design: Defining Work Characteristics at the Individual and Team Levels of Analysis

Work Characteristic	Individual Level Definition	Team Level Definition	Referent Shift or Conceptual Development?
Autonomy	The freedom that a job offers regarding scheduling, decision-making, and methods used to perform work.	The freedom the team has regarding scheduling, decision-making, and methods used to perform work.	Referent shift
Task variety	The range of activities associated with a job.	The range of activities a team is responsible for.	Referent shift
Task significance	The degree to which a job is meaningful and impacts people.	The degree to which the work a team performs is meaningful and impacts people.	Referent shift
Task identity	The degree to which a job involves a complete unit of work, the result of which is easy to identify.	The extent to which a team completes a whole piece of work.	Conceptual development
Feedback from the job	The degree to which a job provides knowledge of how well work was performed.	The degree to which a team's work provides knowledge of how well work was performed.	Referent shift
Job complexity	The difficulty associated with the skills and knowledge required to perform a job.	The difficulty associated with the skills and knowledge that must be integrated to complete a team's work.	Conceptual development
Skill variety	The number of skills required to perform a job.	The breadth of unique skills needed within the team, including skills that emerge by combining team members' skills, that are required to complete work.	Conceptual development
Specialization	The depth of knowledge and skills required to perform a job.	The extent of specialized tasks that the team performs.	Conceptual development
Problem solving	The amount of creative, innovative, and unique ideas required to perform a job.	The amount of creative, innovative, and unique ideas required to perform the team's work.	Referent shift

Work Characteristic	Individual Level Definition	Team Level Definition	Referent Shift or Conceptual Development?
Information processing	The amount of data that is examined and processed to perform a job.	The amount of data that is managed to accomplish the team's work.	Conceptual development
Interdependence	The extent to which a job relies on others and the extent that others rely on the job to be completed.	The extent to which a team must coordinate its efforts and resources to accomplish work, the extent to which workers must set goals and receive feedback and rewards as a team, and the extent to which the team must rely on others and is relied on by other others to accomplish its work.	Conceptual development
Social support	The opportunities for advice, assistance, and friendship that a job provides.	The degree to which the relational structure of the team offers opportunities for assistance, conflict management, and leadership support.	Conceptual development
Feedback from others	The extent that others within the organization provide knowledge about how well the work was performed.	The extent to which the team receives feedback from its members, as well as leaders and coworkers throughout the organization.	Conceptual development
Interaction outside the organization	The extent to which a job requires interaction with people external to the organization.	The extent to which the team's work requires interaction with people external to the organization.	Referent shift
Ergonomics	How well a job allows for healthy posture and movement.	How well a team's work allows for healthy posture and movement.	Referent shift
Physical demands	The amount of physical activity and effort associated with a job.	The amount of physical activity and effort associated with a team's work.	Referent shift

continued

Table 3.1 *continued*

Work Characteristic	Individual Level Definition	Team Level Definition	Referent Shift or Conceptual Development?
Work conditions	The health, safety, and comfort of the environment associated with a job.	The health, safety, and comfort of the environment associated with a team's work.	Referent shift
Equipment use	The variety and complexity of the technology, equipment, and tools used in a job.	The variety and complexity of the technology, equipment, and tools used to accomplish a team's work.	Referent shift

Work Design at the Team Level of Analysis

Evidence for the use of work teams dates back deep into the ancient world (e.g., Cuneiform Tablets circa 3000 BCE; Englund, 1991). The earliest work design research discussed the division of labor (Babbage, 1835; Smith, 1776), and specialized, simplified tasks (Taylor, 1911). These work design principles had implications for how workers related to one another that went largely unstated. For example, highly specialized workers could perform only a small part of a larger, interdependent task. It would not be until the Hawthorne studies that these implications would be recognized in the management literature (Roethlisberger & Dickson, 1939). Observations of informal groups during the Hawthorne studies revealed that the social context of work had significant consequences, suggesting that work design might benefit by purposefully designing work in ways that consider "teamwork and cooperation" (Mayo, 1949, p. 82).

Explicit discussions of teams as a work design phenomenon came from socio-technical systems (STS) theory (Trist & Bamforth, 1951). STS research identified the autonomous work group as a critical unit of analysis for work designers (Parker & Wall, 1998). Work teams have continued to increase their popularity in practice and research (Hackman, 1987; Hackman & Oldham, 1980), both trends that continue to this day (Mathieu et al., 2019).

Campion and colleagues (1993) greatly advanced work design research at the team level, connecting many work and team characteristics to important outcomes. Although not the first to study team and work design (e.g., earlier research was performed on autonomous work groups [Hackman, 1987, Wall et al., 1986]), Campion and colleagues made many contributions by generating

measures, dealing with level of analysis issues, and offering empirical data. Further integrations of team and work design have continued the development of this literature (Morgeson & Humphrey, 2008), alongside other major advancements that embed work design in the broader context of work (Humphrey et al., 2007; Morgeson & Humphrey, 2006; Parker et al., 2017).

Task characteristics

Task characteristics have received the most attention at the team level of analysis. Team and task design elements have been studied in isolation but share many similarities (Morgeson & Humphrey, 2008). Indeed, J. Richard Hackman and Greg R. Oldhamf (1980) argue that task characteristics will have the same impact on a host of behaviors and attitudes at the team level of analysis as they have at the individual level of analysis. Their perspective, alongside STS research on autonomous work groups (Cherns, 1976; Cumming, 1978; Trist & Bamforth, 1951), led to the early trajectory, and a continuing focus at the team level on autonomous teams and task characteristics generally.

This focus is reflected in team level work characteristics being examined on their own, as well as research that has combined sets of task characteristics into a single construct to represent the context of work that teams are embedded within. For example, a set of work characteristics reflects the context in which team empowerment occurs (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). Similar research suggests that a combination of autonomy, flexibility, job enrichment, and task complexity will reflect a supportive work context and will be related to higher psychological safety (Frazier et al., 2017). Moreover, M. Lance Frazier and colleagues (2017) found that team autonomy and team interdependence as individual constructs were both positively related to psychological safety. Indeed, although we organize our review of this literature by the constructs in isolation, it is important to acknowledge that some research has theorized and tested their interactive and combined effects.

