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Reciprocal Relationship Between Proactive Personality and Work Characteristics: A Latent Change Score Approach

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Abstract
Previous proactivity research has predominantly assumed that proactive personality generates positive environmental changes in the workplace. Grounded in recent research on personality development from a broad interactionist theoretical approach, the present article investigates whether work characteristics, including job demands, job control, social support from supervisors and coworkers, and organizational constraints, change proactive personality over time and, more important, reciprocal relationships between proactive personality and work characteristics. Latent change score analyses based on longitudinal data collected in 3 waves across 3 years show that job demands and job control have positive lagged effects on increases in proactive personality. In addition, proactive personality exerts beneficial lagged effects on increases in job demands, job control, and supervisory support, and on decreases in organizational constraints. Dynamic reciprocal relationships are observed between proactive personality with job demands and job control. The revealed corresponsive change relationships between proactive personality and work characteristics contribute to the proactive personality literature by illuminating more nuanced interplays between the agentic person and work characteristics, and also have important practical implications for organizations and employees.

Keywords: proactive personality, personality change, work characteristics, dynamic reciprocal relationship, latent change score

> In these agentic transactions, people are producers as well as products of social systems. (Bandura, 2001, p. 1)

With increasing uncertainty and interdependence in today's organizations, employee proactivity is becoming a critical determinant for organizational performance (Crant, 2000; Grant & Ashford, 2008; Griffin, Neal, & Parker, 2007). Researchers have thus devoted much attention to proactive personality, a "relatively stable tendency" characterized by forecasting future changes, planning, and perseverance (Bateman & Crant, 1993, p. 103). Indeed, three meta-analyses have demonstrated that proactive personality is a unique personality construct related to favorable work characteristics such as job control and social support (Fuller & Marler, 2009; Thomas, Whitman, & Viswesvaran, 2010; Tornau & Frese, 2013).

Although Bateman and Crant (1993) initially defined proactive personality as a dispositional construct, they grounded

their study in a broad interactionist perspective[1] (e.g., Bandura, 1977; Schneider, 1983) and acknowledged that their work "does not longitudinally explore the development of the proactivity disposition or reciprocal causality among the person, behavior, and environment" (p. 115). Nevertheless, their propositions that work characteristics may foster the *development* of proactive personality and that a reciprocal relationship may occur between proactive personality and work attributes have so far not yet been examined.

To date, extant research has predominantly focused on one side of the proposed reciprocal relationship, that is, on how proactive personality impacts work characteristics, but not vice versa. Furthermore, recent meta-analyses (Fuller & Marler, 2009; Tornau & Frese, 2013) show that most studies have provided only cross-sectional tests of the relationship and have rarely examined proactive personality's capacity to alter people's work, a core characteristic of being proactive. (See Seibert, Kraimer, & Crant, 2001, for a notable exception.)

To our knowledge, research has yet to examine the other side of the reciprocal relationship: the effect of work attributes on proactive personality development. One possible reason is that much organizational research still perceives adult personality as "fixed" (e.g., Fugate, Prussia, & Kinicki, 2012, p. 894) and "not easily open to development and change" (e.g., Luthans, Avolio, Walumbwa, & Li, 2005, p. 251). Personality psychologists, however, increasingly recognize that personality is only *moderately* consistent over time and is also moderately *malleable* at adulthood (Baltes, 1997; Caspi, Roberts, & Shiner, 2005; Scollon & Diener, 2006; Terracciano, McCrae, Brant, & Costa, 2005). Accumulating evidence documents that work attributes play a pivotal role in shaping personality changes (e.g., Kohn & Schooler, 1982; Roberts, Caspi, & Moffitt, 2003; Sutin & Costa, 2010). Yet, whether work attributes can modify proactive personality remains unresolved. Addressing this issue contributes to the literature of proactive personality and offers important implications for work design research.

The aim of the present study is threefold. Drawing on the literature on personality development (e.g., Caspi et al., 2005; Roberts & Mroczek, 2008), we first investigate whether work attributes have lagged impacts on changes in proactive personality in a three-wave longitudinal study. Second, we examine dynamic reciprocal relationships between proactive personality and work attributes, that is, whether work attributes have lagged effects on changes in proactive personality that may then further modify work attributes. Third, we demonstrate that a novel research methodology, a latent change score (LCS) approach (Ferrer & McArdle, 2010; McArdle, 2001, 2009), enables us to study dynamic reciprocal relationships related to change.

We focus on perceived work attributes that capture a relatively comprehensive spectrum of work (e.g., pertaining to the job, social relationship, and organization, Morgeson, Garza, & Campion, 2012) and, more important, are pertinent to proactivity. Work design research has shown that perceived work attributes related to job tasks and work social support profoundly affect employee job performance and well-being (Humphrey, Nahrgang, & Morgeson, 2007). Hence, we incorporate work attributes from the widely adopted job demand–control–support model (Karasek, 1979; Karasek et al., 1998). We also include organizational constraints, widely studied in the work stress literature (e.g., LePine, LePine, & Jackson, 2004; Spector & Jex, 1998), because this variable encompasses various aspects of work hindrance in organizations. Moreover, those work attributes provide trait-relevant situations that allow proactive personality to be expressed (Tett & Burnett, 2003). As we discuss below in our hypothesis development, proactive people are likely to seek out and engage in such environments that, in turn, may strengthen their proactive propensity over time.

This study builds on, but diverges from, the Frese, Garst, and Fay (2007) study in which the researchers explored reciprocal linkages between personal initiative behavior and work attributes in three important aspects. First, whereas Frese et al. focused on personal initiative, a behavioral construct, we concentrate on proactive personality, a trait. The two constructs differ sharply: Tornau and Frese (2013) reported that they had a corrected correlation of .29 and demonstrated sufficient discriminant validity. Second, we examine a broader spectrum of work attributes beyond Frese et al.'s focus on the combination of job complexity and job control. Third, Frese et al. studied reciprocal relationships unrelated to changes. In contrast, we adopt an LCS approach to explicitly examine a *dynamic reciprocal relationship related to change*: Work attributes promote changes in proactive personality; the altered proactive personality, in turn, fuels further changes in work attributes.

In the present study, we make three important contributions to the scholarship on proactive personality and personality development in general. First, we shed light on the development of proactive personality by pinpointing which work attributes contribute to idiosyncratic proactive personality changes. Second, given the dearth of organizational studies looking at reciprocal relationships between personality traits and work variables over time (Wu & Griffin, 2012), this study contributes to the literature (Mitchell & James, 2001) by showing that for proactive personality, the causal direction flows not only from proactive personality to work attributes but also in the opposite direction. Third, it demonstrates the flexibility and usefulness of a novel approach, the LCS approach, in studying change-related issues in organizational research. The findings have important implications for organizations in selecting and maintaining proactive workforces (Judge, 2007). As employees are more responsible for their own career development, our findings also have implications for them in actively managing their careers (Hall, 1996).

Theories of Personality Development and Change

Three theoretical approaches to understanding personality development are predominant in personality psychology. The classical trait model (e.g., McCrae et al., 2000) postulates that personality development is governed mainly by genetic factors; after individuals reach maturity, their personalities are essentially stable. Organizational research adopting this perspective examines selection effects of personality on people's work (Bell & Staw, 1989; Holland, 1996; Schneider, 1987; Wrzesniewski & Dutton, 2001). Proactive personality research has predominantly assumed this perspective. Second, the contextualist perspective underscores environmental effects on personality change (e.g., Lewis, 1999). For instance, sociologists have examined socioeconomic variables' effects on personality change (e.g., Kohn & Schooler, 1982).

1 Following previous research (e.g., Bandura, 1977; Schneider, 1983), we use "an interactionist perspective" to accommodate possible reciprocal effects between the person and the environment, not necessarily a statistical meaning of interaction.

