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## **The Moderating Role of Age in the Job Characteristics-Absenteeism Relationship: A Matter of Occupational Context?**

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### Abstract

The present study addresses the relationship between job characteristics and sickness absenteeism, examining it under two important boundary conditions, employee age and occupational group. Drawing from psychological theories that explain age-related differences in the workplace, as well as the sociology of occupations, we formulate hypotheses concerning two- and three-way interactions between five key job characteristics (job demands, autonomy, skill variety, supervisor and colleague support), age, and occupational group, namely blue-collar workers versus clerks. We test our hypotheses on an archival sample of 5,175 employees taken from the French National Survey of Employment Conditions. Hierarchical negative binomial regressions reveal that many of our hypotheses are supported. For example, autonomy and supervisor and colleague support have a differential impact on sickness absenteeism depending on age and the occupational group of employees. We discuss the implications of our findings for both theory and practice.

Keywords: Sickness Absenteeism; Age; Job Characteristics; Occupations; Three-way interaction

### Practitioner Points

- Sickness absences can be predicted by job characteristics as function of age and occupational groups

- Supervisor Support is associated with fewer sickness absences in younger workers, especially clerks
- Occupational context may mask the age differences because for Job Autonomy and Colleague Support age-related differences were detected only within the blue-collar and clerical groups respectively
- The impact of job demands and skill variety on sickness absences is moderated by age and does not vary across the two occupational groups.

The Moderating Role of Age in the Job Characteristics-Absenteeism Relationship:  
A Matter of Occupational Context?

Sickness absenteeism is a costly phenomenon for organizations and, when prolonged, also for nations, which often share with employers a portion of an employee salary to be covered during sick leaves. This has led many European countries to introduce a number of measures and initiatives to control and reduce sickness absence, as noted in the latest annual report of the European Observatory on Working Life (EurWORK, 2014).

When thinking of which people are most likely to miss work, older people are commonly assumed to be more absent due to poorer health (Ng and Feldman, 2013). However, meta-analytical findings have shown that although age is significantly related to a number of clinical health indicators (Ng and Feldman, 2013), it is only weakly related to sickness absences (Ng and Feldman, 2008). Hence, it is important to explore alternative explanations to a simple main effect of age on sickness absence: age may accentuate or buffer the effects of other factors on sickness absenteeism, and additional moderators may be at play such as ergonomic design (Fritzsche, Wegge, Schmauder, Kliegel, & Schmidt, 2014), gender composition of the workplace (Mastekaasa, 2005), family differences (Erickson et al., 2000), or social norms that may operate at the group level (Diestel et al., 2014). In the present study, our focus is on the role job characteristics.

There are practical reasons to understand how factors related to the work context affect the health of older workers. In particular, the study of age in the workplace is extremely important and timely since the population in many countries across the world is ageing (Eurostat, 2016). Our research has implications for better understanding the needs of the age-diverse workforce, and how different job characteristics may meet the needs of workers of different ages, ultimately exerting an impact on their sickness absences. Our research could help practitioners to rethink work organization to better adapt it to the ageing workforce.

In the present paper we focus on the interactive effect of age and job characteristics on sickness absence. This is consistent with recent developments in theorization about the consequences of aging in the workplace (Truxillo, Cadiz, Rineer, Zaniboni, and Fraccaroli, 2012), which note that the effects of job characteristics may vary depending on age. Meta-analytic evidence showed that several job characteristics (i.e., features of the job that can intrinsically motivate and improve employees' wellbeing; Hackman and Oldham, 1980) are significantly related to sickness absence (Humphrey, Nahrgang and Morgeson, 2007); yet a key reason to believe that age may moderate these relationships is that the aging process brings with it several changes in cognitive and emotional functioning that account for changes in personality, values, preferences, and ways of interacting with others (Ng and Feldman, 2013). These age-related differences ultimately dispose an individual to react differently to given stimuli such as those provided by the job.

Drawing on two lifespan development approaches, namely the Selection Optimization Compensation (SOC; Baltes and Baltes, 1990) and Socio-Emotional Selectivity (SES; Carstensen, Isaacowitz, and Charles, 1999) theories, Truxillo and colleagues (2012) developed specific propositions concerning the likely effects of job design characteristics on the attitudes and behaviors of older versus younger employees. Taken together, these propositions suggest that features of the environment that match the value system of an age group would exert greater effects for that group (consistent with SES; Kooij et al., 2011), and features that enable the implementation of SOC strategies (e.g., Bal et al., 2013) would in particular be more effective for older workers. Some of Truxillo et al.'s propositions have been empirically supported (Besen et al., 2013; Zaniboni et al., 2013). For example, a meta-analysis by Ng and Feldman (2015) highlighted the differential effects of autonomy on several employee attitudes and behaviors depending on age. Nonetheless, the moderating role

of age in the relation between job characteristics and sickness absences has not yet been examined. This is unfortunate given that absences are one of the most focal organizational behavior and a costly phenomenon for companies and the present study aims to fill this gap.

Moreover, we believe that the broader work context should be considered to better understand the interplay of job characteristics and age, specifically, the occupational context. It is well known that sickness absence is influenced by social norms (Xie and Johns, 2000), and occupations represent one of the main social groups defining the boundaries of socially accepted and expected behaviors (Dierdorff, Rubin, and Morgeson, 2009), including stereotypes about what is age-appropriate for the job type (e.g., Perry et al., 1996). At the same time, occupational groups shape the meaning and expression of job characteristics (Dierdorff and Morgeson, 2007), and thus they can act as further moderators of the relation between job characteristics, age, and sickness absence. Indeed, one of the challenges recognized in the literature on age and job design is to examine this interaction within different occupational contexts (Truxillo et al., 2012).

In light of this reasoning, the goals of our research were two-fold. First, we investigated whether the relation between job characteristics and sickness absence is moderated by age. Second, we investigated these relationships across different occupations, comparing occupational groups that are similar in the organizational hierarchy but that differ with respect to task and social job characteristics, namely blue collar (e.g., manual workers, skilled workers, warehouse operators) versus clerical jobs (e.g., office workers, secretaries, salespeople). We examine these issues using the French National Survey of Employment Conditions in a sample of over 5,000 employees. It is noteworthy that the results of earlier studies on the joint effect of age and job characteristics on worker outcomes have mainly been obtained using small- to medium-scale samples ( $n = 1,000$ ) which did not afford the opportunity to examine three-way interactions. Hence, previous research may have yielded

group-specific findings and, to the best of our knowledge, no study has analyzed the joint effects of age, occupational context, and job characteristics on worker outcomes.

We start by briefly summarizing the main theoretical frameworks that explain age effects in the workplace. We also illustrate similarities and differences between our two chosen occupational groups. Subsequently, we review extant literature on job characteristics and their association with sickness absences that serves as baseline to develop our hypotheses.

### **Age as predictor and as a moderator**

In their meta-analysis, Ng and Feldman (2008) found that age was negatively related to general absences ( $r = -.26$ , objective measures) and nonsickness-related absence ( $r = -.10$ , objective measures), but positively related to sickness absence, albeit very weakly ( $r = .02$ , objective measures). This suggests that older employees, rather than being more absent simply because of their age, may react differently to the surrounding environment, which is commonly known for having an impact on sickness absences (Marmot et al., 1995; Smulders, 1980).

A job context that matches individuals' patterns of motives and orientations would be more likely to lead to positive outcomes, while the mismatch is likely to harm individual health and well-being (Karasek, 1979). Several theories have been integrated to describe how motives and orientations change across the lifespan and why these changes are relevant in the workplace (Truxillo et al., 2012). We emphasize that these lifespan development theories suggest shifts occurring gradually during a person's life course, rather than hard, precise differences between young and old employees.