Autonomy. Team autonomy has received more attention than any other work characteristic at the team level of analysis. The considerable amount of research has generated several different conceptualizations and empirical representations of what autonomy means at the team level. Examining early discussions of autonomous work groups in STS research (Trist & Bamforth, 1951; Trist et al., 1963), Hackman (1976, p. 3) articulated a conceptualization of team level autonomy that reflects the group's authority "to make decisions about methods for carrying out the work, scheduling various activities, assigning different individuals to different tasks, and (sometimes) deciding which individuals will be permitted to join the group as new members." This approach to team autonomy

suggests that autonomy is a structural characteristic of the team, granted by the organization.

Around the same time, another approach to team autonomy grew out of the aggregation of individual autonomy within teams (Hackman & Oldham, 1980). Conceptual clarity was improved by shifting the referent from the individual to the team before aggregation (Campion et al., 1993). Although there is nothing necessarily wrong with either approach, it is important to recognize the theoretical differences between them, and between individual and team autonomy (Langfred, 2000, 2005, 2007). Team autonomy reflects a characteristic of the team that is distinct from the autonomy experienced by individuals within the team. Claus W. Langfred (2005, p. 514) states that "any team can thus be described in terms of both the level of team autonomy that the team has and the average level of individual autonomy that members of the team have." This is important because, for example, increased individual autonomy within a team is associated with higher individual motivation but reduced team cohesiveness (Langfred, 2000).

Team autonomy has been connected to outcomes across all three levels of analysis. Early research most often connected team autonomy to team performance (Stewart, 2006). Recently, Kameron M. Carter and colleagues (2024) produced a meta-analysis examining 394 studies, connecting team work design with team performance. Their meta-analytic test showed that autonomy was positively related to performance, but that the effects were relatively small. Their moderation analysis showed that industry had a profound effect on the relationship, and when considering the high-tech industry, autonomy had an outsized impact on performance.

Moreover, team autonomy is expected to have broad behavioral and attitudinal outcomes as well. Indeed, a recent meta-analysis was performed on team autonomy as an antecedent of team performance and attitudes (Ryu et al., 2022). J. Woon Ryu and colleagues (2022) found that team autonomy predicts team performance and attitudes, showing that these relationships were mediated by team functioning (task and relational functions; Courtright et al., 2015). Moreover, they identified moderators that showed why autonomy sometimes had inconsistent results, finding some evidence that when tasks were routine, the relationship between team autonomy and task functions was weaker; further, when tasks were routine the relationship between team autonomy and attitudes was weaker as well.

Autonomy has received attention under several other terms as well. One example comes from Helen M. Williams, Sharon K. Parker, and Nick Turner's (2010) study of autonomy in teams using a novel measure and a novel term called team self-management (or similarly, team self-managing behavior; Rousseau & Aubé, 2010). Williams and colleagues (2010) found that team self-management

mediated the relationship between proactive personality and performance. Greg L. Stewart and Murray R. Barrick (2000) considered team autonomy under the guise of team self-leadership, showing that it interacted with task type such that it improved performance on conceptual tasks and worsened performance on behavioral tasks (i.e., executing work). Collective timing and method control (Jackson & Mullarkey, 2000) was developed using earlier individual level autonomy measures (Jackson et al., 1993). Paul R. Jackson and Sean Mullarkey's (2000) examination of a shift away from traditional functional manufacturing work design toward a lean production approach showed the importance of collective autonomy relative to individual autonomy for predicting job strain and satisfaction. Although representing a small sample of the team autonomy literature, these examples show the manifold discussions this important construct has provoked.

The conceptual development of team autonomy research suggests a definitional clarity that is largely not present elsewhere at the team level in work design (Cordery et al., 2010; Hackman, 1987; Ryu et al., 2022). We define team autonomy as the amount of freedom the team has regarding scheduling, decision-making, and methods to complete tasks.

Task variety. Task variety could be conceptualized as task routines at the team level (Langfred & Moye, 2004; Rousseau & Aubé, 2010). Routine tasks represent predictable situations, whereas nonroutine tasks represent situations with changing demands and unique methods or procedures (Rico et al., 2008). Task variety at the team level is important because teams are uniquely capable of approaching exceptional cases, given the potential for having breadth of skills within the team. Although the team task routines research is not a perfect analog to task variety at the individual level of analysis, it does provide one avenue for exploring task variety at the team level. Team task variety reflects the range of activities a team is responsible for.

Task significance. Studies on team task significance have often used individual level measures, reflecting Hackman and Oldham's (1980) assertion that significance (along with skill variety and task identity) predicts the experienced meaningfulness of work for teams in the same way they predict experienced meaningfulness for individuals. Indeed, Stewart's (2006) meta-analysis shows that team task meaningfulness, defined in this way, has a positive relationship with performance. Bradley L. Kirkman and colleagues (Kirkman and Rosen, 1999, 2000; Kirkman et al., 2004) suggest that task significance at the team level of analysis reflects the intrinsic meaningfulness of the team's work and team's contributory impact on achieving those tasks. When experienced alongside autonomy and potency, teams are expected to feel empowerment (Kirkman et al., 2004). Although these studies have approached significance in seemingly different ways, underlying each definition is the meaningfulness of work, closely

matching the definition at the individual level. Team task significance reflects the degree to which the work a team performs is meaningful and impacts people.

Task identity. Thomas G. Cummings (1978) and Hackman (1976) suggest that task identity is a common, if not essential, trait of self-managing teams. In this view, teams are designed to complete an entire piece of work. On the other hand, Campion and colleagues (1993, 1996) suggest that task identity may be confusing at the team level of analysis because the team as an entity accomplishes a complete unit of work, yet the individual workers are unlikely to see this larger complete piece because their work is reflected in a smaller part of the whole. This phenomenon is further clarified in research on lean production teams where the team is responsible for a standardized part that will be worked on further within another organizational structure (Jackson & Mullarkey, 2000). Individual team members' ability to identify their personal efforts or the team's efforts is de-emphasized here. Therefore, it is important to recognize the limitations of task identity at the team level as a predictor of consequences for individuals and teams. Still, recognizing the historic conceptual development for task identity in self-managing teams is important. The team is responsible for completing a "whole and meaningful piece of work" (Hackman & Oldham, 1980), even if identifying the effort involved in completing that work is difficult (Campion et al., 1993). Team task identity reflects the extent to which a team completes a whole piece of work.