The third approach, the interactionist model, emphasizes interactions between the person and the environment. Although this approach views personality as *relatively* enduring patterns of behaviors, thoughts, or feelings (Johnson, 1997), it contends that personality traits are susceptible to influences from life and work experiences throughout the whole life span (Baltes, 1997). Among the models, the *corresponsive principle* (Roberts et al., 2003) posits that personality attributes that lead to validating experiences will be strengthened over time by those experiences. This principle reconciles the selection effects of personalities and the socialization effects of life experiences. Put differently, as individuals select specific work environments, they gain opportunities to express and further develop relevant skills and motives, which in turn may reinforce the traits that led them to such experiences in the first place (Ackerman & Heggestad, 1997). Evidence for this principle has accumulated in personality psychology for some time (Caspi et al., 2005; Scollon & Diener, 2006; Sutin & Costa, 2010), but only recently has it begun to emerge in organizational research (e.g., Wu & Griffin, 2012). We adopt this approach in studying proactive personality and work attributes as they change each other over time.

Types of Personality Change

Personality psychologists have studied three important forms of personality change: mean-level change, rank-order change (which are group parameters), and individual differences in change (e.g., Roberts et al., 2003). *Mean-level change* refers to a group's gains or losses in one personality trait over time. *Rank-order stability/ change* refers to individuals' relative standings within a group over time, typically indexed as test–retest correlations. *Individual differences in change*, the major focus of this study, refers to "the gains or losses (or lack thereof) in absolute levels of a personality trait that an individual experiences over time" (Roberts & Mroczek, 2008, p. 33). It is relatively independent of the two types of group change parameters.

Individual differences in change for a personality trait have been shown to be related to individuals' idiosyncratic work experiences as opposed to normative, population-level changes, and thus have primarily been used to probe reasons for personality change (Roberts, Wood, & Caspi, 2008). Regarded as a "cornerstone of lifespan-development theory," the concept has been placed "front and center in the study of personality development" (Roberts & Mroczek, 2008, p. 33). Thus, individual differences in change are suitable for our major purpose, that is, to examine whether individual differences in work attributes shape individual differences in changes of proactive personality and whether individual differences in proactive personality lead to individual differences in further changes of work characteristics.

An LCS Approach to Studying Dynamic Reciprocal Relationships Related to Change

Organizational research has adopted many methodologies to study either reciprocal relationships or change. For example, cross-lagged analyses are used to study reciprocal relationships (e.g., Lang, Bliese, Lang, & Adler, 2011). Growth curve models, such as using the slope of a linear curve, are widely adopted to examine change (e.g., Bliese & Ployhart, 2002; Chan, 1998; G. Chen & Mathieu, 2008; Mathieu & Rapp, 2009; Ployhart & Vandenberg, 2010). However, neither of the approaches readily allows the simultaneous examination of reciprocal relationships and change with measurement error taken into account.

An LCS approach enables researchers to examine dynamic (i.e., time-lagged) reciprocal relationships related to individual differences in change (Ferrer & McArdle, 2010; McArdle, 2001, 2009). In this study, such a dynamic change-related reciprocal relationship includes (a) whether proactive personality changes from Time 1 (T1) to Time 2 (T2) are driven by work characteristics at T1 and (b) whether the altered proactive personality at T2, by T1 work characteristics, in turn leads to further changes in the same work attributes from T2 to Time 3 (T3). The two relationships in a dynamic reciprocal model cannot directly be examined using ordinary cross-lagged or growth curve models. Specifically, although cross-lagged models can test reciprocal relationships, it cannot explicitly capture change patterns, because a change score is not directly modeled in cross-lagged analyses. Likewise, newly introduced growth curve models can be used to explicitly examine change, for example, using slopes of linear trajectories modeled across at least three time points in a study. Thus, growth curve models can test whether T1 work characteristics prompt linear changes in proactive personality from T1 to T3. However, such models are unable to test the second component in a dynamic reciprocal relationship, that is, whether the modified proactive personality (e.g., at T3) can result in further changes of the same work attributes later on; such a test requires three or more waves of data in order to model further changes in the work characteristics (see McArdle, 2009). Alternatively, researchers may regress one linear trajectory (e.g., for work attributes) on another trajectory (e.g., for proactive personality), but such an analysis is correlational in nature and thus cannot provide information on lagged effects and thus the direction of causality.

Two critical features make the LCS approach more relevant and accessible to researchers interested in change research. First, it models the latent change variable based on two adjacent time points using Y[2] _ 1 _ Y[1] _ 1 _ change algebraically (McArdle, 2009, p. 583), and thus is more flexible for examining change than are growth curve models that often require at least three time points. A *change score* is defined as "the part of the score of Y[2] that is not identical to Y[1]" (McArdle, 2009, p. 583). It is not directly measured and thus modeled as a latent variable with measurement errors of Y estimated. Albeit a full discussion of this approach of modeling change is beyond the scope of the present study, it should be noted that, although this method was once criticized, for example, by Lord (1956) as unreliable, later work has shown that the criticisms are not necessarily valid (Rogosa & Willett, 1983; Williams & Zimmerman, 1996). Indeed, recent work in psychology (McArdle, 2009), biology (Fitzmaurice, 2001), economics (Wooldridge, 2002), sociology (Halaby, 2004), and education (Willett, 1988) has recognized the appreciable reliability, validity, and usefulness of the change score approach. Thus, the change score approach has been widely adopted in those various disciplines in which changes are studied. Second, "the accumulation of first differences can result in distinct nonlinear trajectories" (Ferrer & McArdle, 2010, p. 152), so LCS does not assume that the form of change is linear. Although the assumption of linear change can be tested, growth curve models often use the slope of a linear trajectory to indicate change. Taken in concert, all the above advantages render the LCS approach suitable for the purpose of this study (see the Method section for more).

Theoretical Development and Hypotheses

Proactive Personality and Changes in Work Characteristics: Selection Effects

One of the present article's contributions is the test of a reciprocal relationship between proactive personality and work characteristics. For ease of presentation, we first develop hypotheses on the selection effect of proactive personality on changes of work attributes, the first component of the proposed reciprocal relationship. Proactive people typically seek and/or are selected into jobs, organizations, and work conditions that have compatible characteristics (Bell & Staw, 1989; Holland, 1996; Schneider, 1987).

Proactive personality and changes in job demands, job control, and work social support. Among the work attributes in the job demand–control–support model, job control seems most likely to be changed by proactive personality. *Job control*, or autonomy, refers to latitude for making decisions at work (Hackman & Oldham, 1975). Proactive people have an innate need to manipulate their surroundings; they "scan for opportunities, show initiative, take action, and persevere until they reach closure by bringing about change" (Bateman & Crant, 1993, p. 104). Such change-oriented behaviors likely increase their job control. Indeed, proactive people are reported to make positive work changes by making constructive suggestions (Parker & Collins, 2010), negotiating idiosyncratic deals (Hornung, Rousseau, & Glaser, 2008), and taking career initiatives (Seibert et al., 2001). A meta-analysis showed a corrected cross-sectional correlation of .28 between proactive personality and job control (Fuller & Marler, 2009).

> *Hypothesis 1a (H1a):* Proactive personality is positively related to increases in job control.

Proactive personality and changes in job demands appear to have a complex relationship. *Job demands* indicate psychological demands at work, such as workload and time pressure (Karasek, 1979). Proactive people may make their jobs more demanding by planning ahead, seeking opportunities, and overcoming obstacles (Bateman & Crant, 1993). They have been shown to define their jobs broadly (Parker, Williams, & Turner, 2006). However, excessive job demands may deplete resources, threaten sense of control, and decrease well-being (Humphrey et al., 2007; Maslach, Schaufeli, & Leiter, 2001). Thus, proactive people might strive to make their work less demanding. The two counteracting mechanisms render the overall effects of proactive personality inconclusive. We thus propose no hypothesis on this effect.

Work social support pertains to assistance from supervisors and coworkers (Karasek & Theorell, 1990). We consider both types and expect that proactive personality will increase only *supervisory support*, because proactive people are reported to establish positive relationship with supervisors (N. Li, Liang, & Crant, 2010). Implementing positive changes is risky and requires others' support (Grant & Ashford, 2008). Supervisors usually possess more resources than coworkers, and thus proactive people seek such upper level authorities as best sources of support (Morrison & Phelps, 1999). Supervisors may grant proactive employees more resources and sponsorship as reward for their superior performance (Crant, 2000). Cross-sectional research confirms such a positive relationship (Ohly, Sonnentag, & Pluntke, 2006).

