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Contexts, People, and Work Designs: Developing and Testing a Multilevel Theory for Understanding Variability in Work Design Consequences

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Work design scholarship has demonstrated that work characteristics are important determinants of a wide range of individual outcomes including well-being, motivation, satisfaction, and performance. Yet this scholarship has also revealed substantial and unaccounted for variance in these effects, prompting calls for theory and research that applies multilevel and contextual perspectives to expand our understanding of work designs. We develop theory that spans occupation, job, and individual levels to connect the influences of both context and personal attributes (e.g., skills) on work design consequences. Central to our multilevel theory is the concept of attribute relevance, which reflects the extent to which different attributes are prioritized within occupational and job contexts in which individuals enact their roles. Results across three studies spanning 3,838 incumbents and 339 unique occupations reveal that attribute relevance systematically moderates the relationships between work designs and individual outcomes and thus demarcates factors that account for variability in the main effects observed in previous work design research. We bring much-needed theory and evidence to open questions about how worker requirements and individual differences are connected to work designs.

Keywords: work design, occupations, multilevel, attribute relevance, skills

Work roles can be characterized in many different ways, ranging from a narrow focus on specific tasks to a broader consideration of the competencies that are needed to perform work tasks. As an intermediate level of description, the discrete work characteristics of a given role have been shown to have significant consequences for those performing these roles (Parker, Morgeson, & Johns, 2017). As such, a large body of research has sought to address the ways work is designed, where work design refers to "the content and organization of one's work tasks, activities, relationships, and responsibilities" (Parker, 2014, p. 662). Empirical evidence from this research has shown that enriched work designs are associated with beneficial outcomes for individuals such as increased satisfaction, performance, and motivation, whereas poor-quality designs are linked to adverse outcomes such as increases in stress, absenteeism, and turnover intentions (Humphrey et al., 2007). Despite evidence of these effects, research has also indicated that consequences are not uniform across individuals. That is, although evidence convincingly shows that work designs matter for individual-level outcomes, such effects also exhibit significant between-person variability. Theory has been advanced to explain this variability but has focused primarily on individual differences in growth need strength with very limited supporting evidence (Johns et al., 1992; Tiegs et al., 1992). Thus, a critical need for work design scholarship is new theory that identifies factors that help explain predictor–outcome variability. Doing so not only allows for a better understanding of what accounts for variance in work design outcomes but also how to boost the benefits of work designs for individuals.

Research on work designs is indeed voluminous and robust, yet it has yielded relatively little direct evidence of factors that condition the main effects of work characteristics on individual-level outcomes (Parker, Van den Broeck, & Holman, 2017). Theory from work design scholars, however, has clearly noted that outcome variability is likely to be attributable to both individual (e.g., Hackman & Oldham, 1980; Morgeson & Humphrey, 2008) and contextual differences (e.g., Morgeson et al., 2010; Parker, Van den Broeck, & Holman, 2017). The former factor has a longer empirical record than the latter, but evidence in this vein has been less promising, with studies largely failing to find supportive or consistent effects for person-centric moderators such as needs (e.g., need for achievement; Rentsch & Steel, 1998) and personality (e.g., conscientiousness; Grant, 2008; Raja & Johns, 2010). The search for contextual factors,

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while historically neglected (Morgeson et al., 2010), has provided emerging evidence of conditional effects linked to contexts such as occupations (Dierdorff & Morgeson, 2013; Wolfson et al., 2019) and national cultures (Carter et al., 2024). Taken collectively, the search for individual difference moderators has appeared to be relatively unproductive thus far, whereas the search for contextual moderators appears more fruitful, though work design theory stipulates the likely conditioning roles of both sources of influence.

A potentially more productive way to account for variability in the relationships between work designs and individual outcomes entails adopting a multilevel perspective and considering the moderating influences of both contexts and personal characteristics. Because contexts and the attributes they require can be conceptualized at multiple levels (Dierdorff et al., 2009), developing theory that spans occupation, job, and individual levels provides a unique accounting of how context and attributes (e.g., knowledge, skills, abilities, traits) come to affect work design outcomes. Accomplishing this, however, requires articulating the specific content connections between both person and environment elements across these levels (van Vianen, 2018).

Toward this end, we develop attribute relevance theory (ART), a multilevel theory that identifies discrete work characteristic—attribute connections that differentially shape the effects of work designs depending upon the levels at which attributes are considered. Central to the theory is the concept of *attribute relevance*, which reflects the extent to which different attributes are prioritized within the occupational context or job context in which individuals enact their roles. Attribute relevance exists when elements of the context are commensurate or thematically similar to the features of a given attribute. For example, interpersonal orientation is thematically similar to levels of social support in the job context as both pertain to the nature of social interactions at work. Work is inherently multilevel, in part because job and occupational contexts exist at different levels (Dierdorff & Morgeson, 2007). With specific regard to work designs, job contexts are delineated by specific work characteristics (e.g., autonomy) whereas occupational contexts are delineated by requirements for specific attributes (e.g., achievement orientation). At the job and individual levels, certain work characteristics also imply particular attributes such as autonomy implying the need for self-management skills (Morgeson & Humphrey, 2008). We propose that attribute relevance functions at the individual, job, and occupation levels, allowing ART to link constructs across these distinct levels of work (Morgeson & Hofmann, 1999).

The primary proposition in ART is that attribute relevance moderates the effects of work characteristics on individual outcomes. We examine ART across three studies to both replicate and extend findings using distinct samples, designs, and operationalizations. Across these studies, we test the moderating effects of attribute relevance using three attributes at the occupational level (i.e., achievement orientation, interpersonal orientation, and adjustment) and three attributes at the individual level (i.e., self-management, interpersonal, and adaptation skills) on theoretically relevant work characteristics that span three major design domains (Morgeson et al., 2012) including task, social, and contextual characteristics (i.e., autonomy, social support, and physical demands). Our investigation focuses on individual-level outcomes that encompass four primary types of work design criteria from previous research (Morgeson et al., 2012) including outcomes that are attitudinal (i.e., job satisfaction), cognitive (i.e., turnover intentions), behavioral (i.e., job performance), and well-being (i.e., burnout). Table 1 summarizes the variables we operationalized across the three studies to empirically examine ART.

Study 1 used archival data derived from integrating nationally representative databases (General Social Survey [GSS] and O*NET) spanning 3,300 incumbents and 237 occupations to examine the moderating effects of attribute relevance on the relationships between work characteristics and job satisfaction and turnover intentions. Study 2 combined primary data from 300 incumbents across 138 occupations with O*NET information to address potential measurement limitations of archival data. This second study complemented Study 1 by testing moderation by attribute relevance on the relationships between work characteristics and job satisfaction (a replication) and burnout (an extension). Because Studies 1 and 2 examined attribute relevance via occupational differences (vs. individual-level proficiencies), we conducted a third study that also measured individual differences in attributes using supervisor ratings of participants' skills. Study 3 combined primary data from 238 incumbents across 69 occupations with O*NET information to test attribute relevance for its moderating effects on job satisfaction, turnover intentions, and burnout (replications), as well as on job performance (an extension).

Our theory and analyses make several contributions to work design scholarship and practice. First, ART provides a multilevel theory that articulates how contexts shape the consequences of work designs, thus answering calls to delineate the connections between job and occupational contexts and their implications for individuals enacting their roles in these contexts (Dierdorff, 2019; Johns, 2018). ART offers a general theoretical mechanism (i.e., the construct of attribute relevance) that facilitates an exploration of work design effects across levels. This allows us to create discrete cross-level

Table 1
Research Framework and Variable Operationalizations

Work design category	Work characteristic	Occupation-level attribute	Individual-level attribute
Task	Autonomy	Achievement orientation (spans effort, persistence, initiative)	Self-management skills (spans goal setting, attention to detail, persistence, initiative)
Social	Social support	Interpersonal orientation (spans social orientation, cooperation, concern for others)	Interpersonal skills (spans rapport-building, cooperative relationships, teamwork, empathy, internal and external networking)
Physical	Physical demands	Adjustment (spans self-control, stress tolerance, adaptability)	Adaptation skills (spans adaptability, conflict, resource management, responsibility)

Note. Occupation-level attributes operationalized with O*NET information; individual-level attributes operationalized with supervisor ratings.

links while developing unique theory at each level—essential to multilevel theoretical development (Morgeson & Hofmann, 1999). This aspect of ART also addresses an important need in work design theory. For instance, in synthesizing the multilevel factors that affect work designs, Parker, Van den Broeck, and Holman (2017) remarked that:

> If we want to understand the influences of work design, it is not enough to only consider the higher-level context influences on work … nor is it advisable to only consider how lower-level context and individual factors shape work design. All of these factors affect work design. (p. 297)

Second, we make valuable empirical contributions to work design because our findings reveal systematic, cross-level moderation of the relationships between work characteristics and individual outcomes. This not only helps to account for the variability in established effects observed in prior research but also explicitly recognizes that work designs are contextually embedded phenomena (Morgeson et al., 2010). Third, our depiction of moderating effects linked to both occupational attribute requirements and individual-level attribute proficiencies brings much-needed evidence to the open question of how worker requirements and individual differences are connected to work designs. Although work design theory has long recognized that personal attributes like skills and traits might moderate the effects of work characteristics, to date such possibilities have gone largely unconsidered (Parker, Morgeson, & Johns, 2017). The construct of attribute relevance provides an explanatory mechanism that links processes across both person and environmental elements and addresses a key problem for person–environment research in general, which has "been based neither on theoretical notions about significant individual variances in personal attributes nor on knowledge about job resources" (van Vianen, 2018, p. 93). Finally, a focus on contexts and attributes has practical value because it highlights the conditions under which certain work designs are more or less likely to benefit individuals. Including individual-level, malleable attributes like skills further illuminates the ways beneficial outcomes can be facilitated by organizational interventions.

A Multilevel Theory of Attribute Relevance and Work Design

Attribute relevance describes the foundational concept that different personal attributes, such as knowledge, skills, abilities, or traits, are prioritized within the occupational and job contexts in which individuals enact their roles. Attributes become relevant when elements of a given context are thematically similar to the elements of a given attribute. That is, elements from the two entities (i.e., attributes and contexts) are commensurate due to a shared abstraction or large proportion of overlapping content. In this way, attribute relevance can be seen as a type of "fit construct" (see Harrison, 2007). For example, self-management skills and autonomy are commensurate in that they both relate to what and how work tasks are performed. The broader construct of "relevance" is often found in theories that describe person–situation interactions (e.g., Chatman, 1989; O'Reilly et al., 1991; Schneider, 1987). Central to the concept of attribute relevance and work design, however, is that both attributes and contexts can be conceptualized at multiple levels. Attributes are typically conceptualized at the individual level where they signify potentially important individual differences (Sackett & Laczo, 2003). Yet, attributes can also be conceptualized at higher levels, such as the occupational level. This is because occupations systematically depict differences in requirements for individual attributes (Dierdorff et al., 2009). Contexts can similarly be conceptualized at different levels (Johns, 2006). For example, work characteristics depict discrete features along which job contexts systematically vary (Dierdorff & Morgeson, 2013). Occupations are higher level contextual entities that exert top–down influences (Dierdorff, 2019) and thus "shape the formal and informal distribution of tasks, and influence the skills used in completing those tasks, both of which are key to work design" (Parker, Van den Broeck, & Holman, 2017, p. 280). Taken collectively, attribute relevance is fundamentally multilevel. At the job and individual levels, attribute relevance pertains to the association between an individual's attributes and the work characteristics that define the job's context. At the occupation and job levels, attribute relevance pertains to the association between attributes required by the occupation's context and the work characteristics that define the job's context.

