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Title: WORK ENGAGEMENT AND ACCUMULATION OF TASK, SOCIAL, AND PERSONAL RESOURCES: A THREE-WAVE STRUCTURAL EQUATION MODEL

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Abstract: Drawing on Conservation of Resources Theory and previous research on work engagement, the present study investigates gain spirals between employees' engagement and their task, social, and personal resources. It focuses on the key resources of job control, positive work relationships, and active coping behavior. In a three-wave design, work engagement (T2) is suggested to function both as an outcome and antecedent of these resources, so that engagement mediates indirect longitudinal effects of initial (T1) on subsequent (T3) resources. Item-level structural equation modeling supported our hypotheses in a three-wave panel (N=416) of hospital physicians with measurement intervals of 14 and 19 months. Connections between engagement research and other evolving perspectives in organizational research are highlighted. Unique contributions of the present study and their implications for further research and practice are discussed.

*Cover Letter

Dear Dr. Savickas

Thank you very much for the opportunity to revise our manuscript. The submitted review was overall very positive, but also raised some important issues. We have carefully considered all of these points and are confident that we could adequately address them by making the changes that are detailed below. Thank you very much for considering our work for publication.

Best regards,

The authors

***Response to Reviews**

Reviewer #1: This paper examines the relationships among work engagement, job control, social relationships, and active coping in a three-wave panel research design. The authors find evidence for lagged effects of control, work relationships, and coping on work engagement, with time t-1 levels of work engagement held constant. The results also demonstrate that work engagement can have positive lagged effects on these resource-based variables.

There is much to recommend this paper. The empirical model tested in the paper is conceptually very closely related to the conservation of resources theory, and may be one of the most compelling demonstrations of how positive spirals of work attitudes and resources can develop that I've seen. I also appreciated the longitudinal data collection method.

Thank you very much for your insightful comments and appreciation of our work. We hope that the ways in which we have addressed the issues you have raised will find your approval. Please see our detailed responses below.

The introduction is well-written and easy to follow. I believe that the hypothesis development could have been shortened somewhat by removing wordiness and reducing redundancies. I would guess that the authors could probably shorten this section by a page or so with careful editing. However, I would also note that I found all the arguments easy to follow and also found them to be compelling.

Following your advice, we have been able to tighten up this section by a bit more than one page in total.

I was somewhat confused about the reciprocal relationship between job control and engagement. The actual items in your job control scale sound very situation-based, but your model implies that these are factors over which workers exercise some discretion (if the idea of "discretion about how much discretion you have" isn't too odd a concept). Do you think that job control is something that is more under individual control than typically assumed, or is it that the perception of job control might be enhanced by feelings of engagement? I know you touch on this on page 25, but I would have liked to see more discussion of this issue as part of the hypothesis development.

Yes, the former interpretation brings to the point what we were trying to say. We now have clarified and strengthened our arguments in this respect throughout the hypothesis development section, starting on page 9 with:

> “Although job control is traditionally regarded as a working condition that employees are subjected to, recent studies have stressed the active role that individuals themselves can play in shaping their jobs and expanding their level of discretion at work …. “

In the limitation section (p. 26, please see below) we now acknowledge more explicitly the problem of distinguishing between objective and perceived changes based on self-report data.

Iappreciated the rigor of your tests of various structural models. However, you indicate in several places that fit was acceptable without a citation your source for these standards of acceptability. I think several of your CFI values for the structural model were a bit low relative to the Hu and Bentler standards for model fit, not so low that it would undermine your model, but it should probably be mentioned.

We have clarified the applied standards for goodness-of-fit indices on page 18 (bottom), citing several sources for these conventional rules of thumb.

> “Model fit was evaluated using an established set of goodness-of-fit indices and conventional rules of thumb for their cut-offs, which are discussed, for example, by Brown (2006), Byrne (2001), and Schumacker and Lomax (1996).”

Later in the limitation section (p. 26/27), we discuss the relatively low comparative fit indices and the more stringent simulation-based cut-offs of .95, proposed by Hu and Bentler (1999), but criticized as overly conservative by Marsh, Hau, and Wen (2004). We offer that low values might partly be attributable to the inclusion of control variables.

> “Comparative fit indices (IFI, TLI, and CFI) for the structural model were relatively low. Although they complied with the conventional rule of thumb of .90 or above (e.g., Byrne, 2001), they did not measure up to the more rigorous cut-off value of .95, suggested by Hu and Bentler (1999) based on simulation studies. Their recommendations, however, are not uncontroversial. A more recent replication of their approach has come to the conclusion that their revised cut-offs lack generalizability and are overly restrictive (Marsh, Hau, & Wen, 2004). A possible explanation for the low values in our study lies in the inclusion of control variables with only sporadic significant effects. As these fit indices compare the specified model to a structural null model, where variables are assumed to be independent, they may be particularly sensitive to the inclusion of controls.”

Although the data were longitudinal in nature, there are some concerns about using all data

from a single source. The control for cross-lags in correlations alleviates many of my concerns about using single source data because individual differences in response tendencies will be factored out. I am also unsure that it would be wise to measure any of these variables from the perspective of significant others or co-workers, since appraisal of resources and engagement are intrapsychic processes that occur beyond most external actors' ability to observe.

Thank you very much for pointing this out. We have integrated these arguments in the limitations section on p. 26.

> “Further, there may be some reservations about the use of single-source self-report data. The design of our study, however, should dispel these concerns to the greatest extent. The inclusion of longitudinal autocorrelations controls for individual response tendencies (e.g., Pitts et al., 1996; Zapf et al., 1996), whereas the temporal separation of measurement points minimizes common method variance (e.g., Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). A remaining concern may be that based on our data it is not possible to separate objective from perceived changes. Although it is hard to refute this argument, there also is no reason to believe that employees’ appraisal would change completely independent of their actual workplace conditions.”

Page 20-"Fit indices for a general 1-factor model were inacceptable" should read "Fit indices for a general 1-factor model were unacceptable."

We have corrected this.

*Title Page

Running Head: WORK ENGAGEMENT AND ACCUMULATION OF RESOURCES

WORK ENGAGEMENT AND ACCUMULATION OF TASK, SOCIAL, AND PERSONAL RESOURCES: A THREE-WAVE STRUCTURAL EQUATION MODEL

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WORK ENGAGEMENT AND ACCUMULATION OF TASK, SOCIAL, AND PERSONAL RESOURCES: A THREE-WAVE STRUCTURAL EQUATION MODEL

Abstract

Drawing on Conservation of Resources Theory and previous research on work engagement, the present study investigates gain spirals between employees' engagement and their task, social, and personal resources. It focuses on the key resources of job control, positive work relationships, and active coping behavior. In a three-wave design, work engagement (T2) is suggested to function both as an outcome and antecedent of these resources, so that engagement mediates indirect longitudinal effects of initial (T1) on subsequent (T3) resources. Item-level structural equation modeling supported our hypotheses in a three-wave panel (N=416) of hospital physicians with measurement intervals of 14 and 19 months. Connections between engagement research and other evolving perspectives in organizational research are highlighted. Unique contributions of the present study and their implications for further research and practice are discussed.

Keywords: Work engagement; gain spirals; resources; job control; work relationships; active coping

WORK ENGAGEMENT AND ACCUMULATION OF TASK, SOCIAL, AND PERSONAL RESOURCES: A THREE-WAVE STRUCTURAL EQUATION MODEL

Introduction

Recent years have witnessed a growing interest in the positive aspects of organizational behavior, such as positive affective states and well-being, positive work relationships, and proactive work behavior (e.g., Dutton & Ragins, 2007; Grant & Ashford, 2008; Luthans & Youssef, 2007; Wright, 2003). Within this positive paradigm, a prolific line of research has established work engagement as an emerging concept of work-related well-being (e.g., Bakker & Demerouti, 2007; Bakker, Schaufeli, Leiter, & Taris, 2008; Salanova, Agut, & Peiro, 2005). Engagement is defined as a positive affective-cognitive state, characterized by vigor, dedication, and absorption (e.g., Schaufeli & Bakker, 2004). That is, engaged workers display high levels of energy, identify strongly with their jobs, and experience flow-like states at work. This tripartite conceptualization is rooted in burnout research, reflecting positive antipodes to burnout dimensions of exhaustion, depersonalization, and inefficacy (e.g., Gonzalez-Roma, Schaufeli, Bakker, & Lloret, 2006). Unlike more passive forms of work-related well-being, such as job satisfaction or contentment, work engagement refers to energetic and activated states (e.g., Warr, 2007). As such, it corresponds with the recommended emphasis on positive and proactive states and behaviors in organizations (e.g., Frese, 2008; Parker, 2000; Wright, 2003).