Feedback from the job. Given the combined effort associated with work completed by teams, feedback from the job has received little attention. Instead, research on feedback from the job has largely focused on the team performance feedback, which has been reflected in feedback from others about how the team performed its combined work. This research has focused on general measures of feedback available to teams, largely decontextualized from its source (i.e., the job or others; Patterson et al., 2005). Given this overlap, we review this relatively small literature together and suggest that feedback from the job should reflect a referent shift until more research is performed. Therefore, team feedback from the jobs reflects the degree to which a team's work provides knowledge of how well work was performed.

Knowledge characteristics

Knowledge characteristics, more than task characteristics, change in meaning at the team level of analysis. One reason for this is that teams are created in large part to combine the knowledge and skills of workers to "align members' competencies with task demand" (Mathieu et al., 2019). Several knowledge, skills, and abilities (KSAs) emerge at the team level of analysis, largely relating to teamwork

(Stevens & Campion, 1994, 1999). These KSAs are reflected in a broader scope of knowledge characteristics at the team level. KSAs relating to interpersonal interaction (e.g., conflict resolution, communication, collaboration, coordination) and self-management (e.g., goal setting, performance management, task planning, task coordination), are critical considerations in work design at the team level (Stevens & Campion, 1999).

Job complexity. Job complexity at the team level is more commonly discussed in terms of task complexity or its opposite, task simplicity. When task complexity is high, scholars have argued that it is appropriate, and often required, to approach the task with teams (Sundstrom et al., 1990), and for the most complex tasks, multiteam systems (Zaccaro et al., 2012). Task complexity articulates the relationships between KSAs, complexity arising from the team social environment, and multi-level considerations like teamwork that can each increase complexity. Scholars have suggested that teams are formed to approach task complexity because the breadth of KSAs necessary to complete complex tasks does not exist within a single worker (Bligh et al., 2006; Pearce & Manz, 2005). Indeed, Jessica R. Mesmer-Magnus and Leslie A. DeChurch (2009, p. 543) suggest that "highly complex task domains typically require specialized, nonredundant experts with dissimilar training and background characteristics to integrate information in order to reach a quality solution." Team task complexity has become an increasingly important topic as teams become larger and work becomes generally more complex and interdependent.

Additionally, task complexity emerges from the skills of teamwork itself (Humphrey & Aime, 2014; Stevens & Campion, 1994, 1999). Research in this domain emphasizes the dynamic nature of teamwork, identifying how complexity emerges from coordinating interdependent work and integrating multiple workers' skills and knowledge (Vashdi et al., 2013). Some evidence suggests that teamwork KSAs will mediate the positive relationship between team autonomy and performance as well as the negative relationship between autonomy and stress (Leach et al., 2005).

Meta-analyses on task complexity have had inconsistent results. Task type complexity, as a moderator of the relationship between conflict and performance, has shown mixed results. For example, Carsten De Dreu and Laurie Weingart (2003) found that complex task types strengthened the negative relationship between conflict and performance, whereas Frank R. C. de Wit, Lindred L. Greer, and Karen A. Jehn (2012) found that task type complexity had no effect. In a similar way, task complexity as a moderator of shared leadership and performance received mixed results. For example, Danni Wang, David A. Waldman, and Zhen Zhang (2014) found that task complexity strengthened the relationship between shared leadership and performance, whereas Lauren D'Innocenzo, John E. Mathieu, and Michael R. Kukenberger (2016) found

that task complexity weakened the relationship between shared leadership and performance.

Although task complexity has received limited attention at the team level of analysis, there has been significant construct development. Early research found that teams facing simple, routine tasks are expected to improve many team level outcomes because the difficulty of these tasks was low (Campion et al., 1993; Rousseau & Aubé, 2010). As described, recent research has offered a more nuanced assessment where performance is less easy to predict. Task complexity (i.e., team job complexity) is defined as the difficulty associated with the skills and knowledge that must be integrated to complete a team's work.

Skill variety. Workers in teams are believed to require broader skills to flexibly shift to perform emergent work tasks (Hackman, 1987; Sundstrom et al., 1990). Most models of teamwork suggest that some skill homogeneity is to be expected within teams (i.e., overlapping skills), but that the heterogeneity of KSAs available to the team will improve performance (Gladstein, 1984). Indeed, skill diversity has received considerable attention in the team diversity literature (van Knippenberg et al., 2004, van Knippenberg & Schippers, 2007). Diverse KSAs are believed to give teams more potential options for overcoming challenges, especially non-routine challenges (van Knippenberg et al., 2004). "Having high variety on KSAs provides the team with the necessary raw materials for performing and then adapting to changes in performance requirements" (Harrison & Humphrey, 2010, p. 332).

Broadly, diversity in teams has been theorized to be a "double-edged sword" (Milliken & Martins, 1996) and to have an inconsistent main effect (van Knippenberg & Schippers, 2007). In contrast, skill diversity has received more consistent results. There is significant evidence that KSA diversity has has a larger relationship with performance and conflict within teams (Pelled et al., 1999; Simons et al., 1999), relative to other forms of diversity that are less relevant to work (Pelled, 1996). An important caveat is that, invariably, larger teams face lower cohesion and satisfaction, and higher coordination costs (Gully et al., 1995). As such, including more team members to improve skill variety has significant tradeoffs.

Team skill variety has important extensions beyond its conceptualization as an individual work characteristic. Although the total number of unique skills required to complete the team's work as a unit remains essential to the definition of team skill variety, several other important facets of the work characteristic become clear at the team level. Specifically, overlapping skills (i.e., skill homogeneity versus heterogeneity) and the combining of skills to accomplish work both suggest that this work characteristic deserves additional conceptual development. To this end, team skill variety is defined as the breadth of unique

skills needed within the team, including skills that emerge by combining team members' skills.