Attribute relevance is a construct that is applicable at the occupation, job, and individual levels, and thus, it provides "a level-free metric with which to link similar constructs across levels" (Morgeson & Hofmann, 1999, p. 255). In addition, attribute relevance operates across levels to moderate the relationships between work designs and individual outcomes. This multilevel function of attribute relevance is due to the fact that contextsexert "press" (Murray, 1938), regardless of the level at which contexts are considered, such as jobs or occupations (Johns, 2018), and this press makes attributes relevant to role enactment (Tett & Guterman, 2000). In this sense, attribute relevance in ART is reminiscent of situational relevance in trait activation theory (Tett & Burnett, 2003), where contexts are relevant to the degree that they offer opportunities for certain attributes to be expressed during role enactment. Attribute relevance is also reminiscent of the "matching hypothesis," whereby correspondence between environmental elements, such as stressors and resources, creates interactive effects (de Jonge & Dormann, 2006). Like trait activation theory and the matching principle, we expect relevance or correspondence to moderate predictor–outcome relationships. Beyond these similarities, however, attribute relevance differs from and is broader than situation relevance in trait activation theory and the matching hypothesis because it applies to the relevance of both *attribute–situation* linkages at the job and individual levels and *situation–situation* linkages at the occupation and job levels.

Attribute relevance operates as a moderator across levels for three reasons. First, attribute relevance reflects a prioritization of certain personal characteristics, such as behavioral tendencies and proficiencies, over others when people enact their work roles. For example, in occupations with strong requirements for achievement orientation, behavioral tendencies and proficiencies toward goal-striving and persistence are more salient to role enactment than in occupations low in such requirements. When job contexts are characterized by high levels of autonomy, goal-striving and persistence are similarly more salient to role enactment. Second, attribute relevance indicates that a context has a greater number and diversity of situational opportunities linked to a given attribute (Mowday & Sutton, 1993), thus creating a broader scope, variety, and frequency of activities for which that attribute is salient during role enactment. For instance, in occupations with strong requirements for interpersonal orientation, people face more work situations where cooperation and concern for others come into play when enacting their roles. The same can be expected in job contexts characterized by

high levels of social support. Third, attribute relevance reflects the contextual features that constrain or enhance resources that are directed toward enacting the work role for a given attribute. For example, in occupations with strong requirements for adjustment, contextual demands for adaptability and stress tolerance are high and individuals' psychological and physical resources are more taxed than in occupations low in adjustment. At the job and individual levels, work designs characterized by high levels of physical demands similarly make attributes related to adaptability relevant to role enactment and relate to how people cope with resource drains in such jobs.[1]

Moderating Effects of Attribute Relevance at Different Levels

Although attribute relevance similarly operates as a moderator at different levels, the mechanisms by which it exerts influence differ depending on the levels under consideration (Morgeson & Hofmann, 1999). As mentioned above, attribute relevance can pertain to both situation–situation linkages and attribute–situation linkages. At the occupational and job levels, attribute relevance describes situation–situation linkages and thus the mechanism by which attribute relevance operates is akin to the notion of correspondence (Morgeson et al., 2010) and reflects situation–situation fit where elements from a proximal situation are theoretically aligned with features of the broader context in which the situation occurs (Ostroff & Schulte, 2007). In work designs, the proximal situation is represented by the work characteristics that delineate individuals' job contexts, whereas the broader context is that of the occupation in which individuals' jobs are embedded (Dierdorff & Morgeson, 2013). The moderating effects of attribute relevance at the occupational and job levels will amplify work characteristic—outcome relationships; that is, the benefits and detriments found in prior research are strengthened. This amplification is due to both occupational and job contexts placing dual situational pressures on individuals for the same personal attributes when enacting their roles (Dierdorff, 2019).

At the job and individual levels, attribute relevance describes attribute–situation linkages. As such, the mechanism by which attribute relevance operates is akin to demands–abilities fit (Kristof, 1996) where fit occurs when a person can provide the requisite attributes demanded by the job. In work designs, these linkages are delineated by work characteristics that represent the attributes required by a job's context and the individual attributes a person brings to role enactment. Thus, attribute relevance at the job and individual levels will moderate work characteristic—outcome relationships from prior research; however, whether it amplifies or attenuates these relationships depends on the work characteristic. For work characteristics that are typically associated with positive outcomes (e.g., social support), we expect attribute relevance to strengthen effects on outcomes. For work characteristics that are typically associated with negative outcomes (e.g., physical demands), we expect attribute relevance to weaken effects on outcomes. Such differential moderation at the job and individual levels is aligned with the logic of demands–abilities fit because skillful individuals can better utilize resources provided by certain work designs (e.g., increased discretion, help, or support from others) and better cope with stressors associated with other work designs (e.g., increased strength and endurance requirements).

In sum, we argue that attribute relevance is a key construct that explains the variability evidenced in prior research between work designs and individual outcomes across occupational, job, and individual levels. Related research supports this general proposition. For example, meta-analytic evidence by Fila et al. (2017) showed differences in stress tolerance demands (i.e., accepting criticism, dealing calmly and effectively with high stress situations) across broad occupational groupings (e.g., education, health care) moderated every predictor–criterion relationship proposed by job demands-control theory (Karasek, 1979). Though not centrally focused on the outcomes of work designs, the substantial body of evidence demonstrating the effects of person–environment fit on individual outcomes (e.g., Kristof-Brown et al., 2005; van Vianen, 2018) lends indirect support to our central conjecture at the job and individual levels.

Empirical Framework and Hypothesis Development

Examining ART requires identifying specific attributes and work characteristics across individual, job, and occupation levels to enable a theoretically comprehensive, yet empirically parsimonious, test of attribute relevance. Along these lines, our selection of variables described in Table 1 was guided by four criteria. First, selection was informed by the integrated work design framework described by Morgeson et al. (2012), which organizes work design into distinct categories such as task characteristics that focus on how the work itself is accomplished, social characteristics that reflect the broader social environment within which work is performed, and contextual characteristics that represent the physical and environmental context within which work is performed. This model also organizes the various expected outcomes of work designs, which span attitudinal outcomes that center on an individual's feelings toward the job or organization, cognitive outcomes that pertain to thoughts about the job, behavioral outcomes that focus on the actions of workers, and well-being outcomes that include both physiological and psychological reactions to the job (Morgeson et al., 2012). Applying this framework helped ensure a representative scope of work characteristics and outcomes. Second, we reviewed other work design frameworks that articulated the potential connections between work characteristics and attributes. More specifically, we were informed by Morgeson and Humphrey (2008) who specified different attributes that should hold relevance for certain work characteristics. This framework guided our selection of attributes at the occupation and individual levels. Finally, we looked to existing evidence from work design meta-analyses (e.g., Humphrey et al., 2007) to further inform choices of work characteristics that have been linked to important individual outcomes.

As previously described, the guiding proposition in ART is that attribute relevance moderates the effects of work characteristics on individual-level outcomes found in extant research. Research has generally demonstrated the benefits of autonomy and social support (e.g., increased satisfaction) and the drawbacks of physical demands (e.g., increased burnout). At the occupation and job levels, we

[1] Attribute relevance exists because of the *content* of the attribute and the work characteristic (i.e., the commensurateness of the elements). Although we emphasize high levels of relevance when identifying and describing attributes and work characteristics, the attribute relevance construct is by no means dichotomous but rather there is a continuum of relevance. Our hypothesis development and examinations focus on variables that are on the "high-end" of relevance (i.e., high in attribute relevance).

expect attribute relevance amplifies these effects. At the job and individual levels, we expect attribute relevance amplifies the positive effects of autonomy and social support and dampens the negative effects associated with physical demands.

Attribute Relevance at the Occupation and Job Levels

Achievement Orientation and Autonomy

Autonomy reflects the degree of discretion or freedom people have over their work schedules, decision making, and work methods (Breaugh, 1985; Wall et al., 1992). In work design frameworks, autonomy is a task characteristic because it describes how work is performed and the nature of tasks composing a role (Morgeson & Humphrey, 2006). The attribute of achievement orientation also reflects aspects of the task environment and how work is performed. For example, at the occupation level, achievement orientation demarcates contexts where effort, persistence, initiative, and goal-striving are more pertinent for role enactment (Borman et al., 1999). At the job level, autonomy is also thought to coincide with demands for goal setting, monitoring, and achievement (Morgeson & Humphrey, 2008). This suggests attribute relevance between autonomy and achievement orientation because both have commensurate elements that thematically reflect what and how tasks are performed.

A substantial amount of research has demonstrated the benefits of autonomy on a range of outcomes including satisfaction, turnover intentions, burnout, and performance (Humphrey et al., 2007). These individual benefits are thought to result from autonomy because increasing discretion over one's work prompts feelings of control and self-determination, as well as enhanced work meaningfulness and self-efficacy (Humphrey et al., 2007; Johns et al., 1992; Morgeson & Campion, 2003; Parker & Ohly, 2008). The attribute relevance between autonomy and achievement orientation strengthens these effects, which means the positive associations between autonomy and job satisfaction and performance, and the negative associations with turnover intentions and burnout, should be amplified in occupations that are high in achievement orientation. This amplification occurs because achievement orientation prioritizes certain behavioral patterns like displaying persistence, taking initiative, and goal-striving by presenting more and differentiated situations where these task-focused actions are critical to role enactment.

When jobs have higher levels of autonomy, this increased discretion allows incumbents to engage more effectively in the behavioral priorities emphasized by achievement orientation. For example, increased discretion promotes more freedom to individualize goal-setting processes (Cordery & Parker, 2012), as well as better discern when and where to apply personal initiative to shape the nature of one's tasks (Rudolph et al., 2017). Increased autonomy further grants more flexibility to persist toward successful performance in ways that better respond to an individual's specific job context (Morgeson & Humphrey, 2008). Autonomy is also recognized as a structural job-level resource (Tims et al., 2012), and given that high achievement orientation occupations prioritize persistence and effort which can tax personal resources, increased autonomy should help to counteract these resource constraints. Taken collectively, the expanded opportunities in high achievement orientation occupations allow job-level autonomy to become increasingly relevant and applicable to role enactment, thereby amplifying the established effects autonomy has on individual-level outcomes. Based on this reasoning, we hypothesize:

> *Hypothesis 1:* Achievement orientation amplifies the positive relationships between autonomy on job satisfaction (1a) and job performance (1b) and the negative relationships between autonomy on turnover intentions (1c) and burnout (1d).

Interpersonal Orientation and Social Support

Social support reflects the extent to which the job context provides opportunities for advice and assistance from others, as well as friendships (Karasek, 1979; Karasek et al., 1998; Morgeson & Humphrey, 2006; Sims et al., 1976). Social support is considered a social characteristic because it describes the interpersonal elements of work (Morgeson & Humphrey, 2008). Interpersonal orientation similarly reflects the relational aspects of work, and at the occupational level, it delineates contexts where social orientation, cooperation, and concern for others are especially pertinent to role enactment (Borman et al., 1999). At the job level, social support has also been connected to relational attributes such as affiliation and prosocial values (Grant & Parker, 2009; Morgeson & Humphrey, 2008). This indicates social support and interpersonal orientation have attribute relevance as both constructs pertain to the nature of social interactions that coincide with work.