We do not expect proactive personality to significantly affect *coworker support* because of two potentially opposing forces operating here. Although proactive people may seek coworker support because it is useful, coworkers may disdain change-oriented behaviors because such behaviors can threaten accepted balances (Frese & Fay, 2001). Indeed, some types of proactive behaviors increase task conflicts (Spychala & Sonnentag, 2011), a similar effect found for innovative behavior (Janssen, 2003). Thus, we provide a formal hypothesis only for supervisory support.

> *Hypothesis 1b (H1b):* Proactive personality is positively related to increases in supervisory support.

Proactive personality and changes in organizational constraints. Proactive personality is also likely associated with decreased *organizational constraints* related to work materials, equipment, and procedures that hinder effectiveness (Spector & Jex, 1998). Proactive people "actively seek information and opportunities for improving things" (Crant, 2000, p. 437). Eliminating hindrances promotes organizational functioning (Morrison & Phelps, 1999). It thus follows that proactive people tend to react to restrictive environments by seeking opportunities to remove obstacles (Bateman & Crant, 1993). If they cannot remove constraints, they might seek more favorable environments elsewhere (Grant & Parker, 2009).

We are unaware of empirical evidence directly supporting that relationship, but a recent meta-analysis shows that proactive personality is positively related with taking charge and voice behaviors (Tornau & Frese, 2013) that emphasize making constructive changes by removing organizational obstacles (Morrison & Phelps, 1999; Van Dyne & LePine, 1998). We thus propose:

> *Hypothesis 2 (H2):* Proactive personality is positively related to decreases in organizational constraints.

Work Characteristics and Changes in Proactive Personality: Socialization Effects

Effects of job demands, job control, and work social support. The second component of the proposed reciprocal relationship is the effect of work attributes on proactive personality change. Research on personality development (e.g., Caspi et al., 2005; Kohn & Schooler, 1982; Roberts et al., 2008) has proposed at least two mechanisms: consolidation of proactive behaviors and skill development. First, work provides opportunities, resources, and rewards that promote proactive behaviors. As proactive people successfully alter their environments, the repeated proactive behaviors tend to be consolidated, generalized, and habituated, over time heightening their proactive tendencies (Caspi et al., 2005; Deci & Ryan, 1990; Kohn & Schooler, 1973). Second, as people successfully fulfill challenging work requirements, they acquire new knowledge and skills (Dragoni, Tesluk, Russell, & Oh, 2009). Personality changes may follow because people come to see themselves differently (Ackerman & Heggestad, 1997) and develop a tendency to seek more difficult tasks in the future (Locke & Latham, 2006).

Excessive job demands indicate suboptimal work environments that need positive changes (Carver & Scheier, 1998) and thus provide chances for proactive propensities to be expressed

(Tett & Burnett, 2003). Furthermore, job demands are challenge stressors that may spur intrinsic motivation and personal growth (LePine, Podsakoff, & LePine, 2005; Podsakoff, LePine, & LePine, 2007). Indeed, job demands were found to positively impact proactive behaviors (Fay & Sonnentag, 2002) and capability development (DeRue & Wellman, 2009).

Hypothesis 3a (H3a): Job demands are positively related to increases in proactive personality.

We also expect job control to increase proactive personality through two mechanisms. High job control may enhance the sense of responsibility and efficacy (Bindl & Parker, 2010; Hackman & Oldham, 1976), the "reason to" and "can do" engines to prompt proactive behaviors (Bindl & Parker, 2010). Job control was found to be positively related to proactive behaviors (Parker et al., 2006). In addition, job control is suggested to facilitate knowledge acquisition and skill development (Frese & Zapf, 1994; Morgeson et al., 2012; Parker, 2014) through integrated understanding of the work system, skill utilization, and learning. Indeed, job control was found to be related to increased personality traits including competence orientation (Mortimer & Lorence, 1979) and agentic traits of social potency (Roberts et al., 2003).

Hypothesis 3b (H3b): Job control is positively related to increases in proactive personality.

Also, social support from supervisors likely increases proactive personality. Supporting work relationships can provide access to resources to carry out proactive behaviors (Frese & Fay, 2001). Moreover, work support may reduce tendencies to withhold change-oriented behaviors. Indeed, positive relationships with supervisors have been found to encourage proactive behaviors (Morrison & Phelps, 1999). Supportive supervisors can provide useful information and feedback that may further cultivate learning and skill development (Morrison, 2002). Although it is conceivable that coworker support might also be conducive to proactive personality increase, we do not formulate a formal hypothesis because proactive people may not seek coworker support, which renders the mutual relationship less sustainable.

Hypothesis 3c (H3c): Supervisory support is positively related to increases in proactive personality.

Effects of organizational constraints. Conflicting theories and evidence surround the effects of organizational constraints on proactive personality changes. Constraints interfering with organizational functioning may indicate unsatisfactory work environments, thus calling for proactive work changes (Fay & Sonnentag, 2002). The creativity literature has supported the notion that organizational constraints may spur proactive people to remove hindrances (Zhou & George, 2001). However, organizational constraints are likely to hinder intrinsic motivation, prohibit learning, and trigger burnout (Crawford, LePine, & Rich, 2010; LePine et al., 2004). The two competing mechanisms prevent a directional hypothesis.

Reciprocal Relationships Between Proactive Personality and Work Characteristics

According to the corresponsive principle, we expect that the work attributes that can be modified by proactive personality are the same variables that may further develop proactive personality (Roberts et al., 2003, 2008), which implies essentially a positive *dynamic reciprocal* relationship. Combining Hypotheses 1, 2, and 3, such reciprocal relationships may occur for job control and supervisory support.

The reciprocal relationship has been germane to research on more nuanced relationships between the person and the environment from a broader interactionist perspective. *Reciprocal determinism* states that people influence and are influenced by their surroundings (Bandura, 1978, 2001). A reciprocal relationship has been observed by management researchers (e.g., Chatman, 1991), sociologists (e.g., Kohn & Schooler, 1982), and personality psychologists (e.g., Roberts et al., 2003). Industrial and organizational (I/O) researchers have just begun to examine this issue (e.g., Frese et al., 2007; Wu & Griffin, 2012), and there has been no research examining a reciprocal relationship for proactive personality. This is unfortunate because proactive personality, defined as a tendency to *change the environment*, seems to be a cardinal individual characteristic for capturing a more nuanced relationship between the agentic person and the environment.

Hypothesis 4 (H4): There are dynamic reciprocal relationships of proactive personality with job control (H4a) and supervisory support (H4b) over time: Proactive personality is positively related to increases in job control and supervisory support; changed job control and supervisory support are in turn positively related to further increases in proactive personality.

Method

Participants and Procedure

We tested our hypotheses by conducting a secondary analysis of three-wave data from a longitudinal study based on a representative sample of Dresden in East Germany shortly after the East and West reunification in 1990 (Frese, Erbe-Heinbokel, Grefe, Ryowiak, & Weike, 1994; Frese et al., 2007).[2] The three-wave data were collected in 1992, 1993, and 1995. The changing socioeconomic and cultural context provided an appropriate opportunity to study personality change because of the ensuing life and work changes (George, Helson, & John, 2011).

2 This project includes six waves of data collection and has produced nine separate studies and had three objectives: first, to provide a psychohistorical account of the changes in East Germany after reunification; second, to examine stress and well-being; and third, to study personal initiative behavior and its development. Prior publications on personal initiative behavior using the database have investigated the validity of personal initiative behavior and personality measures (Fay & Frese, 2001; Frese, Fay, Hilburger, Leng, & Tag, 1997) and control aspiration measures (Frese et al., 1994); differences of personal initiative behavior between East and West Germany (Frese, Kring, Soose, & Zempel, 1996); relationships between personal initiative behavior and age (Warr & Fay, 2001) and conservatism (Fay & Frese, 2000a); the function of self-efficacy for the development of personal initiative behavior (Speier & Frese, 1997); work stressors and personal initiative behavior (Fay & Sonnentag, 2002); work stressors and strain (Garst, Frese, & Molenaar, 2000); and reciprocal relationship among work characteristics (only job control and complexity), control orientation, and personal initiative behavior (Frese et al., 2007). In the present study, we used only data with available information on proactive personality from the last three waves. No substantive analyses on proactive personality have been published from this dataset.

