





Exploring dynamic relationships between employees' personalities and psychosocial work factors

Kine Askim, Nikolai Olavi Czajkowski & Stein Knardahl


To cite this article: Kine Askim, Nikolai Olavi Czajkowski & Stein Knardahl (2022) Exploring dynamic relationships between employees' personalities and psychosocial work factors, *European Journal of Work and Organizational Psychology*, 31:1, 1-21, DOI: [10.1080/1359432X.2021.1912016](https://doi.org/10.1080/1359432X.2021.1912016)

To link to this article: <https://doi.org/10.1080/1359432X.2021.1912016>

 [View supplementary material](#) 

 Published online: 15 Apr 2021.

 [Submit your article to this journal](#) 

 Article views: 851

 [View related articles](#) 

 [View Crossmark data](#) 

 Citing articles: 2 [View citing articles](#) 



Exploring dynamic relationships between employees' personalities and psychosocial work factors

Kine Askim^a, Nikolai Olavi Czajkowski^{b,c} and Stein Knardahl^a

^aNational Institute of Occupational Health, Oslo, Norway; ^bDepartment of Psychology, University of Oslo, Oslo, Norway; ^cDepartment of Mental Disorders, Norwegian Institute of Public Health, Oslo, Norway

ABSTRACT

The current study addresses the potentially dynamic relationship between employees' personality and their working conditions. A six-year full-panel longitudinal study of employed individuals was used to test whether (I) task-related, (II) social and (III) organizational work factors contribute to change Big-Five personality traits over time and whether personalities change working conditions. Bivariate latent change score analyses were conducted on repeated-measures data (four waves) from 2356 Norwegian employees. The results showed that specific work factors pertaining to task-related and social characteristics (i.e. leadership) were associated with personality trait changes. Contrary to our expectations, none of the work factors predicted change in neuroticism and extraversion, and we offer several possible explanations for these findings. The results also showed that all personality traits may play an active role in shaping specific attributes of the work environment over time and thereby shed light on how employees' working conditions emerge.

ARTICLE HISTORY

Received 3 June 2020
Accepted 26 March 2021

KEYWORDS

Big Five; personality change; work characteristics; job crafting; work design

Personality characteristics have historically been regarded as stable across situations and across time. Research in the past decades has, however, called this belief into question, and evidence suggests that personality can change across the life-span and in response to environmental influences (cf. Bleidorn et al., 2018; Ferguson & Lievens, 2017; Tasselli et al., 2018; Woods et al., 2019). Given that work, in addition to providing financial security, can be an essential source of identity, reputation, and self-esteem, it seems reasonable to assume that employees' experiences of work may exert a significant impact on their personality (Boyce et al., 2017; Nye & Roberts, 2013). In fact, there is now accumulating evidence linking personality-trait changes to major work-related *life events*, such as starting a first job (Specht et al., 2011), upward career changes (Nieß & Zacher, 2015), being fired (Costa et al., 2000), unemployment (Boyce et al., 2015), and retirement (Löckenhoff et al., 2009; Schwaba & Bleidorn, 2018; Specht et al., 2011). Furthermore, there are studies reporting influences on personality after entering certain careers such as working in sales (Turnbull, 1976), joining the military (Jackson et al., 2012), or working as a correctional officer (Suliman & Einat, 2018). These studies not only show that major work-related *events* may influence personality, but also raise the possibility that being exposed to specific work environments over time can be drivers of personality development in adult life.

At the same time, most workplace phenomenon are also dynamic (Vantilborgh et al., 2018). A dynamic phenomenon can be described as one whose state changes from one point in time to the next governed by certain transition rules and those transition rules may contain interrelations with other dynamic variables (M. M. Wang et al., 2016). Given that both personality

and the work environment may change as well as affect one another (e.g., Li et al., 2014; Wille & De Fruyt, 2014), there may be a dynamic interplay between these two phenomenon. That is, personality may elicit changes in working conditions that, in turn, modifies personality. Similarly, work conditions may elicit changes in personality that, in turn, modifies work related phenomenon. In the current study, the term *dynamic relationship* is used when referring to the effect of one dynamic phenomenon (e.g., working conditions) on another dynamic phenomenon (e.g., personality). In order to elucidate the influence of work on employees' personalities, the present study aimed to clarify the potentially dynamic relationship between the *psychosocial work environment* and personality. More specifically, we sought to determine whether specific psychosocial work factors relates to subsequent personality-trait changes and vice versa (i.e. whether personality traits relates to subsequent changes in psychosocial working conditions) across time.

Since the 1980s the Five-Factor Model (FFM) of personality has emerged as the most popular means of categorizing personality constructs (Bowling & Jex, 2013), and it remains the predominant theoretical framework to investigate associations between personality characteristics and outcomes of work (Ones et al., 2007). With varying labels, the FFM refers to five personality dimensions (the Big Five): neuroticism (negative emotionality, being anxious and nervous; the reverse of emotional stability), extraversion (being assertive, energetic, and sociable, positive emotionality), agreeableness (being cooperative, trusting, and caring), openness to experience (being imaginative, independent-minded, and autonomous), and conscientiousness (being responsible, dependable, and orderly) (Goldberg, 1990; McCrae & John, 1992). Although

a number of longitudinal studies now support the hypothesis that psychosocial work environments shape personality (cf. TasselTasselli et al., 2018; Woods et al., 2013, 2019), few studies have investigated the potential dynamic relationships between specific work features and FFM-dimensions. According to a recent review of the literature (Woods et al., 2019), some prior studies have investigated aspects of the psychosocial work environment pertaining to the perception of task-related and individual-level work factors (e.g., job control, job demands). However, no studies have investigated the influence of social interactions (e.g., leadership) or organizational characteristics (e.g., perceived organizational support or human resource primacy), despite considerable evidence demonstrating the importance of such characteristics to employees' psychological and behavioural outcomes (e.g., Crawford et al., 2010; Fried & Ferris, 1987; Humphrey et al., 2007). Among studies investigating task-related factors, few have investigated all Big Five personality traits. The review shows that previous studies have primarily reported effects on employees' sense of competence (Mortimer & Lorence, 1979), temperament (Brousseau & Prince, 1981), dimensions of emotionality (Le et al., 2014; Roberts et al., 2003), and proactive personality (Li et al., 2014). Moreover, the two studies of Five-factor model traits (Sutin & Costa, 2010; Wu, 2016) have provided seemingly conflicting results regarding the contribution of work to trait changes. Based on their longitudinal cross-lagged analyses Sutin and Costa (2010) maintained that "occupational experiences had minimal impact on personality", whereas Wu (2016) concluded that working conditions could be important drivers of personality change.

Determining the work-related antecedents of personality change could help identify specific kinds of work contexts that best support positive trajectories of personality development (Bowen & Kornadt, 2015), which, in turn, could help promote organizational relevant outcomes and to avoid adverse effects on employees' health. Employee trait change may influence outcomes such as job performance, the potential for adapting to changes and challenges, employees' citizenship contributions, and employees' potential as leaders (TasselTasselli et al., 2018). There is now also ample research showing that even small personality changes are useful predictors of health and well-being outcomes such as depression (Chow & Roberts, 2014), self-ratings of preventative health behaviours and physical health (Letzring et al., 2014; Takahashi et al., 2013), alcohol use (Littlefield et al., 2009), and mortality (Mroczek & Spiro, 2007). Hence, personality development may act as a mediating or moderating variable in causal pathways from working conditions to health and well-being. Finally, determining how personality influences work factors over time (i.e. the opposite direction) can provide valuable knowledge regarding how job incumbents' working conditions emerge (Parker et al., 2017). Although multiple studies have documented the contribution of individual characteristics to employee working conditions (cf. Oldham & Fried, 2016), such investigations have mostly considered personality as a stable predictor and have therefor rarely taken into consideration the potential dynamic relationship between working conditions and employees' personalities.

Theoretical background: the dynamic relationship between work and personality

There has been a rapid growth in theory development and empirical studies adopting a dynamic way of thinking within organizational research over the past two decades (Zacher & Rudolph, 2020). The literature suggests several possible pathways that may result in changes in employees' personalities and/or changes in psychosocial working conditions over time, but the theoretical foundation for the dynamic relationship between personality and work is still diffuse and lacks a unifying framework. Before presenting the work factors under investigation in the present study, we will briefly introduce the most commonly mentioned pathways to changes in employees' personalities and changes in working conditions.

Working conditions influencing employees' personalities: processes and mechanisms

The *corresponsive mechanism* implies that individuals select into environments that fit their traits, and the corresponding activation and expression of those traits serve to strengthen and deepen them (Le et al., 2014; Li et al., 2014; Roberts et al., 2003). Hence, the traits that develop in response to work-related experiences will be the same ones that led the person to enter the environment in the first place (Woods et al., 2020). As an example, a highly extraverted individual may seek jobs with high social requirements (e.g., working in sales), and the repeated exposure to demands of social behaviour (e.g., talking with strangers) may result in the employee becoming even more extravert over time (e.g., Turnbull, 1976).

Alternatively, rather than gravitate towards specific work environments as a result of their personalities, employees may enter an environment due to external forces (e.g., employment opportunities, socio-economic status, uncontrollable life events; Woods et al., 2020). As a result, the work situation may inhibit the expression of trait-consistent behaviour and employees may be required to respond in a way counter to one's typical style or behaviour (Woods et al., 2020, 2019). When employees' typical style is incompatible with the effective performance of duties, a process of *adjustment* may be invoked (Woods et al., 2019), also referred to as *non-corresponsive* personality development (Woods et al., 2020). As an example, individuals with low levels of conscientiousness may be given tasks that require planning, being orderly, or tasks that require much concentration; behaviours consistent with the trait *Conscientiousness*. Even though the individual's personality did not lead the person to seek out such tasks and requirements, they are required to adjust their behaviour to fulfil the requirements of the job (i.e. activation of job-relevant behaviour in place of trait-consistent behaviour). The behaviours and characteristics that a person adopts in order to meet the demands of the social roles (i.e. work role) can become automatic and can subsequently "spill over" into other life domains (Hutteman et al., 2014). Fulfilling such requirements may thereby contribute to increased levels of conscientiousness and consequently result in a reduction in person-environment misfit. Research indicate that individuals tend to develop higher levels of conscientiousness after

gaining their first job (Specht et al., 2011), whereas following unemployment (Boyce et al., 2015) and retirement (Specht et al., 2011) individuals tend to decrease in conscientiousness, which may suggest that work in general will require higher levels of conscientiousness.

One manner in which the psychosocial work environment may influence personality development through non-corresponsive processes is by eliciting more positive or negative emotions in employees. Although some authors have emphasized how work can call upon personality-related *behaviour* in the processes towards personality change (e.g., Woods et al., 2019), the path to personality trait change is not necessarily restricted to behavioural modification. Instead, the process may be more internal through influences on peoples' feelings or self-perceptions (Wrzus & Roberts, 2017). Based on previous empirical evidence one may speculate whether features of the psychosocial work environment influence depressive symptoms (e.g., Finne et al., 2014; Madsen et al., 2017) which, in turn, influence Big Five personality traits (Hakulinen et al., 2015). Although meta-analytical findings suggest that depressive symptoms may contribute to changes in all Big Five traits, the most notable effect will likely be related to increases in neuroticism (or negative emotionality) (Hakulinen et al., 2015). This may explain why most of the predictive effects from work to personality development have been found for the trait neuroticism (cf. Woods et al., 2019). Nevertheless, given that positive emotionality is one of the core features of extraversion (Goldberg, 1990; McCrae & John, 1992), it seems likely that certain aspects of the psychosocial work environment also could contribute to personality change by generating more positive affect (e.g., Finne et al., 2016).

Hence, different mechanisms may operate to elicit trait changes depending on the initial level of consistency between work exposures and personality traits. Although non-corresponsive effects are not currently explained clearly by theory (Roberts & Nickel, 2017; Woods et al., 2020), empirical evidence supports the idea that personality change may occur irrespective of the initial association between people's traits and the work characteristics (Wille & De Fruyt, 2014, p. 274). As both corresponsive and non-corresponsive processes could also be operating simultaneously for a given exposure, a work environment may elicit personality development in a similar way in all persons experiencing it, even though the processes may differ between persons (Woods et al., 2020).

Employees' personalities influencing psychosocial working conditions: process and mechanisms

Instead of (or in addition to) changing their personalities, people may try to shape their environment in ways that are consistent with their traits (Chatman et al., 2008). Hence, studying the dynamic component of personality also requires an understanding of how and why situations and perceptions of situations change and how these changes relate to changes in personality (Beckmann & Wood, 2017). The work design literature describes numerous processes by which job incumbents may influence their working conditions (cf. Parker et al., 2017), several of which have implications for the current study. First, individual attributes may influence employee motivation and

opportunity for adjusting their own work design (Parker et al., 2017). This idea builds on job crafting theory (Wrzesniewski & Dutton, 2001), which suggests that when employee needs are not satisfied at work, they tend to modify their task and relationship boundaries via cognitive and behavioural crafting to obtain higher levels of person-job fit and greater meaning. In other words, individuals not only react or respond to work characteristics but also play an active role in shaping them over time. Given that individuals engage in crafting behaviours directed towards those work characteristics they value the most (Parker et al., 2017) and that personalities likely influences such judgements, employees' personalities will likely have a significant influence on crafting behaviours (Roczniewska & Bakker, 2016; Rudolph et al., 2017).

A second process in which an employee's personalities may contribute to changes in working conditions is by affecting the behaviours or assumptions others (e.g., co-workers, leaders) hold towards her or him (Parker et al., 2017). Agreeable and extraverted individuals, for instance, will likely have a positive effect on interpersonal relations at work due to their skills in interacting with others, their kind and cooperative nature, and their motivation to maintain positive interpersonal relationships with others (Barrick et al., 2002; Costa, 1992; Goldberg, 1990; Judge & Zapata, 2014; Wilmot et al., 2019). Neurotic individuals, on the other hand, tend to report more negative relationships with others, poor interpersonal relationship quality (Judge & Zapata, 2014; Lopes et al., 2003), and less social resources (Rubenstein et al., 2019). Because people tend to exhibit negative responses towards individuals with more negative emotions (Bowling & Jex, 2013; Sacco et al., 1993), neuroticism seems more likely to have an adverse effect on social relationships.

Finally, from the perspective of social information processing theory, workplaces represent inherently ambiguous situations that are open to individual interpretation (Salancik & Pfeffer, 1978) and perception of environmental cues determines interactions with the environment (Nye & Roberts, 2013). Changing how one perceives the work environment can be a coping strategy to handle the challenges in the workplace (Folkman & Lazarus, 1980; Hinojosa et al., 2017). Given that personality influences how work is perceived and appraised (Grant & Langan-Fox, 2007; Michel et al., 2011; Thoresen et al., 2003), changes in employees' personalities may thereby elicit subjective changes in psychosocial working conditions by influencing perception and appraisal.

The present study

To summarize, the literature suggests that psychosocial work characteristics may elicit trait changes by influencing the ways in which employees behave, think, or feel (Wrzus & Roberts, 2017), which may proceed through both corresponsive and non-corresponsive pathways (Wille & De Fruyt, 2014; Woods et al., 2020). Employees' personalities may affect the psychosocial work environment by influencing employees' work-design actions and social relations with others, or by changing how work is perceived and appraised (Parker et al., 2017). To date, there is no theoretical foundation that predicts the direction of such effects a priori. Moreover, the direction of the effects

between personality characteristics and work characteristics is not necessarily a case of “either-or”. In fact, the relationship may be reciprocal so that personality elicits changes in work characteristics that, in turn, modifies personality (e.g., Li et al., 2014; Wille & De Fruyt, 2014).