Research has supported the benefits of social support on a range of outcomes including satisfaction, organizational commitment, turnover intentions, burnout, engagement, and performance (Christian et al., 2011; Dierdorff & Jensen, 2018; Humphrey et al., 2007). Such benefits derive from the assistance provided by peers or supervisors for role enactment, feelings of affiliation and impact on others, and the social reciprocity that follows from higher levels of social support (Grant & Parker, 2009; Heaney et al., 1995; Rhoades & Eisenberger, 2002). The attribute relevance between social support and interpersonal orientation should amplify effects observed in prior research (i.e., increased satisfaction and performance, and reduced turnover intentions and burnout) because occupations high in interpersonal orientation prioritize behavioral patterns such as affiliating with others, building cooperative relationships, and being sensitive to others' needs. This means that such contexts entail a broader scope and diversity of opportunities where these socially focused actions are essential to role enactment.

When jobs have higher levels of social support, the increase in helpful and reciprocal interpersonal exchanges allows incumbents to engage more effectively in the behavioral priorities emphasized by interpersonal orientation. For example, a heightened sense of being affiliated with caring others coincides with social support (Heller et al., 1986), and when people feel more socially supported, it motivates them to reciprocate with prosocial behavior that increases commitment and performance and decreases withdrawal (Grant & Parker, 2009). Higher levels of social support also promote relational coordination (Gittell, 2001), reflecting productive interpersonal communication, mutual respect, and cooperation with others. Social support helps individuals exert situational control through the provision of feedback and aid from others (Heaney et al., 1995), which can bolster role clarity and assist with performance difficulties (Humphrey et al., 2007). Interpersonal relations can be psychologically demanding, and social support is recognized as an important job-level resource that can be brought to bear to readdress resource

drain (Bakker & Demerouti, 2007). This allows individuals to better cope with stress and strain, which can reduce the effects of job demands on burnout and satisfaction (Melamed et al., 1991). In sum, the expanded opportunities in occupations high in interpersonal orientation allow job-level social support to become increasingly relevant and applicable to role enactment, thus amplifying the benefits it holds for individuals. We therefore hypothesize:

> *Hypothesis 2:* Interpersonal orientation amplifies the positive relationships between social support on job satisfaction (2a) and job performance (2b) and the negative relationships between social support on turnover intentions (2c) and burnout (2d).

Adjustment and Physical Demands

Physical demands represent the amount of physical activity, strength, endurance, and effort necessary for a job (Edwards et al., 1999; Morgeson & Humphrey, 2006). Physical demands are considered "contextual" characteristics (Morgeson & Humphrey, 2008) and describe the physiological, perceptual-motor, and biological features of work design (Campion & Thayer, 1985). At the occupational level, the attribute of adjustment also reflects physiological features of work because it delineates contexts that require poise, stress tolerance, and adaptability (Borman et al., 1999). At the job level, studies have also shown physical demands are associated with work stress, coping behavior, and adaptive performance (Carayon & Smith, 2000; Edwards et al., 2000; Pulakos et al., 2000). This suggests attribute relevance between physical demands and adjustment because both are related to physiological requirements inherent to job and occupational contexts (Dierdorff & Morgeson, 2013).

Physical characteristics in work design have received less attention than task and social characteristics. Yet, research has indicated that physical characteristics are related to attitudes and well-being (Humphrey et al., 2007). Generally speaking, lower physical demands are associated with positive consequences such as increased satisfaction and engagement (Christian et al., 2011; Edwards et al., 2000; Humphrey et al., 2007; Nahrgang et al., 2011; Sundstrom & Sundstrom, 1986). The negative effects of increased physical demands are thought to occur because they lead individuals to invest less in their work, become physically uncomfortable, have more negative work experiences, and endure more mental and physical resource depletion during role enactment (Campion, 1988; Humphrey et al., 2007; Kahn, 1990; Nahrgang et al., 2011). Attribute relevance between job-level physical demands and occupation-level adjustment should accentuate the negative effects observed in prior research because occupations high in adjustment prioritize behavioral patterns such as maintaining composure and adapting to high-pressure or changing situations. Such contexts thus create more and varied situations where self-control, stress tolerance, and flexibility are salient to role enactment.

When jobs are more physically demanding, the increases in resource depletion, discomfort, and strain inhibit incumbents from effectively engaging in the behavioral priorities emphasized by adjustment. Occupations high in adjustment are replete with situations that are stress-inducing, variable, and challenging to self-discipline, and these kinds of circumstances are a larger drain on personal resources needed for role enactment. For example, physically demanding jobs require more resilience on the part of employees (Kossek & Perrigino, 2016). This means that when jobs are more physically demanding, individuals face dual resource-draining conditions (occupational and job levels) that serve to accentuate unfavorable consequences. This occurs because when job demands are chronically high and the external environment also presents constraints on personal resources, individuals are unable to reduce the potential negative effects of these demands during role enactment due to the escalating drain on their energy (Schaufeli, 2017). Similar effects even extend to resource depletion tied to the broader environment outside one's organization, where perceived resource scarcity can lead to reduced effort and performance in more physically demanding jobs (Pitesa & Thau, 2018). Considered collectively, the prevalence of resource-draining situations in high-adjustment occupations makes job-level physical demands increasingly relevant to role enactment and thereby exacerbates deleterious effects on individual-level outcomes. We therefore hypothesize:

> *Hypothesis 3:* Adjustment amplifies the negative relationships between physical demands on job satisfaction (3a) and job performance (3b) and the positive relationships between physical demands on turnover intentions (3c) and burnout (3d).

Attribute Relevance at the Job and Individual Levels

Self-Management Skills and Autonomy

Self-management skills are behavioral proficiencies that show personal competence for initiating goal setting, monitoring goal progress, providing self-administered consequences for goal attainment or failure, and engaging in positive self-talk (Manz & Sims, 1980; Millikin et al., 2010). As described earlier, increases in autonomy promote more freedom to individualize goal-setting processes, enact personal initiative, and grant more flexibility to persist, regulate, and alter one's actions toward successful performance. For these reasons, self-management skills have been identified as particularly important in job contexts with high levels of autonomy (Morgeson & Humphrey, 2008), suggesting attribute relevance between autonomy and self-management skills.

This attribute relevance means that individuals who are more skilled in self-management can better utilize the job-level discretion provided by autonomy, which serves to accentuate the benefits of this work characteristic. For example, individuals with strong self-management skills use self-goals and self-reinforcement more effectively to complete necessary tasks, visualize performance execution, and leverage rational counterarguments to dysfunctional beliefs (Millikin et al., 2010). These proficiencies become even more of an asset in jobs with high autonomy because of the increased degrees of freedom that permit individuals to enact their roles in idiosyncratic ways (Dierdorff & Morgeson, 2007; Morgeson et al., 2005). Related research on contexts associated with higher levels of autonomy, such as self-directed teams and empowering leadership, also suggests the increased importance of self-management skills. For instance, the success of self-directed teams is contingent upon team members possessing self-management skills, with team ineffectiveness linked to failures of self-management and increased reliance on leaders outside the team to make decisions (Magpili & Pazos, 2018). Research on empowering leadership, where the provision of autonomy is a centerpiece, finds that follower

self-control and self-management skills are paramount (Pearce & Sims, 2002; Vecchio et al., 2010). Related research has also found that self-management in the absence of autonomy can increase counterproductive behaviors (Jensen & Raver, 2012). Taken collectively, this logic and related evidence suggests that when individuals possess higher proficiency in self-management, they are better able to use the job-level discretion provided by autonomy to enact their roles effectively and, in doing so, feel more positively about their roles. More formally, we hypothesize:

Hypothesis 4: Self-management skills amplify the positive relationships between autonomy on job satisfaction (4a) and job performance (4b) and the negative relationships between autonomy on turnover intentions (4c) and burnout (4d).

Interpersonal Skills and Social Support

Interpersonal skills span communication and relationship-based capabilities, including behavioral proficiencies that display social sensitivity, cooperation, working with others, active listening, and assertive forms of communication (Klein et al., 2006; Lievens & Sackett, 2012). As previously discussed, higher levels of social support motivate people to reciprocate with prosocial behavior directed at others and promote productive interpersonal communication, mutual respect, and cooperation. As such, social support reflects the provision of job-level resources that directly derive from the interpersonal exchanges people have during their role enactments (Bakker & Demerouti, 2007). This suggests attribute relevance between interpersonal skills and a social characteristic like social support. Related research on training supervisors to be more socially supportive corroborates this attribute relevance in that these interventions seek to directly boost interpersonal skills like feedback giving, communication, and coaching (Eastburg et al., 1994; Hammer et al., 2019).

The attribute relevance between social support and interpersonal skills will amplify the benefits of this work characteristic. When people are more interpersonally skilled, they are better equipped to obtain the resources provided by social support (e.g., aid, assistance) through more effective communication that describes and clarifies their needs. Stronger interpersonal skills also allow individuals to build and maintain relationships more effectively with those who support them, which reinforces norms of reciprocity and deepens social affiliation. For example, research has shown that more interpersonally skilled individuals have a heightened sensitivity to others (Riggio, 1986) and are more proficient at navigating social interactions at work (Ferris et al., 2001). These increased social sensitivities are thought to promote more accurate assessments of social cues and reciprocity expectations at work (Dierdorff & Rubin, 2022), as well as the maintenance of high-quality relationships (Segrin & Taylor, 2007). Research has also shown that the individual outcomes of social support are due in part to a person's social integration within their surrounding social network (Cohen & Wills, 1985). Those with higher interpersonal skills should be more adept at social integration and recognize its importance, given that they conceptualize prosocial actions as more central to their work roles than people with lower interpersonal skills (Dierdorff et al., 2021). From this logic and related research, we hypothesize:

Hypothesis 5: Interpersonal skills and social support amplify the positive relationships between social support on job satisfaction (5a) and job performance (5b) and the negative relationships between autonomy on turnover intentions (5c) and burnout (5d).

Adaptation Skills and Physical Demands

Adaptation skills refer to a person's proficiencies to self-regulate behavior and resources in response to changing or challenging conditions of the work environment (Martin, 2012; Ployhart & Bliese, 2006). Jobs that are more physically demanding reflect these kinds of challenging environmental conditions because such job contexts increase resource depletion, discomfort, and strain that lead to more negative work experiences (Demerouti et al., 2001). This suggests attribute relevance between adaptation skills and physical demands. The inclusion of adaptation skills in models of adaptive performance (e.g., Charbonnier-Voirin & Roussel, 2012; Ployhart & Bliese, 2006), which also extend to accommodating physical demands (e.g., Pulakos et al., 2000), further substantiates this relevance.

Unlike higher self-management and interpersonal skills amplifying the positive effects of autonomy and social support, respectively, attribute relevance between adaptation skills and physical demands is likely to dampen the negative effects associated with physical demands. A primary reason for this expectation is that individuals who have higher adaptation skills are better able to cope with the stressors that coincide with physical demands (e.g., strength, effort, and endurance requirements). For example, adaptation processes are important for resilience (Fraser et al., 1999), especially in jobs with higher physical demands (Kossek & Perrigino, 2016). This is due in part to those with stronger adaptation skills being capable of reserving more psychological resources than individuals with weaker adaptation skills (Ployhart & Bliese, 2006). These resource reservoirs also hold longer term benefits because they not only allow individuals to deal with demanding or stressful circumstances more effectively but also help to prevent these circumstances from becoming chronic (Hobfoll, 2002). Individuals with higher adaptation skills engage in more effective self-regulation, which involves the recognition that resources are limited. Related work on the concept of anticipatory coping (Aspinwall & Taylor, 1997), which denotes an understanding of resources as fluid and at risk, suggests that when people with strong adaptation skills work in physically demanding jobs, they are more likely to effectively apply their resources toward future goal attainment or the prevention of loss because they more accurately recognize and anticipate their future resource conditions. In sum, this rationale and related evidence suggests that when individuals possess higher proficiency in adaptation, they are better able to recognize, redress, and anticipate the resource drains and discomfort that coincide with physically demanding jobs. Thus, adaptation skills can buffer against the negative work experiences that ensue from high physical demands. We hypothesize:

Hypothesis 6: Adaptation skills attenuate the negative relationships between physical demands on job satisfaction (6a) and job performance (6b) and the positive relationships between physical demands on turnover intentions (6c) and burnout (6d).