For this study, we included only participants with complete information on demographics, proactive personality, and at least one work variable, which restricted the sample size to 458 from a large group of 548 participants. Including participants with both complete and incomplete information on study variables is recommended for longitudinal research because it can produce results that are not affected by participant attrition (McArdle, 2009). Among the 458 individuals, 239 (52.2%) were men; their average age at T1 was 40.25 (*SD* = 10.74); 76.2% had at least 10 years of education; 40.3% were blue-collar workers, 13.6% were lower level white-collar workers (e.g., clerks), and 40.4% were managers and professionals.

Table 1. Correlations Between the Two Proactive Personality Measures and Other Variables

Variable	The current 6-item measure [95% confidence interval]	The 10-item measure of proactive personality [95% confidence interval]
Self ratings		
Job autonomy	.38** [.26, .49]	.42** [.30, .53]
Intrinsic motivation	.41** [.29, .52]	.49** [.38, .59]
Prosocial motivation	.46** [.35, .56]	.44** [.32, .54]
Psychological safety	.39** [.27, .50]	.35** [.22, .46]
Idiosyncratic deals	.21** [.07, .34]	.20** [.07, .33]
Interpersonal adaptivity	.23** [.10, .35]	.20** [.07, .33]
Learning	.27** [.14, .39]	.21** [.07, .34]
Job satisfaction	.41** [.29, .52]	.42** [.30, .53]
Turnover intention	–.20** [–.33, –07]	–.16* [–.29, –.03]
Supervisor ratings		
Task performance	.30** [.17, .42]	.25** [.12, .37]
Taking charge	.33** [.20, .45]	.26** [.13, .38]

N = 209
* $p < .05$; ** $p < .01$

Measures

Proactive personality. The longitudinal project was launched in 1990. Therefore, the survey did not include Bateman and Crant's (1993) measure of proactive personality. We selected six items from a measure of proactive personality called personal initiative/questionnaire[3] that has been shown to be equivalent to the proactive personality measure by Bateman and Crant (1993) in a recent meta-analysis (Tornau & Frese, 2013). Our measure was included in three waves of the longitudinal survey (α = .83, .88, and .85, respectively). These items were selected on the basis of their relevance to the core components of proactive personality: action orientation, change orientation, opportunity recognition and utilization, and realizing changes (Bateman & Crant, 1993; Frese & Fay, 2001; Grant & Ashford, 2008). Participants indicated the extent to which they agreed or disagreed on each item (1 = *Strongly disagree*, 5 = *Strongly agree*). Items are presented in the Appendix.

We further conducted a validation study to demonstrate the convergent validity of our proactive personality measure with the most widely used instrument (Seibert, Crant, & Krainer, 1999). Using 209 employees and their supervisors from multiple organizations, we administered our scale (α = .89) with the 10-item scale (α = .86) of proactive personality (Seibert et al., 1999) along with other variables, including job control (Morgeson, Delaney-Klinger, & Hemingway, 2005), prosocial and intrinsic motivation (Grant, 2008), psychological safety (edmondson, 1999), idiosyncratic deals (Rousseau, Hornung, & Kim, 2009), interpersonal adaptivity (Pulakos, Arad, Donovan, & Plamondon, 2000), learning (Pulakos et al., 2000), job satisfaction (Tsui, Pearce, Porter, & Tripoli, 1997), and turnover intention (Wayne, Shore, & Liden, 1997). Supervisors rated employees' task performance and taking-charge behavior (Morrison & Phelps, 1999). The correlation between the two proactive personality measures was .72 (.83 after correcting for unreliability). Furthermore, the two measures had very similar patterns of correlations with the other variables (see Table 1): Sizes of correlation coefficients were very similar, and the two sets of coefficients correlated .97 with each other. The evidence shows both adequate reliability and considerable construct validity of the measure of proactive personality used in this study.

Job demands, job control, and work social support. All work variables were captured by self-report scales widely used in Germany. Job demands and job control were measured by instruments devised by Semmer (1982) and Zapf (1993) on a scale ranging from 1 (*Not true at all*) to 5 (*Completely true*), which other researchers have also used (e.g., Fay & Sonnentag, 2012). The *job demands* measure includes five items (α = .76, .70, and .70, respectively, for the three waves) tapping into job aspects of workload, time pressure, and concentration demands on a 5-point scale (1 = *Rarely*, 5 = *Very often*). The *job control* scale includes four items (α = .82, .81, and .83, respectively), capturing, for example, decision-making freedom in planning work and choosing material. Sample items are "How often are you under time pressure?" (job demands) and "Can you decide yourself the way you work?" (job control).

S*upervisor* and *coworker support* were measured using scales adapted from Caplan, Cobb, French, van Harrison, and Pinneau, (1975) with sufficient reliability and validity (Frese, 1999). Participants rated on a 4-point scale (1 = *Not at all*, 4 = *Absolutely*) the following three questions with references to supervisors and colleagues respectively: "How much is … helpful for you to get your job done?" "How much is … willing to listen to your work-related problems?" "How much can … be relied on when things get tough at work?" The two scales have sufficient reliabilities for all three waves (for supervisory support, α = .87, .86, and .85; for coworker support, α = .82, .83, and .81).

Organizational constraints. *Organizational constraints* was assessed using an eight-item instrument of situational constraints interfering with job performance (originally called "organizational problems"; α = .83, .85, and .85, respectively), developed by Semmer (1982) and Zapf (1993). This is consistent with the definition and conceptualization used in other studies (e.g., Spector & Jex, 1998). Participants evaluated how frequently they encountered problems with equipment, tools, materials, and production on a 5-point scale (1 = *Rarely*, 5 = *Very often*). One sample item is "How often is there a lack of supplies at your workplace?"

3 This is a trait measure of proactive behavior, that is, personal initiative behavior. It has shown considerable convergent validity with the widely used measures of proactive personality, and discriminant validity from the behavioral construct of personal initiative, which was typically measured through interviews (Tornau, & Frese, 2013).

Control variables. We included gender and age as control variables because they affect personality development (Caspi et al., 2005; Roberts & Mroczek, 2008). Including educational level as an additional control was inappropriate because proactive people tend to pursue higher educational levels, which may in turn affect their work experiences (Frese & Fay, 2001). Thus, controlling for education would partial out the substantive effects we examine (Spector & Brannick, 2011).[4]

Analytical Strategy

We adopted the LCS approach (Ferrer & McArdle, 2010; McArdle, 2001, 2009) to test our hypotheses. This approach is appropriate to test lagged and reciprocal effects associated with individual differences in change. It has been used to study personality change (Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012) and dynamic relationships in I/O psychology (Toker & Biron, 2012). Figure 1 presents a path diagram of a bivariate LCS model with two factors: proactive personality and a work attribute. A prerequisite to conduct LCS analyses is measurement equivalence across measurement occasions.

In a bivariate LCS model (see Figure 1), latent intercepts and slopes (e.g., Intercept 1 and Slope 1 for proactive personality) for two variables, as typically modeled in growth curve analyses, are constructed as the former affecting the same variable at the first occasion (e.g., Personality T1). More important, the essential feature of an LCS model is that it explicitly models a latent change variable representing gains or losses in the true score for each variable between two adjacent occasions (e.g., ΔPersonality, T1-T2, and ΔPersonality, T2-T3). The latent change variable (e.g., ΔPersonality, T1-T2) is specified to be affected by three components: a linear systematic constant change from the slope (e.g., Slope 1), a proportional change from the same construct at a previous occasion (e.g., Personality T1), and effects from the other variable at a previous occasion (e.g., Work Attribute T1), as indicated by γ_1. Because a latent change variable can be modeled for each individual, it is typically used to study individual differences in change, for example, to identify whether individual differences in personality change from T1 to T2 are attributable to individuals' unique work attributes at T1. Similarly, the LCS approach can also be used to examine whether changes in work characteristics are affected by proactive personality at an earlier time (i.e., as indicated by γ_2). Therefore, the LCS approach enables investigating "cross-lagged dynamic coupling of key factors over time" (McArdle, 2009, p. 597). In the present study, this refers to whether individual differences in proactive personality change from T1 to T2 are impacted by individuals' different work attributes at T1 and, more important, whether modified proactive personality at T2 further promotes more changes in work attributes from T2 to T3. Path coefficient γ_1 represents lagged effects of work variables on changes in proactive personality and is thus relevant in testing Hypothesis 3. Likewise, γ_2 is important in testing Hypotheses 1 and 2. Whether the two path coefficients γ_1 and γ_2 are *both* significant is used to test Hypothesis 4 on reciprocal relationships.