In order to better understand the dynamic relationship between working conditions and the FFM, the current study took an exploratory approach, and we used archival data to investigate a broad range of psychosocial work factors, most of which not previously investigated as predictors of personality trait change. The work factors were selected from the General Nordic Questionnaire for Psychological and Social Factors at Work (QPS_{Nordic}), which includes a comprehensive set of measures pertaining to psychological, social, and organizational work characteristics (Dallner et al., 2000). As personality change is more likely when there is a correspondence between features of the exposure and features of the trait (Woods et al., 2019; Wrzus & Roberts, 2017) the selection of work factors was based on previous theoretical and empirical evidence suggesting that they may be relevant to one or more of the Big Five personality traits.

Task-related work characteristics as predictors of personality trait change

Task-related characteristics refer to factors related to performing activities and tasks of one’s job, i.e. aspects of work that the individual is exposed to when performing their job (also referred to as individual-level characteristics). While some previous studies have reported trait changes following exposure to task-related work factors (cf. TasselTasselli et al., 2018; Woods et al., 2019), there is still a lack of knowledge regarding (I) the specific work characteristics involved in personality development and (II) which of the Big Five traits that are influenced by task-related characteristics. The present study examined four types of task-related work characteristics from the QPS_{Nordic}: *job control* (i.e. presence of freedom of choice between alternatives; related to both autonomy and participation in planning and decision-making), *job demands* (i.e. tasks and requirements that the employee must fulfil to perform the job), *role expectancies* (i.e. role clarity and role conflict, role stressors), and *predictability* (i.e. the possibility of developing expectancies and generate rules of the environment, determines the individual’s possibility of anticipating future developments and demands).

Job control

While job control has been associated with personality development (Woods et al., 2019), studies have provided seemingly conflicting results regarding the contribution of job control to Big Five trait changes (Sutin & Costa, 2010; Wu, 2016). These studies have used broad measures of job control, either by examining composite scores of various types of control (Wu, 2016) or by examining decision latitude with an instrument (Sutin & Costa, 2010) in which control is one of the aspects of the concept (Dallner et al., 2000). Since previous findings indicate that different types of job control may have differing effects on employee outcomes (Muecke & Iseke, 2019), it seems important to determine whether different aspects of

job control also can display differences in relation to personality changes. The present study investigated two specific types of job control to determine whether there are certain aspects of job control that are the drivers of personality change; *control over work intensity* (i.e. the job incumbent’s perceived control of time and pace in his or her work) and *control over decisions* (i.e. the job incumbent’s perceived influence on decisions in his or her work situation). Although the specific mechanisms or situations where job control results in personality change are still not known, we expect job control to be most closely related to openness since preference for autonomy is one of the core components of the openness factors (Costa & McCrae, 1988; Judge & Zapata, 2014).

Job demands and role expectancies

Previous research suggests that *psychological demands* (e.g., workload, time pressures, conflicts in the workplace) can have unfavourable effects on adult personality development as they may increase levels of neuroticism and decrease levels of extraversion and agreeableness (see review by Woods et al., 2019). However, little is known about how specific psychological demands influence employees’ personalities. Job demands/psychological demands are complex terms defined in multiple ways. Although the terms are often used as umbrella terms covering a range of work-related challenges, presumed to have negative or unfavourable effects because they are interpreted as threats (e.g., Bakker & Demerouti, 2007), empirical evidence suggests that job demands are not inherently “bad”. In fact, certain demands (often referred to as challenging job demands; Cavanaugh et al., 2000) may be interpreted positive challenges, opportunities, or even as a token of confidence from others in their capacity and skills (Crawford et al., 2010), and, consequently, result in favourable effects on employee outcomes (cf. O’Brien & Beehr, 2019). Hence, it seems reasonable to assume that different types of demands may have distinct effects on personality development. Moreover, previous evidence suggests that personalities will influence the type of job demands employees seek (Roczniewska & Bakker, 2016). More specifically, employees with high (vs low) levels of extraversion, conscientiousness, and openness may be more prone to seeking out challenging job demands at work (Roczniewska & Bakker, 2016; Rudolph et al., 2017). Challenging demands could thereby affect employees’ personalities through the responsive mechanism (Roberts et al., 2003). The current study investigated three specific types of job demands that may be characterized as challenging demands: *learning demands* (i.e. the difficulty of work tasks and requirements for more training and education), *decision demands* (i.e. demands for decision-making and attention), and *quantitative demands* (i.e. the job incumbent’s time pressure and amount of work).

As opposed to the job demands discussed above, role stressors are often considered hindering demands or stressors as they are found to have a negative impact on employee outcomes (Cavanaugh et al., 2000; Mazzola & Disselhorst, 2019). We are not aware of any studies examining role stressors as predictors of FFM trait change. Yet, multiple studies have documented the adverse effects of role stressors on mental health (Finne et al., 2014; Johannessen et al., 2013; Schmidt et al., 2014), which, in turn, could influence employees’ personalities

(Hakulinen et al., 2015). Hence, role stressors could be relevant to multiple traits, especially neuroticism. The current study investigates two types of role stressors: *role conflict* (being faced with conflicting role expectations, e.g., incompatible requests, conflicts between tasks and available resources, conflicts between given instructions and own standards; Dallner et al., 2000) and *role clarity* (inverse of role ambiguity, the clarity of goals and objectives at work; Dallner et al., 2000).

Predictability

The present study also included two measures of predictability: *short-term predictability* (i.e. the job incumbent's perception of predictability of aspects of the job situation for the immediate future) and *long-term predictability* (i.e. predictability of various aspects of job security in a two-year perspective) as potential predictors of trait changes. The predictability factors were investigated based on findings by Wu et al. (2020), which suggest that job insecurity contributes to personality development. There are several plausible processes by which predictability may lead to Big Five trait changes. For instance, conscientious and agreeable individuals may gravitate towards jobs with high levels of predictability due to their preference for predictability and job stability (McCrae & John, 1992; Wille et al., 2010), thereby influencing personality through a corresponsive process. Alternatively, predictability and job security may affect personality through a non-corresponsive process by increasing organizational commitment (Ashford et al., 1989), making employees more invested in their work and work activities. Evidence suggests that individuals who increase their social investment in their work activities tend to become more conscientious and agreeable over time (TasselTasselli et al., 2018). Finally, low predictability may contribute to personality change by increasing depressive symptoms (e.g., Lau & Knardahl, 2008).

Social work characteristics as predictors of personality trait change

Social characteristics refer to the relational aspects of the workplace (Ørhede et al., 2000). The current study includes three social characteristics as potential contributors to personality change: *social climate* (i.e. aspects of the climate in the job incumbents' work unit), *social support* (i.e. opportunities for obtaining assistance/help from others and having others available to listen to work-related problems), and *leadership* (i.e. perceptions of leadership styles and behaviours). Despite convincing evidence linking social work factors to Big Five personality traits (Rubenstein et al., 2019), we are not aware of previous studies investigating the dynamic relationships between these social characteristics and the FFM.

Inter-group social relations

Although we have not found studies that have investigated the influence of social climate and social support to Big Five trait changes, studies investigating other social aspects indicate that the interpersonal context may be an important contributor to personality change (TasselTasselli et al., 2018). Trait changes have been demonstrated in; (i) students who perceive a better fit with the college environment and with their classmates (Harms et al., 2006), (ii) those who report satisfactory

relationships with co-workers (Scollon & Diener, 2006), (iii) among individuals who increase social investment in work activities with co-workers (Hudson & Roberts, 2016; Hudson et al., 2012), and (iv) among people who increase their counter-productive behaviours towards colleagues (Hudson & Roberts, 2016).

We expect social climate and social support to be most relevant to the traits associated with social skills, namely agreeableness, extraversion, and neuroticism (Judge & Zapata, 2015). As discussed above, agreeable and extraverted individuals will likely have a positive influence on interpersonal relationship, and may therefore be offered more social support and have a better social climate at work. Individuals who are provided with more social resources (i.e. support and a positive climate) may strive to maintain a balance between the amount they receive and the amount they provide (Bowling et al., 2005; Uehara, 1995). Hence, one may speculate whether agreeable and extraverted individuals are in a positive feedback spiral where the reciprocation of social resources results in increased levels of agreeableness and extraversion over time. Given that social characteristics have been related to indicators such as mental distress and positive affect (e.g., Finne et al., 2014, 2016), there is also a possible path to personality change through the influence of social characteristics on employees' emotionality.

Leadership

The current study investigated two measures referring to perceptions of leadership as a potential contributor to personality trait change: *empowering leadership* (i.e. workers' perception of their supervisor's ability to encourage them to express their opinions and to develop themselves) and *fair leadership* (i.e. workers' perception of procedural justice or the fairness of the decision-making process mediated by the superior). We propose several reasons why such leadership styles and behaviours may be especially important in relation to personality trait change. First, previous research has demonstrated that leader behaviour can influence the health and well-being of subordinates (Arnold, 2017; see also K. Nielsen & Taris, 2019), suggesting that leader behaviour are central in employee functioning. Second, leaders are likely to play an important role in the socialization of employees, as they often communicate the expectations of the organization to the employee. Finally, as leaders often are in control of the rewards and punishments that the employee receives, leaders are probably a central source of motivation to make adjustments in the way one typically acts. Over time, such changes may consolidate and habituate, leading to changes in personality traits (Li et al., 2020; Roberts et al., 2008). We propose that such changes will most likely happen through non-corresponsive process. Although one could imagine employees gravitating towards leaders with a certain leadership style based on their personalities, it seems more likely that employees do not have control of the leadership style of their immediate supervisor and that they are merely present in that environment.

Empowering leadership was investigated as a potential contributor to openness. When having an empowering leader, employees are encouraged to speak their minds, participate in the decision-making process and develop their skills (Dallner et al., 2000). Thus, to empower is more about giving influence

to- than having influence over others, and a central aspect of empowering leadership is supporting employees' self-governance at work (Amundsen & Martinsen, 2014). It, therefore, seems plausible for empowering leadership to influence openness, as autonomy is a core component of both the empowering leadership style and openness (Kim et al., 2018; McCrae & John, 1992; Rauthmann et al., 2014). Empowering leadership may also influence openness by stimulating individual creativity (Lee et al., 2018) and through providing intellectual stimulation.

Fair leadership was investigated by the current study based on evidence indicating that exposure to unfair treatment may affect the personality characteristics of adults. Longitudinal analyses in two national studies, the Health and Retirement Survey and the Midlife in the United States Study (MIDUS), suggest that participants who perceived discrimination exhibited an increased tendency to experience negative emotions (an aspect of neuroticism), a decreased tendency to be trusting (an aspect of agreeableness), and a decreased tendency to be organized and disciplined (an aspect of conscientiousness) (Sutin et al., 2016). Together with evidence showing that personality influences perceptions of fairness (Truxillo et al., 2006; Viswesvaran & Ones, 2004) and that agreeableness and neuroticism are important correlates of organizational justice (Shi et al., 2009), we propose that fair leadership could be relevant to the traits agreeableness, neuroticism, and conscientiousness.

Organizational characteristics as predictors of personality trait change

Organizational work characteristics comprise both the formal and informal structural aspects which define and govern the boundaries of work and hence, perceptions of organizational culture/climate and HR-strategies (Ørhede et al., 2000). The current study investigated three work characteristics of potential relevance to personality trait change at the organizational level: *innovation* (i.e. a dimension of innovativeness, which is one of the main components of a learning organization), *inequality* (i.e. employees' perception of fair treatment of workers in the organization), and *human resource primacy* (i.e. organizational practices important to organizational culture and values and involves rewards workers for well-done jobs, taking good care of workers, the interest of management in the health and well-being of workers). According to the review by Woods et al. (2019), no previous studies have investigated the dynamic relationships between Big Five personality traits and organizational characteristics.

Innovation was included as a potential contributor to changes in openness, as openness should be activated in job contexts with strong innovation/creativity requirements (Judge & Zapata, 2014). Open individuals are characterized by their creativity and divergent thinking (Judge & Zapata, 2014; Raja & Johns, 2010), and such individuals will likely be attracted to organizations which are characterized by a high degree of innovation.

Inequality was investigated based on similar arguments as those pertaining to fair leadership. Although inequality in this context refers to observations of unfair treatment of others (in contrast to oneself being subjected to an unfair leader), it too

can have effects on employee functioning (Ozier et al., 2019). For instance, some previous findings indicate that observing others being bullied or harassed at work may have severe negative psychological consequences for the witness (M. B. Nielsen et al., 2020; Sims Randi & Sun, 2012; Sprigg et al., 2019). As with fair leadership, inequality is related to the concept of organizational justice (Dallner et al., 2000). We, therefore, propose that inequality could be relevant to the same personality traits as fair leadership.

Human resource primacy (HRP) was investigated as it may influence mental health and psychological well-being (Finne et al., 2014, 2016) and thereby influence the emotional components of employees' personalities. Conceptually, HRP is closely related to the concept of perceived organizational support (POS, i.e. employees' general belief that their work organization values their contribution and cares about their well-being; Rhoades & Eisenberger, 2002). As POS and HRP have been found to influence both positive and negative psychological well-being (Finne et al., 2014, 2016; Kurtessis et al., 2017; Rhoades & Eisenberger, 2002), HRP could be relevant to changes in both neuroticism and extraversion, in opposite directions.

Specific aims

The specific aims of the current study were to determine whether Big Five personality traits influence and are influenced by different types of work features: (I) task-related, (II) social, and (III) organizational work factors. Although we have proposed how the various work factors can be relevant for different traits, predictions regarding the direction of effects are encumbered with a level of uncertainty. Moreover, given the unexplored territory of the field, it seems entirely possible that there also will be some unexpected effects. Thus, bidirectional relationships were tested for all Big Five traits and all work characteristics. It should be noted, however, that we did not expect to find many instances of personality trait change. As Wrzus and Roberts (2017) posit, there are many steps necessary for personality change to occur and many "exit points" which preclude change. The present study contributes to the existing literature by exploring several work characteristics not previously investigated as predictors of Big Five trait changes.

Material and methods

Participants and procedure

This study is part of a comprehensive research project conducted among Norwegian organizations, which gathered employee data on working conditions and personality, but also background information and information on work organization, attitudes towards work, mental health, physical complaints, and workability. The project was designed as a full-panel prospective study where information on all the included variables was recorded at a two-year interval. Recruitment to the project was done at the organizational level. In most cases, organizations were contacted and offered participation by the research group, but some organizations also contacted the research group wanting to participate. When the employees

and management of the organizations had been informed at the organizational level, the organizations supplied lists with contact information (name and address) and basic demographic information (sex, age, occupation) of all their employees. After receiving this list, letters were mailed to all employees. This letter contained general information regarding the purpose of the project and either a personal access code to the web-based questionnaire or a paper version of the questionnaire with a pre-stamped envelope. All employees in participating organizations were invited to partake in the project. Employees could answer the questionnaire at work or at home. Organizations received written reports and oral presentations of results of the work environment survey. A total of 101 organizations have taken part in the project. These varied in terms of project entry (i.e. when organizations had their first measurement wave) and consequently, the number of many measurement waves they participated in.

To be included in the current sample, employees had to be eligible for participation (i.e. invited to answer the questionnaire) during at least three out of four measurement waves. Hence, employees only invited once or twice were excluded from the current sample. Some employees entered the organization between the first and the second measurement wave. These were included if they were eligible for participation (i.e. remain employed in the same organization and not being on leave) in the following three measurement waves (the first measurement wave was regarded as missing). The project did not follow participants who left the organization between measurement waves.