Method and Results

Transparency and Openness

We describe our sampling process and measures used in this research. We adhered to the *Journal of Applied Psychology* methodological checklist. Study 1 data are from publicly available data sets. Studies 2 and 3 information is available upon request by emailing the corresponding author. The research designs and analyses were not preregistered.[2]

Sample and Procedure: Study 1

Study 1 used archival data derived from integrating two nationally representative databases. The first was the GSS database, which comes from the survey administered by the National Opinion Research Center at the University of Chicago. We used the 2002 and 2006 *Quality of Working Life* module developed by the National Institute for Occupational Safety and Health. The GSS classifies respondents using U.S. Census Bureau occupation codes, which we used to cross-reference GSS data with the U.S. Department of Labor's O*NET database. O*NET contains nationally representative data on over 970 occupations and provides generalizable information on attribute requirements. Joining the GSS data with O*NET data produced a database of 3,300 incumbents spanning 237 occupations.

Measures: Sample 1

Work Characteristics

We operationalized three work characteristics using GSS data. *Autonomy* was assessed with four items: "I am given a lot of freedom to decide how to do my own work" (very true, somewhat true, not too true, and not at all true), "I have a lot of say about what happens on my job" (strongly agree, agree, disagree, and strongly disagree), "In your job, how often do you take part with others in making decisions that affect you" (often, sometimes, rarely, and never), and "How often do you participate with others in helping set the way things are done on your job" (often, sometimes, rarely, and never). Scores were averaged with higher scores indicating more autonomy ($\alpha = .72$). *Social support* was assessed with four items: "My supervisor is concerned with the welfare of those under him or her," "The people I work with take a personal interest in me," "My supervisor is helpful to me in getting the job done," and "The people I work with can be relied on when I need help" (very true, somewhat true, not too true, and not at all true). Scores were averaged with higher scores equaling more support ($\alpha = .76$). Finally, *physical demands* were assessed with two items: "Does your job require you to do repeated lifting, pushing, pulling or bending" and "Does your job regularly require you to perform repetitive or forceful hand movements or involve awkward postures" (yes or no). Scores were averaged with higher scores equating to higher demands (interitem $r = .46$, $p < .01$).

Individual Outcomes

Two outcomes were operationalized with GSS data. *Job satisfaction* was measured with an item asking, "How satisfied are you in your job" (very satisfied, somewhat satisfied, not too satisfied, and not at all satisfied). *Turnover intentions* were measured with the item asking, "Taking everything into consideration, how likely is it you will make a genuine effort to find a new job with another employer within the next year" (very likely, somewhat likely, and not at all likely). Higher values on each of these GSS items were coded to indicate higher levels of each criterion.

Occupation-Level Attributes

Attributes at the occupational level were operationalized using O*NET (see Table 1). All descriptors were rated using a 5-point scale (1 = *not important* to 5 = *extremely important*). *Achievement orientation* was assessed by averaging scores across three descriptors: effort, persistence, and initiative ($\alpha = .94$). *Interpersonal orientation* was measured by averaging scores across three descriptors: social orientation, cooperation, and concern for others ($\alpha = .92$). *Adjustment* was measured by averaging scores across three descriptors: self-control, stress tolerance, and adaptability ($\alpha = .89$).

Results: Study 1

Table 2 shows the means, standard deviations, and correlations for Study 1 variables. Study 1 data were multilevel in nature. We thus sought to account for hierarchical dependencies that could violate independence assumptions and produce biased estimates in linear regression (Aguinis et al., 2013). Accordingly, we first examined the possibility of significant between-occupation (Level 2) variance in each of the outcomes. A significant estimate for the variance of the random component for a given criterion indicates the need to use random coefficient modeling. Results from null models suggested significant between-occupation variance in both criteria across the 237 Level 2 units (occupations). Intraclass correlations (ICC[1]) depict the amount of between-occupation variance and were as follows: job satisfaction (ICC = .05, $p < .01$) and turnover intentions (ICC = .03, $p < .01$). Therefore, we conducted hierarchical linear modeling with random varying slopes using HLM 6 to test hypotheses. Level 1 predictors were grand-mean centered prior to analysis.[3]

Table 3 provides the results pertinent to testing hypotheses pertaining to the outcomes of job satisfaction and turnover intentions (H1a–H3a and H1c–H3c). From the table, there was significant cross-level moderation for five of the six interaction terms. The exception was the interaction between adjustment and physical demands in predicting job satisfaction (failing to support H3a). The forms of the significant moderations are shown in Figure 1. For autonomy, the positive effects on satisfaction and the negative effects on turnover intentions were amplified in occupations with higher achievement orientation (supporting H1a and H1c). Similarly, the effects of social support were amplified such that job satisfaction was higher and turnover intentions lower in occupations with higher interpersonal orientation (supporting H2a and H2c). Finally, the

[2] This research was approved by the DePaul University institutional review board (IRB-2020-119), protocol title: "Job and Team Designs." Analysis output can be found at https://osf.io/j8qgb/?view_only=c1fcf8b62d954425b6bd877e7b4a78d5.

[3] We also ran all models with group-mean centering to verify that cross-level interactions were not spurious (Aguinis et al., 2013). Results did not differ in significance or direction.

Table 2
Study 1 Descriptive Statistics

Variable	*M*	*SD*	1	2	3	4	5
Individual variables							
1. Autonomy	3.15	0.66	—				
2. Social support	3.29	0.64	.37**	—			
3. Physical demands	3.46	0.45	−.11**	−.13**	—		
4. Job satisfaction	3.34	0.75	.38**	.48**	−.13**	—	
5. Turnover intentions	2.56	0.77	−.19**	−.27**	.14**	−.41**	—
Occupational variables							
1. Achievement orientation	3.85	0.39	—				
2. Interpersonal orientation	3.96	0.43	.28**	—			
3. Adjustment	4.08	0.36	.64**	.69**	—		

Note. $N = 3{,}330$ for individual variables derived from General Social Survey; $N = 327$ for occupational variables derived from O*NET.
** $p < .01$, two-tailed.

effects of physical demands on increased turnover intentions were accentuated in occupations with higher adjustment (supporting H3c).

Sample and Procedure: Study 2

Study 2 data were primary data collected via survey from participants recruited using Amazon's Mechanical Turk (Rand, 2012). A total of 300 individuals from 138 occupations participated in the survey. The mean age of the sample was 34.62 ($SD = 10.01$), 42% were female, and 73% had more than 5 years of work experience. The racial composition of the sample was 85% White, 7% Black or African American, 5% Asian, 1% American Indian or Alaskan Native, and 2% indicated "other." In terms of highest educational attainment, 9% indicated "high school graduate," 28% indicated "some college," 13% had a 2-year degree, 39% had a 4-year degree, 9% had a master's degree, and 2% possessed a doctorate. Several quality control checks were used to detect careless responding (Meade & Craig, 2012). First, instructions specified at least 2 years of work experience, allowing a crosscheck with a survey item asking years of work experience. Second, full completion of study measurements was required. Third, we examined within-person response patterns to ensure that individuals, especially those with very fast response times, were not providing the same ratings on consecutive items or other careless patterns (e.g., strict increasing or decreasing sequences). Finally, we used two distractor items that stated, "select strongly agree for this item." No participants were identified as careless respondents using these quality checks. As in Study 1, we integrated responses with O*NET to capture occupational attributes. This was accomplished by asking respondents their job titles and the industries in which they worked. Responses were linked to O*NET occupations.

Measures: Sample 2

Work Characteristics

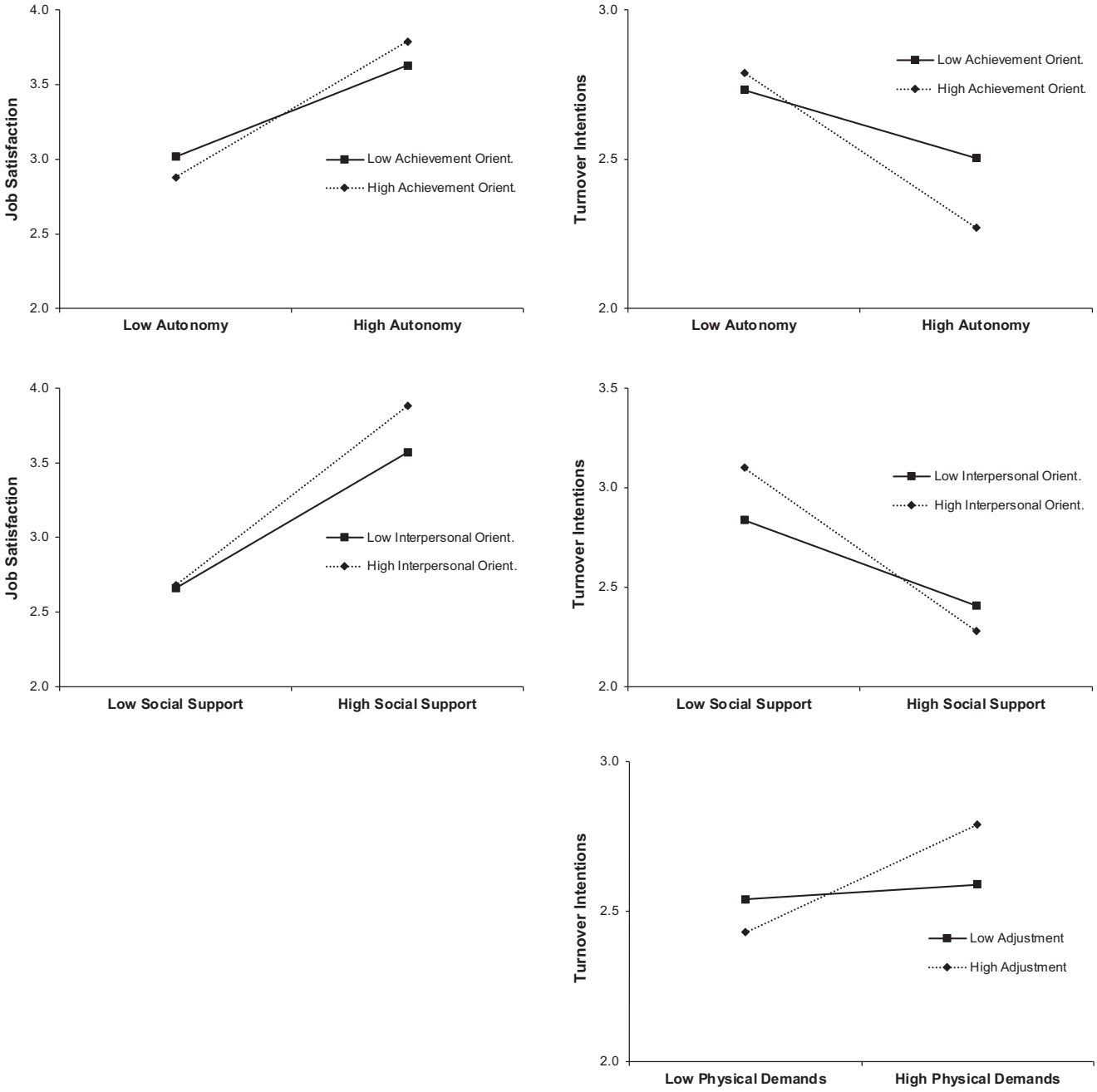
We measured the same work characteristics as in Study 1. All items were derived from scales in the Work Design Questionnaire (Morgeson & Humphrey, 2006) and were rated using a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). *Autonomy* and *social support* were

Table 3
Hierarchical Linear Regression Results From Study 1

	Job satisfaction			Turnover intention		
Level 2 fixed effect	Coeff.	*SE*	*t*-ratio	Coeff.	*SE*	*t*-ratio
Task characteristic						
Achievement orientation, γ01	.01	.04	0.29	−.08	.04	−1.78
Autonomy, γ10	.09	.21	0.43	−.32	.19	−1.68
Autonomy × Achievement Orientation, γ11	.14	.06	2.42*	.14	.05	2.69**
% within-occupation variance explained	.16			.05		
Social characteristic						
Interpersonal orientation, γ01	.16	.04	3.64**	.01	.04	0.11
Social support, γ10	.08	.25	0.34	.29	.26	1.08
Social Support × Interpersonal Orientation, γ11	.11	.06	2.20*	−.15	.07	−2.27*
% within-occupation variance explained	.26			.09		
Contextual characteristic						
Adjustment, γ01	.10	.05	2.17*	.03	.04	0.66
Physical demands, γ10	−.04	.36	−0.09	.78	.34	2.26*
Physical Demands × Adjustment, γ11	−.04	.09	−0.41	−.25	.08	2.97**
% within-occupation variance explained	.02			.08		

Note. For purposes of brevity, only parameters from Level 2 models are shown; each work characteristic category is a separate model. Coeff. = coefficient; *SE* = robust standard errors.
* $p < .05$. ** $p < .01$, two-tailed.