The development of work engagement is suggested to depend on job and personal resources (e.g., Bakker et al., 2008; Mauno, Kinnunen, & Ruokolainen, 2007; Schaufeli, Bakker, & van Rhenen, 2009). Resources have been defined as environmental and individual factors that support the working person in successfully coping with job demands, attaining goals, and achieving personal growth and development (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Recently, several longitudinal studies have indicated that relationships between resources and

work engagement are not unidirectional, but reciprocal (e.g., Hakanen, Perhoniemi, & Toppinen-Tanner, 2008; Llorens, Schaufeli, Bakker, & Salanova, 2007; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). That is, psychological and environmental features seem to function both as antecedents and outcomes of work engagement.

A suggested theoretical framework for studying work engagement, in particular its dynamics over time, is Conservation of Resources Theory (COR; Hobfoll, 2001, 2002). The COR model is based on the premise that individuals strive to protect, retain, and accumulate valued resources, which are a) cherished in their own right, and b) instrumental in attaining higher-order goals or desired future states (e.g., Hobfoll, 2002). Resources comprise material (e.g., physical environment, objects), social (e.g., relationships, support), and psychological (e.g., positive self-regard, optimism) aspects (e.g., Hobfoll & Schumm, 2009). Their availability is presumed to lead to well-being and resilience, whereas psychological distress results if such assets are threatened or lost. As resources are assumed to be generative, the perspective of COR is inherently dynamic. A central postulate is the existence of circular processes by which resources are either progressively accumulated or depleted. These two opposite developments have been termed "positive gain spirals" and "negative loss spirals" (Hobfoll, 2001, 2002; Hobfoll, Johnson, Ennis, & Jackson, 2003). Loss spirals reflect the stress process, associated with a progressive impairment of mental and psycho-physical health and well-being. Gain spirals describe a salutogenic process of positive psychological development, personal resilience, and growth.

The propensity of resources to accumulate is expressed variously in COR. Resources have been suggested to "co-travel in resource caravans", so that "key resources facilitate the development and use of other resources", which eventually results in "a general tendency for enrichment of resources among those who possess a solid resource reservoir" (Hobfoll, 2002, p. 318). Although COR is well established as a stress theory (e.g., Halbesleben, 2006), its

"secondary emphasis on resource gains" (Hobfoll, 2002, p. 312), has received limited attention. By drawing on COR to explain observed reciprocal relationships between job and personal resources and work engagement, scholars have recently begun to address this gap (e.g., Hakanen et al., 2008; Xanthopoulou et al., 2009). The growing empirical basis of engagement research provides a suitable ground for advancing the seldom-tested resource-gain perspective of COR. So far, however, only a handful of studies have been dedicated to this issue.

The present study goes beyond previous research in three ways: a) disentangling gain spirals – it distinguishes three forms of gain spirals, which are based on task, social, and personal resources; b) unpacking resource bundles – rather than operationalizing resources as higher order-factors, it focuses on the key resources of job control, work relationships, and active coping; c) closing the loop – using a three-wave design, it examines the mediating role of work engagement T2 between resources at T1 and T3; this comes closer to COR's postulate that resources can lead to more resources than reciprocal relationships between resources and engagement across two waves. Hypotheses are tested using item-level structural equation modeling in a three-wave panel (N=416) of hospital physicians.

Previous Research on Work Engagement

Work engagement, the experience of positive work-related states of vigor, dedication, and absorption, is influenced by environmental and individual factors (e.g., Bakker et al., 2008; Schaufeli et al., 2009). The former are addressed in the job-demands-resources model (Bakker & Demerouti, 2007; Demerouti et al., 2001). Based on the taxonomy of job demands and resources, it suggests two distinct psychological processes. Job demands, such as workload and role ambiguity, are associated with psychological and/or physical efforts and costs. Negative health outcomes, such as burnout, may result from an effort-driven process, if job demands overtax the working person's regulation capabilities. Work engagement and positive psycho-physical health

are assumed to result from a motivational process triggered by job resources. Job resources have been defined as features that "either/or (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; (3) stimulate personal growth, learning and development" (Schaufeli & Bakker, 2004, p. 296). Job control, social support, and feedback are the most widely researched job resources (e.g., Bakker & Demerouti, 2007). The suggested motivational process reflects assumptions of job characteristics and self-determination theory. Job characteristics theory describes the underlying psychological processes as the experience of felt responsibility, knowledge of results, and meaningfulness (e.g., Hackman & Oldham, 1980); self-determination theory in terms of the fulfillment of basic needs for autonomy, competence, and relatedness (e.g., Gagné & Deci, 2005). The common denominator is the assumption that positive job features facilitate intrinsic motivation, which, in turn, leads to positive individual and organizational outcomes of well-being and high performance.

In addition to the psycho-social work environment, engagement is affected by individual characteristics (e.g., Bakker et al., 2008). Recently, Xanthopoulou and colleagues have expanded the resource perspective in engagement research to include personal resources – operationalized as a higher-order factor of self-efficacy, organizational-based self-esteem, and optimism (Xanthopoulou et al., 2007, 2009). Paralleling the definition of job resources, they argue that these positive self-evaluations support individuals in successfully coping with job demands and associated physiological and psychological costs, achieving work goals, and pursuing pathways for personal growth and development (Xanthopoulou et al., 2009). In line with this assumption, they could show that personal resources had an independent time-lagged effect on engagement.

A growing number of longitudinal cross-lagged panel studies indicate that relationships between both job and personal resources and work engagement are not unidirectional, but reciprocal (Bakker, et al., 2008). Supporting core assumptions of COR, environmental and

personal factors thus seem to function both as antecedents and outcomes of work engagement over time. Evidence for such gain cycles of work engagement and personal and/or job resources has been reported in several two-wave studies, for instance, by Hakanen et al. (2008), Llorens et al., (2007), Salanova, Bakker, and Llorens (2006), Schaufeli, Bakker, and van Rhenen (2009), and Xanthopoulou et al. (2009). Taken together, these results support the idea that positive and energetic states of work engagement enable employees to mobilize job resources. Engaged workers, it has been concluded, actively raise support from colleagues, seek out feedback from supervisors, and create opportunities to exercise control at work (Xanthopoulou, et al., 2009). The underlying processes constitute gain spirals based on positive interactions between the focal person and his or her work environment, or – in the case of personal resources (e.g., self-efficacy) – positive psychological developments and growth.

Contributions of the Present Study

Work engagement research has generated remarkable cumulative evidence. Yet, further progress may be hampered by a) a broad conceptualization of resources b) and their operationalization in terms of aggregate bundles. Different and quite heterogeneous constructs have been combined under one higher-order resources factor. Demerouti et al. (2001) have aggregated performance feedback, rewards, job control, participation in decision making, job security, and supervisor support. Later studies have used subsets of those or included additional aspects, such as social support from colleagues, supervisor coaching, or opportunities for learning and personal development (e.g., Schaufeli & Bakker, 2004; Schaufeli et al., 2009; Xanthopoulou, et al., 2009). Salanova et al. (2006) have operationalized resources in terms of various dimensions of organizational culture; Hakanen and colleagues (2008) have used context-specific scales for craftsmanship, pride in the profession, and direct and long term results. Likewise, personal resources have been investigated as an aggregate of self-efficacy, organizational-based

self-esteem, and optimism (Xanthopoulou et al., 2007, 2009). Although all of these aspects are important, combining them raises questions about independent effects and relative contributions. Especially after having established the function of resources more broadly, researchers should be interested in the role of specific constructs. Several scholars have discussed the importance of distinguishing between different resource-bases, such as the focal individual, organizational members, work tasks, and the overall organization (e.g., Bakker & Demerouti, 2007; Salanova et al., 2006; Shirom, 2007). The aggregation of social and task-related resources, in particular, is an issue of concern, as previous research suggests the distinctness of these domains. A point in case is the extension of Karasek's (1979) demand-control model to accommodate social support as an additional dimension (e.g., van der Doef & Maes, 1999). Consequently, the present study differentiates between task-related, social, and personal resources, represented by job control, work relationships, and active coping. Focusing on these three key resources instead of using aggregated bundles permits a more fine-grained investigation of gain spirals in the task, social, and personal domain, which are suggested to be theoretically and empirically distinct.