The two main approaches to lifespan development that have been adopted to explain the changes in motivations and behaviors in the workplace are SOC (Baltes and Baltes, 1990) and SES (Carstensen et al., 1999) theories. Both theories describe processes of successful adaptation to the aging process. SOC theory argues that aging is a process that brings losses in

some skills and abilities; individuals try to compensate for these losses by selecting goals and activities by which they can make optimal use of their established competences. It also suggests that with aging there is a shift from a promotion focus (i.e., a focus on gains, on acquiring competences, growth and development) to a prevention focus (i.e., a focus on avoiding losses, on maintenance and security) (Ebner et al., 2006; Higgins, 1997). SOC theory is related to the life-span theory of control (Heckhausen and Schultz, 1995) which postulates that trade-offs between primary control (i.e., attempts at modifying the environment) and secondary control (i.e., attempts at fitting oneself in the environment) undergo systematic shifts across the life course in response to the opportunities and constraints encountered. Based on the life-span theory of control, Liebermann et al. (2013) developed a working life span demands-resource model illustrating how available contextual and individual resources will enable workers to cope with job-related challenges over the life span. For example, job demands and resources have a greater weight in the expectation of remaining in that same job long-term for younger workers, whereas one's perceived health is a more important factor for older workers.

SES theory is rooted in the concept of a person's future time perspective, with younger people seeing the future as open-ended, and older people seeing future time as bounded and finite. Depending on one's perception of time, individuals' choice of what goals to pursue varies considerably. In support of the application of SES to the workplace, differences in future time perspective (FTP) have been found for younger and older people of working age (Zacher & Frese, 2009), with younger workers perceiving more time remaining. Younger employees' open-ended perception of time was found to favor the pursuit of knowledge- and growth-related goals (Hyvönen et al., 2009; Huhtala et al., 2013). In contrast, a more limited time perspective in older people favors short-term, present-oriented goals related to emotional satisfaction (Carstensen, Isaacowitz and Charles, 1999). As such, SES proposes that



motivation changes across the life span, with acquisition and growth-related motives being dominant in younger people and emotional regulation motives being dominant in older people (Carstensen et al., 1999). A meta-analysis of motivation studies conducted in the workplace supported most of the SES theory's predictions (Kooij et al., 2011).

The approaches described above are complementary and each is useful to shed light on the fit between job characteristics and individual motivations and orientations over one's life course, and therefore on their interplay in affecting sickness absences.

### **Differences among occupational groups**

As noted by Johns (2006), rarely do studies take into account organizational context, and more specifically the context of occupational group. This observation holds also for the job design literature: occupational context has been largely ignored (Dierdorff and Morgeson, 2007; Morgeson et al., 2010). This is unfortunate for at least two reasons. First, role expectations and thereby expected job characteristics are closely tied to occupational contexts (Dierdorff and Morgeson, 2007). Thus, occupational context influences job design characteristics (Morgeson et al., 2010) especially by restricting the range of expression of certain features or by establishing different base rates at which these features can be observed. Similar overarching effects of context are also likely to mold the relations between job features and other variables, most notably individual reactions (Johns, 2006). The second reason why we should pay more attention to the effects of the occupational context is that each occupation has its own culture or "habitus" (Bourdieu, 1984) which in turn influences the behaviors and attitudes of its members (Abbott, 1988; Bourdieu, 1984). Thus, job characteristics are likely to interact with values espoused in the specific occupational group in predicting work attitudes and behaviors (Morgeson et al., 2010).

In this paper, we focused on two occupational groups, namely clerks and blue-collar workers. This was done to avoid too much heterogeneity and control for confounding

variables that can influence sickness absence such as wages, health inequalities across job types, and level of education – which would be of concern when comparing occupations as disparate as blue-collar workers with white-collar workers or managers. Moreover, although the two focal occupational groups have obvious differences, they also have some important similarities.

Both clerks and blue-collar workers are non-managerial occupations positioned relatively low in the organizational hierarchy. Sociologists consider them as belonging to the same job class (i.e., entry-level, subordinate class), with limited autonomy and power in decision-making, and it is thus pertinent to contrast them with one another (Siblot et al., 2015). They also share several elements linked to the work content. The tasks of blue-collar workers and clerks are standardized and monotonous (Roy, 1959; Vinel, 2013). In a French national survey on working conditions in a sample of 18,000 workers (Enquête Conditions de travail 2005), 33.3% of the clerks and 47.4% of blue-collar workers referred to have a monotonous job compared to 20.1% of the whole population. Nevertheless, “low-level service work may be just as unappealing as factory work, but service workers cannot easily be classified as blue-collar or manual” (Barley and Kunda, 2001: 83). Therefore, despite their similarities in terms of level, the content of the work done by the two groups is quite different.

Blue-collar occupations are predominantly manual, largely occupied by men, and the pace of their work is often fixed and determined by external factors (e.g., machinery), which give them little room to organize their work methods or schedules in comparison with clerks (Roy, 1956). On the other hand, clerical occupations encompass non-manual positions, mostly filled by women, where the pace of work is marked by the flow of customers or service users. As such, clerks are very often in contact not only with customers but also with other employees (Rugulies et al., 2007), whereas blue-collar workers work primarily with their peers (Roy, 1959). This, in addition to the nature of the job, may influence the group dynamics within

occupations as well as their shared values that, in turn, inform work role expectations, attitudes, and behaviors.

Further evidence for considering separate occupational groups comes from epidemiological studies, which demonstrate that sickness absence occurs along an occupational gradient with blue-collar workers and clerks showing absence rates three times higher than the rates of managers (Melchior, Krieger, Kawachi, Berkman, Niedhammer, and Goldberg, 2005). In other studies (Bacharach and Bamberger, 1992; Pousette and Hanse, 2002; Sparks and Cooper, 1999) it was shown that the predictors of sickness absence and stress are more likely to be occupation-specific rather than generic job characteristics. This leads us to take a closer look at individual job characteristics and their effects on absenteeism before we introduce the moderations by age and occupations.

### **Moderated relationships between job characteristics and sickness absences**

The relationship between job characteristics and absenteeism has been studied comprehensively using several models. A model relevant to job characteristics model is the Job Demand-Control model (Karasek, 1979). The expanded Job Demand-Control-Support model (Karasek and Theorell, 1990) considers the influence and inter-relationship of three components (psychological demands, control, and perceived social support) in the work process leading to worker's health and well-being. In addition, one of the most used job characteristics model is the job design model that was aimed at illustrating the impact of job characteristics not only on individual productivity but also on wellbeing (Hackman and Oldham, 1980). Job design has had a rich history, with a number of job design models developing over the last 40 years (Parker, 2014). Following the most recent taxonomy of job characteristics by Morgeson and Humphrey (2006), who integrated the Job Demand-Control-

Support and the job design models, it is helpful to distinguish among macro-categories of job characteristics, namely task, knowledge, social, and work context characteristics<sup>1</sup>.

Among the task characteristics, two that seem particularly relevant for sickness absenteeism are job demands and autonomy.

*Job demands.* With job demands we refer to what a worker has to deal with when performing the job. It includes more than just the physical components of the job (Karasek, Brisson, Kawakami, Houtman, Bongers, and Amick, 1998)<sup>2</sup> and may encompass psychological and emotional demands as well as conflicting or exceeding requests, all of which may contribute to qualifying job demands as a hindrance. Studies of the relationship between job demands and sickness absenteeism have yielded mixed results. Some studies found a positive link (Bakker, Demerouti, De Boer, and Schaufeli, 2003; Niedhammer, Chastang and David, 2006), others revealed a negative association (North et al, 1996; Smulders and Nijhuis, 1999), and finally others showed a nonsignificant relationship (De Jong et al, 2000; Nielsen et al, 2004). The latest available meta-analytical evidence reports a positive correlation, though small in magnitude as .05 (Miraglia and Johns, 2016). These contradictory results might be explained by the presence of moderators such as age and job type.

Because with aging people may start to have reduced homeostasis and ability to return to normal after environmental changes (e.g., Maertens, Putter, Chen, Diehl, and Huang, 2012), and to have some physical, psychological, or cognitive declines (Salthouse, 2012), it is reasonable to expect that job demands would affect the wellbeing of older workers more heavily, which in turn is likely to cause them to be absent from work. Accordingly, we hypothesize the following:

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<sup>1</sup> Since our interest is on job features rather than the overall physical space, we will leave Morgeson and Humphrey's work context features out of our review.

<sup>2</sup> For this reason we distinguish job demands from the physical demands listed by Morgeson and Humprey (2006) among the work context characteristics.

*Hypothesis 1a:* Age moderates the positive relationship between job demands and sickness absenteeism, such that older workers with high job demands will be more absent than younger workers.