Figure 1
Moderating Effects of Attribute Relevance From Study 1



measured using six-item Work Design Questionnaire scales (α = .91 and .92, respectively). *Physical demands* were measured using the three-item Work Design Questionnaire scale (α = .96).

Individual Outcomes

Job satisfaction was assessed using five items from Campion (1988). Sample items include "I like the kind of work I do" and "Considering everything, I am satisfied with my job" (α = .95). *Burnout* was measured using eight items from the exhaustion dimension of the *Oldenburg Burnout Inventory* (Halbesleben & Demerouti, 2005). Sample items include "There are days when I feel tired before I arrive at work" and "During my work, I often feel emotionally drained" (α = .85). All scales were rated using a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*).

Occupation-Level Attributes

O*NET measures described in Study 1 were again used to operationalize attributes at the occupational level. Internal reliabilities were .95, .87, and .90 for achievement orientation, interpersonal orientation, and adjustment, respectively.

Results: Study 2

Study 2 data were multilevel, and we examined the possibility of between-occupation variance in the two outcomes. Results from null models did not indicate significant between-occupation variance in either of the criteria across the 138 Level 2 units. We therefore conducted standard linear multiple regression for testing hypotheses using the PROCESS macro for SPSS (Hayes, 2017). Table 4 provides the means, standard deviations, and correlations for Study 2 variables. Table 5 presents the regression results pertinent to testing hypotheses for the outcomes of job satisfaction and burnout (H1a–H3a and H1d–H3 d). As shown, all interaction terms were significant ($p < .05$) and added incremental prediction beyond the main effects. The forms of these moderations are shown in Figure 2. For autonomy, the positive effects on job satisfaction and the negative effects on burnout were amplified in occupations with higher achievement orientation (supporting H1a and H1d). The effects of social support were also amplified, with higher job satisfaction and lower burnout in occupations with higher interpersonal orientation (supporting H2a and H2d). The deleterious effects of physical demands were accentuated in occupations with higher adjustment, showing lower job satisfaction and higher burnout (supporting H3c and H3d). In sum, Study 2 results replicate Study 1 for job satisfaction and extend the moderation findings to burnout.

Sample and Procedure: Study 3

Study 3 data were from a primary data collection. Participants were 238 incumbents from 69 occupations enrolled in a graduate-level strategic human resource management course at a large private Midwestern university. The majority was enrolled in a part-time MBA program (85%), with a smaller proportion from other graduate programs (e.g., MS in Business Analytics). Participants' average job tenure was 4.02 years ($SD = 2.29$), average age was 31.19 years, and 46% were female. In the course, participants completed two surveys. The first survey measured demographics, work characteristics, and occupations. The second survey was administered approximately 4 weeks later and measured job satisfaction, turnover intentions, and burnout. A third survey captured skill proficiencies and job performance as rated by participants' immediate supervisors. This third survey was part of a developmental feedback exercise in the course and involved a web-based performance evaluation that participants sent directly to their supervisors for completion. The response rate was 97% for this survey.

Work Characteristics

Autonomy, *social support*, and *physical demands* were measured using the same scales as Study 2. Internal reliabilities were .89, .90, and .92 for autonomy, social support, and physical demands, respectively.

Individual Outcomes

Job satisfaction and *burnout* were measured with the same scales as Study 2 ($\alpha = .90$ and .84, respectively). *Turnover intentions* were measured using a three-item scale described by Cammann et al. (1979) and rated on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). Sample items read, "I often think about quitting my organization" and "It's very possible that I will look for a new job in the next year" ($\alpha = .97$). *Job performance* was measured using supervisor ratings on four items: gets the job done, demonstrates effectiveness in accomplishing major work goals, fulfills all responsibilities required by the job, and strives for quality in her/his work ($\alpha = .90$). These items were rated using a 5-point scale (1 = *not at all descriptive* to 5 = *very highly descriptive*).

Skill Proficiencies

Individual skills were measured using supervisory ratings. *Self-management skills* were measured with five items: develops individual work goals that are aligned with organizational goals, shows attention to detail, persists in the face of obstacles, establishes challenging goals, and demonstrates initiative ($\alpha = .86$). *Interpersonal skills* were assessed using seven items: builds rapport with others inside the organization, displays sincere interest in others, develops cooperative working relationships, shows empathy toward others, builds strong relationships with professionals outside the organization, works well in team settings, and knows a wide range of people who can get the job done ($\alpha = .92$). *Adaptation skills* were assessed using four items: adapts well to conflicting personal and

Table 4
Study 2 Descriptive Statistics

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Autonomy	3.87	0.91	—							
2. Social support	3.86	0.98	.18**	—						
3. Physical demands	2.35	1.37	−.09	−.08	—					
4. Achievement orientation	4.03	0.23	.10	−.01	−.09	—				
5. Interpersonal orientation	3.91	0.37	−.04	.20**	.14*	.10	—			
6. Adjustment	4.16	0.29	.05	.13*	.07	.37**	.74**	—		
7. Job satisfaction	3.92	1.02	.48**	.41**	−.13*	.15**	.10	.14*	—	
8. Burnout	2.54	0.82	−.37**	−.41**	.20**	−.11	−.06	−.06	−.63**	—

Note. $N = 300$; Variables 1–3 are work characteristics; Variables 4–6 are occupational attributes derive from O*NET.
* $p < .05$. ** $p < .01$, two-tailed.

Table 5
Moderated Regression Results From Study 2

Model and variable	Job satisfaction			Burnout		
	Coeff.	*SE*	*t* value	Coeff.	*SE*	*t* value
Task characteristic						
Autonomy	.48	.05	9.21**	−.31	.04	−6.85**
Achievement orientation	.10	.05	2.00*	−.06	.04	−1.29
Autonomy × Achievement Orientation	.13	.06	2.19*	−.09	.04	−2.01*
ΔR^2			0.01*			0.01*
R^2			0.25**			0.15**
Social characteristic						
Social support	.43	.06	7.76**	−.35	.04	−7.88**
Interpersonal orientation	.06	.06	1.10	−.01	.05	−0.22
Social Support × Interpersonal Orientation	.13	.05	2.86**	−.09	.04	−2.38*
ΔR^2			0.02**			0.02*
R^2			0.19**			0.18**
Contextual characteristic						
Physical demands	−.14	.06	−2.46*	.18	.05	3.82**
Adjustment	.18	.06	3.01**	−.08	.05	−1.79
Physical Demands × Adjustment	−.12	.06	−2.07*	.13	.05	2.90**
ΔR^2			0.01*			0.03**
R^2			0.05**			0.07**

Note. $N = 300$; ΔR^2 values reflect incremental change attributable to interaction term. Coeff. = coefficient; *SE* = robust standard errors.
* $p < .05$. ** $p < .01$, two-tailed.

work demands, handles multiple demands and priorities effectively, manages resources effectively, and assumes responsibility for her/his actions (α = .88). All items were rated using a 5-point scale (1 = *not at all descriptive* to 5 = *very highly descriptive*).

Occupation-Level Attributes

O*NET measures from the other two studies were again used to operationalize occupational-level attributes. Internal reliabilities were .87, .89, and .87 for achievement orientation, interpersonal orientation, and adjustment, respectively.

Results: Study 3

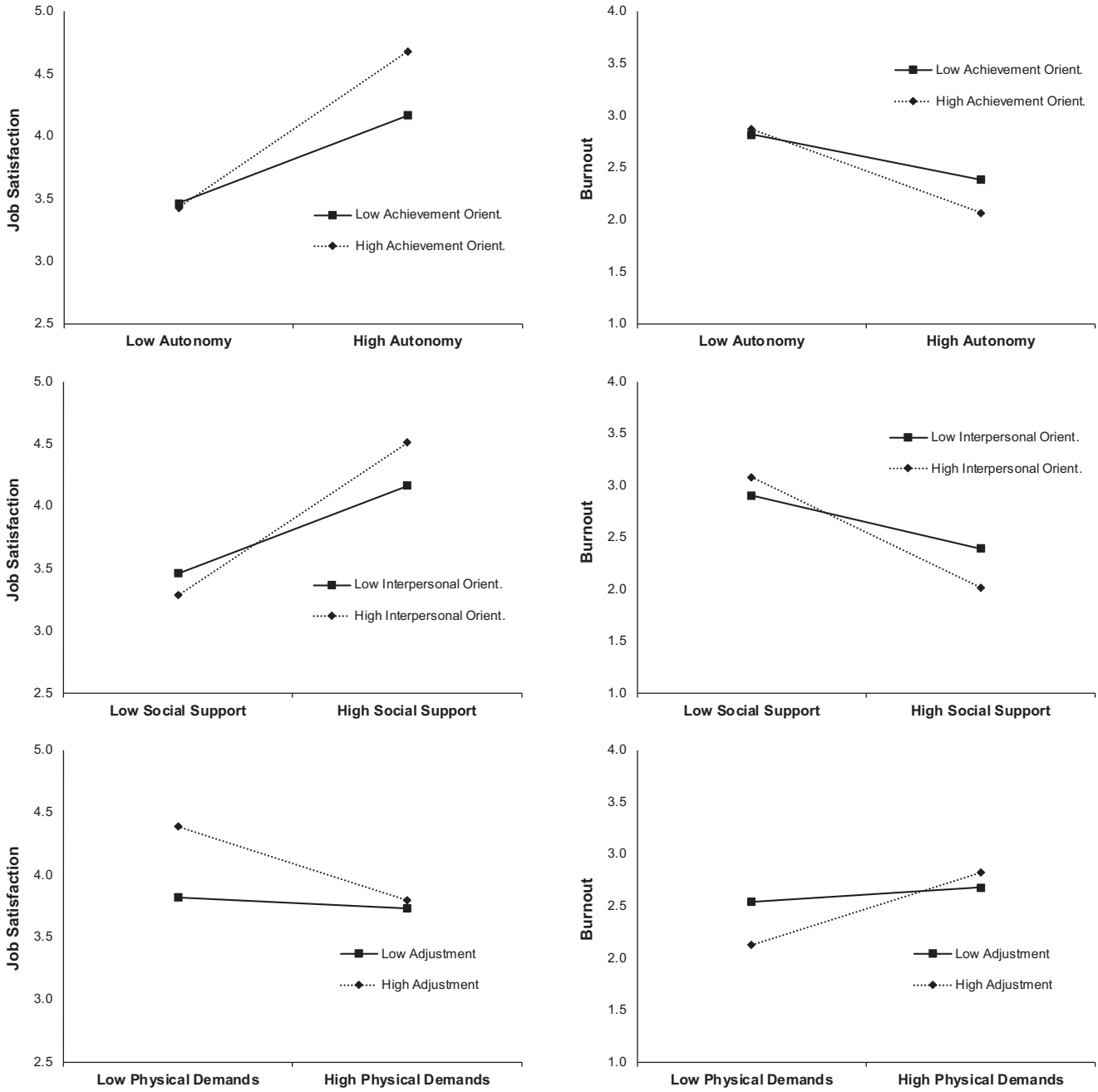
We examined the possibility of between-occupation variance in the outcome measures. Results from null models did not indicate significant between-occupation variance in the criteria across the 69 Level 2 units. We again used the PROCESS macro for SPSS (Hayes, 2017) to test our hypotheses. Table 6 provides the means, standard deviations, and correlations for Study 3 variables. Table 7 results are pertinent to testing all six hypotheses. Results indicated 12 significant interaction terms across the models: five for autonomy, four for social support, and three for physical demands, reflecting moderation of at least half or more of the possible interaction terms within each work characteristic domain. The forms of the moderations are shown in Figures 3–5, organized by work characteristic. For autonomy, the plots indicate accentuated benefits on satisfaction, performance, and burnout by achievement orientation (supporting H1a, H1b, and H1d). Self-management skills also amplified the buffering effects of autonomy on turnover intentions (supporting H4c). For social support, the plots indicate accentuated benefits on satisfaction by interpersonal orientation (supporting H2a). Interpersonal skills also amplified the buffering effects of social support on turnover intentions and burnout (supporting H5c and H5d). Finally, the plots indicate that the deleterious effects of physical demands were buffered by higher levels of adaptation skills for satisfaction, turnover intentions, and burnout (supporting H6a, H6c, and H6d).