A total of 2,356 constituted the sample in the current study, of which 1,610 employees were invited to participate three times, and 746 were invited to participate four times. At the first survey 2,166 were invited to the study, of which 83.1% ($n = 1,801$) responded. At the second survey 2,354 were invited, of which 72.4% ($n = 1704$) responded. At the third survey 2,348 were invited, of which 63.1% ($n = 1481$) responded. At the fourth survey 947 were invited, of which 72.9% ($n = 690$) responded. Response was defined as those providing answers to at least one of the personality measure and one of the work factors. Participants had their first measurement wave between 2005 and 2011.

Of the 21 organizations represented in the current sample, there were six government administration and services organizations, one municipality, three organizations directed towards retail, three organizations working within competence development and research, one religious organization, one labour organization, two non-profit treatment institutions, and four private foundations and membership organizations. These represented a wide variety of occupations and job types. Occupations were classified according to the standard classification of occupations (STYRK) developed by Statistics Norway (www.ssb.no) based on the International Standard Classification of Occupation (ISCO-88). In the current sample, the largest occupational groups were *technicians and associated professionals* ($n = 908$) and *academics* ($n = 703$). Mean age of the total sample was 43.6 ($SD = 9.86$) years with a range from 20 to 68. The sample consisted of more women (55.6%) than men. Although there were more private than public organizations, a larger proportion of the individuals were employed in the

public sector (77.8%) than in the private sector. Although only 11 (five public and six private) of the participating organizations were represented in the fourth measurement wave, the distribution of employee characteristics was highly similar across measurement waves (distribution of employee characteristics per measurement wave is provided in the supplementary material, table A1).

Measures

Personality traits

Big Five personality traits were measured with an abbreviated version of the 50-item IPIP representation of the Goldberg (1992) markers for the Big-Five factor structure. In the abbreviated version, 25 items (five items from each of the FFM subscales) were selected from the original item pool on the basis of their face validity. The selected items capture different facets of the traits and include both positively and negatively framed items. The participants rated each item on a seven-point Likert scale (from “very inaccurate” to “very accurate”). We reversed items that were phrased negatively and calculated the scale means by dividing the sum of all items for each of the Big Five personality characteristics. Sample items are: “Get upset easily” (neuroticism), “Don’t mind being the centre of attention” (extraversion), “Like order” (conscientiousness), “Do not have a good imagination” (openness, reverse coded), and “Take time out for others” (agreeableness).

Work exposures

Work characteristics were assessed by the General Nordic Questionnaire for Psychological and Social Factors at Work (QPS_{Nordic}) (Dallner et al., 2000). QPS_{Nordic} is a validated instrument for research and a tool for monitoring and improving working conditions. The response scale for the QPS_{Nordic} work characteristics was from 1 = “very seldom or never to” 5 = “very often or always”, except *Innovation* and *Social Climate* with response alternatives from 1 = “very little or not at all” to 5 = “very much”. A single indicator was created for each work factor by calculating the average score based on the scale items. A brief description of the scales’ content and sample items is provided in the supplementary material (table B2).

Analytical strategy

Multiple analyses were run to evaluate the psychometric properties of the scales. Exploratory (EFA) and confirmatory (CFA) factor analyses were conducted to evaluate the number of underlying constructs for each scale, the direction, magnitude, and statistical significance of each parameter and to fit a measurement model for each construct separately (Hopwood & Donnellan, 2010; Schumacker & Lomax, 2010). McDonald’s omega coefficient was used to estimate the internal consistency of the items. Omega is a reliability coefficient similar to Cronbach’s alpha. The main advantage of omega, compared to Cronbach’s alpha, is that it provides more realistic estimates of true reliability of scales as it takes into account the strength of association between items as well as item-specific measurement errors (Deng & Chan, 2017; Teo & Fan, 2013). Rank-order stabilities were estimated by calculating test-retest

correlations using Pearson's r . Metric (i.e., factor loading) equivalence was also examined for all scales prior to further analyses.

Binary logistic regression with basic characteristics (private vs public employment, sex, age, and occupational category) included as predictors was used to predicting non-response. When predicting attrition, personality characteristics (i.e. the Big Five traits) and working conditions (i.e. the 16 work factors) were also included as predictors.

Longitudinal structural equation models (SEM) were used to test the bidirectional associations between personality traits and specific work characteristics. More specifically, we adopted the bivariate Latent Change Score (LCS) approach (Ferrer & McArdle, 2010; McArdle, 2009; McArdle & Hamagami, 2001), which combines central features of both the latent growth curve model (LGCM) and the cross-lagged model (see Figure 1). The bivariate LCS approach is regarded as particularly appropriate to evaluate both interrelations among various constructs and changes in those constructs over time (Ferrer & McArdle, 2010; Woods et al., 2013) and it has previously been used to study dynamic relationships in industrial and organizational psychology (e.g., Li et al., 2014; Toker & Biron, 2012). The LCS approach allows us to study individual differences in change, i.e. whether individual differences in personality trait change (e.g., change in neuroticism between T1 and T2) are impacted by individuals' different work characteristics (e.g., role conflict at T1), and whether (modified) personality traits at T2 and T3 further promotes changes in work characteristics.

With the LCS approach we estimate an intercept parameter that reflects standing at the initial wave and an overall latent change factor (slope factor), similar to LGCM. The essential feature of an LCS model is, however, that it explicitly models a latent change variable representing gains or losses in the true score for each variable between two adjacent occasions (Li

et al., 2014). In the bivariate LCS model, this latent change factor is affected by three components (Li et al., 2014): (1) a proportional change from the same construct at a previous occasion, (2) a linear systematic constant change from the slope and (3) effects from the other variable at a previous occasion, i.e. each assessment wave t is used to predict changes in the other construct between assessment t and $t + 1$ (often referred to as coupling or level-to change parameters). Hence, the change process in LCS is essentially divided into multiple segments (Barker et al., 2013) allowing for modelling of more complex patterns of development (Jackson & Allemand, 2014). Making use of latent change parameters also avoids confounding of regression error with actual change which is inherent in cross-lagged models (Rogosa, 1980).

The univariate and bivariate LCS models were specified in Mplus version 8 (Muthén & Muthén, 1998-2017) following methods detailed by Liu et al. (2016). To account for the possibility of non-normally distributed data the MLR estimator was applied. In addition, as the observations in this study are not strictly independent (participants recruited at the organizational level) analysis where adjusted for clustering effects by using the type = complex option in Mplus. Missingness was accounted for with full information maximum likelihood estimation (FIML) assuming responses were missing at random (MAR); therefore, all target individuals were included in the analyses. Age and gender were included as time-invariant control variables (see Figure 1) because they may affect personality development over time (Caspi et al., 2005; Roberts & Mroczek, 2008) and may be systematically associated with the forming of working conditions (Besen et al., 2013; Dubbelt et al., 2016). To evaluate model fit, we relied primarily on the three most frequently reported indices especially in recent longitudinal organizational research (e.g., Li et al., 2014; Meier & Spector, 2013): comparative fit index (CFI), Tucker-Lewis index (TLI), and root-

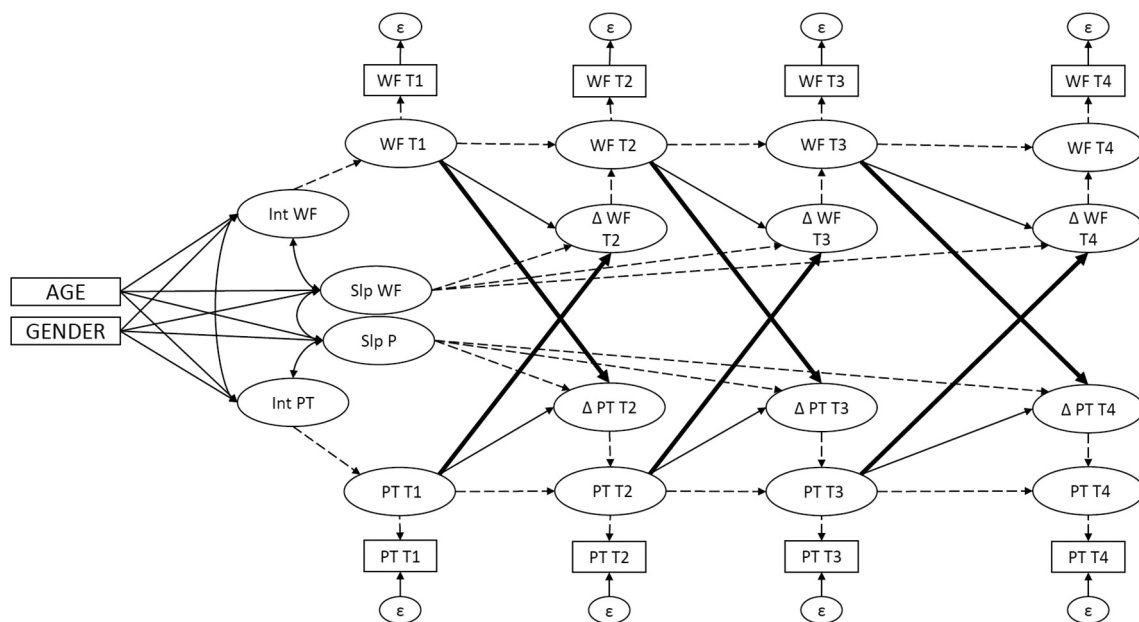


Figure 1. Bivariate latent change score model for a personality traits and a work factors. adopted from Li et al. (2014). This is a simplified representation of a bivariate latent change score model. Broken line represents the path that are fixed to 1. The paths from a latent change variable from Time $n + 1$ are constrained to be equal across time for each of the constructs. The thick black arrow are the coupling parameters linking the two constructs together. These are also held equal across time for each of the construct. PT = Personality trait WF = Work factor, T1 Time point. Slp = Slope. Int = Intercept.

mean square-error of approximation (RMSEA). The following threshold values were used as indicating reasonable model fit: CFI and TLI no smaller than .95 (Hu & Bentler, 1999; Kline, 2012) and RMSEA no larger than .05 (MacCallum et al., 1996).

Results

Non-response and attrition

Some individuals did not respond to any of the four surveys ($n = 141$, 6%). The non-response analyses using binary logistic regression showed that, compared to those aged 30-39, being <30 years (OR: 2.09, 95% CI [1.18, 3.73]) and >59 years (OR: 2.21, 95% CI [1.10, 4.42]) statistically significantly increased the odds of not responding to any of the surveys. Moreover, when being compared to all other occupational groups, *technicians and associate professionals* (OR: 0.50, 95% CI [0.34, 0.76]) and *legislators and senior officials, and managers* (OR: 0.34, 95% CI [0.17, 0.70]) showed a lower risk of not responding to any of the surveys whereas those in *elementary occupations* had a higher odds of non-response (OR: 4.51, 95% CI [2.24, 9.08]). Being employed in private vs public sector (OR: 0.76, 95% CI [0.51, 1.13]) and sex (OR: 0.87, 95% CI [0.60, 1.28]) was not associated with non-response.

Attrition analyses revealed that some age categories, occupational group, personality traits and work characteristics were associated with drop-out between certain measurement waves (being employed in private vs public sector and sex did not predict dropout). Albeit, when investigating the pattern of odds ratios, we saw that none of the variables were consistently associated with drop-out across measurement waves. For instance, extraversion was associated with an increased risk of drop-out between the second and third survey (OR: 1.20, 95% CI [1.05, 1.38]) and conscientiousness was associated with a decreased risk of drop-out between the third and fourth survey (OR: 0.83, 95% CI [0.69, 0.99]), but neither was associated with an increased/decreased odds of drop-out between the other measurement waves (all results are provided in the supplementary material, table C3).

Psychometric properties of the scales

The factor analyses indicated that the scales worked well as all items loaded on their respective latent factors in the expected direction and all factor loadings were significant, with one exception (analysis not shown). One of the openness-items (i.e. "use difficult words", item4) did not perform as expected and was removed from further analyses (more detailed information is provided in the supplementary material, appendix D).

For the scales in the QPS_{Nordic} alternative measurements models were tested (results not reported) by combining various work characteristics into a single construct (e.g., combining the two types of control or combining the leadership factors). However, this led to large decreases in model fit (Δ RMSEA > .5 and Δ CFI > .1), suggesting that the constructs should be analysed separately. Means, standard deviations and internal consistencies reliabilities for all scales are reported in Table 1 (inter-correlations between all study variables are provided in the supplementary material, table E4).

Similar to other studies using short personality scales (e.g., R. E. Wilson et al., 2017) the estimates of internal consistency for our personality scales were low to modest (see Table 2). In line with other studies using other abbreviated versions of IPIP (e.g., Donnellan et al., 2006), the extraversion scale demonstrate the highest internal consistency, which ranged from .65 (T2) to .67 (T4), and openness demonstrate lowest internal consistency, which ranged from .40 (T3) to .43 (T2). For neuroticism reliabilities ranged from .61 (T4) to .63 (T1), for agreeableness from .63 (T1) to .66 (T3), and for conscientiousness from .51 (T3/T4) to .55 (T1).

The Spearman-Brown prediction formula was used to calculate the internal consistencies if the scales were longer and the results indicate that a version containing ten items would yield a reliability estimate >.70. Hence, the modest omega coefficients in the current study likely reflect the small number of indicators per scale and the fact that items were chosen to represent the conceptual breadth within each construct rather than to maximize internal consistency. Although scale reliability is commonly said to limit validity (John & Soto, 2007), it need not be the case. Based on a large study on the psychometric properties of Big Five Inventories, McCrae et al. (2011) concluded that internal consistency appears to be of limited utility for evaluating the potential validity of developed scales. Hence, as the items have previously been demonstrated as indicators of the Big Five personality traits, the scales were judged as sufficient for further analysis. However, because the internal consistencies were modest, we choose to calculate average scores for each trait based on scale items.

Results of the measurement invariance analyses show that setting item loadings equal across time only had minor influences on model fitness for each scale, respectively: Changes in CFI, RMSEA, and SRMR were all less than the suggested cut-off values (Chen, 2007: Δ CFI > -.010, Δ RMSEA < .015, and SRMR < Δ .030, for $N > 300$; Cheung & Rensvold, 2002: Δ CFI > -.010) The findings show sufficient measurement equivalence for our measurements across time (results are provided in the supplementary material, table F5).

Developmental aspects of Big Five traits and psychosocial work factors

Our results indicated moderate to strong levels of rank-order stability in personality traits. The median test-retest correlation for the personality traits was .63, and ranged from .50 to .74 ($p < .001$). As expected, test-retest correlations between measures were lower for longer intervals between measurements (see Table 2). Compared with personality, work characteristics varied more in rank-order stability. Median test-retest correlation was .52 across measurements, and ranged between .26 and .82 ($p < .001$). *Inequality* exhibited the lowest rank-order stability (median: .34, range: .26-.38, $p < .001$). *Control over Work Intensity* displayed the highest rank-order stability (median: .78, range: .76-.82, $p < .001$), and it remained high even when measured six years apart (.78). Although rank-order stabilities were high for some constructs, this does not obviate further examination of bivariate relationships, because such inquiries tap into individual differences in change (Roberts & Mroczek, 2008).

Table 1. Means, Standard Deviations and Internal Consistency Reliabilities for Scales (1st survey/2nd survey/3rd survey/4th survey).