SOC theory (Baltes and Baltes, 1990) would predict that older workers try to optimize their capabilities vis-à-vis the specific tasks they have to perform by adjusting or crafting their jobs (Truxillo et al., 2012). Nevertheless, this may not be possible when the specific order and timing of tasks are externally dictated, as is the case with blue-collar workers. This feature of their occupation may even increase the demands by adding mental tension to workers due to the fear of not being able to follow the rhythm of work (Satochi, 1982). Hence, older blue-collar workers may experience not only reduced energy levels, but also a strict constraint on the use of compensatory actions, which would affect their health and absence levels.

*Hypothesis 1b:* Occupational group moderates the interaction between job demands and age on absenteeism, such that older blue-collar workers with high job demands will be absent more than older clerks.

*Autonomy.* Job autonomy, defined by Hackman and Oldham (1980: 79) as ‘the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out’, was negatively linked to absenteeism in the meta-analysis of Humphrey et al. (2007). Ng and Feldman (2015) conducted a meta-analysis on the effects of autonomy on a number of outcomes and tested two competing hypotheses concerning the moderating role of age. They showed that depending on the outcome variable, the effect of autonomy for older employees may be stronger (e.g., on performance) or weaker (e.g., on job satisfaction). Truxillo and colleagues (2012) theorized that job autonomy is especially beneficial for older workers because greater autonomy allows employees to organize and craft their jobs according to their abilities, and hence to compensate for the lack of certain abilities, achieving better

performance. By extension, jobs that allow for greater autonomy and greater job crafting, also allow older employees to make the job fit their needs even under suboptimal health conditions. Consequently, we expect older workers who have high autonomy to react more positively, with higher wellbeing and in turn lower absences. Thus, we hypothesize the following:

*Hypothesis 2a:* Age moderates the negative relationship between autonomy and sickness absenteeism, such that older workers with high autonomy will be less absent than younger workers.

From prior studies we know that autonomy is a critical characteristic of the job that affects the wellbeing of the clerical group (Narayanan, Menon, and Spector, 1999) as well as of the blue-collar group (Zaniboni et al., 2016). Moreover, we argue that in the clerical occupational group, autonomy is more easily provided to employees as compared to blue-collar, for whom the high degree of standardization likely sets an upper limit to the extent of autonomy that can be achieved. As such, we believe that the broader occupational context may limit the strength of the interaction age-autonomy; the advantages of autonomy for older workers may be more visible in the clerical group, while the limited autonomy that can be achieved in blue-collar occupations is likely to mask the important role played by autonomy in shaping older workers' sickness absenteeism.

*Hypothesis 2b:* Occupational group moderates the interaction between autonomy and age on absenteeism, such that older clerks with high autonomy would be less absent than older blue-collar.

The knowledge characteristics of the job are factors that define the skills and knowledge required by a worker in order to perform the job, as opposed to the task characteristics that identify specific properties of the jobs themselves, based on the nature and order of the tasks they comprise (Morgeson and Humphrey, 2006).

*Skill variety.* Among the knowledge characteristics, skill variety is the most representative, first identified in the original formulation of Hackman and Oldham's (1980) model as one of the main characteristics defining an enriched job, and indicating the range of skills one needs to use when performing a job. In a study by Rentsch and Steel (1998), skill variety negatively predicted two measures of absenteeism, namely frequency and total time lost, for six consecutive years. Similarly, a significant negative relation between skill variety and absenteeism was found in Humphrey et al.'s (2007) meta-analysis, although the fact that the confidence interval included zero suggested the presence of possible moderators, with age being one of them. The interaction between skill variety and age is controversial, and may lead to more positive consequences (e.g., lower turnover intentions: Zaniboni et al., 2013) or more negative consequences (e.g., lower job satisfaction; Besen et al., 2013) for older employees. Thus, we argue that this interaction may have different effects on different outcome variables. Skill variety may have positive impact on the performance of older workers, via facilitating the use of their accumulated knowledge (Baltes and Baltes, 1990; Truxillo et al., 2013). On the other hand, higher skill variety may turn into a source of stress (Warr, 1994; Xie and Johns, 1995) for older workers, particularly in lower-level jobs with relatively little control, to the extent that it may provoke an overstimulation (Pousette and Hanse, 2002) and a perceived mismatch between expectations and ability to deliver at the expected level. Younger workers may benefit from the (over)stimulation of skill variety inasmuch as they are moved by stronger motives for being challenged and for acquiring new competences (Kooij et al., 2011). As such, we believe that skill variety may contribute more to the wellbeing of younger rather than older workers, and in turn affect their attendance behaviors. Thus, we hypothesize:

*Hypothesis 3a:* Age moderates the negative relationship between skill variety and sickness absenteeism, such that younger employees with high skill variety will be less absent than older employees.

The possibility to have skill variety depends on the form of the work organization. The Taylorist organization form in which blue-collar workers are often embedded (24.3% of machine operators and assemblers are working in Taylorist organizations compared to 2.4% of the clerks according to Lorenz and Valeyre, 2006) addresses needs for skill variety very poorly. Indeed, the possibility to learn new things at work concerned only 42% of the employees working in Taylorist organizations compared to 71.5% for the overall population (Lorenz and Valeyre, 2006). Hence, the occupational context of blue-collars may, once more, restrict the range or alter the base rate of skill variety as compared to workers in different occupations and attenuate the effect of skill variety on absenteeism, such that skill variety would have a weaker effect on attendance behavior of young blue-collars than young clerks.

*Hypothesis 3b:* Occupational group moderates the interaction between skill variety and age on absenteeism, such that young clerks with high skill variety would be less absent than young blue-collars.

The category of social job characteristics was more systematically defined by Morgeson and Humphrey (2006) in their job design questionnaire as compared to Hackman and Oldham (1980) and includes, among others, supervisor and colleague support. These variables are particularly relevant for our focal outcome of sickness absence, as recent research has supported the role of the social context in setting the norms for accepted absences (Biron and Bamberger, 2012; Brummelhuis ten, Johns, Lyons, and Ter Hoeven, 2016; Dello Russo, Miraglia, Borgogni, and Johns, 2013; Diestel et al., 2014).

*Supervisor and colleague support.* According to the job demand-control-support model (Karasek and Theorell, 1990), social support (i.e., supervisor and colleagues support)



helps workers who are experiencing high work-stress level. Empirical evidence is unequivocal in suggesting that colleagues are a critical factor protecting employees' health and wellbeing (Sinokki et al., 2009; Woods, 2005), and colleague support was found as negatively linked to absences (Väänänen et al., 2003). Mixed results have been found with regard to supervisors; although in some instances the support by the supervisor did not significantly predict absenteeism trajectory over time (Dello Russo et al., 2013), there is general consensus on their role as buffers and in limiting employees' absences (Väänänen et al., 2003; Vahtera et al., 2000). Meta-analytical findings revealed that both forms of support show a negative relationship with absenteeism (Miraglia and Johns, 2016), although of a relatively small magnitude. However, these relationships may be differentiated by age. We argue that supervisor support would be associated with lower absences of younger employees in particular (Vahtera et al., 2000), because such support from an authoritative figure would fit well with their motives for growth and advancement (SES theory; Carstensen et al., 1999) and therefore they would be more sensitive to receiving support and assistance that is instrumental to their future career. Conversely, it is possible that older workers, not concerned with future-oriented motives, rely on their bosses' support to call in sick when their health conditions are not good for work without fear for negative consequences. Colleague support, on the other hand, would be especially important for older employees in light of their present-oriented motives and their need for meaningful relations that indeed aid in facing stressful situations (Carstensen et al., 1999). In light of these arguments, we formulated the following hypotheses:

*Hypothesis 4a:* Age moderates the negative relationship between supervisor support and absenteeism, such that younger employees with high supervisor support will be less absent than older employees.

*Hypothesis 5a:* Age moderates the negative relationship between colleague support and absenteeism, such that older employees with high colleague support will be less absent than younger employees.

