A Situated Process Model of Vocational Achievement Goal Striving Within Members of the Academic Staff at University

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Abstract

Building on achievement goal approach and Self-Determination Theory, we propose a concise process model of achievement goal striving within academic staff members working at universities. We investigate this model in a sample of 107 academic staff members, who we questioned twice a day over the course of two weeks resulting in 1653 measurement occasions. Using two-level structural equation modeling, we found that substantial amounts of variance in situated achievement goals could be attributed to personal goal orientations. Life aspirations indirectly predicted the general strength of situated achievement goal striving via personal goal orientations. Finally, the situational satisfaction of the basic psychological needs for autonomy, competence and relatedness was differentially predictive for fluctuations in situated achievement goal striving, which in turn predicted situational intrinsic work motivation and work engagement. Our research ties achievement goal approach more closely to Self-Determination Theory and delivers a first outlook on the importance of working conditions in academia for goal setting processes and vocational motivation.

Keywords: Achievement goals, Basic Psychological Needs, Personal Goal Orientations, Intrinsic Motivation, Academic Staff

A Situated Process Model of Vocational Achievement Goal Striving

Within Members of the Academic Staff at University

Introduction

Vocational motivation of university employees and university instructors (in the following text subsumed under the term academic staff members) is becoming a trending topic in motivational research (Barkhuizen, Rothmann, & Vijver, 2014; Daumiller, Grassinger, Dickhäuser, & Dresel, 2016; Stupnisky, Hall, Daniels, & Mensah, 2017). We believe that achievement goals are an especially important aspect of this topic since they have proven to explain differences in workplace behavior as well as occupational well-being (Butler, 2007; Janssen & Van Yperen, 2004; Retelsdorf, Butler, Streblow, & Schiefele, 2010; Van Yperen, Blaga, & Postmes, 2014). Here, we define achievement goals in line with Pintrich (2000) as the purposes or reasons an individual is pursuing in achievement situations. While there have been several attempts to establish different classes of achievement goals in the literature, the strongest consensus still lies in the distinction between mastery or *learning goals* (striving for competence enhancement) and *performance goals* (also called performance approach goals, i.e. striving to demonstrate high competencies; Dweck & Leggett, 1988). There is also a substantial body of evidence suggesting that *performance avoidance goals* (striving to cover the lack of own competencies) can and should be distinguished from performance approach goals (for further ellaborations on this issue see Janke et al., 2016; Murayama, Elliot, & Yamagata, 2011). Moreover, *work avoidance goals* (striving to avoid work load) have proven to be particularly predictive in the work domain (Nitsche, Dickhäuser, Fasching, & Dresel, 2011, 2013). Pioneer research work by Daumiller and colleagues (2016) has found that learning, performance approach, performance avoidance and work avoidance goals are indeed suitable to predict academic staff members' self-efficacy as well as the ascribed quality of their teaching measured by students teaching evaluations. While these findings contribute to the growing body of evidence on the relevance of

achievement goals, we know little about factors that influence the goal-setting process in academic staff members or even employees in other working domains for that matter. This is an important research gap since knowledge about the goal-setting process is crucial to identify fluctuating aspects of the working environment that can be targeted to influence vocational motivation. Here we propose a concise situated process model of vocational achievement goal striving. The model provides a first comprehensive view of dispositional and situated antecedents of achievement goals within academic staff members. It also aims to provide further evidence on the relationship between outcome-oriented (i.e., goals) and task-based vocational motivation (i.e., intrinsic work motivation, work engagement). The process model encompasses three central tenets, namely that goals are presumably (1) hierarchically organized, (2) influenced by satisfaction of basic psychological needs and (3) affect task-based vocational motivation. These three tenets are heavily founded in *Self-Determination Theory*, on which we will now elaborate in greater detail.

Self-Determination Theory as Foundation of the Proposed Process Model

Self-Determination Theory (SDT) is a meta-theory of human motivation that is based on the core assumption that all humans share an inherent striving for personal growth over the course of their lifetime (Deci & Ryan, 2002; Ryan & Deci, 2017). This assumption allows a clear differentiation of intrinsic motives for personal growth from external motives like striving for personal success through admiration by others (Deci, Koestner, & Ryan, 2001; Deci & Ryan, 1985). To understand why SDT can be helpful to understand achievement goal striving in members of the academic staff, we have to consider how the differentiation between intrinsic and extrinsic goals can be applied to achievement goal striving. Learning goals can be characterized as intrinsic goals because they directly emphasize the value of personal growth through learning. Performance goals, however, are founded in the evaluation of one's competencies by others (Elliot, McGregor, & Thrash, 2002), which inherently binds them to external standards. Therefore, performance goals can be considered as extrinsic goals.

Finally, work avoidance goals are characterized as personal motives for conservation of resources and, thus, reflect a less agentic goal class[1]. Based on the assumption that learning and performance goals can be classified as intrinsic or extrinsic goal classes, we can further elaborate on the first central tenet of our proposed process model, which is that broader goals affect achievement goal striving.