Previous longitudinal research has established reciprocal associations between job and personal resources and work engagement between two measurement points. Although these bi-directional relationships are legitimately interpreted as support for the existence of gain spirals, they do not provide a stringent test of COR's postulate that resources generate more resources (Hobfoll, 2002). If engagement functions both as an outcome and antecedent of resources, it should mediate indirect effects of initial on subsequent resources. The inability to assess such theoretically warranted mediating effects in two-wave studies was discussed by Hakanen et al. (2008). To address this issue, the present study is based on a three-wave design. Thus 'closing the loop' promises novel insights on the mediating role of work engagement in resource spirals.

Task-related Gain Spirals: Expanding Job Control

Task-related gain spirals refer to positive interactions between the working person and his or her work characteristics. The most central construct in work design is job control or autonomy, which refers to possibilities for decision-making, employing individual work approaches, and using personal discretion in how to fulfill tasks and attain work goals (e.g., Jackson, Wall, Martin, & Davids, 1993). Probably above all other job features, control has been shown to facilitate positive work experiences, intrinsic motivation, and activated states of psycho-physical well-being (e.g., De Lange, Taris, Kompier, Houtman, & Bongers, 2003; Fried & Ferris, 1987; Parker, Turner, & Griffin, 2003; Sauter, Hurrel, & Cooper, 1989; Saavedra & Kwun, 2000; van der Doef & Maes, 1999). Although job control is traditionally regarded as a working condition that employees are subjected to, recent studies have stressed the active role that individuals themselves can play in shaping their jobs and expanding their level of discretion at work. In addition to the engagement literature, new research in work design and proactivity supports this line of thought (e.g., Grant & Parker, 2009; Parker, 1998). Frese, Garst, and Fay (2007) have reported longitudinal results implying that proactive workers create more challenging and autonomous tasks for themselves. Over the course of several years, complexity and control at work enhanced personal initiative, which, in turn, had a positive reverse effect on these work characteristics. Examples of workers enlarging their own decision latitude and extending the boundaries of their jobs in positive ways (e.g., by adding or modifying tasks) have been provided by qualitative research on job crafting (Wrzesniewski & Dutton, 2001). Further, a recent study suggests that some employees negotiate for more favorable work characteristics with their supervisors, thus making their jobs more supportive of their personal well-being (Hornung, Rousseau, Glaser, Angerer, & Weigl, 2010). These lines of research have contributed to the emergence of a proactive perspective on work design, in which reciprocal relationships between job characteristics and individual attributes are a central assumption (Grant & Parker, 2009).

Accordingly, we propose that engagement is not only an outcome of job control, but also empowers workers to seek out and exercise greater control, thus playing a mediating role in the accumulation of task-related resources.

> ***Hypothesis 1*:** Job control T1 has a positive effect on work engagement T2 (H1a), which, in turn, has a positive effect on job control T3 (H1b), so that work engagement T2 mediates a positive indirect effect of job control T1 on job control T3 (H1c).

Social Gain Spirals: Improving Work Relationships

Social gain spirals reflect positive interactions between the working person and the social environment. COR emphasizes the relevance of social resources, such as the quality of interpersonal relationships at work and in private life (e.g., Hobfoll, 2002; Hobfoll & Schumm, 2009). A recent meta-analysis (Halbesleben, 2006) on the relationships between social support and job burnout supports this claim, whilst demonstrating the particular relevance of work-related (e.g., supervisors and colleagues) versus non-work relationships (e.g., family and friends). Moreover, support from colleagues, supervisor coaching, and feedback have been established as resources that facilitate work engagement (Schaufeli & Bakker, 2004). Recent research has made a strong case for the generative qualities of positive social relationships at work (e.g., Grant & Parker, 2009). Spreitzer, Sutcliffe, Dutton, Sonenshein, and Grant (2005) have introduced a socially embedded model of thriving at work, which includes reciprocal effects or gain spirals between relational resources (i.e., high-quality connections between individuals) and thriving (i.e., experienced vitality and learning). Similarly, Grant (2007) has suggested that positive social interaction at work would enhance prosocial motivation, which, in turn, positively affects employees' interpersonal behavior. Wrzesniewski and Dutton (2001) have distinguished task-directed from relational job crafting, which is aimed at affecting positive changes in the psycho-social work environment. In sum, the assumption that interactions among people can generate

upward spirals of social resources seems to be a common denominator of different perspectives on positive work relationships (Dutton & Ragins, 2007; Rousseau & Ling, 2007).

Highly engaged workers have been suggested to be better able to mobilize social resources by actively seeking out support from co-workers and supervisors (e.g., Xanthopoulou et al., 2009). Moreover, as social relationships are reciprocal, gain spirals may also emit from the capacity to make own contribution to developing positive relationships, such as constructively solving conflicts and providing support to others. Indeed, several studies have shown that positive states of emotional well-being are actually predictive of social support from supervisors and colleagues (Staw, Sutton, & Pelled, 1994; Wright & Staw, 1999). We therefore suggest that positive workplace relationships are generative in that they contribute to work engagement, which, in turn, facilitates the development of more supportive relationships.

> ***Hypothesis 2:*** Work relationships T1 have a positive effect on work engagement T2 (H2a), which, in turn, has a positive effect on work relationships T3 (H2b), so that work engagement T2 mediates a positive indirect effect of work relationships T1 on work relationships T3 (H2c).

Intrapersonal Gain Spirals: Increasing Active Coping

Intrapersonal gain spirals refer to psychological processes of positive adaptation and growth. A core premise of COR is that positive intrapersonal dynamics manifest in an accumulation of personal resources (Hobfoll, 2001, 2002). Several related research traditions support this idea, most importantly social cognitive theory (Bandura, 1997), coping theory (Folkman & Moskowitz, 2004), and broaden-and-build theory (e.g., Fredrickson, 2001). The former posits that high self-efficacy, the belief of being capable to perform in a certain manner, increases the likelihood of mastering the respective task, which, in turn, reinforces perceived competence (Bandura, 1997). Likewise, the transactional coping model suggests that successful

attempts to deal with a challenging or threatening situation lead to progressively positive self-evaluations and reappraisals of the situation (Lazarus & Folkman, 1984). The development of personal resilience thus has been described as a process of learned resourcefulness, in which effective coping strategies and resulting states of active well-being positively influence each other (Rosenbaum, 1990). Broaden-and-build theory addresses the role of positive affective states in expanding the behavioral repertoire, thus enabling more situationally adequate responses and triggering upward spirals of well-being (Fredrickson & Joiner, 2002).

To explain observed reciprocal effects between work engagement and personal resources of self-efficacy, organizational-based self-esteem, and optimism, similar arguments as above have been presented (Llorens et al., 2007; Xanthopoulou et al., 2009). To avoid concerns regarding the conceptual distinctness of positive self-evaluations and work engagement, the present study focuses on active coping – a key personal resource that is not conceptualized as a psychological state, but as a behavior. A similar point has been made by Hakanen et al. (2008) in reporting evidence for gain spirals between engagement and proactive behavior of personal initiative. Active coping refers to problem-oriented and persistent behavior to overcome or constructively deal with the causes of personally distressing or dissatisfying circumstances (e.g., Jerusalem & Schwarzer, 1989; Folkman & Moskowitz, 2004). Extensive research has established active coping as a functional strategy to maintain personal health and well-being, even in light of adverse situations or life-events (e.g., Aspinwall & Taylor, 1997; Diong & Bishop, 1999; van Rhenen, Schaufeli, van Dijk, & Blonk, 2008; Welbourne et al., 2007). Active coping exemplifies COR's definition of personal resources as "aspects of the self that are generally linked to resiliency" (Hobfoll et al., 2003, p. 632). A behavioral correlate of self-efficacy, optimism, and related positive self-evaluations, it also corresponds well with Xanthopoulou et al.'s (2009) conceptualization of personal resources. Not only does an active coping style enable individuals

to effectively deal with problems, master potentially stressful situations, and achieve psychological growth, but the experience of these outcomes, in turn, can reinforce and strengthen the respective behavior (e.g., Glantz & Johnson, 1999; Parker, 2000; Rosenbaum, 1990). Positive affective and energetic states of work engagement can provide a psychological basis for developing a more active and resourceful approach (Fredrickson, 2001). We therefore suggest that active coping enhances work engagement, which, in turn, supports effective coping, resulting in an growth spiral of positive affective states and active behavior.