Specialization. Specialization at the team level reflects the team's type and the purpose for the team's creation (Cohen & Bailey, 1997; Sundstrom et al., 1990). In this view, specialization refers to the specific organizational needs that the team addresses, and the specialized knowledge and skills that the team uses to address those needs. Categorical titles, such as project team, cross functional team, and top management team indicate some information about the strength of specialization in these teams (Cohen & Bailey, 1997; Michel & Hambrick, 1992). Although most studies have focused on the variety of knowledge and skills held by individual team members, by identifying the specialized purposes that teams have in organizations we have gained some insight into how specialization is reflected at the team level of analysis. Team specialization reflects the specialized task that the team performs.

Problem solving. Little research has directly approached problem solving as a team level work design construct, but team problem solving has been broadly examined in the context of team creativity and innovation. Creativity and innovation in teams have been approached most often as the performance of a creative task, such as creating new products and procedures (Paulus et al., 2012). Some scholars have suggested that this explicit focus on a creative task is not required, and that team creativity and innovation can also reflect the introduction of ideas that are novel to the team (van Knippenberg & Schippers, 2017).

These two perspectives help inform team problem solving by suggesting that both creative outputs and the generation and implementation of creative and innovative ideas within the team are within the purview of extant research. The team creativity and innovation literature has historically focused on individual creative outcomes (Hülsheger et al., 2009), but a more recent meta-analysis suggests that this trend is changing, and multi-level outcomes of team creativity are becoming more common (Byron et al., 2023). Team problem solving reflects the amount of creative, innovative, and unique ideas required to perform the team's work.

Information processing. One theory of teams suggests that they are information processors (Hinsz et al., 1997; Martins & Sohn, 2022). This view has two contributions. First, teams must surface information. Second, they must combine the information, processing the surfaced information in a way that transforms it into something useful to the team (Hinsz et al., 1997). Teams often monitor a much larger set of information than individuals are capable of, especially in teams where worker expertise is heterogeneous, and multiple experts must combine their knowledge to perform a task (De Dreu et al., 2008).

Information processing at the team level has been approached from the perspective of how the team examines information about the task (Laughlin, 1980; Stasser & Stewart, 1992) and the way information is discussed by the team (Henningsen & Henningsen, 2003). Information processing has received considerable attention in the teams literature as a predictor of performance. This relationship has been tested through meta-analysis (albeit with few studies), with evidence suggesting that this relationship is mediated by information sharing (Mesmer-Magnus & DeChurch, 2009). Team information processing reflects the amount of data that a team must manage to accomplish its work.

Social characteristics

Work design scholars have come to recognize the important role of the social environment surrounding jobs and teams (Morgeson & Campion, 2003). The clear connection between teams and social characteristics has led to conceptualizations of multi-level work design that consider the social environment as a higher level of analysis than the job or task in work design (Morgeson & Humphrey, 2008).

Interdependence. The term "interdependence" is found in many definitions of work teams (e.g., Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; Salas et al., 1992). It makes sense then that a large amount of work design research at the team level has been performed on interdependence (Campion et al., 1993; Courtright et al., 2015; Gully et al., 2002). A sustained interest in team interdependence has led to significant conceptual development of the construct and its integration with the teams literature. These conceptions of interdependence go beyond interdependence as an individual level work characteristic and are reflected at the team level by a smaller literature on the external interdependence between the team and individuals, teams, and organizations external to the team (Gladstein, 1984).

Early research (e.g., Thompsons, 1967) on team interdependence focused on task interdependence. This perspective emphasized the structural nature of interdependence, relating to stable structural design decisions like team, task, and process design (Campion et al., 1993; Wageman, 1995). James D. Thompson (1967) conceptualized team interdependence as workflow patterns that reflected how taskwork was divided, which is largely static (i.e., structural); interdependence is high when multiple team members' work is integrated, and low when team members complete work independently and then have their efforts pooled. Moses N. Kiggundu (1981, 1983) expanded this conceptualization of task interdependence to incorporate the extent to which team members rely on one another for resources, including skills, information, and materials to

complete work. Additionally, there is a process of task interdependence that has gained more recent attention. Rather than a stable feature of the team, process-oriented research emphasizes the dynamic emergent states of the team (Marks et al., 2001).

Another conceptualization of interdependence that has received substantial research is outcome interdependence. First conceptualized as "goal interdependence" and "interdependent feedback and rewards," outcome interdependence reflects the degree to which teams, versus individuals, have goals and receive rewards (Campion et al., 1993; Wageman, 1995). Rewarding team outputs (versus individual contributions) is a design decision that is expected to encourage individuals to perform behaviors that benefit the group as a whole (Campion et al., 1993; Guzzo & Shea, 1992). Edward J. Lawler (1981) suggested that outcome interdependence in teams is critical to prevent competition between team members. A recent meta-analysis on team interdependence examined the consequences associated with task and outcome interdependence in conjunction (Courtright et al., 2015).

Stephen H. Courtright and colleagues' (2015) meta-analysis suggests that both task and outcome interdependence are related to team performance, and both are partially mediated by task team functions (i.e., transition/action processes, collective efficacy) and relational team functions (i.e., interpersonal process and cohesion), with task interdependence more strongly predicting task functions and outcome interdependence more strongly predicting relational functions. Team interdependence has been commonly used to influence several other team outcomes as well. Other meta-analyses have used interdependence to predict team innovation (Hülsheger et al., 2009), and to strengthen the relationship between trust and performance (DeJong et al., 2016).

One additional form of interdependence, interpersonal interdependence (Marks et al., 2001), is not covered in this review. Although this construct has been named using the interdependence moniker, it is more clearly an interpersonal process construct which is not clearly related to work design.

The vast conceptual development of the interdependence construct at the team level of analysis has generated several important conceptual differences between work design research at the individual level and team levels of analysis. We highlight three domains of interdependence research that relate to team interdependence as a work characteristic: task interdependence, outcome interdependence, and external interdependence. Given this conceptual development, we define team interdependence as the extent to which a team must coordinate its efforts and resources to accomplish work, the extent to which workers must set goals and receive feedback and rewards as a team, and the extent to which the team relies on others and is relied on by other others to accomplish its work.

Social support. One interesting development related to social support at the team level concerns its outcomes. Many studies have adapted organizational citizenship behavior (OCB) measures from the individual level to the team level (Nohe & Michaelis, 2016). Several studies emphasize the important interactions between the individual and team levels, suggesting that OCBs at the team level are the consequence of socially supportive behavior, especially from the leader (Kirkman et al., 2004; Nohe & Michaelis, 2016). Other important research relating to social support at the team level are team managerial support (Shea & Guzzo, 1987) and shared liking or attraction within the group (Evans & Jarvis, 1980). Social support takes on an expanded role at the team level, reflecting the critical role of interpersonal relationships between team members, including leaders. Team social support is defined as the degree to which the relational structure of the team offers opportunities for assistance, conflict management, and leadership support.