First Tenet of the Process Model: Goal Hierarchies

Goal theorists have often articulated that human goal striving follows a goal hierarchy, with broader long-term goals influencing situated short-term goals (Boekaerts, de Koning, & Vedder, 2006). Thereby, the highest tier of goal striving is represented in broad *life aspirations*

[1] While this clear classification of achievement goals in terms of SDT may be intuitively fitting, some researchers might also consider it simplified or even controversial. More specifically, Vansteenkiste, Lens, Elliot, Soenens, and Mouratidis (2014) have prominently claimed that achievement goals could both be adopted for intrinsic or extrinsic reasons regardless of goal content. However, the result pattern of empirical studies on this matter indicated that some reasons were more prominent within certain goal types: For example, Gaudreau (2012) found that learning goals were more often adopted due to intrinsic reasons than performance goals. While this pattern was not present in a more recent study by Michou, Vansteenkiste, Mouratidis, and Lens (2014), the researchers found that performance approach goals were more strongly associated to extrinsic reasons than learning goals. In sum, the empirical evidence support our assumptions that learning goals can be considered as rather intrinsic goals and performance goals as rather extrinsic goals, even though it remains possible that reasons behind achievement goals may vary to some degree between situations (see especially Vansteenkiste, Mouratidis, Van Riet, & Lens, 2014 regarding empirical support for this notion).

(Kasser & Ryan, 1993, 1996) and the lowest tier is represented in situated goal striving in a clearly defined context. Furthermore, *personal goal orientations* form an intermediate tier of goal striving linking highly fluctuating *situated achievement goals* (i.e., lowest tier of achievement goal striving) to broader goal classes (Breland & Donovan, 2005; Payne, Youngcourt, & Beaubien, 2007). Personal goal orientations are characterized as a broad set of beliefs and attitudes regarding achievement that increase the likelihood that an individual adopts certain achievement goals (Murayama, Elliot, & Friedman, 2012). The inclusion of the achievement goal construct into the terminology of SDT allows connecting these personal goal orientations to life aspirations as the highest tier of human goal striving. More specifically, we assume that life aspirations influence these personal goal orientations and this influence is a direct function of the goal content. This means that a learning goal orientation should align well with broader intrinsic life aspirations addressing personal growth, while both performance approach and performance avoidance goal orientations should correspond with extrinsic life aspirations aiming for personal accomplishments concerning personal wealth or status (Ku, Dittmar, & Banerjee, 2012; Mouratidis, Vansteenkiste, Lens, Michou, & Soenens, 2013).

Empirical support for the association between life aspirations and personal goal orientations has been provided for athletes, students and teachers in secondary education (Janke & Dickhäuser, 2016). Even though most of the conducted research on this matter has been correlational, it is more likely that life aspirations influence personal goal orientations than vice versa due to the context-bound nature of the latter goal class. Life aspirations, however, are context-transcending and not limited to achievement situations in their influence (Djeriouat, 2017; Unanue, Vignoles, Dittmar, & Vansteenkiste, 2016) and have proved to be quite stable over large time spans (Kasser et al., 2014). Bidirectional influences still remain possible over the life span but are probably more likely to occur in life-phases that are susceptible to change in personal values (for example during adolescence). Academic staff

members, however, are more likely to enter academia with an already developed set of life aspirations that influences their personal goal orientation in the new context.

In sum, the integration of achievement goal research into SDT delivers a clear outlook on the way life aspirations may directly influence personal goal orientations, which in turn may influence the goal-setting process in work-related achievement situations. Moreover, SDT may also provide a helpful rationale to identify situated antecedents for the achievement goal striving of academic staff members. Thereby, we postulate that the goal-setting process can be influenced by providing conditions that satisfy or dissatisfy the basic psychological needs for autonomy, competence and relatedness.

Second Tenet of the Process Model: Need Satisfaction and Achievement Goals

SDT postulates that all humans share three *basic psychological needs for autonomy, competence and relatedness*. The satisfaction of psychological needs ensures that personal growth is possible in the respective environment, which in turn makes individuals more likely to engage in intrinsic goal striving (Deci & Ryan, 2000; Ryan & Deci, 2017). The provision of autonomy ensures the relative freedom to pursue intrinsic motives, competence support strengthens the belief that those aims are achievable, and perceived relatedness indicates that the social environment will welcome the endeavors of the individual. Research on students supports the idea that need supportive environments facilitate learning goal striving in students (Ames, 1992; Lüftenegger, van de Schoot, Schober, Finsterwald, & Spiel, 2014; Patrick, Anderman, Ryan, Edelin, & Midgley, 2001). Moreover, work on the nature of working conditions of secondary school teachers has indeed shown that the general level of perceived need satisfaction is associated with the strength of a learning goal orientation in teaching personnel (Janke, Nitsche, & Dickhäuser, 2015). Research has also shown that large parts of the variance in need satisfaction can be attributed to the respective situation (current lesson) rather than to personal characteristics (Evelein, Korthagen, & Brekelmans, 2008). This may be especially true for members of the academic staff, who have to handle a wide variety