With regard to supervisor support, young clerks more than young blue-collar workers may positively respond to a supportive boss and perceive higher obligations in terms of attendance behavior. The reason for our argument is that younger employees tend to monitor their relationship with their supervisor because they are motivated by the desire to grow and progress in their careers (Kooij et al., 2011). However, having a good relationship with the boss may not be a sufficient condition for blue-collar workers to gain access to middle-management jobs; acquiring a diploma may also be necessary (Eckert and Monchatre, 2009). Thus, supervisor support might not help blue-collar workers gain promotions as much as clerical workers that typically already possess a qualification (Eckert and Monchatre, 2009), which would attenuate the expected effect of supervisor support on the absenteeism of young blue-collar workers as compared to young clerks.

*Hypothesis 4b:* Occupational group moderates the interaction between supervisor support and age on absenteeism, such that younger clerks with high supervisor support will be absent less than younger blue-collar workers.

With regard to colleague support, we can assume that such support will be more beneficial for clerks than blue-collar workers due to the nature and organization of their respective tasks (Carayon, 1994). Blue-collar workers perform mostly manual jobs that are in relation to machines and that are independent or sequentially interdependent, which means that colleagues' help to perform one's tasks may be just minimal; office work, on the other hand, is more often characterized by pooled, reciprocal, or even team interdependence (Saavedra, Earley, and Van Dyne, 1993) so that colleagues' help and support may be very important for clerks in alleviating work demands and potential strain, resulting in more attendance

behaviors. This would be particularly relevant for older employees that, besides having stronger motives for positive relationships, may benefit from receiving support to face possible mismatches between demands and resources (Salthouse, 2012) or to implement SOC strategies (Bal et al., 2013). Consequently, the effect of colleague support in decreasing absences would be stronger for older clerks.

*Hypothesis 5b:* Occupational group moderates the interaction between colleague support and age on absenteeism, such that older clerks with high colleague support would be absent less than older blue-collars.

## Method

### *Sample and Procedure*

This research is based on the SUMER<sup>3</sup> 2003 survey jointly carried out by the DARES (Directorate for Research, Studies, and Statistics) and the Directorate of Labor Relations of the Ministry of Employment, Social Cohesion and Housing, in France. SUMER 2003 is a cross-sectional survey of 24,486 employees. The benefit of using a nationally representative secondary dataset that surveys a large sample of French employees is at least twofold. Firstly, it contributes to reinforcement of the external validity of a quantitative analysis. Secondly, a research study based on secondary data from the Sumer survey can improve the internal validity of the findings, as it makes it possible to perform a multivariate ‘all other things being equal’ analysis (Barnes, Dang, Leavitt, Guarana, & Uhlmann, 2015). Consequently, this enables us to control for the effects on employees’ absenteeism of socio-demographic factors (sex, tenure) and characteristics of the firm (size of the organization). The 2003 survey was used because the unemployment rates for the blue-collars and clerical occupations are similar, and unemployment rate is a well-known antecedent of absenteeism (Markham and McKee, 1991). Accordingly, during the 2002-2003 period, the unemployment rate of clerks and blue-

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<sup>3</sup> In French, “SURveillance MEDicale des Risques professionnels”; in English “Medical monitoring of occupational risks”

collars were quite similar (7.8% and 9.8%, respectively in 2002), whereas after the financial crisis in 2008, the unemployment rates of the two groups diverged considerably (10.1% and 15.5%, respectively in 2014), as blue-collar jobs suffered the most during the economic crisis. Thus, these data best enable us to test our hypotheses about the relationship among job characteristics, age, and sickness absences across our occupational groups.

The SUMER survey assesses employees' exposure to occupational risks and illnesses, wellbeing, and working conditions. The SUMER survey is conducted by a network of voluntary occupational physicians, in charge of compulsory medical examinations of employees, who collect the data from a random sample of their employees. Each occupational physician selects 40 employees of the population of employees seen during the period of data collection using a random method - one employee out of 10 or 15 visited (Niedhammer, 2002) – and administers them the survey. We selected all the observations in the sample that belong to the two occupational groups of interest, namely blue-collar and clerks. This accounted for an initial sample of 14,029 workers. However, we eliminated observations with missing data in either the independent or dependent variables so that the final sample consisted of 5,175 observations. While the response rate is low, it is consistent with other large surveys (Stringhini et al., 2011). Of these, 55% were men, and the mean age was 39 years ( $SD = 10$ ). This suggests that most employees were between 19 and 59 years of age, generally reflecting the age range for the French economy (retirement age of 60). The sample also shows good age variability in order to detect age differences. The average age of the sample is in line with previous research (e.g., Zaniboni et al., 2013) and with the employment rate of the French labor market that is concentrated in the age group of workers between 25 and 49 years old (it was 81.2% for this age group in 2003 and fell to 53.4% for workers aged between 50 and 64 years). Fifty-nine percent of the workers had less than ten years of tenure, and 55% worked in companies with a size greater than 50 employees. To check for non-response bias (Armstrong

and Overton, 1977), we compared responding and non-responding workers on major attributes and found no significant difference with respect to age ( $t = -1.57, p = .12$ ) and tenure ( $t = .06, p = .95$ ). Significantly more men had incomplete data ( $\chi^2(1) = 20.51, p = .00$ ), and sex was used as a control variable in our analyses.

### *Measures*

We have measured the independent and dependent variables using the questions provided by the SUMER survey. To reduce concerns for common method bias, we note that items measuring the same scale were randomized, limiting the perceived redundancy and the consequent tendency to answer in a consistent manner, and that the questionnaire included reverse-coded items (MacKenzie and Podsakoff, 2012).

*Sickness absences.* This variable was measured by the number of self-reported sickness-related absence days within the previous 12 months. People were asked to report only sickness-related absences that were certified by a doctor<sup>4</sup>, which allowed for a focus on a homogeneous category of absences, as opposed to the wide variety of reasons for absences – including vacation, training, parental leave, union activity, and personal reasons. Despite the common concerns about self-report measures of absences, a recent meta-analysis (Johns and Miraglia, 2015) has shown that they are as valid and reliable as objective data, and they can be confidently used for correlational studies, in that the individual tendency to under-report absences does not affect the rank-ordering of employees.

*Job characteristics* were measured by means of the French translation of Karasek's Job Content Questionnaire (JCQ; Karasek et al., 1998). Niedhammer (2002) has provided evidence of the validity of the French version of the JCQ. *Skill variety* was measured by four items ( $\alpha = .67$ ; e.g., 'My job requires me a high skill level'); *autonomy* was measured by four

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<sup>4</sup> In France, the law about sickness absences is very strict: an employee who is ill and cannot attend work is required to present a medical certification attesting to his/her health conditions even for short (1-2 days) absences. When failing to do so, it is considered as an unjustified absence by the employer who could use these repeated unexcused absences as reasons to fire the employee.

items ( $\alpha = .64$ ; e.g., ‘My job allows me own decisions’); *job demands* was measured by nine items ( $\alpha = .77$ ; e.g., ‘My job requires me working hard’); *supervisor support* was measured by four items ( $\alpha = .83$ ; e.g., ‘My supervisor is concerned with me’); and *colleagues’ support* was measured by four items ( $\alpha = .80$ ; e.g., ‘Colleagues in my job are helpful’). All items were measured on a 4-point Likert scale.

*Age.* This variable was treated as a continuous variable.

*Occupational groups* were coded 1 for blue-collar workers and 0 for clerks. Clerks and blue-collar workers were distinguished using the socioeconomic classification of INSEE (French Statistics Classification).

Clerks are low-level service and non-manual workers that are mainly sales clerks, secretarial and reception workers, and caretakers which are quite homogeneous in terms of job characteristics (Karasek et al., 1998). Blue-collar workers include manual employees, mainly factory workers, and maintenance workers which are quite similar in terms of job characteristics (Karasek et al., 1998).