	N	M(SD)	Omega
Neuroticism	1800/1700/1480/690	3.64(1.03)/3.60(1.02)/3.56(0.97)/3.56(0.98)	.63/.62/.62/.61
Extraversion	1800/1704/1481/690	4.26(1.12)/4.29(1.13)/4.29(1.12)/4.24(1.15)	.65/.65/.66/.67
Agreeableness	1800/1699/1480/690	5.42(0.88)/5.44(0.89)/5.40(0.89)/5.49(0.86)	.63/.64/.66/.64
Openness	1800/1695/1479/689	5.09(0.92)/5.10(0.93)/5.09(0.90)/5.13(0.90)	.47/.47/.46/.46
Conscientiousness	1800/1700/1480/690	5.47(0.86)/5.46(0.86)/5.51(0.81)/5.54(0.82)	.55/.53/.51/.51
Human Resource Primacy	1766/1685/1513/692	2.99(0.90)/3.08(0.93)/3.16(0.89)/3.29(0.88)	.79/.80/.78/.78
Inequality at work	1768/1688/1513/695	1.92(0.93)/1.82(0.94)/1.85(0.94)/1.75(0.94)	.73/.76/.76/.76
Innovation	1803/1698/1520/699	3.58(0.77)/3.62(0.78)/3.63(0.76)/3.76(0.71)	.75/.76/.76/.77
Fair leadership	1892/1757/1533/702	3.93(0.87)/3.94(0.89)/3.92(0.89)/4.04(0.83)	.83/.85/.85/.84
Empowering leadership	1897/1759/1533/703	3.07(1.05)/3.14(1.06)/3.20(1.03)/3.24(1.02)	.89/.89/.89/.90
Support from leader	1905/1763/1541/704	3.85(0.95)/3.86(0.96)/3.86(0.97)/3.92(0.95)	.86/.88/.88/.87
Support co-workers	1903/1763/1541/704	4.12(0.77)/4.18(0.75)/4.15(0.78)/4.19(0.75)	.76/.79/.80/.83
Social climate	1883/1741/1525/698	3.77(0.76)/3.81(0.75)/3.82(0.72)/3.88(0.74)	.73/.73/.71/.73
Control over decisions	1918/1773/1551/706	3.06(0.79)/3.10(0.78)/3.10(0.77)/3.07(0.75)	.74/.74/.74/.73
Control over work intensity	1917/1772/1551/705	3.57(0.96)/3.51(1.02)/3.59(0.96)/3.47(1.09)	.84/.84/.84/.89
Decision demands	1920/1770/1556/710	3.43(0.73)/3.43(0.71)/3.43(0.68)/3.46(0.69)	.63/.63/.62/.59
Learning demands	1829/1702/1543/705	2.96(0.78)/2.91(0.73)/2.87(0.73)/2.87(0.75)	.44/.44/.47/.55
Quantitative demands	1928/1777/1557/711	2.88(0.75)/2.90(0.74)/2.92(0.71)/2.98(0.72)	.76/.76/.73/.73
Role clarity	1918/1776/1556/709	4.21(0.76)/4.20(0.75)/4.21(0.72)/4.28(0.72)	.84/.84/.83/.87
Role conflict	1914/1776/1556/706	2.47(0.77)/2.40(0.76)/2.40(0.74)/2.43(0.75)	.69/.69/.69/.68
Short-term pred.	1911/1768/1545/705	4.21(0.75)/4.23(0.73)/4.28(0.65)/4.24(0.70)	.68/.68/.65/.68
Long-term pred.	1677/1620/1507/690	2.96(1.16)/3.01(1.11)/3.04(1.12)/3.15(1.13)	.92/.92/.91/.92

Note. Omega = McDonald's Omega (internal consistency reliability). N = number of responses. M = mean. SD = Standard deviation.

Univariate LCS models were fitted to both the personality and work variables, and fit was found to be acceptable for all models (fit statistics are provided in the supplementary material, table E5). Although the TLI was slightly below the threshold values for Role Conflict (TLI = .93) both the CFI and the RMSEA indicated acceptable model fit (.95 and .05, respectively).

Univariate LCS analyses showed negative correlations between the intercept and change for most of the personality domains (N,E,A, and C), indicating that for these domains, higher initial scores were associated with lower change scores across subsequent measurement waves (see the Change level *r* in table 2). Gender was significantly associated with the intercept for neuroticism, conscientiousness and agreeableness, while age was only associated with openness to experience (see table G6 for further details).

For the work factors, the univariate analyses showed a negative correlation between the intercept and change factors, indicating that higher initial values were associated with lower change scores (see the Change level *r* in table 2). Age and gender was significantly associated with intercept and/or the slope for multiple work factors. Together age and gender explained between zero and seven per cent of the variance in the intercept, and between zero and five per cent of the variance in the slope (see table G6 for further details).

The relationship between personality and working characteristics

For all bivariate models, RMSEA, CFI and TLI fit indices were below threshold levels. All lagged effects on changes in personality and changes in work characteristics (i.e. coupling parameters) are displayed in Table 3. Model fit values and parameter estimates are provided in the supplementary material (table H7-H11).

Work characteristics contributing to personality change

Overall, six of the work characteristics analysed were associated with personality trait change ($p < .05$). Most effects were found pertaining to the task-related characteristics, but also leadership was associated with personality trait change.

Three work characteristics were associated with an increase in *Agreeableness: Control over Decisions* ($B = .516$, $SE = .205$, $p = .012$, 95% CI [.114, .919]), *Quantitative Demands* ($B = .118$, $SE = .038$, $p = .044$, 95% CI [.044, .193]) and *Long-term predictability* ($B = .400$, $SE = .118$, $p = .001$, 95% CI [.168, .631]). Four work characteristics influenced *Openness: Empowering Leadership* ($B = .178$, $SE = .034$, $p < .001$, 95% CI [.111, .246]), *Control over work intensity* ($B = .206$, $SE = .038$, $p < .001$, 95% CI [.131, .281]), *Decision Demands* ($B = .355$, $SE = .076$, $p < .001$, 95% CI [.205, .504]) and *Quantitative Demands* ($B = .301$, $SE = .108$, $p = .006$, 95% CI [.088, .513]) were all associated with an increase in levels of openness. Only a single work characteristic was associated with changes in *Conscientiousness: Control over Work Intensity* was related to a decrease in Conscientiousness ($B = -.025$, $SE = .012$, $p < .038$, 95% CI [-.048, -.001]). None of the work characteristics was associated with changes in *Neuroticism* or *Extraversion*.

Personality contributing to change in work characteristics

Overall the results showed that personality traits were associated with changes in eight of the work characteristics analysed ($p < .05$). Neuroticism was associated with changes in more work characteristics than the other personality traits and had an effect on task-related, social, and organizational characteristics. Agreeableness and Conscientiousness were related to changes in social and task-related exposures, whereas Extraversion and Openness were only associated with changes in task-related exposures.

Table 2. Developmental Aspects of Personality Traits and Psychosocial Work Factors.

	Observed variables						Latent variables				
	Rank-order stability										
	Two years between measurements		Four years between measurements		Six years between measurements		Estimated latent means		Proportional change	Change Level	
T1-T2	T2-T3	T3-T4	T1-T3	T2-T4	T1-T4	Intercept ^a	Slope	Parameter estimate	<i>r</i>		
Neuroticism	.60	.61	.64	.60	.55	.51	3.64	-0.55	0.15	-.36***	
Extraversion	.69	.74	.74	.69	.69	.67	4.26	-1.45	0.34	-.20**	
Agreeableness	.65	.68	.69	.65	.66	.63	5.44	4.09	-0.76	-.17*	
Openness	.55	.58	.63	.56	.50	.54	5.10	-3.85	0.75	.09*	
Conscientiousness	.62	.61	.64	.61	.57	.58	5.45	-2.47	0.46	-.44**	
Human resource primacy	.66	.62	.57	.58	.49	.52	3.03	-1.77	0.59	-.36***	
Inequality at work	.38	.38	.34	.34	.33	.26	1.91	1.28	-0.70	-.27***	
Innovation	.56	.55	.53	.47	.43	.32	3.60	0.36	-0.10	-.18	
Fair Leadership	.49	.54	.42	.45	.36	.34	3.95	1.56	-0.40	-.19	
Empowering leadership	.58	.58	.49	.51	.42	.38	3.11	-4.42	1.42	-.40***	
Support from leader	.53	.57	.47	.44	.36	.36	3.87	-0.29	0.07	-.32***	
Social climate	.54	.53	.52	.49	.40	.43	4.15	2.78**	-0.67**	-.40***	
Support co-workers	.49	.55	.49	.44	.46	.43	3.07	0.05	-0.02	-.29***	
Control over decisions	.65	.65	.68	.62	.59	.57	3.80	-0.11	0.03	-.30***	
Control over work Int.	.77	.80	.82	.76	.78	.78	3.55	-3.16	0.89	-.12	
Decision demands	.62	.66	.65	.58	.62	.57	3.43	1.76	-0.51	-.38***	
Learning demands	.48	.55	.55	.45	.45	.45	1.75	3.00	-0.62	-.46***	
Quantitative demands	.50	.68	.65	.56	.57	.50	2.89	1.41*	-0.49*	-.37***	
Role clarity	.55	.60	.61	.51	.52	.47	4.22	3.21*	-0.76*	-.33***	
Role conflict	.55	.54	.53	.52	.47	.43	2.44	-1.51	0.62	-.35***	
Short-term predictability	.50	.54	.55	.43	.51	.43	4.19	3.16*	-0.74*	-.51***	
Long-term predictability	.49	.50	.50	.39	.47	.44	2.97	1.71**	-0.57**	-.39***	

Note. P-values < .001 for rank-order stabilities.

*** $p < .001$ ** $p < .01$ * $p < .05$

Specifically, *Neuroticism* was associated with a decrease in *Empowering Leadership* ($B = -.298$, $SE = .080$, $p < .001$, 95% CI [-.455, -.141]), *Support from co-workers* ($B = -.067$, $SE = .027$, $p = .012$, 95% CI [-.119, -.015]), *Role clarity* ($B = -.106$, $SE = .050$, $p = .033$, 95% CI [-.203, -.009]), and *Long-term Predictability* ($B = -.104$, $SE = .034$, $p = .002$, 95% CI [-.171, -.037]). *Extraversion* was related to an increase in *Long-term predictability* ($B = .175$, $SE = .049$, $p < .001$, 95% CI [.080, .271]). *Agreeableness* was associated with increases in *Support from co-workers* ($B = .090$, $SE = .045$, $p = .044$, 95% CI [.003, .178]) and *Long-term predictability* ($B = .134$, $SE = .053$, $p < .011$, 95% CI [.031, .238]). *Openness* was associated with increases in *Decision demands* ($B = .098$, $SE = .048$, $p < .043$, 95% CI [.003, .193]) and *Long-term Predictability* ($B = .232$, $SE = .069$, $p < .003$, 95% CI [.068, .330]). *Conscientiousness* was associated with decrease in *Social Climate* ($B = -.049$, $SE = .021$, $p = .022$, 95% CI [-.091, -.007]) and *Role Conflict* ($B = -.200$, $SE = .058$, $p = .001$, 95% CI [-.314, -.086]).

General discussion

Inspired by the increasing literature on the role of work in personality development, we investigated dynamic relationships between employees' personality traits and specific everyday working conditions. We contribute new knowledge by measuring and analysing a broad set of specific task-related, social, and organizational work characteristics, most of which not previously studied in relation to personality-trait change. In line with previous findings (Woods et al., 2019), the present results support the contention that Big Five personality traits

are not impervious to environmental influences from task-related work exposures, but also show that social work factors (i.e. leadership) may elicit personality trait change. These results suggest that organizations may facilitate personality development through changes in the work environment and that human capital may be maintained or increased by actively developing specific work factors. Our findings also show that Big Five personality traits are associated prospectively with changes in the appraisal of work characteristics over time. Together with other studies (e.g., Sutin & Costa, 2010; Wille & De Fruyt, 2014), these results support the idea that personality is involved in shaping the employees' working conditions over time.

Considering the wide range of work exposures included in the present study, an elaborate discussion of each work factor in relation to the traits is beyond the current scope. However, we will discuss the main findings, focusing on the most robust associations ($p < .001$). As we hope this study stimulates more research on personality development at work, we will also highlight how these findings may inspire future studies exploring the contribution of psychosocial work characteristics to Big Five trait change.

Working conditions contributing to changes in openness

In line with previous findings (Woods et al., 2019), our results indicate that job control and job demands can be important drivers of personality change. More specifically, our results show that both job control and job demands increase levels of openness. The observed effect of job control on openness is not surprising as being autonomous is one of the core

Table 3. Lagged Effects on Personality and Work Characteristics (Results from Bivariate LCS Analyses).

	Lagged effect on personality change Path-coefficients (SE)				
	NEU	EXT	AGR	OPE	CON
Organizational characteristics					
Human Resource Primacy	-.046(.100)	-.264(.726)	.147(.122)	-.064(.284)	-.058(.052)
Inequality at work	-.080(.095)	Na	-.114(.071)	-.001(.087)	-.011(.075)
Innovation	.027(.176)	-.019(.362)	.181(.218)	-.161(.415)	-.091(.123)
Social characteristics					
Fair leadership	-.022(.321)	-.122(.157)	.088(.105)	-.072(.216)	-.120(.158)
Empowering leadership	-.069(.089)	-.240(1.173)	.107(.068)	.178(.034)***	-.035(.040)
Support from leader	-.008(.084)	.028(.058)	.027(.043)	-.091(.247)	.004(.040)
Support from co-workers	-.058(.127)	-.145(.375)	.195(.196)	-.092(.464)	-.139(.105)
Social climate	.075(.219)	-.127(.350)	.173(.152)	-.045(.239)	-.114(.088)
Task-related characteristics					
Control over decisions	.003(.117)	.007(.788)	.516(.205)*	-.283(.384)	-.020(.026)
Control over work int.	.021(.043)	-.070(.224)	.060(.044)	.206(.038)***	-.025(.012)*
Decision demands	.006(.038)	.197(.744)	.115(.159)	.355(.076)***	-.039(.037)
Learning demands	-.041(.073)	-.038(.151)	.072(.154)	Na	.069(.080)
Quantitative demands	.023(.060)	-.001(.205)	.118(.038)**	.301(.108)**	.086(.046)
Role clarity	-.003(.117)	.001(.031)	.080(.793)	-.036(.079)	-.198(.140)
Role conflict	.036(.170)	-.006(.083)	-.030(.031)	.160(.148)	.125(.146)
Short-term predictability	.028(.108)	.009(.077)	.013(.045)	-.059(.136)	-.007(.045)
Long-term predictability	.014(.053)	-.452(.515)	.400(.118)**	-.216(.632)	-.021(.023)
	Lagged effect on change in work factors Path-coefficients (SE)				
	NEU	EXT	AGR	OPE	CON
Organizational characteristics					
Human Resource Primacy	.233(.153)	-.081(.074)	-.178(.111)	-.093(.096)	-.060(.056)
Inequality at work	.078(.085)	Na	-.014(.054)	-.014(.036)	.010(.047)
Innovation	-.009(.082)	.012(.792)	-.012(.095)	.030(.059)	-.024(.026)
Social characteristics					
Fair leadership	-.215(.122)	.011(.049)	.025(.228)	.009(.055)	-.029(.157)
Empowering leadership	-.298(.080)***	-.004(.013)	-.244(.253)	-.388(.350)	.110(.091)
Support from leader	.028 (.066)	-.006(.026)	.004(.047)	-.020(.035)	-.024(.046)
Support from co-workers	-.067(.027)*	.032(.026)	.090(.045)*	.039(.034)	.040(.036)
Social climate	.066(.059)	-.021(.024)	-.047(.042)	-.025(.038)	-.049(.021)*
Task-related characteristics					
Control over decisions	.031(.048)	-.007(.085)	.001(.065)	-.004(.106)	-.011(.011)
Control over work int.	.078(.059)	-.123(.128)	-.095(.097)	-.289(.321)	-.041(.036)
Decision demands	-.013(.011)	.067(.037)	.071(.068)	.098(.048)*	.037(.026)
Learning demands	.008(.016)	.027(.019)	.043(.032)	Na	-.015(.026)
Quantitative demands	-.025(.018)	.049(.028)	.029(.029)	.087(.052)	-.001(.022)
Role clarity	-.106(.050)*	-.015(.033)	.075(.060)	.023(.029)	.154(.088)
Role conflict	-.202(.550)	.005(.030)	-.005(.023)	.012(.039)	-.200(.058)**
Short-term predictability	-.067(.041)	-.008(.016)	.023(.037)	.018(.029)	.025(.034)
Long-term predictability	-.104(.034)**	.175(.049)***	.134(.053)*	.199(.067)**	.017(.033)

NEU = Neuroticism, EXT = Extroversion, AGR = Agreeableness, OPE = Openness, CON = Conscientiousness, int = intensity. Na = no results available due to non-convergence. Unstandardized parameter estimates are presented. Age and gender included as covariates.