of tasks over the course of their workday and are also challenged by the increasing importance of actual job mobility resulting in changing workplace conditions (Fernández-Zubieta, Geuna, & Lawson, 2015; Netz & Jaksztat, 2016). In sum, it can be expected that perceived need satisfaction qualifies as a situated influence factor for achievement goal striving. We think that it is important to identify such situated influence factors since influencing situated achievement goal striving may also provide the tool to indirectly influence task-related aspects of vocational motivation.

Third Tenet of the Process Model: Achievement Goals and Vocational Motivation

Achievement goals represent outcome-centered aspects of vocational motivation by describing what motivates an individual to engage in working tasks. We assume, that these goals also influence task-based motivation. Here we consider two aspects of vocational motivation as potential consequences of achievement goals that have been linked to human goals or motives in the past: Intrinsic work motivation and work engagement. Intrinsic work motivation is defined as the motivation to freely engage in the working task due to personal interest without the necessity for external pressure and under the experience of enjoyment. Individuals tend to be intrinsically motivated for tasks that offer them the possibility for personal growth (Deci & Ryan, 2000, 2002), which may be an explanation for the often found association between learning goals (i.e., the goal to grow in one's competencies) in a particular domain and the respective strength of intrinsic motivation (Elliot & Harackiewicz, 1996; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Harackiewicz & Elliot, 1993). The same studies also show that avoidance goals are often negatively related to intrinsic motivation, which may reflect that individuals who focus on the prevention of negative outcomes are less likely to see the positive opportunities for personal growth in a certain situation.

Work engagement as the second investigated aspect of vocational motivation has been defined as a multifaceted construct consisting of dedication to one's work, experienced vigor

during the working process and absorption in the working activity (Bakker & Demerouti, 2008; Schaufeli, Bakker, & Salanova, 2006). In contrast to intrinsic motivation, work engagement depicts personal dedication to the working process independently of the reason behind this dedication. This means as long as the individual finds a reason to engage in their work (either personal growth or personal success, see also Bakker & Demerouti, 2008), they are supposedly more likely to do so vigorously. Thus, we expect that both approach goals foster the strength of work engagement, while avoidance goals should be negatively associated to this outcome variable.

Summary of the Situated Process Model of Achievement Goal Striving and Hypotheses

The main objective of this article is to propose a concise situated process model of vocational achievement goal striving within the academic staff at university. We have postulated three central tenets for this process model that serve as its base and provide the hypotheses for the following empirical investigation of the model.

The first tenet is that human goal striving is organized in a hierarchical fashion. Thus, broader goals influence more situated goals. A personal goal orientation should be positively predictive for situated achievement goals with the same goal content (e.g., learning goal orientation supposedly predicts situated learning goals). Furthermore, we postulate that intrinsic life aspirations would be indirectly linked to situated learning goals through a learning goal orientation and that extrinsic life aspirations would be indirectly linked to both performance goals through the respective performance goal orientation. We do not expect a work avoidance goal orientation to align with any life aspiration because it rather indicates the personal striving for conservation of resources rather than an agentic goal complex.

The second tenet of the proposed process model is that situational perceived need satisfaction influences achievement goal striving. More precisely, we hypothesized that situational perceived need satisfaction is directly linked to situated learning goals. We had no initial assumptions regarding the association between situational perceived need satisfaction

and the strength of other situated achievement goals. Nevertheless, we decided to investigate these associations in exploratory analyses to contribute to a better understanding of the importance of need satisfaction for goal setting processes.

The third tenet of the process model is that outcome-focused achievement goals influence task-related vocational motivation. Thereby, we postulated that learning goals would foster situational intrinsic work motivation, while (performance and work) avoidance goals would decrease situational intrinsic work motivation. Since previous results regarding effects of performance approach goals have tended to be less clear, we had no clear hypotheses linking performance approach goals to intrinsic work motivation. We investigated this relationship openly to provide new empirical information on the ongoing research regarding the role of performance approach goals in facilitating optimal motivation (Midgley, Kaplan, & Middleton, 2001). Additionally, we hypothesized that (learning and performance) approach goals should be positively predictive for work engagement, while (performance and work) avoidance goals should be negatively predictive for work engagement.