Following previous recommendations (Finkel, 1995; Lang et al., 2011; Little, Preacher, Selig, & Card, 2007), we used structural equation modeling based on item-level data in all our analyses. Metric (i.e., factor loading) equivalence was examined for all of the scales prior to LCS analyses. Previous research has predominantly treated proactive personality and work attributes as continuous variables (e.g., Humphrey et al., 2007; Tornau & Frese, 2013), but they may not necessarily be normally distributed. Therefore, we accommodated this possibility by using diagonally weighted least square estimation (Bandalos, 2008; Lang et al., 2011).

To evaluate model fit, we relied primarily on three most frequently reported indices especially in recent longitudinal organization research (e.g., Lang et al., 2011; Meier & Spector, 2013): comparative fit index (CFI), Tucker–Lewis index (TLI), and root-mean-square-error of approximation (RMSEA). The following cutoff values were suggested as indicating reasonable model fit: CFI and TLI no smaller than .90 (Hu & Bentler, 1999; Kline, 2005) and RMSEA no larger than .08 (Browne & Cudeck, 1993). In comparing different models when testing measurement invariance, differences in CFI, RMSEA, and standardized root-mean-square residual (SRMR) were used (F. F. Chen, 2007; Cheung & Rensvold, 2002). In keeping with recent longitudinal organization research (e.g., Lang et al., 2011; Meier & Spector, 2013), SRMR was not used in assessing model fit in LCS analyses.

Results

Dimensionality of Study Variables

Confirmatory factor analyses were conducted to demonstrate that study variables differ from each other at each of the three measurement occasions. Results show that a six-factor model (with job demands, job control, supervisory support, coworker support, organizational constraints, and proactive personality) yielded an adequate fit to the T1 data: $\chi^2(346) = 637.21$, $p < .001$, CFI = .94, TLI = .92, RMSEA = .044, and SRMR = .058. This model fit data better than an alternative model with a five-factor structure combining the two work social support variables: χ^2 (351) = 991.60, $p < .001$, CFI = .86, TLI = .85, RMSEA = .065, and SRMR = .069; and a one-factor structure combining all the six variables: χ^2 (361) = 2380.56, p _ .001, CFI = .57, TLI = .52, RMSEA = .113, and SRMR = .139. Similar results were obtained for data collected at the other two waves: for Time 2, χ^2 (346) = 679.68, $p < .001$, CFI = .93, TLI = .92, RMSEA = .048, and SRMR = .063; for Time 3, χ^2 (346) = 721.04, $p < .001$, CFI = .92, TLI = .91, RMSEA = .050, and SRMR = .063; again, fitting alternative models resulted in poorer model fit. The evidence shows our measures were distinct from each other for all the three occasions.

Measurement Equivalence

We then tested configural (i.e., form invariance) and metric equivalence of each measure, respectively, across the three occasions. We further examined the two types of measurement invariance with the six factors simultaneously in one model across the three occasions. As suggested (Finkel, 1995; Lang et al., 2011; Meier & Spector, 2013), measurement errors for the same items were allowed to be correlated over time.

4 We also performed analyses with education controlled and obtained very similar results.

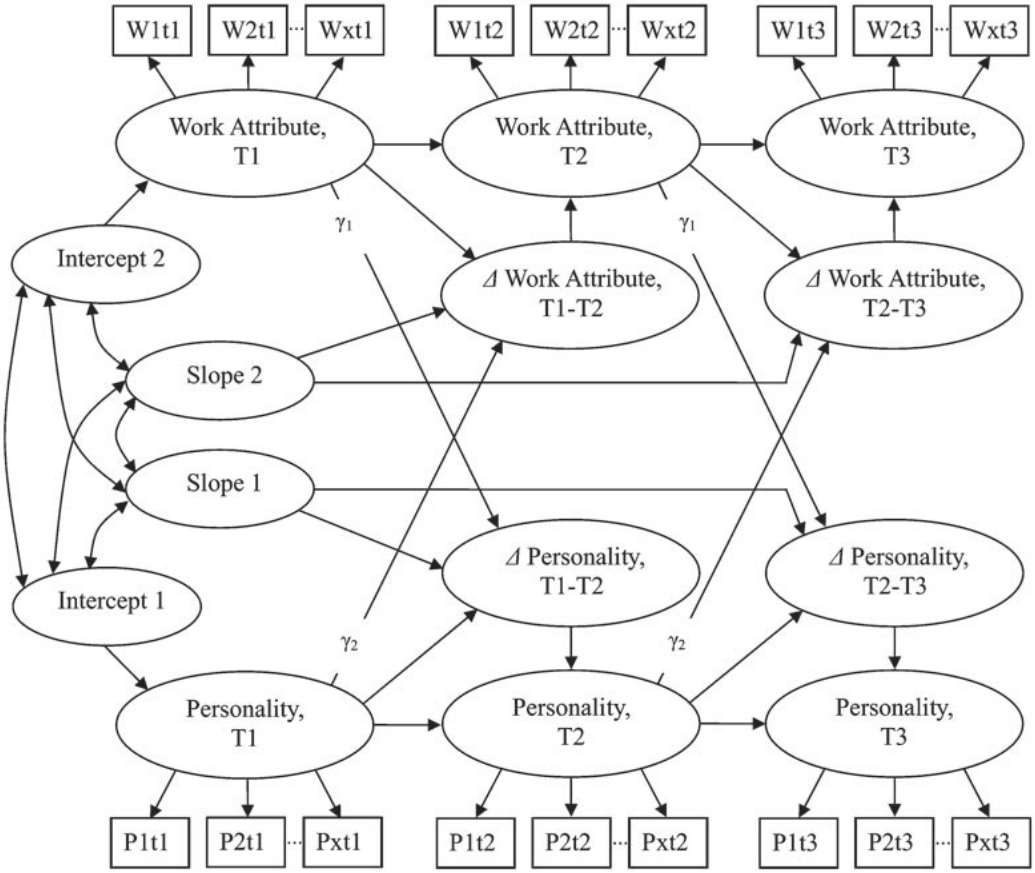

Figure 1. Bivariate latent change score model for proactive personality and work characteristics. Adapted from McArdle (2009, p. 596) and Ferrer and McArdle (2010, p. 151). This is a simplified representation of a bivariate latent change score model. Paths from a variable at Time n to the same variable at Time n _ 1 are fixed to 1, the same for the paths from a latent change variable from Time n to the same construct at Time n _ 1. See McArdle (2001, 2009) for more details. T1, T2, and T3 = Time 1, Time 2, and Time 3.

Results (see Table 2) show that setting item loadings equal across time did not significantly change model fitness for each scale, respectively: Changes in CFI, RMSEA, and SRMR were all less than the suggested cutoff values (Cheung & Rensvold, 2002: ΔCFI > –.010; and F. F. Chen, 2007: ΔCFI > –.010, ΔRMSEA < .015, and ΔSRMR < .030, for N > 300). The findings show sufficient measurement equivalence for our measures across time.

Mean-Level and Rank-Order Changes of the Sample

Table 3 displays the means, standard deviations, and zero-order correlations among study variables. We calculated mean-level and rank-order change of the whole sample (Roberts et al., 2008). Regarding mean-level change, participants' proactive personality slightly increased from T1 to T2 (Cohen's d = .13, t = 2.50, p < .05), and from T1 to T3 (Cohen's d = .20, t = 4.31, p < .01), but did not change significantly from T2 to T3 (Cohen's d = .07, t = 1.47, p > .10). Regarding work characteristics, only organizational constraints decreased from T1 to T3 (Cohen's d = –.18, t = –2.93, p < .01), which aligns with research covering longer time spans (Fay & Frese, 2000b).