Cumulative Synopsis of Research Results

Table 8 provides a summary of hypothesis support across the three studies. Moderation due to the attribute relevance between autonomy and achievement orientation was fully replicated across all studies for satisfaction and burnout. These effects were found for turnover intentions in Study 1, but not Study 3. In the only study with job performance (Study 3), the positive effects of autonomy on performance were also amplified by achievement orientation. The attribute relevance between autonomy and self-management skills also amplified beneficial effects on satisfaction and turnover intentions. Moderation due to the attribute relevance between social support and interpersonal orientation was fully replicated across all studies for satisfaction. These moderating effects were also found for turnover intentions (Study 1) and burnout (Study 2), though not replicated in Study 3. In addition, interpersonal skills increased the buffering effects of social support on turnover intentions and burnout, as well as amplified positive effects on satisfaction (Study 3). Finally, adjustment amplified the deleterious effects of physical demands on satisfaction, turnover intentions, and burnout, but these effects were not replicated across studies. Study 3 further revealed that higher adaptation skills buffered the negative effects of physical demands on satisfaction, turnover intentions, and burnout.[4]

[4] We also examined nonhypothesized moderation; that is, variables not argued to have high attribute relevance. Across all three studies, only three interactions were found (4% of possible occurrences), with each showing amplification of main effects. These were Social Support × Adjustment on burnout (Study 2), Autonomy × Interpersonal Skills on satisfaction (Study 3), and Social Support × Self-Management Skills on satisfaction (Study 3). These results provide additional support for the attribute relevance we posited in Table 1. Results can be found at https://osf.io/j8qgb/?view_only=c1fcf8b62d954425b6bd877e7b4a78d5.

Figure 2
Moderating Effects of Attribute Relevance From Study 2



Discussion

We address calls that have gone largely unanswered for theory and research that explores the multilevel and contextual influences that condition work design outcomes (e.g., Morgeson et al., 2010; Parker, Morgeson, & Johns, 2017). To do so, we built a new multilevel theory that connects occupations, jobs, and individuals to work designs by proposing the concept of attribute relevance to describe when and how different levels of context and attributes align and thereby shape the outcomes individuals experience as they enact their work roles. Across three studies that span 3,838 incumbents and 339 unique occupations, our findings reveal that attribute relevance systematically moderates the relationships between work designs and individual outcomes. Such results are important for work design scholarship because they demarcate factors that account for the variability in well-established main effects observed in previous research. This is especially valuable given that the historical search for conditioning factors has generally failed to provide clear or

Table 6
Study 3 Descriptive Statistics

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Autonomy	3.86	0.86	—												
2. Social support	3.83	0.91	.25**	—											
3. Physical demands	1.92	0.94	.03	−.14*	—										
4. Achievement orientation	3.98	0.19	−.01	.01	.06	—									
5. Interpersonal orientation	3.84	0.42	.01	.12	.10	.03	—								
6. Adjustment	4.15	0.28	.09	.20**	.07	−.07	.63**	—							
7. Self-management skills	3.97	0.68	−.16*	.06	−.03	.19**	.02	−.02	—						
8. Interpersonal skills	3.96	0.67	−.08	−.03	−.07	.05	.06	.09	.42**	—					
9. Adaptability skills	3.86	0.71	.02	−.04	−.26**	−.01	−.03	−.08	.29**	.40**	—				
10. Job satisfaction	3.71	0.95	.40**	.34**	−.15*	.02	.10	.11	.30**	.16*	.16*	—			
11. Job performance	4.24	0.57	.17*	.02	−.02	.24**	−.03	−.01	.16*	.23**	.27**	.13	—		
12. Turnover intentions	2.74	1.31	−.12	−.21**	.20**	−.17**	−.07	−.08	−.15*	−.24**	−.23**	−.38**	−.14*	—	
13. Burnout	2.64	0.78	−.04	−.08	.19**	−.06	.03	.03	−.09	−.10	−.10	−.25**	−.01	.53**	—

Note. $N = 238$; Variables 1–3 are work characteristics; Variables 4–6 are occupational attributes derive from O*NET; Variables 7–9 are supervisor ratings of skills.
* $p < .05$. ** $p < .01$, two-tailed.

consistent evidence (Parker, Van den Broeck, & Holman, 2017). That we find moderation for attribute relevance at multiple levels also brings much-needed evidence to open questions about how worker requirements and individual differences are connected to work design and its outcomes (Parker, Morgeson, & Johns, 2017).

Taken collectively, results support our proposition that attribute relevance amplifies the direct benefits or challenges commonly found in work design research. For example, the individual benefits associated with increased job-level autonomy have been well supported and our results indicate that such benefits are accentuated when individuals work in occupations with high achievement orientation as well as when they possess strong self-management skills. We further find that the benefits of increased job-level social support can be heightened in occupations with higher interpersonal

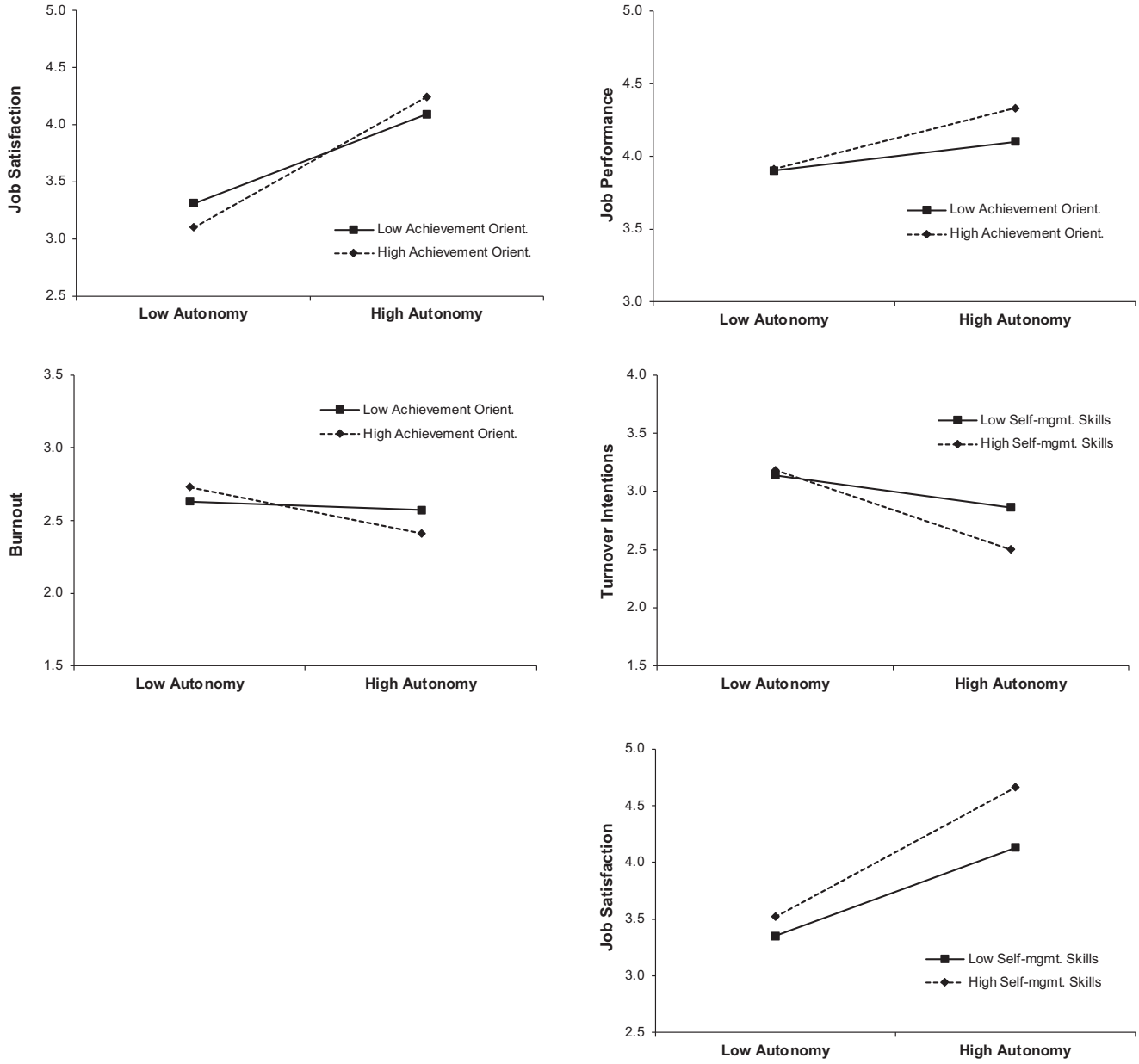
Table 7
Moderated Regression Results From Study 3