Research on the impact of achievement goal striving on task-based vocational motivation has to take into account that broader goals like personal goal orientations are most likely to affect broad aspects of motivation, while situated goals are more likely to affect situational motivation and actual behavior. This is because individuals often tend to ignore concrete aspects of the situation when thinking about their general values and overarching motives. In contrast, individuals are supposedly more likely to consider concrete aspects and restrictions of the situation at hand when they think of their situational goals (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009; Trope & Liberman, 2010). This means that situational goals more likely influence situational motivation and behavior since they already encompass knowledge about opportunities and restrictions for goal striving in the given situation. This has also been pointed out by Elliot (2005; p. 66): *"From an empirical stand point, it is well established that the predictive utility of an independent variable is maximized*

when it is operationalized at the same level as the dependent variable of interest (see Ajzen & Fishbein, 1977). This correspondence between independent variable and dependent variables is violated in achievement goal research that seeks to predict affect, cognition, or behavior in a specific achievement situation with a dispositional achievement goal measure." Taken together, we assumed that situated achievement goals have a maximum impact on situational intrinsic work motivation and situational work engagement. For this reason, we assigned a special focus to the situational level of the proposed process model in the following study.

However, we also assumed that personal goal orientations would be indirectly tied to work engagement and intrinsic work motivation via situated achievement goals. Finally, we hypothesized that influences of situated achievement goals on vocational motivation persist even after accounting for direct effects of situational perceived need satisfaction. This is an important notion because perceived satisfaction of the basic psychological needs can influence vocational motivation with higher need satisfaction contributing to stronger intrinsic motivation and engagement (Deci, Ryan, et al., 2001; Gagné & Deci, 2005; Milyavskaya & Koestner, 2011). In fact, it has already been shown that the general level of situational perceived need satisfaction is associated with the general level of intrinsic work motivation within doctoral candidates (i.e. young members of the academic staff; see Collie, Shapka, Perry, & Martin, 2015).

Even though all three tenets of the proposed process model are heavily inspired by preceding research, we think that the integrative and comprehensive perspective sets our process model apart from other goal models. In addition, we think that the suggested model is the first process model that delivers a rather comprehensive outlook on the antecedents of vocational motivation of the academic staff at university. We illustrate the final process model of situated achievement goal striving including all predicted and explored paths in *figure 1*.

--- insert Figure 1 about here ---

Method

Sample

We conducted an intensive longitudinal study with 113 members of various universities' academic staff (66.4 % female, M_{Age} = 30.8 years; *SD* = 4.94 years) over the time span of two weeks. The participants were mostly employed at universities in Germany (90.3%) or German speaking countries (Austria, Switzerland) and reported working 43.31 hours/week on average (*SD* = 10.76 hours/week). They conducted their research in a wide array of research fields, with most working in the social sciences (59.8%), followed by humanities (13.4%) as well as natural and life sciences (12.5%). Furthermore, minor groups of participants were doing research in engineering (7.1%), computer sciences (3.6%) as well as economic sciences and law (both 1.8%). One person omitted information on her field of studies. Most of the participants were doctoral candidates (79.4% and 20.6% post-docs). The participants had been employed for a mean duration of 3.61 years (*SD* = 3.01 years). For a better understanding of our sample, we want to clarify that doctoral candidates are mostly members of the academic staff (and not students) in German universities and, thus, perform working tasks in research, teaching as well as administrative tasks. On average, the participating staff members reported investing about 28.6 percent of their working time in teaching related tasks and 50.7 percent of their working time in research related tasks. The participants used the remaining time to engage in administrative tasks.

Procedure

We measured life aspirations, personal goal orientations as well as demographic information in an initial online survey, which we distributed one week in advance of the intensive longitudinal study via academic mailing lists and social media. The participants were then automatically contacted twice per day (morning and afternoon) via email over the course of the following two working weeks. These daily measures included questions on

situational perceived need satisfaction, situated achievement goals for the respective first or second half of their workday and situational vocational motivation. We conducted these measurements from Monday to Friday (typical duration of the working week), which resulted in twenty singular measurement occasions over the course of two weeks in total. We assured participants that all of their responses would remain confidential and would be used for scientific purposes only.

Measures

Initial Online Survey

Life Aspirations were assessed with the German Version of the Aspiration Index (Klusmann, Trautwein, & Lüdtke, 2005). This instrument consists of two scales that reflect intrinsic and extrinsic life aspirations. Each of the scales had three subscales with five items each. The subscales that indicate extrinsic life aspirations are Fame, Wealth and Image. In contrast, the subscales that indicate intrinsic life aspirations are Personal Growth, Relationships as well as Community[2]. In sum, intrinsic life aspirations as well as extrinsic life aspirations were both indicated by 15 items, which we aggregated to general scores. A sample item measuring intrinsic life aspirations ($\alpha = .86$) is *"It is an important life goal for me to decide what to do for myself rather than subject myself to the constraints of life"* (subscale Personal Growth), while a sample item for extrinsic life aspirations ($\alpha = .89$) is *"It is an important life goal for me to be rich"* (subscale Wealth). All items were measured with a Likert-type scale ranging from 1 (*total disagreement*) to 7 (*total agreement*).

[2] The original scale also included the subscale Health indicating intrinsic life aspirations. However, Klusmann et al. (2005) found that this subscale could be characterized as an intrinsic as well as an extrinsic life aspiration. Thus, we decided to exclude this particular subscale from our analyses due to its high ambiguity.