***Hypothesis 3*:** Active coping T1 has a positive effect on work engagement T2 (H3a), which, in turn, has a positive effect on active coping T3 (H3b), so that work engagement mediates a positive indirect effect of active coping T1 on active coping T3 (H3c).

METHOD

Sample and Procedure

The study was conducted in the years 2004 to 2007 in the German Federal State of Bavaria. Based on their registration with the association of medical doctors, 1000 junior hospital physicians (518 male and 482 female) in their second or third year of medical practice were asked to participate. Surveys and return envelopes were mailed to participants' home addresses. All signed a letter of informed consent approved by the university's internal review board.

A priori, a 1-year lag was specified between the first (T1) and the second (T2) wave, and a 1.5-year lag between the second and the third (T3) wave. This design was chosen based on previous studies and rules of thumb regarding appropriate time lags for studying organizational well-being (e.g., De Lange et al., 2003; Taris & Kompier, 2003; Zapf, Dormann, & Frese, 1996). The incorporated variation of measurement intervals is a recommended feature for multi-wave studies to increase information on the timeline of effects (Kessler & Greenberg, 1981; Rogosa, 1980). During each wave two reminder letters were sent out. To increase response rates, data

gathering periods were extended to accommodate for ongoing participation. This resulted in average factual time lags of 14 months (range: 12 to 16) between T1 and T2 and 19 months (range: 17 to 22) between T2 and T3. At T1, 621 (62.1%) questionnaires were returned; out of those, 561 also participated at T2, and 507 at T3. The panel dropout thus amounted to 114. Listwise deletion of missing data excluded another 91 participants. Our final sample consisted of N = 416 doctors (41.6% response rate), who had continuously worked as junior physicians.

The gender distribution (212 male and 204 female) was balanced and did not differ significantly from the sample's potential participants ($\Delta\chi^2(1)$ = 0.12, *ns*). At T1, the average age was 30.50 years (SD = 2.71) and professional tenure 2.65 years (SD = 1.25). Part-time work had increased during the study from 3.1% (13) at T1 to 5.0% (21) at T2 and 8.9% (37) at T3. At T2 37.0% (154) and at T3 35.3% (147) of participants had reported some changes in their jobs since the last wave. These referred either to taking over new functions within the same unit, placements in another department within in the same hospital or transfers to another institution within the public healthcare system. During the early stages of medical practice, such rotations or transfers are common to gain experience in different areas. Job changes were controlled in the analyses.

To ensure there was not a systematic bias in the study sample, chi-square and unpaired *t*-tests were used to compare the final sample of N = 416 with the 205 participants at T1, who had dropped out of the panel or were excluded due to incomplete data. Altogether 55.6 % (114) of excluded respondents were female and 4.4% (9) worked part-time. Both distributions did not differ from the analyzed sample (gender: $\Delta\chi^2(1)$ = 2.37, *ns*; part-time: $\Delta\chi^2(1)$ = 0.64, *ns*). Excluded initial participants also had similar age ($M_{.}$ = 30.60 years, SD = 2.70, $t(619)$ = 0.43, *ns*) and professional tenure (M = 2.68 years, SD = 0.92, $t(619)$ = 0.24, *ns*) as panel responders. Consequently, there is no indication for systematic selection effects in our panel sample.

Measures

Job control. Control was measured with a four-item scale from a German self-report instrument for work analysis in hospitals (Büssing & Glaser, 2000, 2002; Hornung et al., 2010). Validation studies affirm that work characteristics can be effectively measured by self-reports due to high convergence between job incumbents' self-ratings and external observations (e.g., Büssing & Glaser, 2002; Spector, 1992; see also Frese et al., 2007). Participants were instructed to rate the degree, to which their work allowed them to "make own decisions on task goals"; "decide, which tasks to pursue"; "be creative in fulfilling assigned tasks"; and "use personal discretion in choosing work methods." Items used a 5-point Likert scale from 1 = "*not at all"* to 5 = "*to a very great extent*." Cronbach's alpha was .75 (T1), .77 (T2), and .82 (T3).

Work relationships. Four items on interpersonal relationships at work were drawn from the same instrument as job control (Büssing & Glaser, 2002). Two parallel worded set of items refer to the quality of social relationships and cooperation among coworkers and with supervisors: *"*Work relationships among coworkers / with supervisors in this unit are based on trust" and "Cooperation among coworkers / with supervisors in this unit is often impaired (e.g., social conflicts, lack of teamwork)" (reversed coded). The same 5-point scale as above was used. Internal consistency was .70 (T1), .75 (T2), and .77 (T3).

Active coping. Three items on active coping were adapted from an established German measure (Jerusalem, 1993; Jerusalem & Schwarzer, 1989). Participants rated the extent to which the following statements reflected their present personal coping style: "I tackle problems, until I have solved them", "I take appropriate steps of action", and "I engage in all possible efforts". Items used a 4-point scale from 1 = "*strongly disagree"* to 4 = "*strongly agree".* Consistency coefficients were .78 (T1), .80 (T2), and .81 (T3).

Work engagement. Engagement was measured using the German 9-item (α = .87) short version of the Utrecht Work Engagement Scale (UWES-9; Schaufeli & Bakker, 2003), which has been extensively validated. The three subdimensions of vigor, dedication, and absorption are each represented by three items (e.g., "At my job, I feel strong and vigorous"; "I am enthusiastic about my job"; and "I feel happy when I work intensely"). Participants rated how often they experienced these positive work-related states, using a 7-point scale from 1 = "*never"* to 7 = "*always / every day*". Overall internal consistency was high at .92 (T1), .92 (T2), and .93 (T3).

Control variables. Gender (0 = male, 1 = female) and employment status (0 = full-time; 1 = part-time) were measured with dichotomous variables; age and tenure in the medical profession were reported in years; at T2 and T3 particiants were also asked to indicate, whether they had changed jobs since the last wave (0 = no job change, 1 = job change since last wave).

Descriptive Statistics

Descriptive statistics and zero-order correlations are displayed in Table 1. Pairwise *t*-tests assessed changes in variable means across consecutive measurement points. Average Job Control had decreased between T1 ($M = 2.64$, $SD = 0.69$) and T2 ($M = 2.46$, $SD = 0.67$; $t(415) = -5.17$, $p < .01$) and had increased again from T2 to T3 ($M = 2.55$, $SD = 0.75$; $t(415) = 2.57$, $p < .01$). Work Relationships showed a stable mean value across T1 ($M = 3.58$, $SD = 0.66$) and T2 ($M = 3.53$, $SD = 0.69$; $t(415) = -1.62$, *ns*) as well as T2 and T3 ($M = 3.52$, $SD = 0.68$; $t(415)_{T2–T3} = -0.04$, *ns*). Likewise, no significant changes were observed in Active Coping between T1 ($M = 2.92$, $SD = 0.50$) and T2 ($M = 2.96$, $SD = 0.53$; $t(415) = 1.72$, *ns*) or T2 and T3 ($M = 2.99$, $SD = 0.54$; $t(415) = 1.02$, *ns*). Work Engagement had not changed significantly between T1 ($M = 4.57$, $SD = 1.01$) and T2 ($M = 4.52$, $SD = 1.02$; $t(415) = -1.00$, *ns*), but a slight decline was observed at T3 ($M = 4.42$, $SD = 1.04$; $t(415) = -2.35$, $p < .05$). We conclude that, although there is some variation in the scale means, no clear-cut pattern of a generally positive or negative trend was discernable.