***p < .001 **p < .01 *p < .05

components in openness (Goldberg, 1990; McCrae & John, 1992). While previous studies on job control have mostly relied on composite scores of different dimensions of control (e.g., Wu, 2016), our study indicates that it is *control over work intensity* that drives changes in openness. Although we found no evidence suggesting that personality will influence changes in job control, there was as significant association between openness and job control at the first measurement wave (i.e. significant correlation between intercepts). If open individuals have selected occupations and roles known to have high levels of job control there could be a corresponsive process resulting in trait changes. However, more knowledge is need to determine the underlying mechanisms for the effect of job control on changes in openness.

We found a reciprocal relationship between openness and decision demands. That is, decision demands were associated

with increases in openness and vice versa. This finding may reflect a corresponsive process towards trait change. Because open individuals are curious, more willing to try new things and tolerant of uncertainty (Goldberg, 1990; McCrae, 1990), they may be more inclined to seek out challenging demands that in turn may enhance openness because it necessitates intellectual curiosity, creativity, and imagination to meet those demands.

Taken together, our findings pertaining to job control and job demands help shed light on the relationship between role transitions and personality change. Openness not only predicts upward job changes but will also change after transitioning into managerial professions (Nieß & Zacher, 2015). Evidence suggests that transitions into a leadership role will lead to higher demands and more job control (Li et al., 2018). The results of the current study imply that such changes will be significant to personality development and may thereby

explain why individuals tend to become more open after gaining a leadership role.

A novel finding of the current study is the effects of leadership on personality development. More specifically, employees seem to increase in openness if they perceive their leader as more empowering. Openness was not associated with changes in empowering leadership. As previously discussed, employees will most likely not select leaders with specific leadership styles based on their personalities. Hence, these results may reflect a non-corresponsive change process where employees change their personalities to fit the requirements of the environment in which they are present.

Because leaders have the potential to influence their subordinates' work design (Kim et al., 2018), our findings raise the questions as to what the main driving force behind personality trait changes in the workplace are and whether our findings on openness are, in fact, interrelated. Empowering leadership is a high involvement management approaches that give authority and responsibility to subordinates (Kim et al., 2018; Leach et al., 2003). Hence, it seems reasonable to assume that this leadership style will facilitate more job control among subordinates but also results in higher demands for decision-making. Empowering leadership may also change task-related work factors indirectly by empowering individuals to actively shape their work context (H. H. Wang et al., 2020). Hence, there could be both direct effects (as our results suggest) and indirect effects (though changes in job control and demands) of empowering leadership on trait changes. We encourage future research to delve more into the effects of leadership styles on subordinates' personalities, including investigations of both direct and indirect effects.

Personality affecting leadership

We also found an effect of personality on leadership. More specifically, employees with higher levels of neuroticism will experience a decrease in empowering leadership over time. While we have posited that there may be limited selection effects associated with leadership styles of one's immediate supervisor, employees' personalities may still have unintentional effects on leadership by triggering the assumptions managers hold about the individuals' competency and trustworthiness (Parker et al., 2017).

Individuals with high levels of neuroticism may display behaviours such as acting irritated, expressing insecurity, exhibiting physical signs of tension/anxiety, seeking reassurance, and expressing guilt (Rauthmann et al., 2014). When neurotic individuals meet aversive situations at work, rather than engage in productive coping behaviours to meet demands, they may be more inclined to implement maladaptive coping behaviours such as denial (i.e. not dealing with the actual problem at hand: Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). Leaders may not trust employees displaying such styles and behaviours to behave responsibly and in accordance with organizational goals, rules, and policies. Against this background, managers may be less likely to display empowering leadership for individuals who are high in neuroticism.

Although the findings were not as robust, our results also indicate that neurotic individuals will experience a decrease in

several task-related work characteristics considered as favourable to the employee (e.g., role clarity, long term-predictability). These results are in accordance with the stressor-creation mechanism proposed by Spector et al. (2000), which states that individuals with high levels of negative affectivity/neuroticism will create a more stressful environment for themselves by their behaviour. However, it is possible that some of the observed changes in task-related work characteristics are a result of employees' affecting their leaders and the leaders' decisions regarding work design at the individual level (Parker et al., 2017). Previous research suggests, that employees with less empowering leaders also will have less role clarity (Windeler et al., 2017). Future research could investigate whether the changes in task-related work characteristics and leadership neurotics report are interrelated or whether they are distinct and separate effects.

As the current study pertains to subjective reports of working conditions, we cannot determine whether the changes reported by employees with higher levels of neuroticism reflect objective changes or whether these employees mainly perceive a less favourable work environment. Compared to those with low levels of neuroticism, highly neurotic individuals may have a tendency to see the world in a more negative way and therefore perceive their environment less favourable (Spector et al., 2000). According to the gloomy perception mechanism (De Lange et al., 2005), certain individuals may also re-evaluate their environment more negatively and thus report less favourable work factors. For instance, it is possible that employees with higher levels of neuroticism re-evaluate that their supervisors as being less empowering over time. Negative re-evaluation may occur when there is a discrepancy between what the employee wants (e.g., a highly empowering leader) and what the employee gets in their work environment (De Lange et al., 2005; Semmer, 2003). Although the results of the current study does not indicate that neurotics have a "gloomier perception" of all work factors (neuroticism was only associated with unfavourable changes in certain work factors), this mechanism could be operating for specific work factors. Employees with high levels of neuroticism may value and want certain environmental conditions (e.g., high levels of empowering leadership, role clarity and long-term predictability) to a larger extent than those with low levels of neuroticism, and may therefore be more likely to have a negative re-evaluation of these specific work factors. Other work factors (e.g., job control, social climate, human resource primacy), could be valued equally independent of levels neuroticism, and therefore not affected by the gloomy perception mechanism. Future research may elucidate why neurotics seems to perceive unfavourable changes in certain work factors by exploring potential moderators such as the value that individuals place on certain work factors.

A reciprocal relationship between predictability and agreeableness

Another notable finding of the current study was the reciprocal relationship between agreeableness and long-term predictability (i.e. predictability of various aspects of job security in a two-year perspective): agreeableness increased long-term

predictability and vice versa. As previously discussed, this may reflect a corresponsive mechanism where agreeable individuals seek towards more stable jobs (Wille et al., 2010) and roles with higher predictability which may increase commitment and social investment in work and work activities that, in turn, leads to higher levels of agreeableness. It may be that agreeable individuals seek more stability and predictability at work because it satisfies an innate desire to achieve and maintain stable social relationships (Wu et al., 2020). Our results for predictability complement that of Wu et al. (2020) who recently found that chronic job insecurity was associated with decreases in agreeableness. However, it should be noted that our findings pertaining to changes in agreeableness was not as robust ($p > .01$) as the effect of agreeableness on predictability ($p < .001$).

Providing secure jobs, competence to ensure self-efficacy for being employable, and maintaining attention on human capital when introducing technological and organizational changes may contribute to employees' perceptions of predictability and, in turn, personality development. However, given that the perception of long-term predictability is seemingly highly susceptible to personality influences, changing the individual's perception of long-term predictability through organizational interventions may be difficult. Our results indicate that multiple traits contribute to changes in long-term predictability (neuroticism was associated with decreased levels, whereas agreeableness, extraversion, and openness were associated with increased levels of predictability). These results seem reasonable given that predictability, unlike the other work factors included in the current study, involves a judgment about future perspectives (long-term predictability refer to judgements pertaining to the next two years). Compared with judgements about current perspectives, judgements about future perspectives are more susceptible to the influence of affective and cognitive feelings (Greifeneder et al., 2011). More knowledge is needed to determine whether organizations may influence employees' level of agreeableness through changes in long-term predictability.

The effects of intergroup social relations on personality change

We found no evidence of personality change associated with any of the other social characteristics pertaining to intergroup social relation (i.e. social climate and social support). This result may be considered surprising, given that the workgroup is potentially the most proximal representation of the context where the socialization process takes place (Woods et al., 2019).

With regard to social support, the present study investigated *perceptions of available support* (as opposed to receiving objective). It is possible that personality development is more closely related to the behaviour of giving social support rather than receiving it. Unfortunately, we did not have measures of provided support. As both agreeableness and extraversion have been found to predict giving of social support (Bowling et al., 2005), future investigations should include measures of social support given and explore the role of social support reciprocity. As both over-benefiting (i.e. receiving more support than one gives) and under-benefiting (i.e. giving more support than one

receives) have been found to have negative consequences to the individual, including aversive effects on mood (Buunk et al., 1993; Gleason et al., 2003, 2008), one may speculate whether an unbalanced relationship between social support received and social support given also may have consequences for personality development (e.g., increased levels of neuroticism).

Indeed, there may also be other social characteristics than the ones included in the current study that elicit personality trait change. Future studies may examine whether inter-group characteristics are a more prominent source of personality change. In a recent study, Vezzali et al. found that both the quality and quantity of intergroup contact predicted personality trait change (Vezzali et al., 2018). Although the study was done on high school students, it seems reasonable to assume that such effects may also be relevant in a workplace setting. Future studies should also direct their attention towards characteristics aimed at capturing negative aspects of the social environment (e.g., intra- and inter-group conflicts, sexual harassment, abusive leadership, laissez faire leadership). Given that previous research suggests that individuals tend to give greater weight to negative information than positive information (Norris et al., 2019), that negative events tend to have a stronger impact than positive events (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) and that stressors tend to have a more detrimental effect on employee health than resources do (Bakker & Demerouti, 2017). One may speculate whether highly negative social characteristics also will have a more substantial influence on personality development. Several previous studies indicate that interpersonal problems (e.g., conflicts) influence personality trait development (Borghuis et al., 2020; Hudson & Roberts, 2016; Mund & Neyer, 2014). Borghuis et al. (2020), for instance, found that adolescents who reported higher levels of daily conflict with their friend tended to show stronger subsequent within-person increases in neuroticism. Future studies could explore whether similar effects can be found among older individuals in a work setting.

Effects on neuroticism and extraversion

Based on previous empirical evidence (Woods et al., 2019), we expected several of the work factors to be associated with changes in neuroticism and extraversion. However, we found no evidence of any such direct effects. This was the case even for well-known work stressors such as role conflict and role ambiguity that have been demonstrated to have an impact on employees' affective dispositions (e.g., Finne et al., 2014; Johannessen et al., 2013; Schmidt et al., 2014), and thereby should be relevant to changes in, for instance, neuroticism.

One possible explanation may be due to differences in instruments between the studies. The instrument used to evaluate work characteristics in the current study (the QPS_{Nordic}) was designed with the aim of avoiding reporting bias due to affective states by avoiding terms with positive/negative connotations (e.g., satisfied with) and instead asked people how often a situation occurs (i.e. frequency labels). Hence, our measurements may be less sensitive to the affective component of the work environment. Other instruments may be more related to affective experiences at work and therefore, more closely

related to traits pertaining to affect, namely neuroticism and extraversion. Yet, other studies using the QPS_{Nordic} have documented effects on affective dispositions such as mental distress (e.g., Finne et al., 2014).

A second possible explanation may be related to differences in sample characteristics between studies. That is, the association between work and neuroticism may not be generalizable to all employees, some individuals may be more susceptible to personality changes than others (Scollon & Diener, 2006). For instance, findings by Hudson and colleagues indicated that employees who are more socially invested in their job may be more likely to experience personality changes (Hudson & Roberts, 2016; Hudson et al., 2012). Yet, we did identify several instances of personality-trait changes indicating that the employees in our sample are susceptible to personality changes in general. Alternatively, differences in employee populations and context may explain the contrasting finding. The current study was conducted among Norwegian employees, which are generally characterized by high levels of job security and job control, compared to many other countries (The National Institute of Occupational Health in Norway, 2018). Although stressors have a negative impact on mental health, the long-term effects on neuroticism could be moderated/mediated by a high sense of work control. The combination of demands and control (often termed job strain; Karasek, 1979) may exert a stronger contribution than the factors separately. Due to the number of variables and amount of analyses included, analysing the combined effects of two or more exposures on personality traits was beyond the scope of the present study. Future research could examine whether some jobs combine certain work characteristics (e.g., high demands and low support) and whether these combinations have differential effects on patterns of personality development.

A third possible explanation is that the path from work to changes in neuroticism (and perhaps extraversion) is a fully mediated relationship. That is, there may be an indirect path for psychosocial work factors to changes in neuroticism and extraversion. For instance, if the independent variable (i.e. work characteristic) exert a stronger influence in a mediator (e.g., depression) than on the dependent measure (i.e. personality change), this could lead to a stronger indirect effect than total/direct effect (Rucker et al., 2011). Hence, indirect effects may exist even when direct effects are absent (Rucker et al., 2011).

As higher levels of emotional stability (e.g., Barrick & Mount, 2009) and extraversion (e.g., Wilmot et al., 2019) are potentially beneficial in some organizational settings, future studies should aim to determine when and for whom work exposures will elicit changes in neuroticism and extraversion.

Methodological strengths and limitations

The present study took the dynamic and potentially reciprocal relationship between personality traits and psychosocial work factors into consideration by assessing bi-directional effects as measured at four waves across a six-year period using the Latent Change Score approach. This type of multi-wave lagged modelling is well suited for unpacking the directional effects between working conditions and personality changes (Selig & Preacher, 2009; Wu, 2016) and limits the possibility that work

characteristics are spuriously related to personalities because they are both affected by the same measured variable (Parker et al., 2014). By adopting a full panel design with multiple measurement points, the present study also addresses potential methodological limitations of previous studies investigating the FFM, which were based on only two measurement waves (Sutin & Costa, 2010) or an incomplete panel design (Wu, 2016). Nevertheless, while the LCS model has been recommended over alternative analytical strategies such as the cross-lagged panel model (Ferrer & McArdle, 2010), it is not without limitations. Although LCS models enable analysis that attenuates ambiguities in the directional effects between interrelated processes, this is not equivalent to establishing causal inferences (Woods et al., 2013).

Our sample included respondents from 21 different organizations with a variety of occupations, age and skill levels. However, organizations were not recruited by random sampling and only included Norwegian organizations, which may limit the generalizability of our findings. Norway is wealthy, ranked very high on WHO's human development index (<http://hdr.undp.org/en/composite/trends>), and maintained very low levels of unemployment throughout the time period of the present study. Although we believe the diversity of the sample constitutes a strength of the current study, external validity is unknown. It can be argued that even representative samples may have limited external validity when drawn from wealthy (or poor) economies. At any rate, sample characteristics should be kept in mind when interpreting the results.