Personal Goal Orientations were assessed with an adapted version of a well validated German self-report questionnaire ("Skalen zur Erfassung der Lern- und Leistungsmotivation"; SELLMO; Spinath, Stiensmeier-Pelster, Schöne, & Dickhäuser, 2002) that is typically used to measure the personal goal orientations of students. We adapted the wording of the original items in order to more closely tie them to the working context of members of the academic staff at university. The questionnaire had four subscales measuring Learning Goal Orientation (α = .84; sample item: "*In my vocation at university it is important to me to learn interesting things"*), Performance Approach Goal Orientation (α = .84; sample item: "*In my vocation at university it is important to me to demonstrate that I am good at my job"*), Performance Avoidance Goal Orientation (α = .89; sample item: "*In my vocation at university it is important to me that nobody recognizes when I fail to understand something"*) and Work Avoidance Goal Orientation (α = .84; sample item: "*In my vocation at university it is important to me to avoid working hard"*). Each subscale consisted of eight items with the exception of performance approach goal orientation, which only comprised seven items. All items were measured with a Likert-type scale ranging from 1 (*total disagreement*) to 7 (*total agreement*).

Daily Measures

All of the daily measures were specifically tailored to the context of this study and the frequency of the measurement. In other words, they needed to be situated, concise (see also Goetz, Sticca, Pekrun, Murayama, & Elliot, 2016 regarding the necessity of a low number of items for situated measures) and applicable to the working context of members of the academic staff. We validated the respective measures in a pretest sample that was comparable

to our final sample[3]. We will elaborate on the findings of this pretest when introducing the respective measures in the following paragraphs. However, when reporting the reliability of the scales, we refer to the final sample rather than to the pretest sample. We used the Spearman-Brown coefficient to assess reliability for all scales that consisted of only two items (as recommended by Eisinga, Grotenhuis, & Pelzer, 2013). Furthermore, we report lower and upper bounds of reliability observed at the singular measurement occasions. The items of all subsequently described scales were measured with a Likert-type scale ranging from 1 (*total disagreement*) to 7 (*total agreement*).

Situated Achievement Goals were assessed with four newly constructed Short Scales for Situated Achievement Goal Striving, which consisted of two items each. The subscales measured Situated Learning Goals (ρ = .66 - .86; sample item: "*This morning/afternoon it is an important goal to me to learn as much as possible"*), Situated Performance Approach Goals (ρ = .79 - .94; sample item: "*This morning/afternoon it is an important goal to me to demonstrate that I am good at what I do"*), Situated Performance Avoidance Goals (ρ = .78 - .93; sample item: *"This morning/afternoon it is an important goal to me to conceal when I am bad at something"*) and Situated Work Avoidance Goals (ρ = .76 - .92; sample item: *"This morning/afternoon it is an important goal to me to avoid working hard"*). While these items were similar in their wording to the items of the goal orientations measure to capture the essence of the respective achievement goal, they were bound to the current situation rather than addressing overarching tendencies. Consequently, the association with the corresponding scales of the SELLMO reached values between $r = .56$ and $r = .67$ indicating that the scale

[3] The pretest sample consisted of 126 members of various universities' academic staff (65.9 % female, $M_{Age} = 31.9$ years; $SD = 6.96$ years). The participants reported working 40.26 hours/week on average ($SD = 44.83$ hours/week). The participants were predominantly doctoral candidates (84.1% and 15.9% post-docs).

measured similar (same goal content) but not identical constructs (different generality level). Furthermore, a principal component analysis with the pretest data delivered further evidence for the assumed four-factor structure (all $\lambda > .80$), which accounted for 81.62 percent of the total item variance.

Situational Perceived Need Satisfaction was assessed with a newly constructed Situated Need Satisfaction Short Scale consisting of six items. The measure was strongly inspired by the Basic Psychological Needs Scale (BPNS, 21 items; Deci, Ryan, et al., 2001) and the Balanced Measure of Psychological Needs (BMPN, 18 items; Sheldon & Hilpert, 2012). The measure encompassed three subscales measuring Perceived Autonomy ($\rho = .86$ - .97; sample item: *"At this moment I have the feeling that I can decide for myself how to engage in my work"*), Perceived Competence ($\rho = .82$ - .95; sample item: *"At this moment I have the feeling that I am good and competent in my working tasks"*) and Perceived Relatedness ($\rho = .86$ - .97; sample item: *"At this moment I have the feeling that I am close and connected with my colleagues"*) with two items each. These subscales reached associations in between $r = .62$ and $r = .73$ with the corresponding subscales of the BMPN indicating their respective convergent validity. Moreover, the subscales showed only low to moderate associations with the other subscales of the BMPN ($r = .12$ - .36) and each other ($r = .03$ - .29) indicating their divergent validity. In line with these findings, a principal component analysis with the pretest data suggested the extraction of three factors (all $\lambda > .90$), which explained 86.77 percent of the total item variance.