Additionally, we compared scale means at T1 between the 416 participants retained in the final sample and those 205 that were subsequently excluded. No mean differences (unpaired *t*-tests) were found in Job Control T1 ($M_{excl.}$ = 2.59, *SD* = 0.64, *t*(619) = -0.77, *ns*), Work Relationships T1 ($M_{excl.}$ = 3.65, *SD* = 0.65, *t*(619) = -1.21, *ns*), Active Coping T1 ($M_{excl.}$ = 2.93, *SD* = 0.53, *t*(586) = -0.38, *ns*), or Work Engagement T1 ($M_{excl.}$ = 4.48, *SD* = 1.02, *t*(588) = 0.96, *ns*). Results further dispel concerns about selection effects.

Insert Table 1 about here

RESULTS

Analyses are based on latent-variable structural equation modeling (SEM) with maximum likelihood estimation (AMOS 17.0). Model fit was evaluated using an established set of goodness-of-fit indices and conventional rules of thumb for their cut-offs, which are discussed, for example, by Brown (2006), Byrne (2001), and Schumacker and Lomax (1996). Chi-square (χ^2) indicates the discrepancy between specified and empirical covariance structure and is used to compare alternative models. Relative chi-square (χ^2/df) below 2.0 indicates acceptable, below 3.0 good fit. Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) should be .90 or higher. Root Mean Square Error of Approximation (RMSEA) values below .08 signify satisfactory and below .05 good fit. A 90% confidence interval (CI_{RMSEA}) and p-value for the test that RMSEA exceeds .80 in the overall population are reported.

Measurement Models

Instruments were subjected to Confirmatory Factor Analysis (CFA) in several steps. First, the measurement model for resources was tested by allocating the respective 33 items to nine latent factors (Job Control, Work Relationships, and Active Coping for each of the three

measurement points). Consistent with common practice, measurement errors of the *same* items were correlated across waves to account for their non-independence (e.g., Brown, 2006; Pitts, West, & Tein, 1996); this also applies to all subsequent analyses). The 9-factor model showed good fit ($\chi^2(426) = 612.95$; $p < .001$; $\chi^2/df = 1.44$; IFI = .97; TLI = .96; CFI = .97; RMSEA = .033; $CI_{RMSEA} = [.027; .038]$, *ns*). We also tested a general 1-factor model and two 3-factor models, which combined all items either from the same wave across constructs or the same constructs across measurement points. To confirm the empirical distinctness of the three types of resources, we systematically combined items from two constructs under one factor, which resulted in three alternative 6-factor models, none of which yielded acceptable fit (see Table 2).

The measurement model for work engagement was tested in a second step. Work engagement consists of three strongly interrelated dimensions, which are commonly aggregated one indicator. For the nine-item short scale (UWES-9) used here, the distinction between the three dimensions is optional (Schaufeli & Bakker, 2003). A 3-factor model, in which all items measured in the same wave loaded on one latent construct produced acceptable fit ($\chi^2(294) = 632.74$; $p < .001$; $\chi^2/df = 2.15$; IFI = .96; TLI = .95; CFI = .96; RMSEA = .053; $CI_{RMSEA} = [.047; .058]$, *ns*). A 9-factor model, differentiating between the three sub-dimensions resulted in a non-admissible solution (i.e., non-positive definite covariance matrix), attributable to high linear dependency between the subdimensions (e.g., Schumacker & Lomax 1996; on the manifest level, within-measurement point correlations between vigor, dedication, and absorption ranged between r = .74 and r = .82). Fit indices for a general 1-factor model were unacceptable (see Table 2).

Finally, all 60 items were combined into one 12-factor CFA model with adequate fit ($\chi^2(1584) = 2385.58$; $p < .001$; $\chi^2/df = 1.51$; IFI = .94; TLI = .94; CFI = .94; RMSEA = .035; $CI_{RMSEA} = [.032; .038]$, *ns*). Again, alternative models were tested by subsuming work

engagement under one common factor with a) Job Control, b) Work Relationships, and c) Active Coping. For none of these three alternative 9-factor models fit was acceptable (see Table 2).

Consequently, the supported 12-factor CFA model was tested for measurement invariance across the three waves. First, factor loadings of the same items were constrained to be equal for T1, T2, and T3. The resulting change in chi-square was non-significant ($\Delta\chi^2(32) = 33.56$, *ns*). In subsequent steps, equality constraints were extended to factor variances ($\Delta\chi^2(8) = 12.39$, *ns*) and factor correlations ($\Delta\chi^2(12) = 15.80$, *ns*). As neither of these steps resulted in a significant decrease of fit, conventional levels of measurement invariance were achieved (Byrne, 2001). Accordingly, there is no indication that variables differ in their meaning across the three waves.

Insert Table 2 about here

Structural Model

Next, the measurement model was transformed into a structural model. Again, we followed a stepwise approach. First, a stability model was specified, containing only autoregression paths for each construct from T1 to T2 and from T2 to T3. Additionally, control variables were included: Gender, Age T1, Tenure T1, and Part-time T1 were modeled to affect Job Control T1, Work Relationships T1, Active Coping T1, and Work Engagement T1. Part-time and job changes at T2 and T3 were controlled on all four constructs at the respective measurement point. A slightly low TLI notwithstanding, fit complied with standards: $\chi^2(2090) = 3529.43$, $p < .001$; $\chi^2/df = 1.69$; IFI = .90; TLI = .89; CFI = .90; RMSEA = .041; CI = [.038; .043], *ns*. Next, lagged effects from all three resources on work engagement at the consecutive measurement point were added. Including these six paths improved model fit ($\Delta\chi^2(6) = 26.34$, $p < .01$). Subsequently, the six reverse lagged paths from work engagement on resource constructs

were added. Again, model fit improved ($\Delta\chi^2(6) = 32.56$, $p < .01$). This final model is depicted in Figure 1. Fit indices are: $\chi^2(2078) = 3470.53$, $p < .001$; $\chi^2/df = 1.67$; IFI = .91; TLI = .90; CFI = .91; RMSEA = .040; CI = [.038; .043] *ns*.

Insert Figure 1 and Table 3 about here

Out of the six possible lagged effects of resource variables on work engagement, five were significant. In accordance with hypotheses H1a, H2a, and H3a, Job Control T1 ($\beta = .09$, $p < .05$), Work Relationships T1 ($\beta = .10$, $p < .05$), and Active Coping T1 ($\beta = .10$, $p < .05$) positively affected Work Engagement T2. Job Control T2 ($\beta = .13$, $p < .05$) and Active Coping T2 ($\beta = .09$, $p < .05$) also had a positive impact on Work Engagement T3, whereas Work Relationships T2 did not ($\beta = -.06$, *ns*). Reverse effects of engagement on resources were observable in four out of six paths. Work Engagement T1 only had a positive effect on Active Coping T2 ($\beta = .13$, $p < .01$), but not Job Control T2 ($\beta = -.06$, *ns*) or Work Relationships T2 ($\beta = -.01$, *ns*). Work Engagement T2, however, related consistently to Job Control T3 ($\beta = .10$, $p < .05$), Work Relationships T3 ($\beta = .17$, $p < .01$) and Active Coping T3 ($\beta = .12$, $p < .01$). Thus, H1b, H2b, and H3b were supported. Three effects from the included control variables attained significance below the five percent level. Age T1 related negatively to Work engagement T1 ($\beta = -.11$, $p < .05$), Part-time T2 related positively to Work Relationships T2 ($\beta = .10$, $p < .05$), Part-time T3 to Job Control T3 ($\beta = .10$, $p < .05$), and Job Change T3 to Work Relationships T3 ($\beta = .10$, $p < .05$). For complete results see Table 3.