Feedback from others. Feedback from others largely reflects feedback from leaders inside and outside of the team (Kirkman & Rosen, 1999; Wageman, 2001) and from others more generally (Patterson et al., 2005). Leader feedback is expected to be related to the location of the leader as internal or external to the team (Morgeson, 2005). Internal leaders are expected to be focused on day-to-day team management, whereas external leaders are better able to provide feedback (Komaki Desselles & Bowman, 1989). Seeking feedback from others throughout the organization has been identified as an important role within teams (Ancona & Caldwell, 1988).

Autonomous teams are believed to require performance feedback to align their goals with organizational goals and to avoid a state of disorder (Katz & Kahn, 1966). Research has shown that autonomy and feedback have an important interactive effect, referred to as "channeled autonomy," which can create alignment between the team and the organization, ultimately leading to improved team performance (Gonzalez-Mulé et al., 2016). Team feedback from others reflects the extent to which the team receives feedback from its members, as well as leaders and coworkers throughout the organization.

Interaction outside the organization. Although many teams must work interdependently with individuals, teams, and organizations that are external to the organization, there is little research that explicitly focuses on this. Rather, many studies have focused on interaction outside the team with other parts of the organization and boundary-spanning behaviors between teams (Ancona & Caldwell, 1988, 1992; Choi, 2002; Sundstrom & Altman, 1989). There is some research on how teams assess (i.e., "scan") the environment for information outside of the organization (e.g., marketing trends), although, this largely is outside of the social nature of the work (Ancona & Caldwell, 1992). Team interaction

outside the organization reflects the extent to which the team's work requires interaction with people external to the organization.

Contextual characteristics

Because contextual characteristics at the team level of analysis have received little empirical research attention, this section highlights the potential for incorporating contextual features into team level work design research. Indeed, much of the work on context at the team level of analysis has been outside of the characteristics examined in the WDQ, with many studies focusing on novel contextualizations of the work environment (Johns, 2018).

Ergonomics. One aspect of the environment is the physical space that is available to the team. Ergonomics are affected by the size of physical space, potentially crowding teams of workers (Altman, 1975). At the team level of analysis, more research has considered the psychological impingement of physical spaces than the ergonomics of the space (Sundstrom et al., 1990). For example, researchers have considered how the physical environment creates opportunities for privacy, communication, and social behavior (Sundstrom et al., 1980; Sundstrom et al., 1990). Less research has considered how the physical environment affects the team's ability to move and maintain healthy positions, although some applied ergonomics research has discussed this work characteristic as an outcome (e.g., musculoskeletal discomfort outcomes in teams; Robertson et al., 2008). Team ergonomics reflects how well a team's work allows for healthy posture and movement.

Physical demands. Physical demands in teams have received some attention in the context of the job demands-resources model with the same predicted demands effects as the individual level (e.g., burnout risks; Bakker & Demerouti, 2007). Physical demands in teams have also received some attention in the applied ergonomics literature and are predicted to have the same deleterious effects as those predicted at the individual level (e.g., Fritzsche et al., 2014). Physical demands reflect the amount of physical activity and effort associated with a team's work.

Work conditions. Little research has considered work conditions as a characteristic of work in teams (cf., Fritzsche et al., 2014). Team health and safety have largely been considered from a climate perspective (Hofmann et al., 2017; Hofmann & Morgeson, 1999; Salas et al., 2020) or a training (KSA) perspective (Salas et al., 2008). Comfort has received some attention in teams, specifically noise and other unwanted external intrusions (Sundstrom et al., 1994; Sundstrom & Altman, 1989). Work conditions reflect the health, safety, and comfort of the environment associated with a team's work.

Equipment use. Although equipment use has received little research attention at the team level of analysis, the increasing complexity of technology has led to teams operating technology in contrast to earlier technologies which were more often operated by individuals. Importantly, equipment use in teams is argued to change the nature of teamwork (e.g., equipment use enables team virtuality; Larson & De Church, 2020). Equipment use reflects the variety and complexity of the technology, equipment, and tools used to accomplish a team's work.

Work Design at the Organizational Level of Analysis

Work design at the organizational level of analysis reflects the systematic deployment of sets of work characteristics to achieve desired outcomes. Sets of work characteristics are believed to have the potential to generate synergistic and interactive effects in combination (Morgeson & Humphrey, 2008), potentially altering the predictable relationships between work characteristics and outcomes. Campion's interdisciplinary research identified four models of work design, each focused on unique, and often conflicting, outcomes (Campion & Thayer, 1985). Implicit in this research is the idea that thematically related work characteristics (e.g., mechanistic, motivational) can produce distinctive outcomes, with some sets of work characteristics leading to important tradeoffs in outcomes (e.g., between satisfaction and efficiency; Campion & McClelland, 1993; Morgeson & Campion, 2002).

Although our focus at the organizational level of analysis is to identify sets of work characteristics and outcomes associated with them, organizational work design is contextualized by other aspects of organizational design. Work design in the organizational design literature is often construed as an element of organizational design (e.g., Adler et al., 1999; Gibson & Birkinshaw, 2004). One common theme when work design scholars explore the higher levels of analysis is that outcomes are often not predicted accurately by the work characteristics in isolation (Parker et al., 2001). Organizational design decisions infuse work characteristics with organizational context through organizational structures such as size and centralization (James & Jones, 1976; Oldham & Hackman, 1981). Indeed, organizational context is often impactful because information in the broader work environment changes the nature of work (Johns, 2006, 2018; Morgeson et al., 2006; Morgeson et al., 2010). We review organizational design research that presents sets of work characteristics, desired outcomes, and organizational context, summarizing the reviewed approaches by highlighting their work characteristics and desired outcomes in Table 3.2.