Situational Intrinsic Work Motivation was assessed with a newly constructed Short Scale for Intrinsic Work Motivation consisting of two items ($\rho = .77$ - .93). In the construction of the scale, we followed the recommendations by Deci and Ryan (2016), who pointed out that Interest and Enjoyment are the best ways to operationalize intrinsic motivation in self-report measures. The two items of the final questionnaire directly capture these aspects of intrinsic motivation. These items address situational interest (*"At this moment I find my work interesting"*) and enjoyment at work (*"At this moment I enjoy working"*). We assessed the

construct validity in the pretest sample by calculating the correlation with the subscale for interest/enjoyment of the Intrinsic Motivation Inventory (eight items; Deci & Ryan, 2016). The correlation reached a very high level with $r = .83$, which indicated that our items indeed measured situational intrinsic work motivation in a more concise way than the Intrinsic Motivation Inventory.

Situational Work Engagement is typically conceptualized as a multifaceted construct defined by dedication to one's work, experienced vigor during the working process and absorption in the working activity (Bakker & Demerouti, 2008). These three facets are also subscales of the often applied Utrecht Work Engagement Scale (Schaufeli et al., 2006), which heavily inspired the newly constructed short scale that we used to measure the construct. This Short-Scale for Situational Work Engagement ($\alpha = .83$ - $.93$) assessed current Vigor (*"At this moment I feel strong and vigorous at work"*), Dedication (*"At this moment I am enthusiastic about my work"*) and Absorption at Work (*"At this moment I am immersed in my work"*) with one item each, instead of with three items as within the Utrecht Work Engagement Scale. The short scale was highly correlated with the original Utrecht Work Engagement Scale ($r = .79$) in the pretest sample. Furthermore, each of the items showed a sufficient item-total correlation ($r_{it} > .65$) and proved to be more strongly associated to the original subscale it was inspired by when compared to its association with the other two subscales.

Analyses

We excluded five participants who filled out the initial online questionnaire but had not participated in any of the daily surveys. We also excluded one participant who worked in a job that was not directly tied to academia. The remaining 107 participants contributed 1685 singular measurement points. We excluded 32 of these singular measurement points because the participants either indicated that they were not working that particular day or because they were in another time zone due to their attendance of scientific conferences. Both criteria (no work schedule, different time zone) would have compromised the comparability of the

respective measurement points. The final sample included 107 participants that contributed 1653 singular measurement points and, thus, on average 15.45 measurement points per person. Most participants contributed more than seven measurement points (90 percent of the cases).

We conducted hierarchical structural equation models (with random intercepts) with Mplus Version 7 (Muthén & Muthén, 1998-2012) to investigate our research questions. Thereby, we treated the 107 members of the academic staff as level 2 instances and the 1653 measurement points as level 1 instances that were clustered within persons. Between-level effects on variables that were measured on daily bases can, thus, be interpreted as influences on the general strength of these constructs, while within-level effects can be interpreted as influences on the fluctuation of these constructs. The model fit of all computed models is reported according to the recommendations by Hu and Bentler (1999). Hence, we used the χ^2-test for model fit in combination with misfit (SRMR, RMSEA) and fit indices (CFI). Our interpretation of these indices relied on the rules of thumb for cut-off values by Schermelleh-Engel, Moosbrugger, and Müller (2003). Thus, we distinguished between an acceptable model fit (SRMR $\leq$ .10, RMSEA $\leq$ .08, CFI $\geq$.95) and a good model fit (SRMR $\leq$ .05, RMSEA $\leq$ .05, CFI $\geq$.97).

The investigated hierarchical structural equation model mirrored the proposed situated process model of vocational achievement goal striving that is depicted in *figure 1*. We investigated the first tenet of our process model (goal hierarchy) on the between-level of the model by modeling direct paths from the respective life aspirations on personal goal orientations and from personal goal orientations on the general level of situated achievement goals respectively. The second tenet of the proposed process model (need satisfaction and achievement goal striving) was assessed by modeling direct paths from the situational perceived satisfaction of the three basic psychological needs to all four investigated situated achievement goals. We investigated the predictive power of situational perceived need

satisfaction for the fluctuation in situated achievement goals (direct paths on the within-level) as well as for the general level of situated achievement goals (direct paths on the between-level). We examined the third tenet of the proposed process model by modeling direct paths from situated achievement goals to both indicators of task-based vocational motivation (situational intrinsic motivation and work engagement) both on the within- (effects on fluctuation in task-based vocational motivation) as well as on the between-level (effects on the general level of task-based vocational motivation). We also allowed for direct effects of situational perceived need satisfaction on task-based vocational motivation in order to investigate the incremental predictive power of situated achievement goals.