Rank-order changes are typically indicated by correlations of variables at different occasions (e.g., test–rest reliability). As Table 3 displays, for proactive personality, the correlations were .65 between T1 and T2, .70 between T2 and T3, and .72 between T1 and T3, suggesting moderate stability (which is typical for other personality traits; see Roberts & DelVecchio, 2000). The correlations for work variables ranged from .42 to .71, indicating that the variables were also moderately stable across time. As indicators of change and stability of the entire sample, mean-level and rank-order stabilities do not prevent further examination of reciprocal relationships, because such an inquiry taps into individual differences in change (Roberts & Mroczek, 2008; Roberts et al., 2008).

Tests of Hypotheses: Individual Differences in Change

Lagged effects of proactive personality on changes in work characteristics. Hypothesis 1 predicted that proactive personality is related to positive changes in job control (H1a) and supervisory support (H1b). Table 4 depicts results of fitting five bivariate LCS models. Results (Model 2) show that with age and gender controlled for, proactive personality was significantly related to increases in job control (γ_2 = .29, p < .001), supporting H1a. Likewise supporting H1b, proactive personality also had positive lagged effects on increases in supervisory support (γ_2 = .15, p < .05, Model 3). Means for slope (Slope 1) and intercept (Intercept 1) of proactive personality across time were also positive (= 3.28, p < .01, and 3.49, p < .01, respectively), suggesting a positive trajectory after correcting for demographic effects.

Table 2. Fitness of Measurement Models to Test Measurement Invariance

Model	χ^2 (*df*)	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Proactive personality								
Free loading	288.79*** (126)	.959	.950	.053	.041	—	—	—
Loadings invariant	299.48*** (136)	.959	.953	.051	.051	.000	–.002	.010
Job demands								
Free loading	269.15*** (82)	.922	.900	.071	.078	—	—	—
Loadings invariant	275.09*** (90)	.923	.910	.067	.081	.001	–004	.003
Job control								
Free loading	100.08*** (47)	.978	.969	.050	.045	—	—	—
Loadings invariant	106.22*** (53)	.978	.972	.047	.053	.00	–.003	.008
Supervisory support								
Free loading	24.02 (21)	.998	.997	.018	.027	—	—	—
Loadings invariant	30.55 (25)	.997	.995	.023	.040	–.001	.005	.013
Coworker support								
Free loading	33.21* (21)	.991	.985	.036	.034	—	—	—
Loadings invariant	34.29 (25)	.994	.991	.029	.036	.003	–.007	.002
Org. constraints								
Free loading	405.04*** (205)	.962	.949	.046	.047	—	—	—
Loadings invariant	424.61*** (219)	.961	.950	.045	.049	–.001	–.001	.002
Six-factor model								
Free loading	5332.97*** (3424)	.900	.900	.035	.060	—	—	—
Loadings invariant	5393.48*** (3470)	.900	.900	.035	.061	.000	.000	.001

N = 435, 426, 443, 427, 446, 457, and 426 for the models for proactive personality, job demands, job control, supervisory support, coworker support, org. constraints, and the six-factor models, respectively. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; Org. = organizational

* $p < .05$; *** $p < .001$

H2 focused on the lagged effects of proactive personality on changes in organizational constraints. LCS analyses provided support by showing proactive personality to have a negative relationship with increase in organizational constraints (γ_2 = –.14, $p < .01$, Model 5). Although the relationship between proactive personality and changes in coworker support was not significant (γ_2 = .07, $p > .05$, Model 4), a significant relationship between proactive personality and increases in job demands was observed (γ_2 = .10, $p < .05$, Model 1).

Lagged effects of work attributes on changes in proactive personality. H3 stated that job demands (H3a), job control (H3b), and supervisory support (H3c) have lagged effect on changes in proactive personality. Our analyses revealed significant effects for job demands (γ_1 = .07, $p < .05$, Model 1) and job control (γ_1 = .06, $p < .05$, Model 2) but not for supervisory support (γ_1 = .04, $p > .10$, Model 3), nor for coworker support (γ_1 = .01, $p > .10$, Model 4). The results supported only H3a and H3b.

Reciprocal relationships between proactive personality and work attributes. H4 predicted reciprocal relationships of proactive personality with job control (H4a) and supervisory support (H4b). As discussed above, proactive personality had lagged effects on increases in job control (H1a); increased job control also enhanced proactive personality (H3b). Thus, H4a was supported. Supervisory support did not relate to increases in proactive personality, lending no support to H4b. Together, H4 received partial support.

The LCS approach provides unique information that ordinary growth curve or cross-lagged models cannot provide. Although growth curve models can indicate latent growth parameters (e.g., means of intercepts and slopes in Table 4), they cannot examine dynamic reciprocal relationships related to change (e.g., lagged effects of work attributes on changes in proactive personality, and the changed proactive personality in turn fuels more changes in the same work attributes later on). Ordinary cross-lagged models can examine lagged effects (e.g., of work attributes on proactive personality), but such examinations are typically unrelated to change (e.g., whether proactive personality changes are associated with work attributes). The LCS approach is suitable for this study by providing unique information regarding dynamic reciprocal relationships between proactive personality and work characteristics; that is, work attributes at T1 affect changes of proactive personality from T1 to T2; the modified proactive personality at T2 generates further changes of the work attributes from T2 to T3.

Discussion

Researchers adopting an interactionist approach have long theorized a reciprocal relationship between the person and the environment (e.g., Bandura, 1977; Bell & Staw, 1989; Chatman, 1991; Hall, 1971; Schneider, 1983; Terborg, 1981). By its very definition, proactive personality is a pertinent personality construct for studying nuanced interactions between people and their environment. Building on recent personality development research using the interactionist approach (e.g., Caspi et al., 2005; Roberts & Mroczek, 2008), we analyzed three waves of data in a longitudinal study to investigate whether proactive personality can generate changes in work characteristics that, in turn, further affect proactive personality development. This study has important implications for research and practice on proactive personality and proactivity in general.

Table 3. Means, Standard Deviations, and Correlations for Variables in the Present Study

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Proactive personality T1	3.58	0.52																	
2. Job demands T1	3.50	0.75	.34**																
3. Job control T1	3.61	0.85	.38**	.21**															
4. Supervisory support T1	2.86	0.70	.12*	−.02	.28**														
5. Coworker support T1	3.00	0.56	.10	.02	.05	.44**													
6. Org. constraints T1	1.89	0.66	.02	−.02	−.01	−.29**	−.11*												
7. Proactive personality T2	3.64	0.57	.65**	.29**	.34**	.10	.08	−.05											
8. Job demands T2	3.51	0.68	.24**	.65**	.13*	−.04	−.03	−.05	.18**										
9. Job control T2	3.62	0.83	.29**	.17**	.71**	.17**	−.05	.01	.35**	.15**									
10. Supervisory support T2	2.93	0.67	.09	.04	.19**	.52**	.24**	−.21**	.18**	−.02	.27**								
11. Coworker support T2	3.07	0.57	.12*	.01	.07	.20**	.58**	−.07	.18**	−.04	.08	.38**							
12. Org. constraints T2	1.81	0.65	−.06	.02	−.01	−.20**	−.04	.70**	−.11*	−.05	−.03	−.31**	−.08						
13. Proactive personality T3	3.66	0.54	.72**	.30**	.30**	.09	.05	.00	.70**	.24**	.29**	.11*	.09	−.07					
14. Job demands T3	3.52	0.69	.28**	.61**	.17**	−.03	−.06	.00	.23**	.67**	.10	−.04	−.09	.04	.25**				
15. Job control T3	3.65	0.89	.29**	.21**	.55**	.11	−.03	.00	.24**	.22**	.68**	.18**	.01	−.04	.31**	.18**			
16. Supervisory support T3	2.93	0.67	.09	.01	.10	.39**	.27**	−.12*	.12*	.03	.12*	.49**	.25**	−.22**	.19**	−.01	.25**		
17. Coworker support T3	3.09	0.56	.09	*.05	.06	.22**	.43**	−.01	.09	−.12*	.09	.25**	.48**	−.07	.12*	−.10	.11*	.41**	
18. Org. constraints T3	1.75	0.61	−.07	*.03	−.04	−.22**	−.05	.61**	−.09	−.03	−.04	−.23**	−.02	.69**	−.13*	.09	−.07	−.30**	−.17**

N = 435, 426, 443, 427, 446, 457, 435, 426, 443, 427, 446, 457, 435, 426, 443, 427, 446, and 457 for the 18 variables (from 1 to 18), respectively. T1, T2, and T3 = Time 1, Time 2, and Time 3. Org. constraints = organizational constraints