The current study measured working conditions and personality traits at the individual level by self-report. Changes employees make to their environment need not be observable by others, there may be cognitive variation in how the employee perceives his or her work characteristics (Berg et al., 2008; Nye & Roberts, 2013). Hence, we need a measure sensitive to the employees' perception and appraisal of work characteristics. Although considerable empirical evidence has shown that perceptions and reporting of work characteristics do reflect objective attributes of work (Frese & Zapf, 1999; Fried & Ferris, 1987; Hackman & Lawler, 1971; Morgeson & Campion, 2003; Spector, 1992), the results of the current study do not necessarily pertain to objective work characteristics. Moreover, as this study is based exclusively on self-reports, common method bias (CMB) also constitutes a possible limitation (Podsakoff et al., 2003). However, the influence of CMB should be limited for a number of reasons. First, QPS_{Nordic} was constructed with the specific aim of counteracting such biases (Dallner et al., 2000; Podsakoff et al., 2003), as mentioned, terms with negative/positive connotations (e.g., "satisfied with") were avoided, and people were asked how often a situation occurs (i.e. frequency, rather than to rate agreement to statements), verbal labels were used for all response categories, and some items were reversed. Second, the different measures were placed in different sections of the questionnaire and had different response categories. Third, the potential problem of CMB is alleviated because of the longitudinal design and the analytical strategy utilized. The LCS approach models changes in latent variables reflecting the differences in one variable between two adjacent occasions (Ferrer & McArdle, 2010; McArdle, 2009). Furthermore, if CMB was

a severe concern in the present article, we would expect to find large and statistically significant correlations among variables, especially for those variables measured concurrently. In our study, a considerable proportion of correlations (see table C3 in the supplementary material) between personality traits and work variables at survey one (time 1) were nonsignificant. If a factor causing common method variance was influential, we would expect it to have caused significant relationships between all these variables. Hence, while an effect of CMB on the magnitude of the estimates can not be ruled out, we believe that the associations between personality and work should not be dismissed as merely a result of CMB.

Although the literature on personality development is growing and increasing attention is being paid to the contribution of work, knowledge pertaining to the role of the psychosocial work environment in trait changes is still scarce. Heeding a recent call for more inductive research within organizational psychology (Spector, 2017), we opted for an exploratory approach which allowed us to investigate a wide range of factors, many of which have not been studied in relation to personality trait change, revealing new and potentially important predictors of trait changes. We do acknowledge that this type of inductive studies will have their caveats. In the current study, the broad spectrum of work factors and traits investigated resulted in a large number of analyses, which may have increased the risk of type I-error. To address this issue, we, therefore, choose to focus on our most robust findings ($p < .001$).

Practical implications

Findings from the current study provide important implications for organizations' role in employees' personality development. Organizations may consider changing employees' working conditions as a form of stretch experience to influence employees' personalities. The (work) environment as a determinant of trait changes should be regarded as particularly interesting as it may be relatively easy to manipulate, at least in comparison to other variables suggested to play a role in trait development, such as genes and neurobiological structures (e.g., McCrae & Costa, 1999).

We found that several aspects of the psychosocial work environment increased levels of Openness. Openness is a known marker for cognitive ability and intellectual curiosity (Chamorro-Premuzic et al., 2007). It has been causally and positively linked to knowledge and skill acquisition (Furnham et al., 2007), job performance (Bing & Lounsbury, 2000), job performance trajectories (Minbashian et al., 2013), and upward job changes (Nieß & Zacher, 2015). People with higher scores on openness also tend to express ideas well (Rauthmann et al., 2014). It is, therefore, not surprising if higher levels of openness are desirable in many work contexts. In order to facilitate personality development, we suggest focusing on environmental changes that also demonstrated other beneficial effects. Prior research suggests that improvements in empowering leadership and job control may have favourable effects such as enhancing motivation, performance, and health and well-being (e.g., Christensen & Knardahl, 2010; Harvey et al., 2017; Kim et al., 2018; Nixon et al., 2011). Training managers towards becoming more empowering and providing subordinates with

more job control (e.g., by providing flexible working hours) may therefore represent a "healthy" pathway towards developing more open employees.

Increases in Openness can also have important implications at the individual level. Given that Openness has been associated with job performance developing higher levels of Openness can be an essential factor for employees in managing their careers, but it may also have additional beneficial health-related effects such as increased physical activity (K. E. Wilson & Dishman, 2015) and general health (Letzring et al., 2014). Although seemingly offering benefits to the individual, having a higher level of Openness and increased demands may come at a cost. Our results suggest that open individuals will generate high levels of certain demands. It could be that some employees may perform better when exposed to challenging demands because challenging goals and expectations may provide employees with a sense of purpose, focus, and direction (Bauwens et al., 2019). However, some authors posit that job demands, although perhaps perceived as positive challenges, can be resource-depleting over time and thereby detrimental to health and well-being (Li et al., 2020; Sonnentag & Frese, 2012). Being mindful of both the benefits and cost of changes in the psychosocial work environment may help organizations make better decisions about how to facilitate personality development in the workplace.

Conclusions

Both task-related and social work characteristics were associated with personality development but no effects were found for the organizational characteristics. Several work factors were found to influence subsequent levels of openness. These findings are in line with previous studies which have demonstrated that openness is a trait reactive to the influences of work exposures and work-related events (e.g., Nieß & Zacher, 2015; Woods et al., 2020; Wu, 2016). Compared with previous research on personality change (cf. Woods et al., 2019), the current study point to the importance of the contribution of leadership for the dynamic relationship between working conditions and personality. Leadership influenced personality change but was also influenced by personality. We have proposed how our findings on leadership and task-related work characteristics can be interrelated, but more knowledge is needed to determine whether leader-level exposures are the driving force behind the observed effects on personalities and task-related work factors. None of the work characteristics in the present study predicted change in neuroticism or extraversion, which may suggest that these traits are less susceptible to the influence of common every-day (not extreme) working conditions measured with scales with a low affective component. However, we have proposed several alternative explanations for our findings and suggestions for future research (e.g., exploring highly adverse social exposures, combinations of work factors, and indirect paths to personality change).

Acknowledgments

The authors would like to thank Anne Lene Andersen Watn, Bjørn Lau, Jan Olav Christensen, Jan Emberland, Margrethe Schøning, Elisabeth Petersen,

and Shahrooz Elka for their participation in the administration of the survey. We would also like to thank the companies that have taken part in the study for their participation.

Information about the study

This study is part of a long-term project called “The New Workplace” carried out by the National Institute of Occupational Health. Information about the project and previous publications: <https://stami.no/prosjekt/den-nye-arbeidsplassen-arbeid-helse-ogdeltakelse-i-arbeidslivet/>

Data availability statement

The data that support the findings of this study are available in anonymous format on request from the corresponding author. The data are not publicly available due to the GDPR and ethical restrictions.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

- Amundsen, S., & Martinsen, Ø. L. (2014). Empowering leadership: Construct clarification, conceptualization, and validation of a new scale. *The Leadership Quarterly*, 25(3), 487–511. <https://doi.org/10.1016/j.leaqua.2013.11.009>
- Arnold, K. A. (2017). Transformational leadership and employee psychological well-being: A review and directions for future research. *Journal of Occupational Health Psychology*, 22(3), 381–393. <https://doi.org/10.1037/ocp0000062>
- Ashford, S. J., Lee, C., & Bobko, P. (1989). Content, cause, and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal*, 32(4), 803–829. <https://doi.org/10.5465/256569>
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285
- Barker, D. H., Rancourt, D., & Jelalian, E. (2013). Flexible models of change: Using structural equations to match statistical and theoretical models of multiple change processes. *Journal of Pediatric Psychology*, 39(2), 233–245. <https://doi.org/10.1093/jpepsy/jst082>
- Barrick, M. R., & Mount, M. K. (2009). Select on conscientiousness and emotional stability. In E. A. Locke (Ed.), *Handbook of principles of organizational behavior* (Vol. 15, pp. 28). John Wiley & Sons, Ltd.
- Barrick, M. R., Stewart, G. L., & Piotrowski, M. (2002). Personality and job performance: Test of the mediating effects of motivation among sales representatives. *Journal of Applied Psychology*, 87(1), 43–51. <https://doi.org/10.1037/0021-9010.87.1.43>
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5(4), 323–370. <https://doi.org/10.1037/1089-2680.5.4.323>
- Bauwens, R., Decramer, A., & Audenaert, M. (2019). Challenged by great expectations? Examining cross-level moderations and curvilinearity in the public sector job demands-resources model. *Review of Public Personnel Administration*, 1–19. <https://doi.org/10.1177/0734371x19884102>
- Beckmann, N., & Wood, R. E. (2017). Editorial: Dynamic personality science. Integrating between-person stability and within-person change. *Frontiers in Psychology*, 8(1486), 1–7. <https://doi.org/10.3389/fpsyg.2017.01486>
- Berg, J. M., Dutton, J. E., & Wrzesniewski, A. (2008). What is job crafting and why does it matter? Retrieved from the website of *Positive Organizational Scholarship on August, 15, 2018*.
- Besen, E., Matz-Costa, C., Brown, M., Smyer, M. A., & Pitt-Catsoupes, M. (2013). Job characteristics, core self-evaluations, and job satisfaction: What's age got to do with it? *The International Journal of Aging and Human Development*, 76(4), 269–295. <https://doi.org/10.2190/AG.76.4.a>
- Bing, M. N., & Lounsbury, J. W. (2000). Openness and job performance in U.S.-based Japanese manufacturing companies. *Journal of Business and Psychology*, 14(3), 515–522. <https://doi.org/10.1023/a:1022940519157>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality*, 86(1), 83–96. <https://doi.org/10.1111/jopy.12286>
- Borghuis, J., Bleidorn, W., Sijtsma, K., Branje, S., Meeus, W. H. J., & Denissen, J. J. A. (2020). Longitudinal associations between trait neuroticism and negative daily experiences in adolescence. *Journal of Personality and Social Psychology*, 118(2), 348–363. <https://doi.org/10.1037/pspp0000233>
- Bowen, C. E., & Kornadt, A. E. (2015). Work context and personality development across adulthood. In N. A. Pachana (Ed.), *Encyclopedia of Geropsychology* (pp. 1–9). Springer Singapore.
- Bowling, N. A., & Jex, S. M. (2013). The role of personality in occupational stress. In N. D. Christiansen & R. P. Tett (Eds.), *Handbook of personality at work* (pp. 692–717). Routledge.
- Bowling, N. A., Beehr, T. A., & Swader, W. M. (2005). Giving and receiving social support at work: The roles of personality and reciprocity. *Journal of Vocational Behavior*, 67(3), 476–489. <https://doi.org/10.1016/j.jvb.2004.08.004>
- Boyce, C. J., Wood, A. M., Daly, M., & Sedikides, C. (2015). Personality change following unemployment. *Journal of Applied Psychology*, 100(4), 991–1011. <https://doi.org/10.1037/a0038647>
- Boyce, C. J., Wood, A. M., Delaney, L., & Ferguson, E. (2017). How do personality and social structures interact with each other to predict important life outcomes? The importance of accounting for personality change. *European Journal of Personality*, 31(3), 279–290. <https://doi.org/10.1002/per.2099>
- Brousseau, K. R., & Prince, J. B. (1981). Job-person dynamics: An extension of longitudinal research. *Journal of Applied Psychology*, 66(1), 59–62. <https://doi.org/10.1037/0021-9010.66.1.59>
- Buunk, B. P., Doosje, B. J., Jans, L. G., & Hopstaken, L. E. (1993). Perceived reciprocity, social support, and stress at work: The role of exchange and communal orientation. *Journal of Personality and Social Psychology*, 65(4), 801–811. <https://doi.org/10.1037/0022-3514.65.4.801>
- Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, 61(1), 679–704. <https://doi.org/10.1146/annurev.psych.093008.100352>
- Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, 56, 453–484. <https://doi.org/10.1146/annurev.psych.55.090902.141913>
- Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. managers. *Journal of Applied Psychology*, 85(1), 65–74. <https://doi.org/10.1037/0021-9010.85.1.65>
- Chamorro-Premuzic, T., Furnham, A., & Lewis, M. (2007). Personality and approaches to learning predict preference for different teaching methods. *Learning and Individual Differences*, 17(3), 241–250. <https://doi.org/10.1016/j.lindif.2006.12.001>
- Chatman, J. A., Wong, E. M., & Joyce, C. K. (2008). When do people make the place?: Considering the interactionist foundations of the attraction-selection-attrition model. In B. Smith (Ed.) *The people make the place: Dynamic linkages between individuals and organizations* (pp. 63–86). Taylor & Francis Group/Lawrence Erlbaum Associates.
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(3), 464–504. <https://doi.org/10.1080/10705510701301834>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Chow, P. I., & Roberts, B. W. (2014). Examining the relationship between changes in personality and changes in depression. *Journal of Research in Personality*, 51, 38–46. <https://doi.org/10.1016/j.jrp.2014.04.007>
- Christensen, J. O., & Knardahl, S. (2010). Work and neck pain: A prospective study of psychological, social, and mechanical risk factors. *Pain*, 151(1), 162–173. <https://doi.org/10.1016/j.pain.2010.07.001>

- Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology*, 93(6), 1080–1107. <https://doi.org/10.1037/0022-3514.93.6.1080>
- Costa, P. T., Jr. (1992). *Revised NEO personality inventory and NEO five-factor inventory*. Professional manual. Psychological Assessment Resources.
- Costa, P. T., Jr, Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment*, 7(4), 365–378. <https://doi.org/10.1177/10731911000700405>
- Costa, P. T., Jr, & McCrae, R. R. (1988). From catalog to classification: Murray's needs and the five-factor model. *Journal of Personality and Social Psychology*, 55(2), 258–265. <https://doi.org/10.1037/0022-3514.55.2.258>
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology*, 95(5), 834–848. <https://doi.org/10.1037/a0019364>
- Dallner, M., Elo, A.-L., Gamberale, F., Hottinen, V., Knardahl, S., Lindström, K., ... Ørnhede, E. (2000). *Validation of the General Nordic Questionnaire (QPSNordic) for psychological and social factors at work*: Nordic Council of Ministers [Nordiska ministerrådet].
- De Lange, A. H., Taris, T. W., Kompier, M. A. J., Houtman, I. L. D., & Bongers, P. M. (2005). Different mechanisms to explain the reversed effects of mental health on work characteristics. *Scandinavian Journal of Work, Environment & Health*, 31(1), 3–14. <https://doi.org/10.5271/sjweh.843>
- Deng, L., & Chan, W. (2017). Testing the difference between reliability coefficients alpha and omega. *Educational and Psychological Measurement*, 77(2), 185–203. <https://doi.org/10.1177/0013164416658325>
- Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The mini-IPIP scales: Tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment*, 18(2), 192–203. <https://doi.org/10.1037/1040-3590.18.2.192>
- Dubbelt, L., Rispens, S., & Demerouti, E. (2016). Gender discrimination and job characteristics. *Career Development International*, 21(3), 230–245. <https://doi.org/10.1108/CDI-10-2015-0136>
- Ferguson, E., & Lievens, F. (2017). Future directions in personality, occupational and medical selection: Myths, misunderstandings, measurement, and suggestions. *Advances in Health Sciences Education*, 22(2), 387–399. <https://doi.org/10.1007/s10459-016-9751-0>
- Ferrer, E., & McArdle, J. J. (2010). Longitudinal modeling of developmental changes in psychological research. *Current Directions in Psychological Science*, 19(3), 149–154. <https://doi.org/10.1177/0963721410370300>
- Finne, L. B., Christensen, J. O., & Knardahl, S. (2014). Psychological and social work factors as predictors of mental distress: A prospective study. *PLoS ONE*, 9(7), e102514. <https://doi.org/10.1371/journal.pone.0102514>
- Finne, L. B., Christensen, J. O., & Knardahl, S. (2016). Psychological and social work factors as predictors of mental distress and positive affect: A Prospective, multilevel study. *Plos One*, 11(3), e0152220. <https://doi.org/10.1371/journal.pone.0152220>
- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*, 21(3), 219–239. <https://doi.org/10.2307/2136617>
- Frese, M., & Zapf, D. (1999). On the importance of the objective environment in stress and attribution theory. Counterpoint to Perrewé and Zellars. *Journal of Organizational Behavior*, 20(5), 761–765. [https://doi.org/10.1002/\(SICI\)1099-1379\(199909\)20:5<761::AID-JOB951>3.0.CO;2-Y](https://doi.org/10.1002/(SICI)1099-1379(199909)20:5<761::AID-JOB951>3.0.CO;2-Y)
- Fried, Y., & Ferris, G. R. (1987). The validity of job characteristics model: A review and meta-analysis. *Personnel Psychology*, 40(2), 287–322. <https://doi.org/10.1111/j.1744-6570.1987.tb00605.x>
- Furnham, A., Christopher, A. N., Garwood, J., & Neil Martin, G. (2007). Approaches to learning and the acquisition of general knowledge. *Personality and Individual Differences*, 43(6), 1563–1571. <https://doi.org/10.1016/j.paid.2007.04.013>
- Gleason, M. E. J., Iida, M., Bolger, N., & Shrout, P. E. (2003). Daily supportive equity in close relationships. *Personality and Social Psychology Bulletin*, 29(8), 1036–1045. <https://doi.org/10.1177/0146167203253473>
- Gleason, M. E. J., Iida, M., Shrout, P. E., & Bolger, N. (2008). Receiving support as a mixed blessing: Evidence for dual effects of support on psychological outcomes. *Journal of Personality and Social Psychology*, 94(5), 824–838. <https://doi.org/10.1037/0022-3514.94.5.824>
- Goldberg, L. R. (1990). An alternative “description of personality”: The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59(6), 1216–1229. <https://doi.org/10.1037/0022-3514.59.6.1216>
- Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, 4(1), 26–42. <https://doi.org/10.1037/1040-3590.4.1.26>
- Grant, S., & Langan-Fox, J. (2007). Personality and the occupational stressor-strain relationship: The role of the Big Five. *Journal of Occupational Health Psychology*, 12(1), 20–33. <https://doi.org/10.1037/1076-8998.12.1.20>
- Greifeneder, R., Bless, H., & Pham, M. T. (2011). When do people rely on affective and cognitive feelings in judgment? A review. *Personality and Social Psychology Review*, 15(2), 107–141. <https://doi.org/10.1177/1088868310367640>
- Hackman, J. R., & Lawler, E. E. (1971). Employee reactions to job characteristics. *Journal of Applied Psychology*, 55(3), 259–286. <https://doi.org/10.1037/h0031152>
- Hakulinen, C., Elovainio, M., Pulkki-Råback, L., Virtanen, M., Kivimäki, M., & Jokela, M. (2015). Personality and depressive symptoms: Individual participant meta-analysis of 10 cohort studies. *Depression and Anxiety*, 32(7), 461–470. <https://doi.org/10.1002/da.22376>
- Harms, P. D., Roberts, B. W., & Winter, D. (2006). Becoming the Harvard man: Person-environment fit, personality development, and academic success. *Personality and Social Psychology Bulletin*, 32(7), 851–865. <https://doi.org/10.1177/0146167206287720>
- Harvey, S. B., Modini, M., Joyce, S., Milligan-Saville, J. S., Tan, L., Mykletun, A., ... Mitchell, P. B. (2017). Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occupational and Environmental Medicine*, 74(4), 301–310. <https://doi.org/10.1136/oemed-2016-104015>
- Hinojosa, A. S., Gardner, W. L., Walker, H. J., Coglisier, C., & Gullifor, D. (2017). A review of cognitive dissonance theory in management research: Opportunities for further development. *Journal of Management*, 43(1), 170–199. <https://doi.org/10.1177/0149206316668236>
- Hopwood, C. J., & Donnellan, M. B. (2010). How should the internal structure of personality inventories be evaluated? *Personality and Social Psychology Review*, 14(3), 332–346. <https://doi.org/10.1177/1088868310361240>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Hudson, N. W., & Roberts, B. W. (2016). Social investment in work reliably predicts change in conscientiousness and agreeableness: A direct replication and extension of Hudson, Roberts, and Lodi-Smith (2012). *Journal of Research in Personality*, 60, 12–23. <https://doi.org/10.1016/j.jrp.2015.09.004>
- Hudson, N. W., Roberts, B. W., & Lodi-Smith, J. (2012). Personality trait development and social investment in work. *Journal of Research in Personality*, 46(3), 334–344. <https://doi.org/10.1016/j.jrp.2012.03.002>
- Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology*, 92(5), 1332–1356. <https://doi.org/10.1037/0021-9010.92.5.1332>
- Hutteman, R., Hennecke, M., Orth, U., Reitz, A. K., & Specht, J. (2014). Developmental tasks as a framework to study personality development in adulthood and old age. *European Journal of Personality*, 28(3), 267–278. <https://doi.org/10.1002/per.1959>
- Jackson, J. J., & Allemand, M. (2014). Moving personality development research forward: Applications using structural equation models. *European Journal of Personality*, 28(3), 300–310. <https://doi.org/10.1002/per.1964>
- Jackson, J. J., Thoemmes, F., Jonkmann, K., Lüdtke, O., & Trautwein, U. (2012). Military training and personality trait development: Does the military make the man, or does the man make the military? *Psychological Science*, 23(3), 270–277. <https://doi.org/10.1177/0956797611423545>
- Johannessen, H. A., Tynes, T., & Sterud, T. (2013). Effects of occupational role conflict and emotional demands on subsequent psychological distress:

- A 3-year follow-up study of the general working population in Norway. *Journal of Occupational and Environmental Medicine*, 55(6), 605–613. <https://doi.org/10.1097/JOM.0b013e3182917899>
- John, O. P., & Soto, C. J. (2007). The importance of being valid. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 461–494). Guildford.
- Judge, T. A., & Zapata, C. P. (2014). The person–situation debate revisited: Effect of situation strength and trait activation on the validity of the Big Five personality traits in predicting job performance. *Academy of Management Journal*, 58(4), 1149–1179. <https://doi.org/10.5465/ambj.2010.0837>
- Judge, T. A., & Zapata, C. P. (2015). The person–situation debate revisited: Effect of situation strength and trait activation on the validity of the Big Five personality traits in predicting job performance. *Academy of Management Journal*, 58(4), 1149–1179. <https://doi.org/10.5465/ambj.2010.0837>
- Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24(2), 285–308. <https://doi.org/10.2307/2392498>
- Kim, M., Beehr, T. A., & Prewett, M. S. (2018). Employee responses to empowering leadership: A meta-analysis. *Journal of Leadership & Organizational Studies*, 25(3), 257–276. <https://doi.org/10.1177/1548051817750538>
- Kline, R. B. (2012). Assumptions in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 111–125). Guilford Publications.
- Kurtessis, J. N., Eisenberger, R., Ford, M. T., Buffardi, L. C., Stewart, K. A., & Adis, C. S. (2017). Perceived organizational support: A meta-analytic evaluation of organizational support theory. *Journal of Management*, 43(6), 1–31. <https://doi.org/10.1177/0149206315575554>
- Lau, B., & Knardahl, S. (2008). Perceived job insecurity, job predictability, personality, and health. *Journal of Occupational and Environmental Medicine*, 50(2), 172–181. <https://doi.org/10.1097/JOM.0b013e31815c89a1>
- Le, K., Donnellan, M. B., & Conger, R. (2014). Personality development at work: Workplace conditions, personality changes, and the corresponsive principle. *Journal of Personality*, 82(1), 44–56. <https://doi.org/10.1111/jopy.12032>
- Leach, D. J., Wall, T. D., & Jackson, P. R. (2003). The effect of empowerment on job knowledge: An empirical test involving operators of complex technology. *Journal of Occupational and Organizational Psychology*, 76(1), 27–52. <https://doi.org/10.1348/096317903321208871>
- Lee, A., Willis, S., & Tian, A. W. (2018). Empowering leadership: A meta-analytic examination of incremental contribution, mediation, and moderation. *Journal of Organizational Behavior*, 39(3), 306–325. <https://doi.org/10.1002/job.2220>
- Letzring, T. D., Edmonds, G. W., & Hampson, S. E. (2014). Personality change at mid-life is associated with changes in self-rated health: Evidence from the Hawaii personality and health cohort. *Personality and Individual Differences*, 58, 60–64. <https://doi.org/10.1016/j.paid.2013.10.002>
- Li, W.-D., Fay, D., Frese, M., Harms, P. D., & Gao, X. Y. (2014). Reciprocal relationship between proactive personality and work characteristics: A latent change score approach. *Journal of Applied Psychology*, 99(5), 948–965. <https://doi.org/10.1037/a0036169>
- Li, W.-D., Li, S., Feng, J., Wang, M., Zhang, H., Frese, M., & Wu, C.-H. (2020). Can becoming a leader change your personality? An investigation with two longitudinal studies from a role-based perspective. *Journal of Applied Psychology*, 1–20. Advanced online publication. <https://doi.org/10.1037/apl0000808>
- Li, W.-D., Schaubroeck, J. M., Xie, J. L., & Keller, A. C. (2018). Is being a leader a mixed blessing? A dual-pathway model linking leadership role occupancy to well-being. *Journal of Organizational Behavior*, 39(8), 971–989. <https://doi.org/10.1002/job.2273>
- Littlefield, A. K., Sher, K. J., & Wood, P. K. (2009). Is “maturing out” of problematic alcohol involvement related to personality change? *Journal of Abnormal Psychology*, 118(2), 360–374. <https://doi.org/10.1037/a0015125>
- Liu, Y., Mo, S., Song, Y., & Wang, M. (2016). Longitudinal analysis in occupational health psychology: A review and tutorial of three longitudinal modeling techniques. *Applied Psychology*, 65(2), 379–411. <https://doi.org/10.1111/apps.12055>
- Löckenhoff, C. E., Terracciano, A., & Costa, P. T., Jr. (2009). Five-factor model personality traits and the retirement transition: Longitudinal and cross-sectional associations. *Psychology and Aging*, 24(3), 722–728. <https://doi.org/10.1037/a0015121>
- Lopes, P. N., Salovey, P., & Straus, R. (2003). Emotional intelligence, personality, and the perceived quality of social relationships. *Personality and Individual Differences*, 35(3), 641–658. [https://doi.org/10.1016/S0191-8869\(02\)00242-8](https://doi.org/10.1016/S0191-8869(02)00242-8)
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1(2), 130–149. <https://doi.org/10.1037/1082-989X.1.2.130>
- Madsen, I. E. H., Nyberg, S. T., Magnusson Hanson, L. L., Ferrie, J. E., Ahola, K., Alfredsson, L., . . . Kivimäki, M. (2017). Job strain as a risk factor for clinical depression: Systematic review and meta-analysis with additional individual participant data. *Psychological Medicine*, 47(8), 1342–1356. <https://doi.org/10.1017/S003329171600355X>
- Mazzola, J. J., & Disselhorst, R. (2019). Should we be “challenging” employees?: A critical review and meta-analysis of the challenge-hindrance model of stress. *Journal of Organizational Behavior*, 40(8), 949–961. <https://doi.org/10.1002/job.2412>
- McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology*, 60(1), 577–605. <https://doi.org/10.1146/annurev.psych.60.110707.163612>
- McArdle, J. J., & Hamagami, F. (2001). Latent difference score structural models for linear dynamic analyses with incomplete longitudinal data. In L.M. Collins & A. G. Sayer (Eds.), *Decades of behaviour. New methods for the analysis of change* (pp. 139–175). American Psychological Association.
- McCrae, R. R. (1990). Traits and trait names: How well is openness represented in natural languages? *European Journal of Personality*, 4(2), 119–129. <https://doi.org/10.1002/per.2410040205>
- McCrae, R. R., & Costa, P. T., Jr. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 139–153). Guilford Press.
- McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, 60(2), 175–215. <https://doi.org/10.1111/j.1467-6494.1992.tb00970.x>
- McCrae, R. R., Kurtz, J. E., Yamagata, S., & Terracciano, A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personality and Social Psychology Review*, 15(1), 28–50. <https://doi.org/10.1177/1088868310366253>
- Meier, L. L., & Spector, P. E. (2013). Reciprocal effects of work stressors and counterproductive work behavior: A five-wave longitudinal study. *Journal of Applied Psychology*, 98(3), 529–539. <https://doi.org/10.1037/a0031732>
- Michel, J. S., Clark, M. A., & Jaramillo, D. (2011). The role of the Five Factor Model of personality in the perceptions of negative and positive forms of work–nonwork spillover: A meta-analytic review. *Journal of Vocational Behavior*, 79(1), 191–203. <https://doi.org/10.1016/j.jvb.2010.12.010>
- Minbashian, A., Earl, J., & Bright, J. E. H. (2013). Openness to experience as a predictor of job performance trajectories. *Applied Psychology*, 62(1), 1–12. <https://doi.org/10.1111/j.1464-0597.2012.00490.x>
- Morgeson, F. P., & Campion, M. A. (2003). Work design. In N. Schmitt & S. Highhouse (Eds.), *Handbook of psychology: Industrial and organizational psychology* (Vol. 12, pp. 525–559). Wiley.
- Mortimer, J. T., & Lorence, J. (1979). Occupational experience and the self-concept: A longitudinal study. *Social Psychology Quarterly*, 42(4), 307–323. <https://doi.org/10.2307/3033802>
- Mroczek, D. K., & Spiro, A. (2007). Personality change influences mortality in older men. *Psychological Science*, 18(5), 371–376. <https://doi.org/10.1111/j.1467-9280.2007.01907.x>
- Muecke, S., & Iseke, A. (2019). How does job autonomy influence job performance? A meta-analytic test of theoretical mechanisms. *Academy of Management Proceedings*, (2019(1), 14632. <https://doi.org/10.5465/ambpp.2019.145>