Besides the postulated effects, we allowed for correlations between the different classes of situated achievement goals as well as between the different classes of personal goal orientations. We did so because previous research had indicated that the different classes of achievement goals are not perfectly independent (especially true for performance goals, see Janke et al., 2016; Murayama et al., 2011). We also allowed for correlations between situational intrinsic work motivation and situational work engagement due to plausible interdependencies between the two constructs and for correlations between the perceived satisfaction of the different needs at work due to their presumably moderate to high communality (Hanfstingl, Andreitz, Müller, & Thomas, 2011).

Finally, we compared our model that reflected hierarchical associations between goals with a more complex model. In this second model, we included unexpected direct effects of life aspirations on personal goal orientations (e.g., intrinsic aspirations on performance approach goal orientation) as well as direct effects of life aspirations on the level of situated achievement goals. We also included direct effects of personal goal orientations on the level of situational intrinsic work motivation and situational work engagement. All of these additional effects were of particular interest because they would have impaired the validity of

the postulated goal hierarchy (first tenet of the proposed process model). Thus, we assumed that the comparison model would not yield a superior fit to the postulated model.

Results

All scale means and standard deviations as well as zero-order correlations of the scales and subscales are depicted in *table 1*. The obtained Intra-class-correlations yielded evidence that situated goal striving may be affected by dispositional as well as situated antecedents. We found that learning goals were the least stable class of goals (*ICC* = .42) as has been suggested by prior research (e.g., Praetorius et al., 2014), followed by performance avoidance (*ICC* = .49) as well as work avoidance goals (*ICC* = .52). Performance approach goals showed the highest Intra-class-correlation of all goal classes (*ICC* = .59). Perceived situational autonomy (*ICC* = .45), competence (*ICC* = .48) and relatedness (*ICC* = .53) also proved to be partly stable over the accounted situations, which indicated individual differences in general levels of need satisfaction at work. This was also true for intrinsic work motivation (*ICC* = .53) and situational work engagement (*ICC* = .55).

--- insert Table 1 about here ---

Overall, the conducted structural equation model reached a good model fit; χ^2 (55) = 75.94, p = .03, $SRMR_{within}$ = .00, $SRMR_{between}$ = .08, *RMSEA* = .02, *CFI* = .99. All direct effects that reached statistical significance in the model are depicted in *figure 2*. Furthermore, all undirected paths are depicted in *table 2*. We will elaborate on the meaning of these paths for the investigation of the proposed central tenets of the postulated process model in the following passages.

--- insert Figure 2 about here ---

--- insert Table 2 about here ---

Investigation of the First Tenet: Goal Hierarchy

We found statistically significant direct effects of intrinsic life aspirations on a learning goal orientation as well as statistically significant direct effects of extrinsic life aspirations on both performance goal orientations as predicted. However, the explained variance was only marginally significant for the learning goal orientation (R^2 = .09; p = .053) and not significant for the performance avoidance goal orientation (R^2 = .09; p = .117). This might be a result of the low amount of between-level units since the effect sizes would indeed indicate medium effects. The obtained stability coefficients for situated achievement goals (see above) yielded first evidence for the importance of dispositional determinants like personal goal orientations. In fact, all corresponding personal goal orientations proved to be significant predictors of the general strength of the respective situated achievement goals. However, the degree to which the respective personal goal orientation predicted the respective situated achievement goals depended largely on the goal content. Thereby, the two situated goals characterized by an avoidance goal valence (performance avoidance, work avoidance) showed the strongest association with personal goal orientations, whereas learning goals were the least determined by the respective personal goal orientation. Finally, we found an indirect effect of intrinsic life aspirations via the strength of the learning goal orientation on the general strength of situated learning goals ($\beta_{indirect}$ = .09; p = .004). Furthermore, we found an indirect effect of extrinsic life aspirations via the strength of the performance approach goal orientation on the general strength of situated performance approach goals ($\beta_{indirect}$ = .18; p < .001) as well as via the strength of the performance avoidance goal orientation on the general strength of situated performance avoidance goals ($\beta_{indirect}$ = .12; p = .009).

Investigation of the Second Tenet: Need Satisfaction and Achievement Goals

With regard to the relationships between situational perceived need satisfaction and situated achievement goals, we found a very diverse result pattern. More specifically, we found that perceived situational autonomy and perceived situational relatedness were both positively predictive for fluctuations in situated learning goals. We also found tendencies for the influence of both variables on the general strength of situated learning goals, with $p_{one\text{-}tailed}$ <.05. Nevertheless, we did not find any evidence for influence of perceived situational competence on situated learning goals on either level of the model. With that being said, we found evidence for the importance of this variable for fluctuations in situated performance approach goals. We also found a negative effect of perceived situational autonomy and a positive effect of perceived situational relatedness on situated performance avoidance goals on the within-level. However, none of the accounted predictors (perceived situational autonomy, perceived situational competence, perceived situational relatedness) reached the conventional significance level of $p_{two\text{-}tailed} < .05$ on the between-level. Nevertheless, we observed some tendencies for perceived autonomy for the general strength of situated performance approach ($\beta = .20$; $p = .078$) as well as performance avoidance goals ($\beta = .21$; $p = .083$). We mention these tendencies since they are notable in size and because of the possibility that they missed conventional significance because our power to detect effects on the between-level is lower than on the within-level.