*Control variables.* The literature suggests that a variety of socio-demographic and organization variables such as sex, tenure, and the size of the organization may be related to the perceptions of job characteristics (Hackman and Oldham, 1980). In order to avoid their potentially confounding effects, we controlled for the effects of these variables on absenteeism. Sex was treated as a dichotomous variable with men coded as 1 and women coded as 2; tenure was coded on a scale from 1 to 4, with 1 indicating less than one year employed in the organization and 4 employed for over 10 years; organization size was coded on a scale from 1 to 5 with 1 indicating organizations with less than 9 employees and 5 organizations greater than 500 employees<sup>5</sup>. Other variables, such as family-related variables, were not available in the dataset; nevertheless, because several studies have shown that

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<sup>5</sup> This part of the questionnaire on socio-demographic and organization characteristics was filled out by the occupational physician of the respondent.

having children is not a risk factor for sickness absence among married/cohabiting women (Bradberg et al., 2002; Erickson et al., 2000; Mastekaasa, 2000; Voss et al., 2008), and a meta-analysis by Allen and colleagues (2000) reported a non-significant weighted mean correlation between work-family conflict and absenteeism, we believe that the lack of these control variables is not of concern.

### *Data Analysis*

Absence days were not normally distributed, and simple transformations, such as square root and logarithmic transformations, often do not result in normality for data (Watson, Driver, and Watson, 1985). Therefore, such data require a nonlinear modeling strategy. Since our data did not show an excessive number of zeros (4.7 % of the counts), we did not use zero-inflated models (Allison, 2012) and only compared the fit of the Poisson and negative binomial regression models through the analysis of the  $-2 \log$  likelihood, AIC, and BIC indicators, and chose the negative binomial model. The negative binomial model generalizes the Poisson model with an additional parameter allowing the variance to exceed the mean (Allison, 2012). After checking the endogeneity of our models, we found that none of the predictors correlate with the error terms  $\varepsilon$  (Greene, 1993)<sup>6</sup>. To address the concerns for common variance bias we conducted a Harman's single-factor test by performing an exploratory factor analysis on our study variables and examined the unrotated factor solution. No single factor accounted for the majority of the variance<sup>7</sup>. This would suggest that common method variance is limited in our dataset (Podsakoff and Organ, 1986).

## **Results**

Means, standard deviations, and intercorrelations are shown in Table 1. The results indicate that all job characteristics were significantly associated with sickness absences, except for job demands ( $r = .014, p > .05$ ). In addition, age and occupational group were also

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<sup>6</sup> Results of these tests are available from the first author upon request.

<sup>7</sup> Results of this test are available from the first author upon request.

associated with absenteeism: older workers and blue-collarers are significantly more absent compared, respectively, to young workers and clerks ( $r = .056, p < .01$  and  $r = -.031, p < .05$ , respectively).

----- Insert Table 1 about here -----

Prior to our analyses, all continuous variables were mean-centered to increase the interpretability of interactions and to mitigate multicollinearity issues (Dawson and Richter, 2006). First we ran a model that only included the control variables (Model 1 in Table 2), next we added the main effects (Model 2), and then to test Hypotheses 1a to 5a, we incorporated the two-way interaction terms into the model. As can be seen in Model 3 in Table 2, the relationships of job demands, skill variety, and supervisor support with absenteeism are moderated by age ( $B = .01, p < .05$ ;  $B = .01, p < .05$ ; and  $B = .01, p < .01$ , respectively). We found that, although not displaying a main effect, high job demands are related to more absences only for older workers; conversely, the negative associations of skill variety and supervisor support with sickness absence are stronger for younger workers. Hence, Hypotheses 1a, 3a and 4a were supported, whereas hypotheses 2a and 5a (involving autonomy and colleague support) were not<sup>8</sup>.

----- Insert Table 2 about here -----

To test Hypotheses 1b to 5b, we entered the three-way interaction terms into the regression analysis (model 4 in Table 2). The findings showed that three interaction terms were significant and, specifically, those involving autonomy ( $B = .02, p < .01$ ), supervisor support ( $B = -.01, p < .05$ ), and colleague support ( $B = .02, p < .01$ ); the three-way interaction effects between age, occupational group, and job demands or skill variety were not significant

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<sup>8</sup> Following an anonymous reviewer's suggestion we retested our regression model after excluding workers with tenure of less than one year (8.1 % of the sample). In these analyses the 2-way interactions of age with job demands and skill variety are no longer significant. We note this for transparency, nevertheless we opted for keeping the original analyses. In fact, the sickness absences referred to the period of the last 12 months but the question does not specify in which workplace. Therefore, our reasoning is that these individuals may have well answered considering the full year, regardless of their employer or job. Removing 8.1% of the sample (normally distributed with respect to age, which is one of our main independent variables) would produce a significant loss in variance that may be at the origin of the different results we obtain in the regression analyses.



( $p > .10$ ). Thus, Hypotheses 2b, 4b and 5b were supported, while Hypotheses 1b and 3b were not.

To further explore the moderation effects (Dawson and Richter, 2006), we plotted the significant two-way interactions for job demands (Figure 1), skill variety (Figure 2) and supervisor support (Figure 3) at 1 SD above and 1 SD below the mean of age. Figure 1 shows that the slopes of absenteeism on job demands for low and high age not only diverge, but that of older workers is steeper and upward. In Figure 2 we can observe a similar pattern: higher skill variety is associated with fewer absences for younger workers but more absences for older workers. In figure 3 we observe that greater supervisor support is associated with fewer absences in younger but not older workers.

----- Insert Figures 1, 2, 3, 4, 5 and 6 about here -----

Similarly, we plotted the three-way interactions for autonomy, supervisor support, and colleague support (Figures 4, 5 and 6, respectively) at 1 SD above and 1 SD below the mean of age for blue-collars and clerks respectively, and these graphs clearly indicate that, depending on the occupational group, the age-moderated effect of each job characteristic on sickness absence is either amplified or attenuated. Figure 4 reveals that older clerks provided with high autonomy had the fewest absences, although the test of simple slope difference revealed they were not statistically different from younger clerks ( $t = -1.62, p = .11$ ). On the other hand, older blue-collars were significantly less absent than younger blue-collars when provided with greater autonomy ( $t = -3.04, p < .01$ ). Figure 5 depicts the downward slopes of absenteeism on supervisor support for both groups of younger workers, which nevertheless differ significantly ( $t = 2.34, p < .05$ ) in that younger clerks display a much steeper negative relationship between supervisor support and absences than younger blue-collars. Unexpectedly, the slopes of both older clerks and older blue-collars were positive and not different from one another. Finally, Figure 6 illustrates that high colleague support is

associated with sharply decreased absences in older clerks, compared to older blue-collarers ( $t = 3.63, p < .01$ ).

### **Discussion**

This study aimed to shed new light on the relationship between age and sickness absences, starting from the observation that, although positively related to a number of clinical health conditions, age is only weakly related to sickness absences (Ng and Feldman, 2008; 2013). Therefore, we presented arguments and tested hypotheses by which age may moderate the effects of job characteristics on sickness absenteeism and may in turn be moderated by additional occupational factors. In doing so we believe we have made a number of contributions.

First, we have contributed to a developing area of research on the role of age as an important boundary condition to many well-established relations in the workplace, especially those related to job characteristics (Truxillo et al., 2012); yet their combined impact on sickness absences had not been previously investigated, and the present study fills this gap.

Second, answering a call in the literature for bringing occupations back to the center of empirical investigation (Barley and Kunda, 2001; Morgeson et al., 2010; Truxillo et al., 2012), we placed these relationships within the broader occupational context and compared two groups with similar (low) status in the organizational hierarchy, but with different task and social job characteristics. We documented that the interaction between age and job characteristics varies in intensity, and sometimes even in direction, as a function of occupational group (Johns, 2006). In other words, the well-established relationship between job characteristics and work outcomes (Humphrey et al., 2007) is moderated by individual (age) and situational (job type) factors. Also, extending the job demand-control-support model (Karasek and Theorell, 1990), our results could help organizations to better design jobs that differentiate between and within occupations by age categories.

From our study, it emerges that features such as job demands and skill variety are moderated by age regardless of the occupation. Accordingly, we observed that job demands are positively associated with absences only for older workers – who may experience a decline in different types of capabilities (e.g., cognitive, physical; Salthouse, 2012) that may generate a larger mismatch between job demands and one's resources, impairing one's wellbeing and ability to attend work. While Liebermann et al. (2013) found that job demands are a less important factor for older workers when considering whether remaining in the same job until retirement, especially compared to their health, our results suggest that job demands may play a role directly on their health, as they affect their sickness absences. As hypothesized, higher levels of skill variety would better fit with the growth-oriented motives of younger workers (Kooij et al., 2011) who therefore tend to be less absent from work when they are stimulated and challenged to acquire new competences; on the opposite, older workers may react to high skill variety as to an overstimulation particularly, we argue, if the job requires learning new skills rather than using those they possess, because this would conflict with the implementation of SOC strategies, with potentially mixed effects (Warr, 1994; Xie and John, 1995).