* $p < .05$; ** $p < .01$

Table 4. Fitness and Parameter Estimates for Bivariate Latent Change Score (LCS) Models With Proactive Personality and Work Characteristics

Bivariate LCS model	Model fit indices				Parameter estimates (*SE*)			
Proactive personality with	χ^2 (*df*)	CFI	TLI	RMSEA	Lagged effect of work variables, γ_1	Lagged effect of personality, γ_2	Mean of Slope 2, linear trajectory for work variables	Mean of Intercept 2, starting point for work variables
Job demands, Model 1	1289.32 (599)	.90	.90	.050	.07* (.04)	.10* (.05)	.33 (.30)	3.48*** (.18)
Job control, Model 2	1102.56 (499)	.91	.91	.052	.06* (.03)	.29*** (.09)	.16 (.66)	4.16*** (.21)
Supervisory support, Model 3	854.28 (407)	.92	.92	.049	.04 (.04)	.15* (.06)	.47 (.37)	3.13*** (.19)
Coworker support, Model 4	853.21 (407)	.92	.92	.049	.01 (.03)	.07 (.04)	.77* (.35)	3.28*** (.14)
Org. constraints, Model 5	1777.78 (926)	.91	.91	.045	−.02 (.03)	−.14** (.04)	−.99*** (.27)	3.08*** (.19)

N = 426, 435, 427, 435, and 435 for the five models, respectively. Age and gender were controlled. All chi-squares are significant at $p < .001$. Parameters are unstandardized. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation; Org. constraints = organizational constraints.

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

Theoretical Implications

Proactive personality and changes in work characteristics. In this study, we examined a core characteristic of proactive personality, that is, the propensity to produce meaningful and positive work changes (Bateman & Crant, 1993). Significant relationships have been found between proactive personality and various proactive behaviors, including active problem solving (Parker et al., 2006), idiosyncratic deals (Hornung et al., 2008), relationship building (N. Li et al., 2010), and career initiatives (Seibert et al., 2001). We go beyond previous research by showing that proactive personality alters the work environment: It improves positive work aspects such as job control and supervisory support and reduces inhibiting aspects of organizational constraints. Consistent with prior findings that proactive people define their roles more broadly (Parker et al., 2006), we found that proactive personality over time led to increases in job demands. Future research should examine this relationship in greater depth, for instance, to test increased job demands for the effect on well-being.

Work attributes and proactive personality change. Recent literature searching for sources of life experiences that may generate different forms of personality change has mainly focused on individual differences in personality change (Roberts & Mroczek, 2008; Roberts et al., 2008). We found that job demands stimulated positive changes in proactive personality, which aligns with previous research that job demands spur proactive behaviors (Fay & Sonnentag, 2002; Ohly & Fritz, 2010), intrinsic motivation, and personal growth (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; LePine et al., 2004, LePine et al., 2005; Podsakoff et al., 2007).

Similarly, in line with research on proactive behaviors (Parker et al., 2006), we observed that job control enhances proactive propensity. The effects of work attributes on proactive personality development have been recognized since Bateman and Crant's (1993) seminal research but have never been tested. Together, the results of this study echo personality development research in both sociology (e.g., Kohn & Schooler, 1978; Mortimer & Lorence, 1979) and personality psychology (Caspi et al., 2005; Helson, Kwan, John, & Jones, 2002; Roberts & Mroczek, 2008; Sutin & Costa, 2010), stating that different investments in work roles drive individual differences in personality development. The present research also has important implications to work design research by showing profound effects of work characteristics on changing individuals' personality traits (Parker, Andrei, & Li, 2014).

Reciprocal relationships between proactive personality and work characteristics. Our analyses revealed significant reciprocal relationships between proactive personality and job control. Proactive people tend to garner more work control, which in turn contributes to further advancement of proactive personality over time. Previous longitudinal research reported similar findings between work characteristics and individual attributes. In addition to findings described in the introduction (Chatman, 1991; Frese et al., 2007; Roberts et al., 2003; Wu & Griffin, 2012), Kohn and Schooler (1978, 1982) observed that individuals with high levels of ideational flexibility (e.g., openness) increased their job complexity and self-direction. Job complexity and self-direction also increased ideational flexibility. Those findings support the corresponsive principle that the personality traits that draw people to certain work experiences may be further cultivated by those same experiences (Roberts et al., 2003, 2008).

According to the corresponsive principle, mutual reinforcement of personality and work characteristics will generate positive feedback loops over time. Although our results suggest such a trend between proactive personality and job control, we do not know how long the mutually reinforcing process endures (Clegg & Spencer, 2007). One major reason for being proactive is to master the environment (Bateman & Crant, 1993). If people believe that they have already achieved high control, the need to be proactive may diminish (Carver & Scheier, 1998). Indeed, high levels of person–environment fit (e.g., need fulfillment) were found to be related to less personality malleability or more consistency (Roberts & Robins, 2004). Similarly, misfits were pointed out to drive individual change (Chatman, Wong, & Joyce, 2008) and organizational change (Schneider, 1987).

Although supervisory support facilitates short-term proactive behaviors (Van Dyne, Kamdar, & Joireman, 2008), we did not find that it fueled long-term proactive personality development. Compared with job demands and job control, two motivational characteristics of work, effects of supervisor support, a social aspect, seem to be less easily self-internalized (Ryan & Deci, 2000). This is consistent with recent meta-analytic findings that job autonomy is the only job characteristic significantly correlated with objective job performance (Humphrey et al., 2007), and that job demands play important roles in facilitating intrinsic motivation (LePine et al., 2004). Future research should examine effects of different types of social support (e.g., emotional and instrumental) on personality change.

Job demands seem necessary for individual development. We found a reciprocal relationship between job demands, a form of job challenge, and proactive personality. This might have occurred because our study participants experienced only moderate job demands (e.g., 3.50 out of 5). Excessive job demands, however, may breed job stress and hinder well-being (e.g., Humphrey et al., 2007; Maslach et al., 2001). Future research attention should be paid to whether job challenge evokes tension that both enables development and reduces well-being.

We also tested the active learning hypothesis in additional analyses (Karasek, 1979; Karasek & Theorell, 1990) because strong job demands combined with high levels of job control or work support might generate employee learning and development and thus instigate proactive personality changes. We found no empirical support in examining those possibilities, consistent with previous reviews of the job demand–control–support model (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Van Der Doef & Maes, 1999).

We found that coworker support had no significant lagged effects on proactive personality changes, nor did we find vice versa effects. Coworker support is only a specific component of coworker relationships, so our results do not preclude the importance of coworker relationships in proactivity. One possible explanation is that the relationship between proactive personality and coworker support may be bidirectional. Coworkers may dislike proactive people (Frese & Fay, 2001). The bidirectional nature of the relationship may render the effects of coworker support on proactive personality changes nonsignificant. Future research may explore coworkers' attribution and the interaction between proactive people and coworkers in initiating environmental changes (Grant, Parker, & Collins, 2009).

Practical Implications

This study has implications for organizations in selecting and maintaining proactive workforces and for employees in actively managing their career development. Although the usefulness of personality inventories (especially the Big Five) has been debated in personnel selection (Morgeson et al., 2007), meta-analytic evidence suggests that proactive personality is a valid predictor of various indicators of job performance and career success beyond the Big Five (Fuller & Marler, 2009; Thomas et al., 2010; Tornau & Frese, 2013). Coupled with previous research, our findings suggest that selecting proactive people may be useful to improve employee job performance because they carry out positive work changes by increasing their job demands and job control. That said, high levels of proactive personality may not be required for all types of jobs in all situations (Tett & Christiansen, 2007). As with other self-report personality scales, there might be a potential problem of faking when using proactive personality in selection. Practitioners should consider other methods of assessment such as peer reports and behavioral measures (Bledow & Frese, 2009; Morgeson et al., 2007; Ones, Dilchert, Viswesvaran, & Judge, 2007).