Model and variable	Job satisfaction			Job performance			Turnover intention			Burnout		
	Coeff.	*SE*	*t* value	Coeff.	*SE*	*t* value	Coeff.	*SE*	*t* value	Coeff.	*SE*	*t* value
Task characteristic												
Autonomy	.39	.05	7.66**	.10	.04	2.70**	−.14	.08	−1.70	−.03	.05	−0.59
Self-management skills	.35	.05	6.76**	.09	.04	2.38*	−.16	.08	−1.94	−.06	.05	−1.17
Achievement orientation	−.05	.05	−0.88	.12	.04	3.14**	−.20	.08	−2.36*	−.03	.05	−0.61
Autonomy × Self-Management Skills	.18	.05	3.52**	.02	.04	0.50	−.20	.08	−2.40*	−.05	.06	−0.10
ΔR^2			0.03**			0.00			0.02*		.00	
Autonomy × Achievement Orientation	.12	.05	2.27*	.11	.04	2.91**	−.11	.09	−1.23	−.12	.54	−2.27*
ΔR^2			0.01*			0.03**			0.00			0.02*
Total R^2			0.37**			0.14**			0.10**			0.04*
Social characteristic												
Social support	.37	.06	6.56**	.02	.04	0.52	−.30	.08	−3.65**	−.09	.05	−1.63
Interpersonal skills	.09	.06	1.62	.14	.04	3.43**	−.28	.08	−3.36**	−.07	.05	−1.33
Interpersonal orientation	.02	.06	0.32	−.03	.04	−0.78	−.03	.08	−0.31	.05	.05	0.96
Social Support × Interpersonal Skills	.24	.06	3.98**	−.00	.04	−0.01	−.16	.08	−1.99*	−.11	.06	−1.97*
ΔR^2			0.05**			0.00		.02*				0.02*
Social Support × Interpersonal Orientation	.16	.06	2.73**	.02	.04	0.54	−.06	.08	−0.75	.04	.05	0.78
ΔR^2			0.03**			0.00			0.00			0.00
Total R^2			0.22**			0.06*			0.12**			0.04*
Contextual characteristic												
Physical demands	−.09	.06	−1.39	.03	.04	0.84	.15	.08	1.71	.10	.05	1.98*
Adaptability skills	.10	.06	1.52	.16	.04	4.14**	−.20	.08	−2.31*	−.02	.05	−0.29
Adjustment	.11	.06	1.80	.01	.04	0.13	−.11	.08	−1.37	.03	.05	0.50
Physical Demands × Adaptability Skills	.15	.06	2.44*	.00	.04	0.03	−.28	.08	−3.53**	−.12	.05	−2.49*
ΔR^2			0.02*			0.00			0.05**			0.03*
Physical Demands × Adjustment	.11	.06	1.69	.01	.04	0.35	−.08	.08	−0.94	−.05	.05	−1.00
ΔR^2			0.01			0.00			0.00			0.01
Total R^2			0.09**			0.08**			0.13**			0.07**

Note. $N = 238$; ΔR^2 values reflect incremental change attributable to the addition of each interaction term. Coeff. = coefficient; *SE* = robust standard errors.
* $p < .05$. ** $p < .01$, two-tailed.

Figure 3

Moderating Effects of Attribute Relevance for Autonomy From Study 3

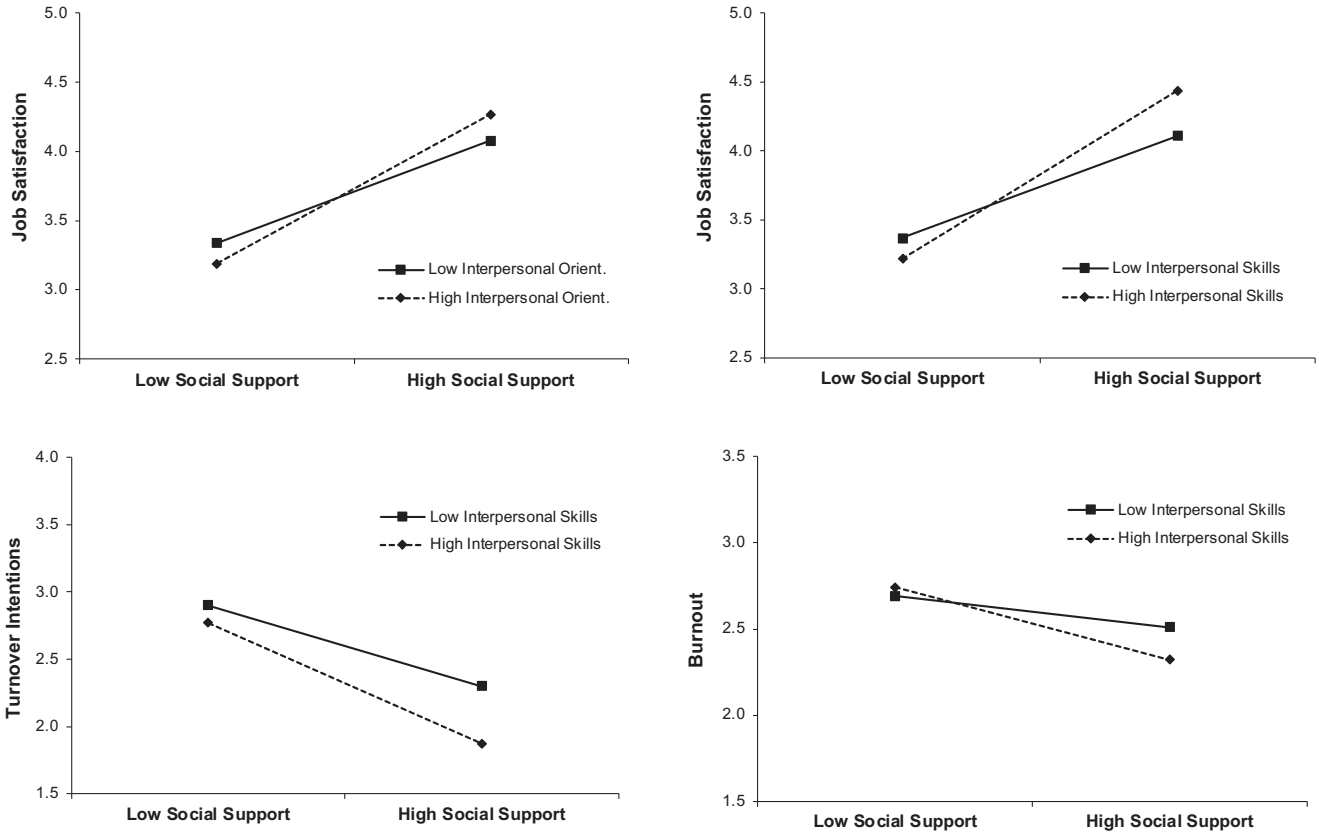


orientation or when individuals possess strong interpersonal skills. The detrimental effects of high physical demands in jobs appear to be exacerbated in occupations with high adjustment and buffered when individuals have strong adaptation skills. Such evidence confirms the central mechanisms in ART, as well as theorizing that work designs are indeed contextually embedded phenomena (e.g., Dierdorff, 2019) and that work designs implicate certain individual attributes (e.g., Morgeson & Humphrey, 2008).

In testing ART, we emphasized breadth over depth to ensure evidence across three major domains of work characteristics (task, social, and contextual) as well as four common categories of work design outcomes (attitudinal, cognitive, behavioral, and well-being). Results reveal moderation within each of these domains and across all four criteria, which affirms the generalizability of attribute relevance in shaping work design outcomes. That said, results suggest that some work characteristics are conditioned more than others, with autonomy and social support showing slightly more interactions than physical demands. Larger differences in moderation, however, are more obvious across work design *outcomes* than work characteristics. Results here indicate that effects on satisfaction are conditioned the most by attribute relevance, followed by turnover intentions and burnout, both of which displayed 60% of the interactions found for satisfaction. Moderating effects on job performance by attribute relevance appear rare in our data—only the

Figure 4

Moderating Effects of Attribute Relevance for Social Support From Study 3



positive effects of autonomy on performance were amplified in high achievement orientation occupations. It may be that the lack of moderating effects for job performance is due to the restricted range of occupations in Study 3. Nonetheless, these results are consistent with other work design studies that reveal somewhat uniform effects of work characteristics on job performance across contexts (e.g., Carter et al., 2024).

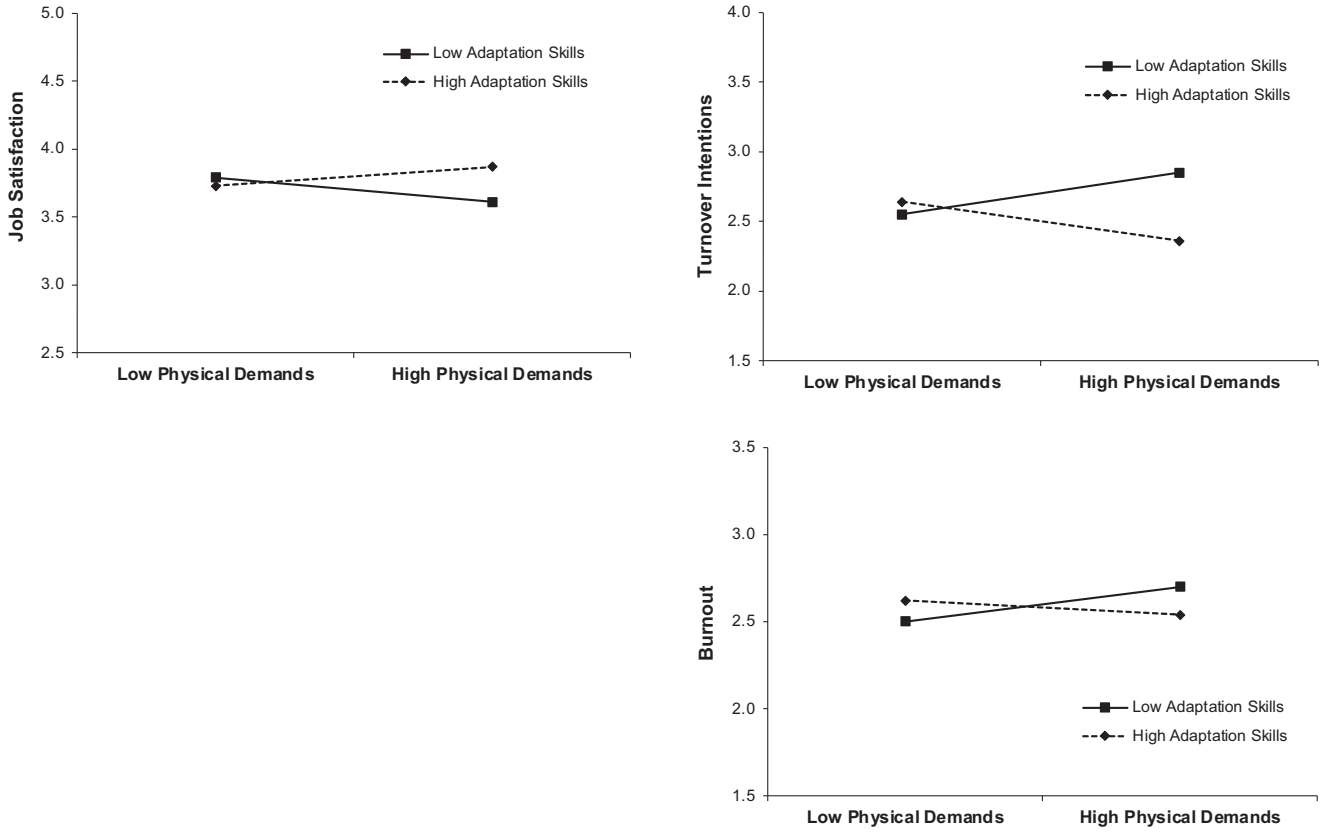
Implications for Work Design Scholarship

The departure point for our multilevel theory was the supposition that a more productive way to account for variability between work designs and individual outcomes is to dually consider the moderating influences of both contexts and attributes across the levels at which they can be conceptualized. ART stipulates that these conditioning effects result from a relevance between job-level work characteristics and specific attributes that are implied by these work characteristics, whether such attribute relevance is delineated by occupational attributes or by individual attributes. We theorized that the multilevel influence of attribute relevance derives from a contextual prioritization of certain personal characteristics over others, a greater number and diversity of situational opportunities relevant to those attributes, and contextual pressures that constrain or enhance resources during an individual's role enactment. When considered as a body of evidence, our results confirm the moderating effects of attribute relevance and support its theoretical value for explaining why some individuals reap greater benefits than others from similar work designs. Such results also reinforce the idea that occupational contexts hold important cross-level influences on work design and that attributes shape the degree to which work design outcomes are experienced by individuals. It is noteworthy to reiterate that evidence for the latter implication has been scant, although postulations of such effects have abounded. For example, scholarship applying the job demands-resources model (JD-R; Demerouti et al., 2001) remains largely silent about the role of occupations even though it explicitly recognizes that "not all occupational sectors have the same demands" (Bakker et al., 2023, p. 42).