Mediated Effects

The observed result pattern supported all the necessary direct effects to further test the specified mediation hypotheses. The significance of indirect effects was assessed in a product-of-

coefficient approach based on Sobel-Tests (Sobel, 1982), used in conjunction with the revised critical z-values (i.e., $z < 0.97$ for $p' < .05$ and $z < 1.10$ for $p' < .01$) by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002). These analyses are based on the unstandardized parameter estimates and standard errors of measurement, which are provided in Figure 1. Results are displayed in Table 4. Accordingly, all indirect effects of resource constructs at T1 that work engagement T2 mediated on resources at T3 are considered statistically highly significant. In particular, Work Engagement T2 mediated indirect effects of Job Control T1 on T3 ($\beta_{indirect}$ = .009, $p' < .01$), Work Relationships T1 on T3 ($\beta_{indirect}$ = .017, $p' < .01$), as well as Active Coping T1 on T3 ($\beta_{indirect}$ = .012, $p' < .01$), thus providing full support for H1c, H2c, and H3c.

Table 4 about here

Tests for Misspecification

The likelihood of model misspecification was assessed in two ways. First, we examined the Lagrange Multiplier (LM) statistics in our final model. Univariate LM's (modification indices) provide an estimate of the model's chi-square change associated with adding non-specified paths. An advantage of this approach over testing alternative nested models is that it does not require the researcher to arbitrarily modify the model. A recommended threshold of $LM_{df = 1} > 10$ was used to signify a substantial model improvement (e.g., Byrne, 2001), which would justify adding the respective non-specified path in light of concerns regarding overfitting and capitalization on chance (e.g., MacCallum, Roznowski, & Necowitz, 1992). Estimation results indicated that none of the 12 potential lagged effects among resource constructs would exceed this threshold.

Second, three alternative models were tested by systematically switching the positions of Work Engagement and each of the three resource constructs. By holding constant the degrees of freedom, this approach eliminates bias arising from changes in model parsimony. As compared models share the same degrees of freedom, no significance testing of (relative) differences is indicated, but rather all (absolute) differences are statistically meaningful (e.g., Byrne, 2001). All three alternative models had higher chi-square (see Table 2). Fit was worst when switching positions between Work Engagement and Active Coping ($\Delta\chi^2(0) = 20.27$), followed by Work Relationships ($\Delta\chi^2(0) = 14.71$), and Job Control ($\Delta\chi^2(0) = 9.36$). We conclude that there is no indication for model misspecification.

DISCUSSION

Our study provides further evidence for the existence of gain spirals between work engagement and both environmental and psychological resources. It goes beyond previous research by disentangling task-related, social, and intrapersonal gain spirals, demonstrating that these three are distinct and relatively independent processes. The former two correspond well with what Grant and Parker (2009, p. 317) have termed emerging "relational and proactive perspectives" in work design; that is, the realization that individuals can make a positive impact on their work tasks and workplace relationships. The latter represents a cycle of positive psychological development and active socialization, characterized by improved coping skills and growing resilience (e.g., Glantz & Johnson, 1999). Using a three-wave design, our study is the first to directly test the mediating role of work engagement in gain spirals. Results confirm assumptions of COR regarding the tendency for an accumulation of resources. Key resources of job control, work relationships, and active coping have been shown to facilitate the mobilization of additional resources via enhancing work engagement. Engagement, the experience of positive

work-related states of vigor, dedication, and absorption, thus acted as a hub – connecting resource spirals and channeling the positive effects of initial on subsequent resources.

Our study illustrates the need for a more dynamic perspective in organizational research. That is, cross-sectional studies, or what Avital (2000, p. 66) has called the "ubiquitous single-snapshot technique", may actually misconstrue the role of work engagement and related constructs of active well-being as both outcomes and antecedents of job, environmental, and individual characteristics. This seems to be especially relevant as in our study both the causal direction from resources to engagement and the reverse associations from engagement to resources were equally pronounced. In fact, the chi-square change that resulted from including the reverse paths from engagement on resource constructs actually exceeded the initial improvement of adding causal paths from resources on engagement. As such, some caution is recommended when assuming that engagement is predominantly a positive work *outcome*.

Although all specified hypotheses received support, the result pattern was not completely consistent across both measurement intervals. Complete reciprocal relationships were found only between active coping and work engagement. Initial lagged effects of Work Engagement T1 on Job Control T2 and Work Relationships T2 were not significant. Moreover, Work Relationships T2 did not relate to Work Engagement T3. Two explanations are offered for this finding. The first one relates to the respective time lag, which amounted to 14 months between T1 and T2 and 19 months between T2 and T3. For work engagement to affect environmental features might actually require a longer timeline than for the environment to affect engagement. Job characteristics and social relationships tend to be somewhat inert and typically cannot be changed at short notice (Hackman & Oldham, 1980; Parker et al., 2003). To be able to do so may require strategic actions, such as building a reputation of trustworthiness and reliability vis-à-vis peers and supervisors; positioning oneself for opportunities to take over tasks offering higher levels of

autonomy and discretion, or continuously enacting incremental modifications, which cumulatively lead to shifts in one's job profile over time. As such, it may be that the shorter time lag between T1 and T2 was more suitable to detect effects of job resources on engagement, whereas the longer interval between T1 and T2 was more appropriate for the reverse effects of engagement on the environment. Concomitantly, the emotional component of work relationships may affect engagement in a shorter term, than, for example, job control. In the absence of more specific guidelines for the timeline of effects, researchers should experiment with different time-lags to generate such rules of thumb. One possibility to do this are sliding time lags (e.g., 0.5, 1.0, and 1.5 years) and a continuous time modeling approach (e.g., Oud, 2002) to test effects across different measurement intervals.

The second explanation for incomplete reciprocal relationships lies in the nature of the respective constructs and their proximity to the working person. Reciprocal relationships were most consistent for active coping, followed by job control, and lastly work relationships. This order corresponds with the proximity of these constructs to the focal person. Whereas the first is a behavioral pattern, the second refers to individual work tasks, and the third to interactions with other persons at work. The more distal the resource domain, the more susceptible the respective relationships may be to external influences, such as opportunities for extending job control, the behavior of colleagues and supervisors, or changes in the social workplace climate. Some indication for this suggestion is found in the effects of control variables. Work relationships at T2 were positively affected by part-time employment; at T3, part-time work related to higher job control and workers who had changed job since the last wave reported better workplace relationships. The further removed the respective resources are from the focal individual, the more likely is it that other factors need to be taken into account as interferences or disturbances in gain spirals. Future research should explicitly address the situational characteristics under which

resources and engagement resonate with each other so that gain spirals can develop. More specifically, this might take the form of including moderator variables, for example, to represent the opportunities to craft one's job and positively impact social relationships at work.

Finally, previous research operationalizing personal resources in terms of self-efficacy beliefs and related positive self-evaluations, has suggested that these psychological aspects mediate between job resources and engagement (Llorens et al., 2007; Xanthopoulou et al., 2007, 2009). On the other hand, Hakanen et al. (2008) have proposed that work engagement mediates between job resources and proactive behavior (i.e., personal initiative). Operationalizing personal resources in terms of active coping behavior, our study supports the latter position. Work Engagement T2 mediated indirect longitudinal effects of Job Control T1 on Active Coping T3, but no substantial lagged effects among resource constructs were found. Considering theoretical differences between the investigated aspects of personal resiliency (i.e., psychological states versus behavior), this is not a contradiction. Yet, it points towards the need to further investigate the multiple roles that different types of personal resources play in facilitating gain spirals.

Limitations

Several limitations warrant attention. It has been pointed out that correlational studies are not suitable for testing resource gains in terms of mean changes (e.g., Xanthopoulou et al., 2009). This would require an intervention study or field experimental design, which we commend to further advance the resource gain perspective. For example, such an undertaking could include a work design intervention to increase job control, team building and/or coaching to improve social relationships at work, or a training program to enhance personal coping skills. In our study, observed mean changes in variables over time could imply external influences. These may be attributable to broader developments in the health care system (e.g., public health care reform, new tariff agreement). Establishing measurement invariance between measurement points

addresses this issue, as it shows that the variables preserved their structure and meaning. Our sample of hospital doctors may raise questions about generalizability to less high-qualified jobs. Although previous results suggest that the examined relationships are generic, demonstrated dynamics should be further validated in diverse occupational contexts. Further, there may be some reservations about the use of single-source self-report data. The design of our study, however, should dispel these concerns to the greatest extent. The inclusion of longitudinal autocorrelations controls for individual response tendencies (e.g., Pitts et al., 1996; Zapf et al., 1996), whereas the temporal separation of measurement points minimizes common method variance (e.g., Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). A remaining concern may be that based on our data it is not possible to separate objective from perceived changes. Although it is hard to refute this argument, there also is no reason to believe that employees' appraisal would change completely independent of their actual workplace conditions.