Nonetheless, other job characteristics show differential effects when we consider also the occupational groups, which may mask or make more salient the moderating role of age. With respect to autonomy, we argued that it would be an important characteristic for older workers owing to the increased possibility of finding a good fit with the job, since it allows for crafting and re-arranging one's tasks (Baltes and Baltes, 1990; Truxillo et al., 2012); we found that this is especially true within the blue-collar group when comparing older and younger workers than in the clerical group. This may point to the fact that particularly in occupations where the demands and external pace of the job may require older workers implementation of SOC strategies, autonomy is particularly critical for crafting one's job.

The finding that for older and younger clerks the slopes were not significantly different may be explained with a tendency of younger clerks' slope toward an upward trajectory, which ultimately leads to two opposite lines that cancel one another out. Although definitive conclusions cannot be made based on this archival dataset, we can speculate on two possible explanations. One is that younger clerks feel the pressure of higher autonomy, which would turn into a stressor – especially if they are not supported enough by their colleagues and supervisor in facing this stressor (De Jonge and Schaufeli, 1998; Warr, 1994). Alternatively, it may be that younger clerks misuse the autonomy they are granted, in a way taking advantage of it, if they are low on self-regulation. As our speculative interpretations allude to the underlying mechanisms that might explain these interactions among autonomy, age, and job type and their effects on sickness absences, future research should test them. One possibility might be an experimental approach. Specifically, younger and older workers might be provided with experimental situations in which they are granted different degrees of autonomy and measure not only how they felt while performing a task, but also how they interpreted the autonomy they were granted.

As with autonomy, we did not detect any age-related difference for colleague support until we also considered the specific occupational group. Only by taking a closer look did we observe that within the blue-collar group, receiving more support from colleagues is not associated with fewer absences for older (vs. younger) workers as we expected, but it does so in the clerical group. It may be due to the way the work is structured and the different types and levels of interdependence that characterize the two occupational groups (Saavedra et al., 1993). While clerks are more likely to work in a pooled interdependence and interact directly with their colleagues, the blue-collar workers often work in relation to machines, thus either independently from one another or in sequence. Under these conditions the support received by colleagues can only be minimal and probably not sufficient to buffer the job-related strain.

Finally, consistent with our hypotheses, supervisor support is associated with lower absenteeism, for younger workers and especially for clerks, although it was not associated with lower absenteeism for either older clerks or older blue-collar workers. According to previous research, younger employees have stronger motives for promotions and career advancement (Kooij et al., 2011), and in this perspective we interpret our findings: Younger workers and particularly clerks, who have the possibility to progress more in their career as compared to younger blue-collar workers, are more likely affected by a supportive supervisor and would react by being less absent. Conversely, it seems that the buffering role of supervisors (Biron and Bamberger, 2012) toward older workers functions in an unexpected direction being associated with more absences. It may well happen that supportive supervisors are very understanding and accommodative whenever sickness absences increase due to aging, and this may explain the upward slope we observed. Future studies are needed here as well, specifically, studies designed to test the mediating mechanisms, including FTP and SOC strategies that are assumed to explain the interaction between age and supervisor support.

A final observation pertains to the significance of our findings. The effect sizes appear small, but they may still be meaningful. Let us consider the job autonomy example. With all other variables held at their mean, when age is high (1 SD above the mean) and job autonomy is low (1 SD below the mean) a clerk is expected to be absent 1.6 days less than a blue-collar; however, when both age and autonomy are high (at 1 SD above the mean) a clerk is expected to be absent 2.9 days less than a blue-collar. In other words, compared to older blue collar workers, the number of sickness absence days of older clerks is 81% lower when job autonomy is high. In terms of monetary effects, for a daily minimum wage of 50€ for these occupations in France (approximately £43 or \$53), and under the conservative assumption that the marginal benefit of reducing absenteeism is confined to the daily wage regardless of other indirect costs (Pauly et al., 2002), a single increase in job autonomy for an older clerk would be associated

to a total saving of 150 € (approximately £128 or \$159) compared to an older blue-collar, which makes a very good return of organizational investments.

### *Limitations and future directions*

A few limitations have to be acknowledged. First, the data were collected adopting a cross-sectional research design and, as such, suffer from the well-known drawback of not speaking to causal relations among the constructs. Nonetheless, we also recognize that such a large sample size would be hard to achieve with a more complex research design. In fact, it enables us to detect even small effects that exist in the population thanks to high statistical power and offers the opportunity to examine multiple variables and interactions simultaneously – thus representing much more closely the complexity of organizational settings. In addition, the current study examined a series of moderated relationships. Thus, inflated correlations due to common method variance are only likely to reduce the possibility of detecting significant interactions. A second criticism concerns the internal consistency reliability of the autonomy and skill variety scales that were slightly below the recommended threshold (Nunnally, 1978). Indeed, we were limited by the items used in the survey, and it is likely that a larger number of items would have increased the reliability (Nunnally, 1978). Nonetheless, it is important to point out that the scale we used had been validated in French (Niedhammer, 2002). Third, other factors that were not considered in this study (e.g., ergonomics, gender composition, impact of social norms, family differences) could also moderate the effects of age on sickness absenteeism. We focused here on the psychological aspects of work characteristics, but the ergonomic factors defining the more physical job characteristics should be paid more attention in future studies, particularly when examining the issue of worker age. Moreover, although meta-analysis suggest that the correlation between work-family conflict and absenteeism is non-significant (Allen et al., 2000), it may be important to examine this issue more deeply within different age groups.

*Practical implications*

In terms of practical implications, the results suggest that occupational group and age differences should be taken into account to improve the effectiveness of HR policies about sick absences. Indeed, our results show that colleague support is associated with fewer sickness absences, specifically for older clerks. This suggests that organizations faced with high sickness absence for this group could implement an intervention aimed at encouraging colleagues to be more supportive and improving interpersonal relationships, such as team building. In the same way, our results show that supervisor support is associated with fewer sickness absences for younger clerks and blue-collarers. Thus, HR managers that face sickness absence issues for these categories should encourage frontline supervisors to be more helpful and supportive for junior employees and provide them with training to improve their relationships with younger workers.

Finally, our results show a differential effect for autonomy on sickness absence depending on age and occupational groups. Indeed, autonomy is associated with significantly less sickness absences for older clerks and blue-collarers, but it seems to correlate with higher sickness absenteeism for younger clerks. We should not misinterpret these results. Autonomy can be a strong motivator to attend work as theorized by Hackman and Oldham (1980), but it may have unintended consequences (Ng and Feldman, 2015). Specifically, it may turn into a stressor when the HRM policies - in terms of pay, training, objectives to achieve - do not fit with the level of job autonomy. HR managers should be cautious in using autonomy without adapting their HR policies to avoid negative effects on young clerks' sickness absences.

*Conclusion*

In conclusion, this paper demonstrates that the interplay between job characteristics, age, and absenteeism is more complex than we might think. Specifically, a deeper understanding of these variables is only possible when we place them within the broader

occupational context (Morgeson et al., 2010) that shapes the meaning of job features, affects the saliency of lifespan development, and ultimately amplifies, attenuates, or even reverses the influence played by age on the job characteristics-absenteeism relationship. As such, we encourage future research to examine the multiple individual and contextual factors that can moderate the relationships between job characteristics and work outcomes.