Organizations wishing to attract or retain highly proactive individuals should provide challenging and supportive work environments to increase person–job fit (Judge, 2007). Organizations should also be prepared to accept or encourage the proclivity of proactive employees for customizing their jobs informally without supervisory oversight (Wrzesniewski & Dutton, 2001). Such job design practices would also initiate and maintain a virtuous cycle of self-improvement in proactive individuals. Moreover, promoting optimal levels of person– organization fit may lead to reduced turnover costs among a firm's most valuable employees (Erdogan & Bauer, 2005).

Researchers and practitioners have continuously emphasized that organization research should focus on employee well-being and development because employees are important organizational stakeholders (e.g., Weiss & Rupp, 2011). With increasing mobility across organizations, employees are finding it more important to act proactively to maintain their jobs and remain employable (Arthur & Rousseau, 1996). Our results suggest that employees may actively seek organizations that offer more decision-making discretion and work challenges for cultivating their proactive propensities. This has further implications for organizations to provide more individualized management practices to employees with different characteristics (Lawler, 1974; Rousseau, 2005).

Study Strengths, Limitations, and Future Research

This study has a number of strengths. We used the LCS approach based on three waves of longitudinal data to examine changes in proactive personality as affected by a broad range of work characteristics. Moreover, the study represents the first longitudinal assessment of a dynamic reciprocal relationship between proactive personality and work characteristics.

The study also has several limitations. First, we had no objective measures of work characteristics. Researchers have argued and considerable empirical evidence has shown that perceptions of work characteristics reflect objective attributes of work (Frese & Zapf, 1999; Fried & Ferris, 1987; Hackman & Lawler, 1971; Morgeson et al., 2012; Spector, 1992). As such, perceived work environments play a mediating role in the relationship between objective work conditions and outcomes (e.g., Oldham & Hackman, 1981; Rousseau, 1978). The importance of perceived work characteristics has also been documented in meta-analyses on psychological empowerment (Seibert, Wang, & Courtright, 2011) and perceived organizational support (Riggle, Edmondson, & Hansen, 2009). Perhaps that is why self-report questionnaires are "the most popular method for gathering data about the job environment" (Spector, 1992, p. 123), as reflected in recent meta-analyses on work design (Humphrey et al., 2007) and work stress (Gilboa, Shirom, Fried, & Cooper, 2008; Lee & Ashforth, 1996; LePine et al., 2005). Multiple factors influence perceived work attributes, including occupation, organization, and individual characteristics (Morgeson et al., 2012; Parker, 2014; Spector, 1992). Although classic work design research has focused on occupation and organizational factors, recent trends on employee proactivity have focused on individual characteristics in substantially affecting work attributes beyond merely perceptions (e.g., Grant, Fried, & Juillerat, 2010). Self-report questionnaires seem useful for capturing between- and within-job differences in work conditions caused by proactive employees (Morgeson et al., 2012). Future research can use both self-reported and other-rated work attributes that may offer different perspectives.

Proactive people may come to view their work more positively over time; thus, our significant findings might reflect merely percept-percept biases. We tested this possibility by including optimism (Scheier & Carver, 1985) in all three occasions as a time-variant variable. Results showed that with effects of optimism controlled, the findings remained very similar. Furthermore, the potential problem of common method variance is alleviated because the LCS approach models changes in latent variables reflecting the differences in one variable between two adjacent occasions (Ferrer & McArdle, 2010; McArdle, 2001, 2009).

Second, research on cross-lagged relationships is often prone to alternative explanations that a third variable may explain significant findings (Finkel, 1995). Zapf, Dormann, and Frese (1996) argued that such a third variable should not include time-invariant variables (e.g., demographics). Controlling for optimism as a time-variant variable did not significantly change our results. As in most cross-lagged research, we cannot rule out all possible alternative explanations. However, the nonsignificant relationship between proactive personality and coworker support suggests a rather low possibility of a third-variable explanation: If such a factor was operative, it should also have caused a significant relationship between proactive personality and coworker support.

Third, our results may reflect personality change under the specific economic and cultural context of the German reunification. As a first possibility, East Germany's societal and economic shift caused people to change their jobs and altered the nature of work (Fay & Frese, 2000b; Frese et al., 2007). Such changes may have simultaneously modified their job characteristics and in turn may have further shaped their personalities. However, the most dramatic work changes in East Germany occurred between November 1990 and late 1991 (Garst et al., 2000). Between 1992 and 1995, the time of data collection for this study, the economic situation and changes in work were relatively stabilized.

One may argue whether the findings based on participants who were on average 40 years old across 3 years can be generalized to other settings. Note that similar results were found in previous research on personality development: Mean-level personality changes at the population level occurred mostly between ages 20 and 40, as in our study, and personality continued to change even into late adulthood (Roberts et al., 2003; Roberts & Mroczek, 2008; Roberts et al., 2008). Together, although future research should replicate the findings in other settings, our findings do not necessarily reflect dramatic societal changes and thus might be generalizable to other settings,[5] considering that many places such as Europe, Africa, Latin America, China, and India are currently experiencing societal changes.

Another possibility is that after reunification, the societal change may have made people more optimistic about their future that in turn may have changed their proactive propensities and their change-oriented behaviors. We ruled out that possibility by controlling for optimism in all three occasions and finding no significant changes in our results.

Fourth, the LCS approach typically assumes equal time intervals between adjacent occasions to simplify model specifications (e.g., presuming effects of time are similar across different occasions). Like many previous studies using this methodology in personality psychology (e.g., Jackson et al., 2012) and organizational psychology (e.g., Toker & Biron, 2012), our time intervals were uneven. However, this concern may be alleviated as reunification effects may decay over time (Fay & Sonnentag, 2002). The relationship between time and change is rather complex and may be oversimplified in our study. Future research needs more sophisticated designs to gain a deeper understanding of change (Collins, 2006).

Fifth, we did not examine the mechanisms for the effects of work environments on proactive personality changes. Researchers have rarely explicitly studied the causal mechanisms through which personality changes occur in response to the environment. Most personality psychology researchers assume that personality changes occur when positive behaviors are reinforced and negative behaviors are punished (Hudson, Roberts, & Lodi-Smith, 2012; Roberts et al., 2008). More recently, sociogenomic explanations have been offered (Roberts & Jackson, 2008), highlighting the importance of generalization of behaviors and neurobiological functions. The mechanism through skill development seems to be relatively less stressed. Recent research in personality development has just started to tackle this mechanism (Jackson et al., 2012). Future interdisciplinary research is needed.

Sixth, we examined only a few work characteristics. Future research should examine other work attributes such as income (Sutin, Costa, Miech, & Eaton, 2009), promotions (Roberts et al., 2003), challenging assignments (Ohlott, 2004), occupying leadership roles (W. D. Li, Song, & Arvey, 2011), and other factors outlined in recent work design research.

Seventh, the present research was based on a large longitudinal study launched before Bateman and Crant's (1993) proactive personality scale was developed, so we constructed a measure of proactive propensity using items pertinent to the core characteristics of proactivity. Nevertheless, our validation study shows the constructed measure was a reliable and valid instrument to capture proactive disposition.

Lastly, although the values of the TLI and CFI indices of our models are reasonably good using the cutoff value of .90, which has been widely adopted (Hu & Bentler, 1999; Kline, 2005), those values might be regarded as relatively low if using a cutoff criterion of .95. However, it is important to note that researchers have yet to reach consensus on the cutoff criteria for model fitness. Furthermore, our model fit indices were not uncommon in longitudinal research (Ployhart & Vandenberg, 2010). As such, we deem our findings and conclusions based on the LCS models are valid.

Conclusions

Bandura (2001) asserted that human beings are agents who are capable and willing to alter the environment, during which they are also changed by the environment. In this study, we examined the reciprocal relationship by focusing on a specific form of human agency: proactive personality, which essentially captures nuanced interactions between the person and the environment. We hope future research can further discover more delicate relationships between the agentic person and the work environment.

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5 We thank Paul Bliese, our action editor, for pointing this out.

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Appendix: Items in the Proactive Personality Instrument Used in the Present Study

Characteristics	Items in the scale used in the present study
Action orientation	Whenever there is a chance to get actively involved, I take it.
Change orientation	Whenever something goes wrong, I search for a solution immediately. I actively attack problems.
Opportunity recognition and utilization	I use opportunities quickly in order to attain my goals. I take initiative immediately even when others don't.
Realizing changes	I am particularly good at realizing ideas.