Indirect effects of resources T1 on resources T3 mediated via engagement T2 were small, which may raise questions about their practical relevance. As others have discussed before, however, low effect sizes in longitudinal studies are attributable to the variance absorbed by the autoregression (e.g., Lent, Sheu, Singley, Schmidt, Schmidt, & Gloster, 2008). Especially in correlational studies where variables are not intentionally manipulated, range restrictions will thus lead to small effects, which are more appropriately interpreted according to significance rather than size (Fichman, 1999). Comparative fit indices (IFI, TLI, and CFI) for the structural model were relatively low. Although they complied with the conventional rule of thumb of .90 or above (e.g., Byrne, 2001), they did not measure up to the more rigorous cut-off values of .95, suggested by Hu and Bentler (1999) based on simulation studies. Their recommendations, however, are not uncontroversial. A more recent replication of their approach has come to the conclusion that their revised cut-offs lack generalizability and are overly restrictive (Marsh, Hau,

& Wen, 2004). A possible explanation for the low values in our study lies in the inclusion of control variables with only sporadic significant effects. As these fit indices compare the specified model to a structural null model, where variables are assumed to be independent, they may be particularly sensitive to the inclusion of controls.

A methodological highlight of our study is the use of item-level SEM, which brings to bear the full advantage of integrated estimation of the measurement and structural model (e.g., Byrne, 2001). This is methodologically superior to the widely used alternative of aggregating items to parcels (e.g., Hall, Snell, & Foust, 1999). Although item parceling is a legitimate strategy with certain merits (e.g., improved ratio of sample size and model parameters), it eliminates distinct advantages of SEM. It assumes that scale parcels are measured with perfect reliability and allows to model random error only on a scale level, but not on the item level, where it actually occurs (Coffman & MacCallum, 2005). These limitations are even more pronounced in manifest path analysis or traditional regression. Moreover, only complete item-level SEM permits accounting for the non-independent nature of the measurement error terms of the same items over time (e.g., Pitts et al., 1996). By carefully establishing the measurement models and their invariance across measurement points, we ensured that the methodological rigor of our study is above the average.

Conclusion

Adopting a more dynamic perspective is an important step to advance research on worker well-being. Longitudinal research using the advantages of the cross-lagged panel design provides the means to empirically test long-held theories on the interaction between individuals, their work tasks, and their social work environment as well as the intrapersonal dynamics of a positive occupational socialization. Yet, this line of empirical research has emerged only recently and has just begun to explore questions regarding the existence and timeline of reciprocal relationships

between environmental and individual factors and active work-related well-being. Our study emphasizes the importance of job control, positive work relationships, and active coping behavior as three key resources of the task, social, and personal domain. It has shown that these resources enhance work engagement and trigger positive developments that enable employees to make a positive impact on their work and interpersonal relationships. It thus provides further evidence that workers are not passive job recipients, but active crafters of their jobs. In line with COR, our study also indicates that an adequate task-related, social, and personal resource pool may be a precondition for worker to enact this positive role. As such, organizations should not rely on workers to self-design their jobs. However, by triggering self-reinforcing gain spirals, well-designed jobs and positive relationships at work can have multiplying effects, which eventually may result in an increasingly engaged workforce that makes positive developments happen.

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Tables

TABLE 1

Descriptive Statistics and Correlations

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Gender (♀)	–	–																			
2. Age T1	30.50	2.71	-.13**																		
3. Tenure T1	2.65	1.25	-.05	.36**																	
4. Part-Time T1	–	–	.13**	.02	-.03																
5. Part-Time T2	–	–	.21**	.02	.01	.53**															
6. Part-Time T3	–	–	.21**	.00	.05	.42**	.50**														
7. Job Change T2	–	–	.14**	-.03	-.04	.01	.03	.03													
8. Job Change T3	–	–	.07	-.03	-.10*	-.05	.02	-.03	.29**												
9. Job Control T1	2.64	0.69	.06	.02	-.01	.07	.07	.06	.02	-.01											
10. Job Control T2	2.46	0.67	.09	.08	.05	.13**	.12*	.03	.07	.04	.48**										
11. Job Control T3	2.55	0.75	.03	.10*	.14**	.13**	.05	.11*	.09	.04	.43**	.53**									
12. Work Relationships T1	3.58	0.66	.01	-.12*	-.15**	-.02	-.06	-.04	-.05	.01	.38**	.20**	.11*								
13. Work Relationships T2	3.53	0.69	.06	-.03	-.04	-.01	.07	-.07	.03	-.04	.23**	.42**	.18**	.48**							
14. Work Relationships T3	3.52	0.68	-.03	-.05	-.12*	.01	-.00	-.04	.05	.07	.24**	.30**	.34**	.41**	.54**						

15. Active Coping T1	2.92	0.50	.05	.05	.11*	.03	.02	.06	-.03	.00	.04	.03	.11*	.02	.11*	.10*					
16. Active Coping T2	2.96	0.53	.01	.03	.10*	.03	.04	.11*	-.02	.01	.12*	.08	.08	.02	.12*	.13**	.51**				
17. Active Coping T3	2.99	0.54	.07	-.06	-.00	.04	.09	.09	-.02	.07	.18**	.12*	.17**	.07	.08	.18**	.38**	.52**			
18. Work Engagement T1	4.57	1.01	.05	-.10*	-.02	.01	-.02	-.01	-.05	-.06	.31**	.09	.16**	.33**	.15**	.21**	.25**	.19**	.25**		
19. Work Engagement T2	4.52	1.02	.04	-.05	-.02	.04	.05	-.04	.05	-.08	.25**	.25**	.23**	.25**	.28**	.26**	.21**	.28**	.24**	.61**	
20. Work Engagement T3	4.42	1.04	.02	-.04	.02	.10	.11*	.02	.03	-.05	.20**	.24**	.34**	.13**	.17**	.37**	.23**	.24**	.32**	.57**	.65**

Notes: $N = 416$; $^{**}p < .01$, $^{*}p < .05$; M = Mean; SD = Standard Deviation.

TABLE 2

Structural Equation Modeling Results

	χ^2	*df*	χ^2/df	IFI	TLI	CFI	RMSEA [CI]
CFA Resources: 9 factors	**612.95****	**426**	**1.44**	**.97**	**.96**	**.97**	**.033 [.027; .038] ns**
CFA Resources: 1 factor (general factor)	3176.68**	462	6.88	.50	.43	.50	.119 [.115; .123]**
CFA Resources: 3 factors (each wave combined across constructs)	2474.62**	459	5.39	.63	.57	.63	.103 [.099; .107]**
CFA Resources: 3 factors (each construct combined across waves)	2040.00**	459	4.44	.74	.69	.61	.091 [.087; .095]**
CFA Resources: 6 factors (control-relationships combined)	1386.90**	447	3.10	.83	.80	.83	.071 [.067; .075]**
CFA Resources: 6 factors (control-coping combined)	1731.28**	447	3.87	.77	.72	.76	.083 [.079; .087]**
CFA Resources: 6 factors (relationships-coping combined)	1717.77**	447	3.84	.77	.72	.77	.083 [.079; .087]**
CFA Engagement: 3 factors	**632.74****	**294**	**2.15**	**.96**	**.95**	**.96**	**.053 [.047; .058] ns**
CFA Engagement: 1 factor (general factor)	3128.29**	297	10.53	.66	.60	.66	.152 [.147; .156]**
CFA Complete: 12 factors	**2385.58****	**1584**	**1.51**	**.94**	**.94**	**.94**	**.035 [.032; .038] ns**
CFA Complete: 9 factors (engagement-control combined)	3567.83**	1614	2.21	.86	.85	.86	.054 [.052; .056]**
CFA Complete: 9 factors (engagement-relationships combined)	3395.66**	1614	2.10	.88	.86	.88	.052 [.049; .054] ns
CFA Complete: 9 factors (engagement-coping combined)	3426.73**	1614	2.12	.87	.86	.87	.052 [.050; .054] ns
CFA Complete: 12 factors (invariance across waves, step 1)[a]	2419.14**	1616	1.50	.94	.94	.94	.035 [.032; .037] ns
CFA Complete: 12 factors (invariance across waves, step 2)[b]	2431.53**	1624	1.50	.94	.94	.94	.035 [.032; .037] ns