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Table 1 – Descriptive statistics and bivariate correlations

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1.Occupation (0 = clerks; 1= blue-collars)	.55	.49										
2. Size of the organization	2.95	1.47	0.04**									
3.Sex (1= male ; 2 = female)	1.45	0.49	-0.61**	-0.05**								
4. Tenure	3.01	0.98	0.01	0.22**	0.01							
5. Autonomy	2.9	0.61	-0.06**	-0.18**	-0.03**	0.01						
6. Skill variety	2.8	0.59	0.00	-0.07**	-0.12**	0.02*	0.44**					
7. Job demand	2.3	0.48	-0.10**	0.11**	0.08**	0.07**	-0.14**	0.07**				
8. Supervisor support	2.8	0.61	-0.03**	-0.07**	0.01	-0.11**	0.27**	0.32**	-0.23**			
9. Colleagues support	3.0	0.51	-0.01	-0.02*	-0.03**	-0.07**	0.17**	0.28**	-0.10**	0.38**		
10. Age	38.8	10.43	0.00	0.05**	0.01	0.15**	-0.01	-0.01	0.01	-0.04**	-0.03**	
11. Absenteeism	15.25	27.33	0.03*	-0.01	0.01	0.07**	-0.04**	-0.04**	0.01	-0.04**	-0.04**	0.06**

\* $p < .05$ , \*\*  $p < .01$

Table 2– Negative Binomial Regression testing the moderating effects of Age and Occupational Group on the association between Job Characteristics and Absenteeism

Variable	Model 1		Model 2		Model 3		Model 4	
	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>
Sex (1= male ; 2 = female)	0.13	0.00	0.10	0.00	0.09	0.01	0.08	0.02
Occupation (0 = clerks; 1= blue-collars)	0.18	0.00	0.16	0.00	0.16	0.00	0.15	0.00
Size of the organization	-0.06	0.00	-0.07	0.00	-0.07	0.00	-0.07	0.00
Tenure	0.13	0.00	0.13	0.00	0.14	0.00	0.14	0.00
Age	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.02
Autonomy			-0.08	0.01	-0.09	0.03	-0.09	0.04
Skill variety			-0.04	0.12	-0.01	0.80	-0.01	0.86
Job demand			0.02	0.47	-0.01	0.81	-0.01	0.79
Supervisor support			-0.04	0.08	-0.08	0.03	-0.09	0.01
Colleagues support			-0.05	0.10	-0.10	0.01	-0.10	0.01
<i>Two-way interactions</i>								
Occupation X age					0.01	0.01	0.01	0.01
Autonomy X Occupation					0.03	0.63	0.02	0.73
Skill variety X Occupation					-0.06	0.29	-0.06	0.25
Job demand X Occupation					0.05	0.42	0.06	0.36
Supervisor support X Occupation					0.07	0.20	0.08	0.10
Colleagues support X Occupation					0.11	0.06	0.10	0.07
Autonomy X Age					-0.00	0.38	-0.01	0.00
Skill variety X age					0.01	0.02	0.00	0.53
Job demand X age					0.01	0.05	0.01	0.10
Supervisor support X age					0.01	0.00	0.02	0.00
Colleagues support X age					0.00	0.39	-0.01	0.09
<i>Three-way Interactions</i>								
Autonomy X age X Occupation							0.02	0.00
Skill variety X age X Occupation							0.00	0.39
Job demand X age X Occupation							-0.00	0.74
Supervisor support X age X Occupation							-0.01	0.01
Colleagues support X age X Occupation							0.02	0.00

## Two- and three-way moderations on sickness absences

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-2 Log Likelihood	-19363.40	-19210.62	-19189.33	-19173.70
Chi-square	14907.17***	14901.28***	14489.55***	14286.03***
AIC	38738.80	38443.25	38422.66	38401.40
BIC	38778.11	38515.23	38566.63	38578.09

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Notes:  $n = 5137$   $B$  values are unstandardized regression coefficients. \*  $P < .05$  \*\*  $P < .01$  \*\*\*  $P < .001$  \*\*\*