Table 3.2 Organizational Work Design: Deploying Sets of Work Characteristics to Achieve Desired Outcomes

Organizational Design Approach	Work Design Approach	Set of Work Characteristics	Desired Outcomes
Scientific Management	Mechanistic	Low autonomy, task variety, identity, job complexity, skill variety	Efficiency
Toyota Production System	Mechanistic	High autonomy, low job complexity	Efficiency, quality
Lean Production	Mechanistic	High autonomy, task variety, feedback from the job, task identity, skill variety, information processing, interdependence	Efficiency, job satisfaction
Socio-Technical Systems Theory	Sociotechnical Systems	High autonomy, feedback from the job, task identity, interdependence	Efficiency, job satisfaction
Self-Managing Organizations	Sociotechnical Systems	High autonomy, feedback from others	Employee empowerment
Balance Theory of Job Design	Sociotechnical Systems	High autonomy, feedback from the job	Safety
High Performance Work Systems	Strategic HR	High autonomy, significance, interdependence	Organizational performance

Mechanistic approaches

Scientific management. Although scientific management is often associated with the mechanistic approach to designing individual jobs (e.g., time-and-motion studies; Gilbreth, 1911), Frederick W. Taylor's (1911) vision was for a totalizing mechanistic approach to organizational design. In this vision, the concept of work design should be organization-wide, with every individual job designed in an interlocking system of mechanistic cooperation. Taylor (1911,

p. 140) stated, "it is no single element, but rather this whole combination, that constitutes scientific management." Scientific management sought to program every conceivable action at work in the "one best way" (Taylor, 1911, p. 41).

To achieve this goal, the mechanistic approach to work design is focused on broadly reducing the task and knowledge characteristics of work, with the ultimate goal of increasing efficiency outcomes. There are many unintended and undesirable consequences of designing work this way, which have largely been articulated by motivational approaches to work design (Herzberg et al., 1959; Hackman & Oldham, 1975). Implicit in the scientific management approach is the increasing interdependencies of low autonomy, highly specialized workers (March & Simon, 1958). As individual workers perform smaller, more specialized parts of larger tasks, they rely on and are relied on by other workers and teams within the organization to complete the entire work task. Additionally, these small and specialized tasks are not reflective of entire pieces of work, resulting in very low task identity.

The properties of this scientific management system, specifically relating to job simplification, made sense in the context of early efforts at mass production and industrialization as reflected in Ford Motor Company's moving assembly lines in the early 1900s. As machines and automation became increasingly important facets of the work environment, worker knowledge and skill receded from prominence. Although still practiced today, even expanding with the advent of artificial intelligence (AI) and algorithmic management (AM) (Parent-Rocheleau & Parker, 2022; Parker & Grote, 2022), highly mechanistic approaches tend to appear less attractive because of the recognition of their many undesirable, unintended consequences, such as low motivation and job satisfaction, and increased absenteeism. Moreover, as the organizational environment becomes more variable and dynamic, unpredictable contingencies require coordination between interdependent but siloed workers (March & Simon, 1958).

New organizational and work designs emerged following the Hawthorn studies (Roethlisberger & Dickson, 1939). These new organizational designs recognized that informal organizational structures existed in every organization (Mintzberg, 1979) and that overly formalized and mechanistic work may be unpleasant or unhealthy for workers (Likert, 1961). These insights in research were mirrored in changes across organizational design practice, changing the trajectory of work design away from purely mechanistic approaches and toward approaches that considered human experiences.

Toyota Production System. The TPS (Ohno, 1988) represents a reflection and advancement on organizations designed using scientific management principles. The TPS added worker autonomy to mechanistically designed jobs, and "in this way, human intelligence, or a human touch, is given to the machines"

(Ohno, 1988, p. 6). The TPS reflects a dual concern for automation and autonomy, where workers are tasked with stopping production when abnormalities are identified during the course of work. The TPS is expected to increase efficiency above and beyond traditional mechanistic work design systems by reducing waste. Managers working in organizations using the TPS are believed to be especially cognizant of errors that arise during production because of the systematic focus on errors and continuous improvement (Monden, 2012) alongside increased managerial monitoring and surveillance (Delbridge et al., 1992). Although not formally theorized, these systems can have significant implications for improving opportunities for feedback from the job and from others.

Over decades of using TPS principles in organizations, many other work design advancements emerged as organizational design subsystems within organizations using the TPS. One important subsystem in the TPS is the Just-in-Time approach (JIT) (Monden, 2012). JIT is a production strategy that strives to improve performance by producing the right items in the right quantity at the right time, minimizing waste. These practices have been associated with increased autonomy, task variety, knowledge demands, and interdependence (Brown & Mitchell, 1991), but the exact work characteristics in practice have been characterized as "elusive" and "amorphous" (Dean & Snell, 1991). The small amount of empirical research that has been performed on these JIT practices has shown that work characteristics have a minimal effect on outcomes for workers (Jackson & Martin, 1996), or that outcomes are contingent upon other organizational practices (e.g., individual versus team rewards; Snell & Dean, 1994).

Lean production. Lean production (LP) (Krafcik, 1988; Shah & Ward, 2003, 2007) is the most modern formalization of the TPS, with a specific set of practices that are "lean" in nature (Womack et al., 1990). LP, like the TPS, is focused on creating efficiency through waste reduction, and is believed to halve costs (e.g., labor) relative to mass production (Krafcik, 1988). Although the TPS was believed to have had important outcomes for workers as a second-order effect (Dohse et al., 1985), LP considers the worker's role in the production process explicitly and specifies a systematic approach to work design (Shaw & Ward, 2003). There is significant debate over the consequences of LP for workers, with one camp focusing on the motivational aspects of LP and another focusing on the opportunities for work intensification and anxieties about costly mistakes (Landsbergis et al., 1999);the "lean-production system does indeed remove all slack—that's why it's lean. But it also provides workers with the skills they need to control their work environment and the continuing challenge of making the work go more smoothly" (Womack et al., 1990, p. 101).

LP is said to have two critical components: first, continuous task improvement (reflecting high autonomy, task variety, identity, and feedback from the

job), and second, a system for identifying the cause of production errors (Womack et al., 1990). To achieve these two goals, work characteristics are identified that highlight the importance of skilled workers (MacDuffie, 1995; Snell et al., 2000). Skill variety is especially critical under LP, as worker control over a varied task domain requires workers to use many skills to accomplish the breadth of potential tasks. Information processing is associated with LP as demands to respond to production errors require monitoring complex data. Additionally, some scholars have pointed to interdependence as a critical aspect of LP as teams rely on one another to complete tasks sequentially.