- Mund, M., & Neyer, F. J. (2014). Treating personality-relationship transactions with respect: Narrow facets, advanced models, and extended time frames. *Journal of Personality and Social Psychology*, 107(2), 352–368. <https://doi.org/10.1037/a0036719>
- Muthén, L., & Muthén, B. (1998–2017). *Mplus* (Vol. 5, Eighth ed.). Muthén & Muthén.
- Nieß, C., & Zacher, H. (2015). Openness to experience as a predictor and outcome of upward job changes into managerial and professional positions. *Plos One*, 10(6), e0131115. <https://doi.org/10.1371/journal.pone.0131115>
- Nielsen, K., & Taris, T. W. (2019). Leading well: Challenges to researching leadership in occupational health psychology—And some ways forward. *Work & Stress*, 33(2), 107–118. <https://doi.org/10.1080/02678373.2019.1592263>
- Nielsen, M. B., Rosander, M., Blomberg, S., & Einarsen, S. V. (2020). Killing two birds with one stone: How intervening when witnessing bullying at the workplace may help both target and the acting observer. *International Archives of Occupational and Environmental Health*, 94 (2), 261–273. <https://doi.org/10.1007/s00420-020-01575-w>
- Nixon, A. E., Mazzola, J. J., Bauer, J., Krueger, J. R., & Spector, P. E. (2011). Can work make you sick? A meta-analysis of the relationships between job stressors and physical symptoms. *Work & Stress*, 25(1), 1–22. <https://doi.org/10.1080/02678373.2011.569175>
- Norris, C. J., Leaf, P. T., & Fenn, K. M. (2019). Negativity bias in false memory: Moderation by neuroticism after a delay. *Cognition and Emotion*, 33(4), 737–753. <https://doi.org/10.1080/02699931.2018.1496068>
- Nye, C. D., & Roberts, B. W. (2013). A developmental perspective on the importance of personality for understanding workplace behavior. In N. D. Christiansen & R. P. Tett (Eds.), *Handbook of personality at work* (pp. 796–818). Routledge.
- O'Brien, K. E., & Beehr, T. A. (2019). So far, so good: Up to now, the challenge–hindrance framework describes a practical and accurate distinction. *Journal of Organizational Behavior*, 40(8), 962–972. <https://doi.org/10.1002/job.2405>
- Oldham, G. R., & Fried, Y. (2016). Job design research and theory: Past, present and future. *Organizational Behavior and Human Decision Processes*, 136, 20–35. <https://doi.org/10.1016/j.obhdp.2016.05.002>
- Ones, D. S., Dilchert, S., Viswesvaran, C., & Judge, T. A. (2007). In support of personality assessment in organizational settings. *Personnel Psychology*, 60(4), 995–1027. <https://doi.org/10.1111/j.1744-6570.2007.00099.x>
- Ørhede, E., Hottinen, V., Skogstad, A., Knardahl, S., Elo, A.-L., Dallner, M., & Gamberale, F. (2000). *User's guide for the QPSNordic: General Nordic questionnaire for psychological and social factors at work*: Nordic Council of Ministers.
- Ozier, E. M., Taylor, V. J., & Murphy, M. C. (2019). The cognitive effects of experiencing and observing subtle racial discrimination. *Journal of Social Issues*, 75(4), 1087–1115. <https://doi.org/10.1111/josi.12349>
- Parker, S. K., Andrei, D., & Li, W.-D. (2014). An overdue overhaul: Revamping work design theory from a time perspective. In A. J. Shipp & Y. Fried (Eds.), *Time and work* (Vol. 1, pp. 201–238). Psychology Press.
- Parker, S. K., Van Den Broeck, A., & Holman, D. (2017). Work design influences: A synthesis of multilevel factors that affect the design of jobs. *Academy of Management Annals*, 11(1), 267–308. <https://doi.org/10.5465/annals.2014.0054>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88 (5), 879. <https://doi.org/10.1037/0021-9010.88.5.879>
- Raja, U., & Johns, G. (2010). The joint effects of personality and job scope on in-role performance, citizenship behaviors, and creativity. *Human Relations*, 63(7), 981–1005. <https://doi.org/10.1177/0018726709349863>
- Rauthmann, J. F., Gallardo-Pujol, D., Guillaume, E. M., Todd, E., Nave, C. S., Sherman, R. A., ... Funder, D. C. (2014). The situational eight DIAMONDS: A taxonomy of major dimensions of situation characteristics. *Journal of Personality and Social Psychology*, 107(4), 677–718. <https://doi.org/10.1037/a0037250>
- Rhoades, L., & Eisenberger, R. (2002). Perceived organizational support: A review of the literature. *Journal of Applied Psychology*, 87(4), 698–714. <https://doi.org/10.1037/0021-9010.87.4.698>
- Roberts, B. W., & Nickel, L. B. (2017). A critical evaluation of the neo-socioanalytic model of personality. In J. Specht (Ed.), *Personality development across the lifespan* (pp. 157–177). Academic Press.
- Roberts, B. W., Caspi, A., & Moffitt, T. E. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology*, 84(3), 582–593. <https://doi.org/10.1037/0022-3514.84.3.582>
- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35. <https://doi.org/10.1111/j.1467-8721.2008.00543.x>
- Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In *Handbook of personality: Theory and research* (3 ed ed., pp. 375–398). The Guilford Press.
- Roczniewska, M., & Bakker, A. B. (2016). Who seeks job resources, and who avoids job demands? The link between dark personality traits and job crafting. *The Journal of Psychology*, 150(8), 1026–1045. <https://doi.org/10.1080/00223980.2016.1235537>
- Rogosa, D. (1980). A critique of cross-lagged correlation. *Psychological Bulletin*, 88(2), 245–258. <https://doi.org/10.1037/0033-2909.88.2.245>
- Rubenstein, A. L., Zhang, Y., Ma, K., Morrison, H. M., & Jorgensen, D. F. (2019). Trait expression through perceived job characteristics: A meta-analytic path model linking personality and job attitudes. *Journal of Vocational Behavior*, 112, 141–157. <https://doi.org/10.1016/j.jvb.2019.02.002>
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, 5(6), 359–371. <https://doi.org/10.1111/j.1751-9004.2011.00355.x>
- Rudolph, C. W., Katz, I. M., Lavigne, K. N., & Zacher, H. (2017). Job crafting: A meta-analysis of relationships with individual differences, job characteristics, and work outcomes. *Journal of Vocational Behavior*, 102, 112–138. <https://doi.org/10.1016/j.jvb.2017.05.008>
- Sacco, W. P., Dumont, C. P., & Dow, M. G. (1993). Attributional, perceptual, and affective responses to depressed and nondepressed marital partners. *Journal of Consulting and Clinical Psychology*, 61(6), 1076–1082. <https://doi.org/10.1037/0022-006X.61.6.1076>
- Salancik, G. R., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23(2), 224–253. <https://doi.org/10.2307/2392563>
- Schmidt, S., Roesler, U., Kusserow, T., & Rau, R. (2014). Uncertainty in the workplace: Examining role ambiguity and role conflict, and their link to depression—a meta-analysis. *European Journal of Work and Organizational Psychology*, 23(1), 91–106. <https://doi.org/10.1080/1359432X.2012.711523>
- Schumacker, R. E., & Lomax, R. G. (2010). *A beginners guide to structural equation modelling* (3 ed.). Routledge.
- Schwaba, T., & Bleidorn, W. (2018). Personality trait development across the transition to retirement. *Journal of Personality and Social Psychology*, 116 (4), 651–665. <https://doi.org/10.1037/pspp0000179>
- Scollon, C. N., & Diener, E. (2006). Love, work, and changes in extraversion and neuroticism over time. *Journal of Personality and Social Psychology*, 91(6), 1152–1165. <https://doi.org/10.1037/0022-3514.91.6.1152>
- Selig, J. P., & Preacher, K. J. (2009). Mediation models for longitudinal data in developmental research. *Research in Human Development*, 6(2–3), 144–164. <https://doi.org/10.1080/15427600902911247>
- Semmer, N. K. (2003). Individual differences, work stress and health. In M. Schrabracq, J. Winnubst, & C. Cooper (Eds.), *Handbook of work and health psychology* (Vol. 2, pp. 83–120). John Wiley & Sons Ltd.
- Shi, J., Lin, H., Wang, L., & Wang, M. (2009). Linking the Big Five personality constructs to organizational justice. *Social Behavior and Personality: An International Journal*, 37(2), 209–222. <https://doi.org/10.2224/sbp.2009.37.2.209>
- Sims Randi, L., & Sun, P. (2012). Witnessing workplace bullying and the Chinese manufacturing employee. *Journal of Managerial Psychology*, 27 (1), 9–26. <https://doi.org/10.1108/02683941211193839>
- Sonnentag, S., & Frese, M. (2012). Stress in organizations. In N. Schmitt & S. Highhouse (Eds.), *Handbook of Psychology* (Vol. 12, 2 ed., pp. 560–592). Wiley.
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal*

- of *Personality and Social Psychology*, 101(4), 862–882. <https://doi.org/10.1037/a0024950>
- Spector, P. E. (1992). A consideration of the validity and meaning of self-report measures of job conditions. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 7, pp. 123–151). Wiley.
- Spector, P. E. (2017). The lost art of discovery: The case for inductive methods in occupational health science and the broader organizational sciences. *Occupational Health Science*, 1(1), 11–27. <https://doi.org/10.1007/s41542-017-0001-5>
- Spector, P. E., Zapf, D., Chen, P. Y., & Frese, M. (2000). Why negative affectivity should not be controlled in job stress research: Don't throw out the baby with the bath water. *Journal of Organizational Behavior*, 21(1), 79–95. [https://doi.org/10.1002/\(SICI\)1099-1379\(200002\)21:1<79::AID-JOB964>3.0.CO;2-G](https://doi.org/10.1002/(SICI)1099-1379(200002)21:1<79::AID-JOB964>3.0.CO;2-G)
- Sprigg, C. A., Niven, K., Dawson, J., Farley, S., & Armitage, C. J. (2019). Witnessing workplace bullying and employee well-being: A two-wave field study. *Journal of Occupational Health Psychology*, 24(2), 286–296. <https://doi.org/10.1037/ocp0000137>
- Suliman, N., & Einat, T. (2018). Does work stress change personalities? Working in prison as a personality-changing factor among correctional officers. *Criminal Justice and Behavior*, 45(5), 628–643. <https://doi.org/10.1177/0093854818758141>
- Sutin, A. R., & Costa, P. T. (2010). Reciprocal influences of personality and job characteristics across middle adulthood. *Journal of Personality*, 78(1), 257–288. <https://doi.org/10.1111/j.1467-6494.2009.00615.x>
- Sutin, A. R., Stephan, Y., & Terracciano, A. (2016). Perceived discrimination and personality development in adulthood. *Developmental Psychology*, 52(1), 155–163. <https://doi.org/10.1037/dev0000069>
- Takahashi, Y., Edmonds, G. W., Jackson, J. J., & Roberts, B. W. (2013). Longitudinal correlated changes in conscientiousness, preventative health-related behaviors, and self-perceived physical health. *Journal of Personality*, 81(4), 417–427. <https://doi.org/10.1111/jopy.12007>
- Tasselli, S., Kilduff, M., & Landis, B. (2018). Personality change: Implications for organizational behavior. *Academy of Management Annals*, 12(2), 467–493. <https://doi.org/10.5465/annals.2016.0008>
- Teo, T., & Fan, X. (2013). Coefficient alpha and beyond: Issues and alternatives for educational research. *The Asia-Pacific Education Researcher*, 22(2), 209–213. <https://doi.org/10.1007/s40299-013-0075-z>
- The National Institute of Occupational Health in Norway. (2018). *Faktaboka om arbeidsmiljø og helse*. Oslo: stami.no
- Thoresen, C. J., Kaplan, S. A., Barsky, A. P., Warren, C. R., & De Chermont, K. (2003). The affective underpinnings of job perceptions and attitudes: A meta-analytic review and integration. *Psychological Bulletin*, 129(6), 914–945. <https://doi.org/10.1037/0033-2909.129.6.914>
- Toker, S., & Biron, M. (2012). Job burnout and depression: Unraveling their temporal relationship and considering the role of physical activity. *Journal of Applied Psychology*, 97(3), 699–710. <https://doi.org/10.1037/a0026914>
- Truxillo, D. M., Bauer, T. N., Campion, M. A., & Paronto, M. E. (2006). A field study of the role of Big Five personality in applicant perceptions of selection fairness, self, and the hiring organization. *International Journal of Selection and Assessment*, 14(3), 269–277. <https://doi.org/10.1111/j.1468-2389.2006.00351.x>
- Turnbull, A. A. (1976). Selling and the salesman: Prediction of success and personality change. *Psychological Reports*, 38(3), 1175–1180. <https://doi.org/10.2466/pr0.1976.38.3c.1175>
- Uehara, E. S. (1995). Reciprocity reconsidered: Gouldner's 'moral norm of reciprocity' and social support. *Journal of Social and Personal Relationships*, 12(4), 483–502. <https://doi.org/10.1177/0265407595124001>
- Vantillborgh, T., Hofmans, J., & Judge, T. A. (2018). The time has come to study dynamics at work. *Journal of Organizational Behavior*, 39(9), 1045–1049. <https://doi.org/10.1002/job.2327>
- Vezzali, L., Turner, R., Capozza, D., & Trifiletti, E. (2018). Does intergroup contact affect personality? A longitudinal study on the bidirectional relationship between intergroup contact and personality traits. *European Journal of Social Psychology*, 48(2), 159–173. <https://doi.org/10.1002/ejsp.2313>
- Viswesvaran, C., & Ones, D. S. (2004). Importance of perceived personnel selection system fairness determinants: Relations with demographic, personality, and job characteristics. *International Journal of Selection and Assessment*, 12(1–2), 172–186. <https://doi.org/10.1111/j.0965-075X.2004.00272.x>
- Wang, H., Li, P., & Chen, S. (2020). The impact of social factors on job crafting: A meta-analysis and review. *International Journal of Environmental Research and Public Health*, 17(21), 8016. <https://doi.org/10.3390/ijerph17218016>
- Wang, M., Zhou, L., & Zhang, Z. (2016). Dynamic modeling. *Annual Review of Organizational Psychology and Organizational Behavior*, 3(1), 241–266. <https://doi.org/10.1146/annurev-orgpsych-041015-062553>
- Wille, B., & De Fruyt, F. (2014). Vocations as a source of identity: Reciprocal relations between Big Five personality traits and RIASEC characteristics over 15 years. *Journal of Applied Psychology*, 99(2), 262–281. <https://doi.org/10.1037/a0034917>
- Wille, B., De Fruyt, F., & Feys, M. (2010). Vocational interests and Big Five traits as predictors of job instability. *Journal of Vocational Behavior*, 76(3), 547–558. <https://doi.org/10.1016/j.jvb.2010.01.007>
- Wilmot, M. P., Wanberg, C. R., Kammeyer-Mueller, J. D., & Ones, D. S. (2019). Extraversion advantages at work: A quantitative review and synthesis of the meta-analytic evidence. *Journal of Applied Psychology*, 104(12), 1447–1470. <https://doi.org/10.1037/apl0000415>
- Wilson, K. E., & Dishman, R. K. (2015). Personality and physical activity: A systematic review and meta-analysis. *Personality and Individual Differences*, 72, 230–242. <https://doi.org/10.1016/j.paid.2014.08.023>
- Wilson, R. E., Thompson, R. J., & Vazire, S. (2017). Are fluctuations in personality states more than fluctuations in affect? *Journal of Research in Personality*, 69, 110–123. <https://doi.org/10.1016/j.jrp.2016.06.006>
- Windeler, J. B., Maruping, L., & Venkatesh, V. (2017). Technical systems development risk factors: The role of empowering leadership in lowering developers' stress. *Information Systems Research*, 28(4), 775–796. <https://doi.org/10.1287/isre.2017.0716>
- Woods, S. A., Edmonds, G. W., Hampson, S. E., & Lievens, F. (2020). How our work influences who we are: Testing a theory of vocational and personality development over fifty years. *Journal of Research in Personality*, 85, 103930. <https://doi.org/10.1016/j.jrp.2020.103930>
- Woods, S. A., Lievens, F., De Fruyt, F., & Wille, B. (2013). Personality across working life: The longitudinal and reciprocal influences of personality on work. *Journal of Organizational Behavior*, 34(S1), S7–S25. <https://doi.org/10.1002/job.1863>
- Woods, S. A., Wille, B., Wu, C.-H., Lievens, F., & De Fruyt, F. (2019). The influence of work on personality trait development: The demands-affordances transactional (DATA) model, an integrative review, and research agenda. *Journal of Vocational Behavior*, 110 (part B), 258–271. <https://doi.org/10.1016/j.jvb.2018.11.010>
- Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26(2), 179–201. <https://doi.org/10.5465/amr.2001.4378011>
- Wrzus, C., & Roberts, B. W. (2017). Processes of personality development in adulthood: The TESSERA framework. *Personality and Social Psychology Review*, 21(3), 253–277. <https://doi.org/10.1177/1088868316652279>
- Wu, C.-H. (2016). Personality change via work: A job demand–control model of Big-five personality changes. *Journal of Vocational Behavior*, 92, 157–166. <https://doi.org/10.1016/j.jvb.2015.12.001>
- Wu, C.-H., Wang, Y., Parker, S. K., & Griffin, M. A. (2020). Effects of chronic job insecurity on Big Five personality change. *Journal of Applied Psychology*, 105(11), 1308–1326. <https://doi.org/10.1037/apl0000488>
- Zacher, H., & Rudolph, C. W. (2020). How a dynamic way of thinking can challenge existing knowledge in organizational behavior. In Y. Griep & S. D. Hansen (Eds.), *Handbook on the temporal dynamics of organizational behavior* (Vol. 1, pp. 8–25). Edward Elgar Publishing Limited.