Figure 1. Two-way interaction between job demands and age on absenteeism

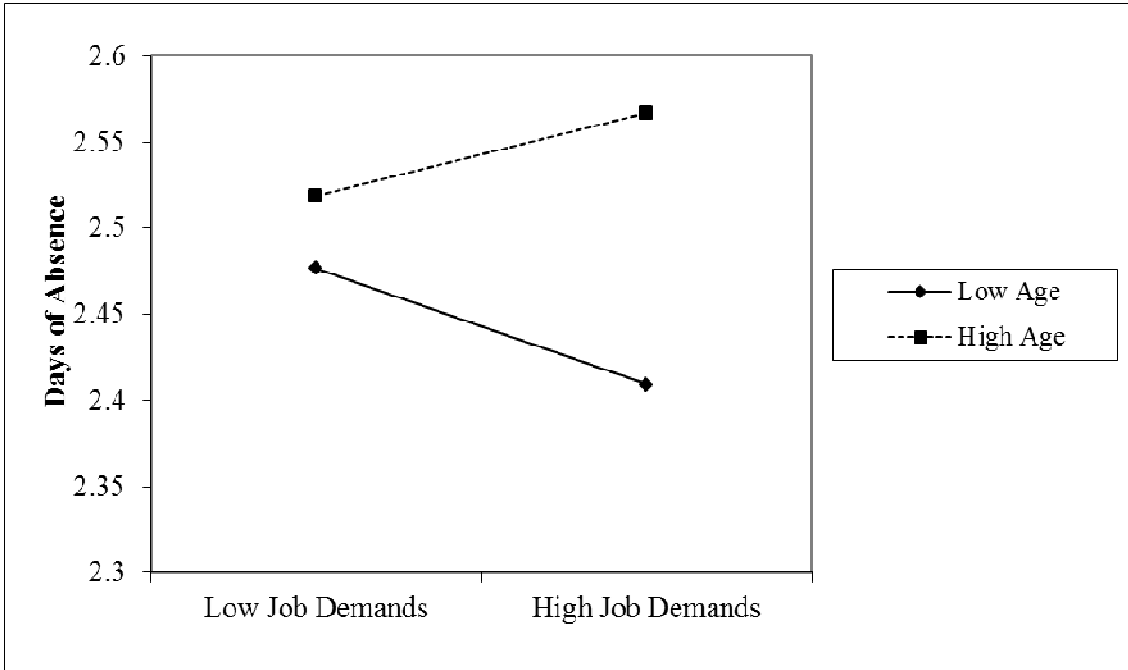


Figure 2. Two-way interaction between skill variety and age on absenteeism

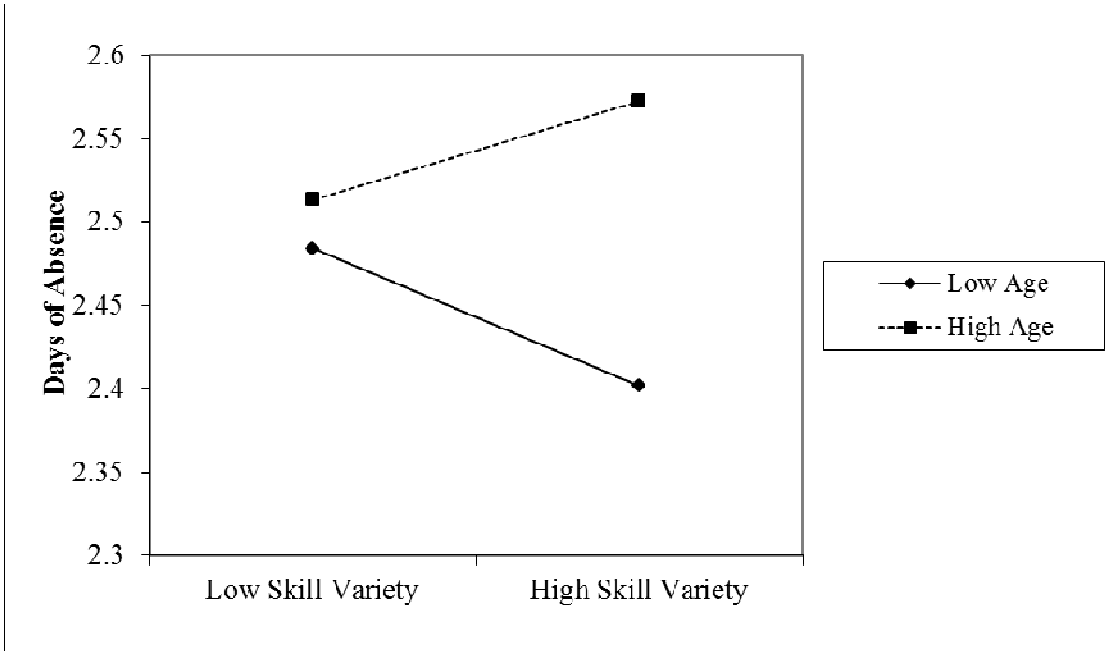


Figure 3. Two-way interaction between supervisor support and age on absenteeism

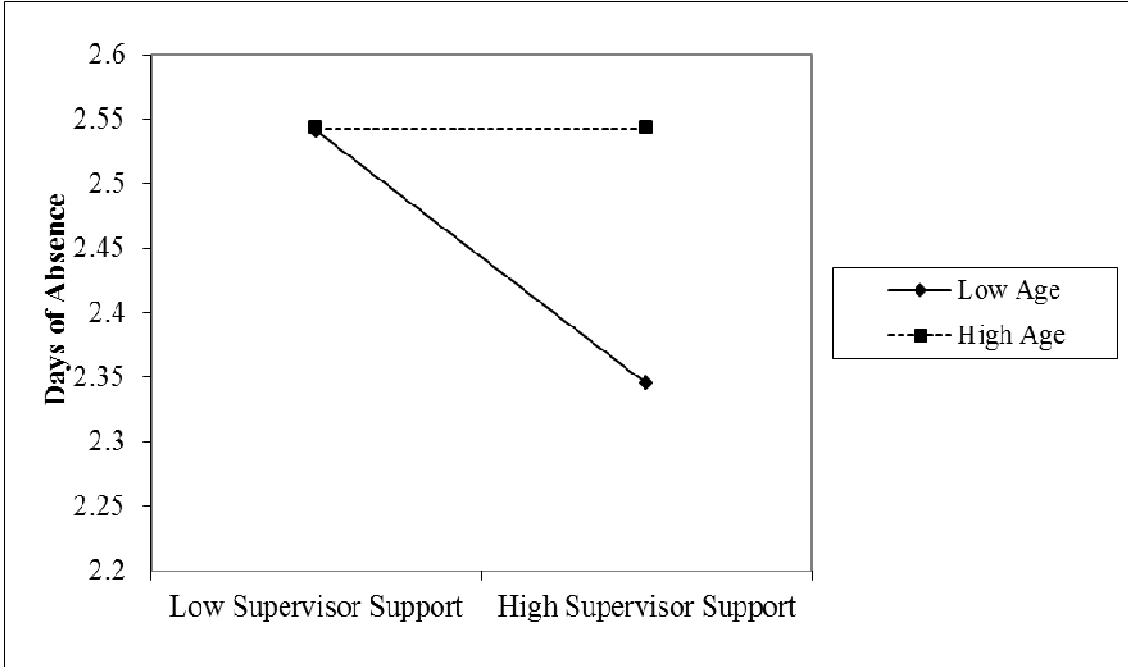


Figure 4. Three-way interaction between autonomy, age and occupational group on absenteeism

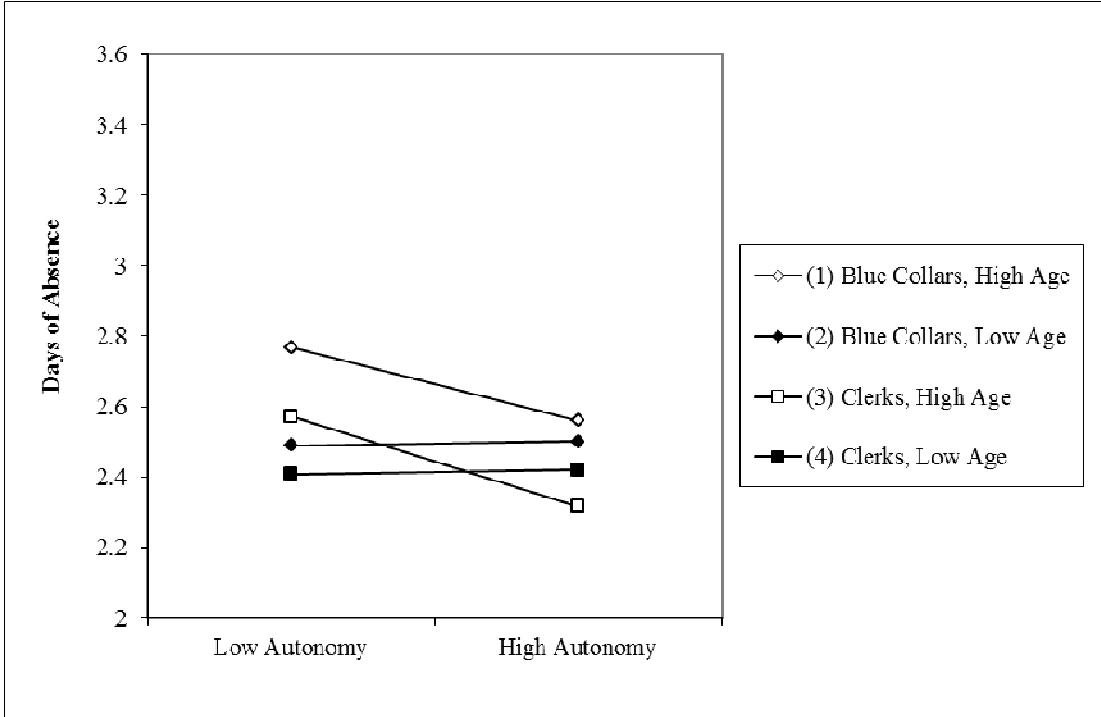


Figure 5. Three-way interaction between supervisor support, age and occupational group on absenteeism

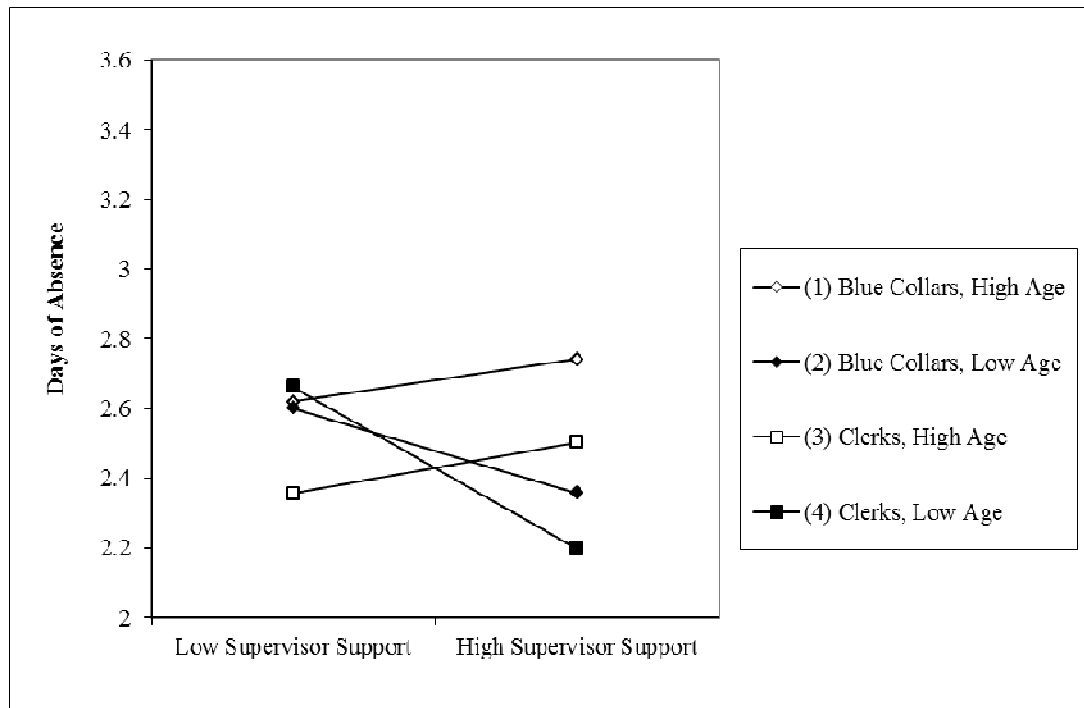




Figure 6. Three-way interaction between colleague support, age and occupational group on absenteeism