In contrast to earlier studies of the TPS, LP has received significant attention from work design researchers. LP has been suggested to be a particular challenge for work design theories that are focused on predicting the consequence of individual work characteristics. The LP context is believed to change the nature of the relationships between work characteristics and many outcomes. Indeed, scholars that have focused on certain individual LP practices (e.g., assembly lines) have identified negative outcomes of LP for workers (Parker, 2003; Sprigg & Jackson, 2006) whereas other researchers have found positive outcomes contingent upon different LP practices (e.g., increased boundary-control; Anderson-Connolly et al., 2002; Conti et al., 2006).

Several researchers have posited that LP as an integrated system may have unexpected positive outcomes for workers because of the highly motivating work environment (Adler, 1993; Womack et al., 1990) or because of the specific configuration of work characteristics associated with it (De Treville & Antonakis, 2006). A growing body of research has suggested that the systematic deployment of work characteristics associated with LP can jointly optimize efficiency and motivational outcomes (Cullinane et al., 2013, 2014; Jackson & Mullarkey, 2000; Jackson et al., 1993). Sarah-Jane Cullinane and colleagues (2012, p. 56) conclude that LP has the "potential to enhance both organizational performance (e.g., waste reduction, quality improvements, etc.) and the quality of working life for employees through simple job redesign."

Socio-technical system approaches

Socio-technical systems theory. STS theory (Cherns, 1976; Cummings, 1978; Trist & Bamforth, 1951) is a systematic approach to work design that focuses on the joint optimization of social and technical work systems (Emery, 1959; Trist, 1981). Although often associated with autonomous work groups and the team level of analysis, STS is concerned with entire organizations (Emery & Trist, 1965; Hackman, 1980; Pasmore, 1988; Trist, 1981). The attention placed on teams reflects the assumption that organizations are too large and complex to

be centrally managed. Therefore, STS theory suggests that organizations should be designed such that teams close to disturbances can manage any issues that arise (de Sitter et al., 1997).

Coordination between workers, autonomous work groups, and the workers largely engaged with the external environment is a cohesive work system (Cummings, 1978). This systems level approach to work design has important implications for the deployment of work characteristics throughout the entire organization (Ingvaldsen & Rolfsen, 2012). The joint interest in social and technical work systems is reflected in a broad set of work characteristics that are believed to jointly optimize efficiency and satisfaction outcomes. In contrast to the potential for work intensification associated with more mechanistic systems, STS theory's focus on specific characteristics suggests a consciousness of the potential for overload. Conventionally, complete, easily identified pieces of work are most often designated to be completed by an autonomous team, providing high team task identity. The closeness and boundaries of the task should provide feedback (i.e., feedback from the job) and be performed interdependently by the team (Hackman, 1987). Chapter 12 discusses case examples of STS-based interventions for work redesign.

Self-managing organizations. Recently, the concept of implementing self-management throughout an entire organization has gained significant traction in industry under the organizational design practice called "Holacracy" (Robertson, 2015) and in research under the guise of "self-managing organizations" (SMOs) (Lee & Edmonson, 2017). Research on SMOs builds upon STS theory (Trist & Bamforth, 1951), Theory X and Theory Y (McGregor, 1960), and other worker empowerment approaches to work design (Morgeson & Campion, 2003). SMOs systematically remove hierarchical relations between work units, deploying autonomy over team design, task design, and objectives, as well as implementing peer feedback processes (Robertson, 2015). SMOs are expected to empower workers to design their own work, and to behave flexibly and innovatively by removing bureaucratic hurdles from decision-making (Roberston, 2015). SMOs embody the most extreme version of William A. Pasmore and colleagues' (1982, p. 1186) assertion that "the behavior of sociotechnical systems should not be bound by rules, regulations, and procedures except when absolutely necessary."

The Balance Theory of Job Design. The Balance Theory of Job Design (Smith & Sainfort, 1989) examines work design from an organizational lens, analyzing the relationship between sets of organizationally contextualized work characteristics and health factors (Carayon, 2006, 2009; Carayon & Smith, 2000). The Balance Theory of Job Design is closely associated with other systems approaches to work safety and the "macroergonomics" approaches to organizational design (Hendrick, 1991; Kleiner, 2006, 2008) which are themselves closely

related to STS theory. The Balance Theory of Job Design suggests that health and safety at work must be approached through organizational level work design and in consideration of a comprehensive set of work design factors (i.e., task, knowledge, social, and contextual characteristics; Carayon et al., 2015).

This theory posits that the design of safety protocols at work does not reflect actual safety practices (Carayon et al., 2015). Safety concerns are conceptualized as unpredictable, emergent situations that must be approached by autonomous workers and teams in the local work environment. Moreover, safety behavior is posited to be sensitive to personal and organizational priorities (Nahrgang et al., 2011), and must therefore be approached with multiple considerations beyond task design. Built on STS theory (Trist & Bamforth, 1951), the Balance Theory of Job Design emphasizes that organizations should grant autonomy as close to the safety behavior as possible (i.e., variance control; Clegg, 2000). Additionally, it emphasizes continuous adaptation to feedback from errors at work (Clegg, 2000; Leveson, 2016). The theory ultimately suggests that the entire system of work characteristics to be deployed must be considered in combination because the environmental context as a whole will have a profound impact on safety practice, regardless of the intended design of work (Carayon et al., 2015).

Strategic human resources approaches

High-performance work systems. Work design has been identified as an important component of high-performance work systems (HPWS) (Huselid, 1995). Early discussions of HPWS suggested that organizations should implement principles of STS theory (Batt & Applebaum, 1995), a proposal that was largely abandoned by later researchers that focused on more specific sets of HR practices. Other early HPWS research suggested that work design is one facet of a "bundle" of HR management practices that should be used in conjunction as "best practices" (Arthur, 1994; Becker & Huselid, 2006; Huselid, 1995; MacDuffie, 1995). Practices outside of work design include incentives, training, selection, and flexible work arrangements, among many others (Huselid, 1995). HPWS focuses on complementarities and synergies between a set of HR management practices, including work design.