Occupations and work designs also exist across organizations and geographic regions (Dierdorff, 2019), which implies that aspects of these latter contexts represent potentially important influences. Scholars have theorized that organizational contexts can mediate or moderate the effects of work characteristics and influence the emergence of work designs (Morgeson et al., 2010). Moreover, a recent meta-analysis by Carter et al. (2024) demonstrated that the benefits of most work characteristics for satisfaction and performance were largely universal across cultures; however, there were some exceptions such as job complexity and physical demands. Future research would be enhanced by studies examining how attribute relevance is affected by organizational factors (e.g., operational uncertainty, organizational design) and national factors (e.g., economy, institutional structures; see Parker, Van den Broeck, & Holman, 2017).

Figure 5

Moderating Effects of Attribute Relevance for Physical Demands From Study 3



It is important to note that in describing ART, we did not address how work designs emerge to delineate the job context; that is, whether specific work characteristics arise from top–down managerial intervention or from bottom–up efforts by individuals to craft their jobs (Wrzesniewski & Dutton, 2001). We believe the moderating effects of attribute relevance are generalizable across both formal and informal work designs. Recognizing that people can actively craft their roles even within the same jobs or occupations raises interesting avenues for future studies. Attribute relevance at the job and individual levels implies demands for certain personal characteristics for successful role enactment (e.g., requisite job skills). Thus, the extent to which people possess these attributes could affect the manner with which they craft their jobs and how effective their crafting is for attitudes or performance. With regard to ART, applying the construct of attribute relevance can help identify the discrete work characteristics that are more likely to be the target of crafting behavior and the type of crafting behavior likely to lead to beneficial outcomes. For example, at the occupation and job levels, individuals working in occupations with high interpersonal orientation requirements may be more likely to engage in relational

Table 8

Summary of Research Findings

Hypothesis and variable	Job satisfaction (Studies 1–3)	Turnover intention (Studies 1 and 3)	Burnout (Studies 2 and 3)	Job performance (Study 3)
Moderation of autonomy by				
H1: Achievement orientation (Studies 1–3)	✓✓✓	✓	✓✓	✓
H4: Self-management skills (Study 3)	✓	✓		
Moderation of social support by				
H2: Interpersonal orientation (Studies 1–3)	✓✓✓	✓	✓	
H5: Interpersonal skills (Study 3)	✓	✓	✓	
Moderation of physical demands by				
H3: Adjustment (Studies 1–3)	✓	✓	✓	
H6: Adaptability skills (Study 3)	✓	✓	✓	

Note. Checkmarks indicate hypothesis support.

crafting as such occupations offer more job-relevant opportunities to do so. Moreover, at the job and individual levels, people with stronger social skills may engage in more relational crafting or be better able to reap the benefits of crafting higher levels of interdependence into their jobs. Some related research suggests this possibility by showing the effects of within-person relational crafting on energy and performance are conditioned by interdependence (Doden et al., 2024). Finally, some have also argued that job crafting promotes learning (e.g., Parker, 2017). The concept of attribute relevance thus suggests that greater gains in competence would ensue when crafting efforts increase work characteristics that are connected to particular knowledge and skills that hold more relevance within the job and occupational contexts.

Some theories of work design take a more omnibus approach where job contexts and work characteristics are conceptualized broadly as "demands" or as "resources," of which JD-R is an exemplar. While this general descriptive specificity is flexible and has been widely applied across many domains (Bakker et al., 2023), there are also trade-offs in that JD-R does not offer clear guidance as to what particular environment and person features are more or less likely to be connected, at what levels these connections can exist, and how these connections shape individual outcomes (Schaufeli & Taris, 2014). In its omnibus approach, JD-R identifies contextual dimensions by what they "do" not by what they "are," and thus, job demands are features that coincide with costs and job resources are features that coincide with benefits. ART is more discrete by emphasizing what contextual and personal dimensions "are"; that is, the content that these discrete features reflect. This approach increases theoretical specificity and allows for the identification of more precise and multilevel work characteristics—attribute linkages that are not directly specified in more omnibus theories like JD-R. Addressing this lack of discreteness is valuable for work design scholarship, especially when one considers that research has identified many discrete work characteristics that could serve as job resources (e.g., task significance, specialization, ergonomics), job demands (e.g., job complexity, information processing), or perhaps be both or neither (e.g., external interactions, problem-solving, interdependence). ART thus holds the potential to precisely identify linkages between omnibus job "demands" and job or personal "resources" suggested in JD-R. For example, the omnibus category of "cognitive demands" could be more discretely depicted in work characteristics like information processing or job complexity. Here, attribute relevance would point to personal resources such as problem-solving skills or cognitive ability given the commensurateness between such work characteristics and personal attributes that pertain to the acquisition and application of information and knowledge. Such attributes would also be relevant to the work characteristic of skill variety. For job resources that are already discretely depicted, such as task identity, attributes such as project management skills, systems thinking, and cognitive complexity seem relevant given the commensurateness between task identity and attributes that pertain to how multiple and differentiated tasks collectively combine into a functional whole.

Others have proposed that people differ in the extent to which they hold expectations for particular work designs in certain occupations (Ford, 2012); for example, professors might expect high levels of job autonomy. The gravitational hypothesis (Wilk et al., 1995) also suggests occupational requirements create sorting effects, which might narrow the variability of attributes among incumbents. Such occupational norms or sorting effects could accentuate or attenuate the effects we find for attribute relevance. We examined attribute relevance at the occupational and job levels, and job and individual levels, yet attribute relevance can operate across all three levels. Future studies could explore additional multilevel effects of attribute relevance. For example, how associations found between proactive personality and work designs characterized by autonomy or task variety (e.g., Griffin et al., 2007; Parker & Sprigg, 1999) relate to individual outcomes across occupations that vary in terms of achievement orientation, which reflect contextual requirements for attributes such as effort, persistence, and initiative.

Finally, the breadth we emphasized in testing ART constrained the set of work characteristics and attributes (see Table 1). Attribute relevance is feasible between other work characteristics and individual differences and should be examined in future studies. For instance, attribute relevance seems likely between the work characteristic of problem-solving and attributes such as analytical thinking or critical thinking at both the occupational and individual levels. Similarly, attribute relevance seems apparent between a work characteristic such as external interactions and occupational contexts high in interpersonal orientation and individual-level social skills. Given the general lack of effects for individual-level attributes such as needs or personality traits in previous studies, our evidence also suggests that a more productive focus for future research is to incorporate individual-level attributes such as skills and knowledge.

Implications for Practice

Dierdorff and Morgeson (2013, pp. 30–31) noted that "an awareness of the specific occupation in which work roles to be designed or redesigned reside could provide valuable information for improving the efficacy of such efforts." Our results bolster this supposition and help illuminate the conditions under which work designs are more or less likely to benefit individuals. Our findings suggest that characteristics often affiliated with high-quality work designs, such as high levels of autonomy and social support (Parker, Van den Broeck, & Holman, 2017), can be facilitated in certain occupations. For example, work designs that seek to promote autonomy seem especially useful in occupations high in achievement orientation (e.g., financial analysts and pathologists) where our evidence suggests even larger increases in satisfaction and decreases in burnout. Interventions to increase social support will likely yield higher satisfaction and lower turnover and burnout when implemented in occupations high in interpersonal orientation (e.g., actors, art or music therapists). Alternatively, our results show that if work design efforts increase or ignore high physical demands, the costs will be amplified in occupations with high adjustment (e.g., construction, manufacturing, and many health care occupations), resulting in less satisfaction and more burnout and turnover. On this latter implication, one approach for addressing the drawbacks of physical demands might be to introduce supportive technology or specialized machinery. Parker and Grote (2022) noted, however, that such automation could pose trade-offs where benefits occur for some characteristics (i.e., physical demands) but at the cost of benefits from other characteristics (e.g., autonomy).

At the job and individual levels, our moderation results for skills further point to other practical considerations. Compared to personality traits or values, skills are more malleable. This suggests pairing work design initiatives with training interventions to increase

attribute-relevant skills. For example, offering training on self-management skills along with efforts to increase autonomy. Or, when work redesigns are less feasible such as in jobs that necessitate physical demands, training adaptation skills could improve demands–abilities fit and buffer against burnout and turnover intentions. It is important to note that the preceding implications for work design practice, especially those for boosting positive outcomes, are predicated on the application of these specific designs. As others have cautioned, however, the extent to which more enriching work designs occur in practice appears to be declining in the contemporary workplace, where evidence shows a continued prevalence of managerial interventions that standardize and simplify work rather than enriching it (cf. Parker, Morgeson, & Johns, 2017).

Limitations

Our research should be considered against its potential limitations. First, though from nationally representative databases, Study 1 used archival data, which limited the selection of measures. For instance, criteria were operationalized using single-item measures. We sought to alleviate these concerns by collecting primary data in Studies 2 and 3 using multi-item scales, and many of the results from Study 1 were replicated. Second, occupations are higher level entities, yet we only observed significant between-occupation variance for the criteria in Study 1 and the estimates were relatively small (3%–5%). The lack of between-occupational variability is likely due to Studies 2 and 3 having a more constrained set of occupations overall. Third, although an expansive set of occupations was included across the three studies, this set was certainly not exhaustive, which could reduce variance in work designs and attributes. Fourth, despite our three-study approach using different samples and our replication of many of the predicted moderation effects, our empirical tests required examining numerous interactions, which raises concerns about adequate statistical power. Fifth, some have speculated that job and personal resources could substitute to help deal with job demands (e.g., Demerouti & Bakker, 2023). For example, more autonomous jobs might substitute for the proactive tendencies of achievement-oriented individuals. Such an effect is at the job and individual levels. We did not measure achievement orientation as an individual difference and thus could not test this specific association. Sixth, similar to the majority of work design research, we focused on between-person relationships. Yet research also shows that work characteristics can display daily variability (e.g., Daniels & Harris, 2005), which suggests the need to examine attribute relevance from a within-person approach. Finally, we analyzed a diverse set of work characteristics, attributes, and individual outcomes, yet other variables are relevant and have been previously studied. For instance, we used variables that represented each of the three work characteristic categories and four common types of work design outcomes. Future studies are needed to expand to other commonly studied work characteristics (e.g., skill variety, feedback from others) and individual outcomes (e.g., role ambiguity, role overload, absenteeism).

Conclusion

We developed a multilevel work design theory to connect occupations, jobs, and individuals. Through the concept of attribute relevance, we help to explain the substantial variability evidenced in prior research between work designs and individual outcomes. We thus sought to offer new theory and evidence in the spirit of "conducting more contextualized studies of work design" (Parker, Morgeson, & Johns, 2017, p. 417). Our results, coupled with existing evidence from work design research, affirm the calls for theoretical explications and empirical examinations of how occupations and individual differences come to shape the various ramifications of work designs.

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