CFA Complete: 12 factors (invariance across waves, step 3)[c]	2447.33**	1636	1.50	.94	.94	.94	.035 [.032; .037] ns
Structural Model: Stability Model (autoregression paths, controls)	3529.43**	2090	1.69	.90	.89	.90	.041 [.038; .043] ns
Structural Model: Effects of resources on engagement[d]	3503.09**	2084	1.68	.91	.90	.90	.041 [.038; .043] ns
Structural Model: Reciprocal effects (final model, see Figure 1)[e]	**3470.53****	**2078**	**1.67**	**.91**	**.90**	**.91**	**.040 [.038; .043] ns**
Alternative Structural Model 1 (engagement & control switched)	3479.89**	2078	1.68	.91	.90	.91	.040 [.038; .043] ns
Alternative Structural Model 2 engagement & relationships switched)	3485.24**	2078	1.68	.91	.90	.91	.040 [.038; .043] ns
Alternative Structural Model 3 (engagement & coping switched)	3490.80**	2078	1.68	.91	.89	.90	.040 [.038; .043] ns

Notes: $N = 416$; $^{**}p < .01$, $^{*}p < .05$; χ^2 = chi-square discrepancy, *df* = degrees of freedom; χ^2/df = relative chi-square; IFI = Incremental Fit Index; TLI = Tucker Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = 90% Confidence Interval; Δdf = change in degrees of freedom; $\Delta\chi^2$ = change in chi-square;

[a] Invariant factor loadings; compared to unconstrained model: $\Delta\chi^2(32) = 33.56$ ns

[b] Invariant factor loadings and variances; compared to step 1: $\Delta\chi^2(8) = 12.39$ ns

[c] Invariant factor loadings, variances; and covariances; compared to step 2: $\Delta\chi^2(12) = 15.80$ ns

[d] Compared to stability model: $\Delta\chi^2(6) = 26.34$, $p < .01$

[e] Compared to previous model: $\Delta\chi^2(6) = 32.56$, $p < .01$

TABLE 3

Effects of Control Variables in Structural Model

	Gender T1	Age T1	Tenure T1	Part-Time T1	Part-Time T2	Job Change T2	Part-Time T3	Job Change T3
Job Control T1[a] / T2[b] / T3[c]	.09	.01	-.01	.05	.07	.07[o]	.10*	.02
Work Relationships T1[a] / T2[b] / T3[c]	-.02	-.06	-.10[o]	-.04	.11*	.05	.01	.10*
Active Coping T1[a] / T2[b] / T3[c]	.07	.01	.11[o]	.03	.05	.02	.05	.07
Work Engagement T1[a] / T2[b] / T3[c]	.04	-.11*	.02	.01	.06	.08	.03	-.01

Notes: $N = 416$; *$p < .05$; [o]$p < .10$; effects of controls on study variables in the structural model (Figure 1); standardized regression weights.

[a] First four columns refer to effects of controls on study variables at T1.

[b] Fifth and sixth column refer to effects of controls T2 on study variables at T2.

[c] Last two columns refer to effects of controls T3 on study variables at T3.

TABLE 4

Indirect Effects of Resources Constructs T1 on T3 Mediated via Work Engagement T2

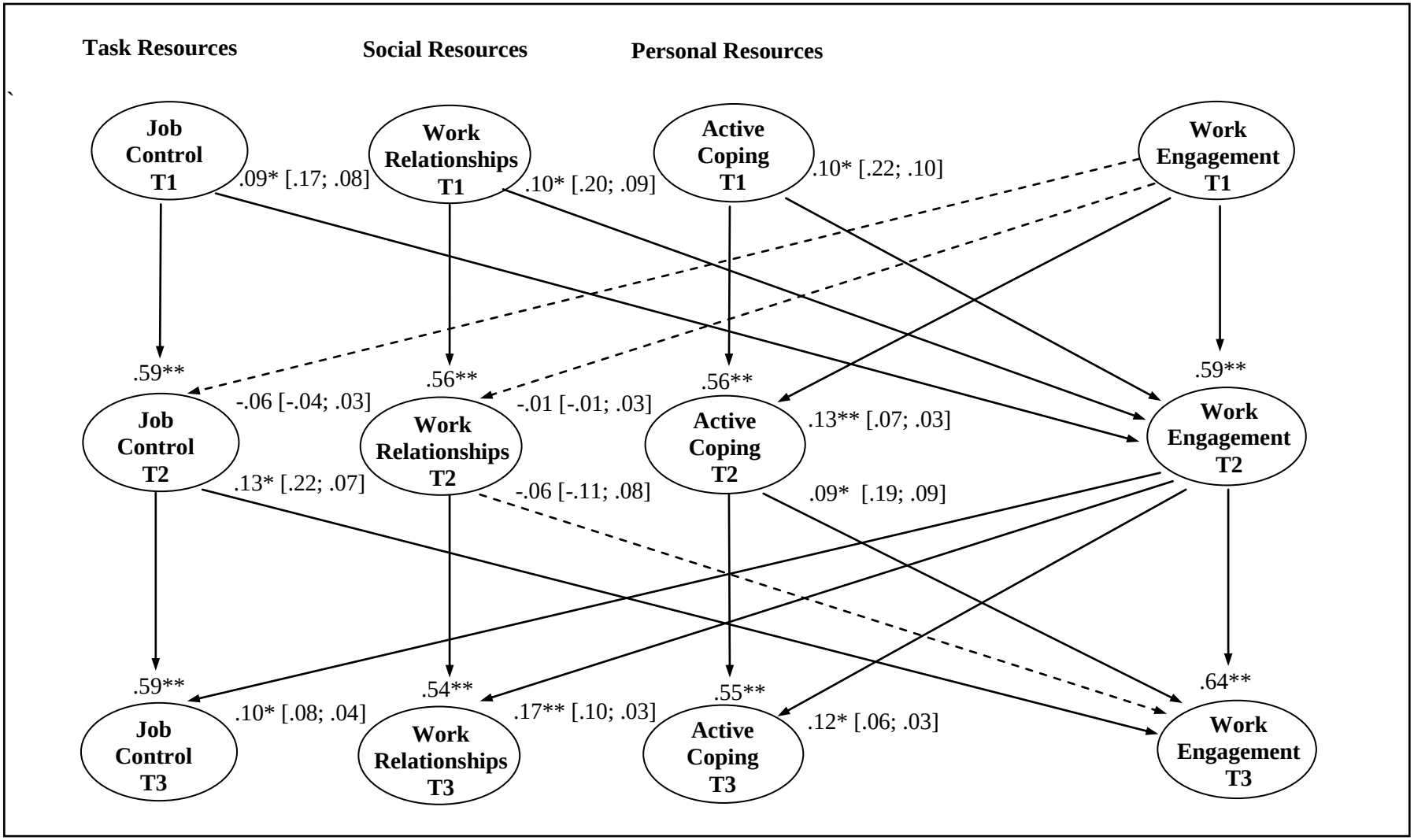
	Job Control T1	Work Relationships T1	Active Coping T1
Job Control T3	.009** [.014; .009], z = 1.46	.010** [.016; .011], z = 1.49	.010** [.018; .012], z = 1.48
Work Relationships T3	.015** [.017; .009], z = 1.79	.017** [.020; .011], z = 1.85	.017** [.022; .012], z = 1.84
Active Coping T3	.011** [.010; .007], z = 1.46	.012** [.012; .008], z = 1.49	.012** [.013; .009], z = 1.48

Notes: N = 416; ***p'* < .01 based on z < 1.10 (MacKinnon et al., 2002); values in brackets are unstandardized estimates and standard errors of measurement.

Figure

Figure 1

Structural Model



Notes: $N = 416$; $^{**}p < .01$, $^{*}p < .05$; values in brackets are unstandardized estimates and standard errors of measurement; measurement models and control variables not displayed; job control and work relationship each use four items as manifest indicators, active coping is measured with three and work engagement with nine items.