Some HPWS research suggests that increasing autonomy, significance, and interdependence alongside other HR practices will help achieve desirable organizational outcomes (Becker & Huselid, 2010). That said, Mark A. Huselid (1995) was clear that job design should be tailored to individual workers such that they can best leverage their unique KSAs. HPWS are expected to generate worker outcomes including higher job satisfaction, lower turnover, and increased productivity (Jiang et al., 2012). Importantly, this literature has

focused on how HPWS can influence organizational outcomes relating to firm performance (Combs et al., 2006).

In contrast to the theorized synergistic combination of work design and HR practices found in HPWS, Morgeson and colleagues (2006) found that increasing autonomy in teams was important for improving performance only when other HR practices were not motivating. This disconnect provides evidence for the view that work design may substitute for poor HR practices rather than complementing them as proposed by the HPWS literature. Moreover, Barrick and colleagues (2015) tested the effects of the full set of task characteristics and feedback from others on firm performance, finding that they did not significantly predict firm performance on their own, but did so when combined with other HR practices and transformational leadership. Taken together, these studies suggest that work design and HR decisions should be considered in conjunction, emphasizing that they interact, but are not always synergistic in combination.

Discussions around HPWS suggest that the research is split on the effectiveness of the universal best practice bundles prescribed by earlier HPWS research (Delery & Doty, 1996). Alternative perspectives identify contingencies where certain HR practices may be more effective than others (Youndt et al., 1996; Lepak et al., 2005). One model suggests that bundles of HR practices, including work design, should be differentiated by the human capital they serve, with unique HR configurations for different types of human capital (Lepak & Snell, 1999). Indeed, many HR researchers have debated the merits of using best practice HR policies, pointing to the benefits of policies that are differentiated by job types and organizational levels (Campion et al., 2005; Kang & Snell, 2009; Tsui et al., 1997).

Discussion

The history of work design research has in large part been the history of individual work design and the examination of work characteristics at the individual level of analysis. This attention has led many scholars to imply that we know everything that there is to know about work design. But this assertion is premature given the far smaller bodies of work design research at the team and organizational levels of analysis. We highlighted the uneven amounts of research on each work characteristic at the team level, showing gaps in our knowledge across the task, knowledge, social, and especially the contextual domains. Moreover, we offered a new avenue for examining work design at the organizational level.

Work design research at the organizational level of analysis is in its infancy. We contributed a definition of organizational work design in the hopes of

sparking a debate about how organizations can deploy sets of work characteristics to achieve desired outcomes. Although the extant organizational level research we reviewed in this chapter has been performed outside the domain of work design, much of it not even invoking the term, we believe that it provides a substantive foundation for future research. Moreover, work characteristic approaches to work design have more to contribute to organizational research than is implied by their historic treatment in micro-oriented empirical tests. The individual work characteristics have already had a large impact on team and team design research and have the potential to have a large impact on higher level organizational and organizational design research.

Implications and Future Research Directions for Team and Organizational Work Design

Although the 18 individual work characteristics examined by the WDQ reflect a comprehensive approach to analyzing job and work characteristics at the individual level of analysis (Morgeson & Humphrey, 2006), there are some deficiencies in these characteristics for analyzing all work characteristics that emerge at the team level. Future research should consider a broader scope of work characteristics that arise at the team level of analysis. Moreover, level of analysis remains another clear challenge in the multi-level work design literature. Theory is often at the team level of analysis, but work characteristics are measured at the individual level. As our review of the literature has shown, many researchers have used conceptually different meanings for many work characteristics at the individual versus team level of analysis.

Team level

A far more extensive review of the team autonomy literature is warranted than what is provided in this chapter. The differences between team autonomy as a theoretical construct (as defined in this chapter) and the multiple measurements used across studies at the team level merit their own review. At a minimum, identifying studies that use idiosyncratic measures of autonomy could offer insights into the meaning behind subtle differences in measurement. Further, our examination of interdependence at the team level revealed qualitative research that suggests interdependence in autonomous teams can lead to difficulty coordinating with other teams (Ingvaldsen & Rolfsen, 2012). There may be significant costs to autonomy and decentralization relating to

coordination when considering the interdependence between teams in multi-team systems and other parts of the organization (Ancona & Caldwell, 1988, 1992). These studies suggest that interdependence between teams is an important future direction for work design scholarship. Many other areas deserve more attention as the world of work changes. For example, how might collaborating with AI as a teammate change the task, knowledge, social, and contextual characteristics of work differently than collaborating with human workers?

Organizational level

Future research on work design at the organizational level is particularly important because it can shape the meaning of work at the lower levels, aligning individual and team behavior with organizational strategy (Campion et al., 2005; Pasmore et al., 1982). Yet, organizational level work design initiatives are infrequently found to predict the design of individual jobs and teams (Arthur, 1994). Future research should consider work design alongside other organizational design considerations to see which decisions take precedence.

An integrative review of the literature on HR constructs that interact with work design is needed to simultaneously advance multi-level work design and HR research. Many studies have approached work design from an HR systems lens, yet, to our knowledge, there is no review of the two subjects together. This is unfortunate because these are both topic domains that managers have significant control over and are likely to have underexamined tradeoffs between them (Morgeson & Campion, 2002, 2003). When managers focus on one domain, they are likely to have to make concessions in the other (e.g., increasing knowledge characteristics increases compensation requirements; Campion & Berger, 1990; Morgeson & Humphrey, 2006).

Organizational design scholars have pointed to the importance of work design as a mechanism through which organizations can achieve their strategic goals. For example, Jeffrey B. Arthur (1994) articulates two bundles of HR practices that are expected to mutually reinforce one another to generate specific outcomes (i.e., commitment and control), but presumably, other bundles are possible. This research on HR bundles offers many HR practices, including work design, as the predictors of desired outcomes like reduced turnover in the commitment bundle, and increased productivity in the control bundle (Arthur, 1994; MacDuffie, 1995). Future research should consider how other aspects of work design might be able to influence a broader set of organizational goals.

Conclusion

Multi-level work design is an important research domain that still has many important research opportunities. We hope that this chapter sparks a larger debate about organizational work design and the ways in which work design research can be further integrated across levels of analysis and with a broader array of organizational research.

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