Investigation of the Third Tenet: Achievement Goals and Vocational Motivation

Concerning the postulated consequences of situated achievement goals, we found that situated achievement goals could account for variance on the between- as well as on the within-level for situational intrinsic work motivation and situational work engagement. Our findings indicate that the general strength of situated learning goals was a positive predictor for the general strength of intrinsic work motivation as well as work engagement. Furthermore, situated work avoidance goals were negatively predictive for the general

strength of intrinsic work motivation, but not for work engagement. We found none of the expected direct effects of situated performance avoidance or performance approach goals on any outcome variable on the between-level. On the within-level, we found a positive effect of situated learning goals as well as a negative effect of situated work avoidance goals on both outcome variables. We also found the expected positive effect of situated performance approach goals on situational work engagement. Contrary to our expectations, we also found a positive effect of situated performance avoidance goals on this variable. However, it has to be noted that the direct effects of situated learning goals vastly exceeded the influence of performance goals for both outcome variables ($p < .001$ for all comparisons of path coefficients, see Paternoster, Brame, Mazerolle, & Piquero, 1998 regarding the applied test procedures). All observed effects were present even though we controlled for the direct effects of situational perceived autonomy, competence and relatedness, which were also statistically significant predictors for both outcome variables on either level. Finally, we found indirect effects of a learning goal orientation via the general level of situated learning goals on the general strength of intrinsic work motivation ($\beta_{indirect} = .08$; $p = .009$) as well as on the general strength of work engagement ($\beta_{indirect} = .07$; $p = .011$). We only found one additional negative indirect effect of a work avoidance goal orientation on the general strength of intrinsic work motivation via the general strength of situated work avoidance goals ($\beta_{indirect} = -.10$; $p = .018$).

Model Comparison

We compared our postulated model with a more complex model, which also took direct effects into account that would have contradicted our assumptions regarding the hierarchical nature of human goal striving (see above). However, this model did not fit the data substantially better than our model; $\Delta\chi^2\ (21) = 27.15$, $p = .166$, $\Delta SRMR_{within} = .00$, $\Delta SRMR_{between} = -.02$, $\Delta RMSEA = .00$, $\Delta CFI = .00$. Thus, we did not consider the inclusion of additional paths into our model.

Discussion

The present study lays the groundwork for a concise situated process model that explains dispositional as well as situated influence antecedents of achievement goal striving within the academic staff at university. The empirical evidence supports the three central tenets of this model. With regard to the first tenet, we found that human goal striving indeed seems to be hierarchically organized: Our results show that broad life aspirations influence situated achievement goals via personal goal orientations. These associations were a function of goal content, meaning that goals characterized by intrinsic goal content (e.g., intrinsic life aspirations, learning goals) were interrelated as well as goals characterized by extrinsic goal content (e.g., extrinsic life aspirations, performance goals). We also found empirical evidence for the second tenet, namely that situational perceived need satisfaction is an important situated antecedent for achievement goal striving. This is especially true for learning goals, which are consistently influenced by situational perceived autonomy and perceived relatedness, but also for performance goals. Finally and in line with the third tenet of the proposed process model, we also found that outcome-centered situated achievement goals are the foundation for task-based vocational motivation within academic staff members. Learning goals, in particular, were positively associated to both the general strength of and fluctuations in situational intrinsic work motivation and work engagement. Situated performance goals were also positively related to fluctuations in situational intrinsic work motivation and work engagement in most instances (three out of four cases), but the path coefficients were considerably lower than the positive influence of situational perceived need satisfaction and situated learning goals. Situated work avoidance goals consistently proved to be maladaptive antecedents for task-based vocational motivation. In sum, the overall result pattern supports all three tenets (goal hierarchy, need satisfaction as antecedent, task-based vocational motivation as consequence) of the proposed process model.

Under the Spotlight: Practical Implications for the Motivation of Academic Staff

We cannot claim that the process model can be generalized to other contexts outside of academia yet but it can already provide us with a deeper understanding of the motivation of research professionals. Our research highlights the importance of achievement goals for the vocational motivation of members of a university's academic staff. We can show that situated achievement goals influence the interest and joy that academic staff members experience when engaging in work-related tasks at hand as well as their engagement in these tasks. Thereby, we especially find that situated learning goals (possibly in combination with performance approach goals) help to maintain task-based vocational motivation, while situated work avoidance goals seem to undermine it. This makes it crucial to identify mechanisms that foster learning goals. The process model helps to identify possible influence factors that foster beneficial situated achievement goals like learning or performance approach goals.

With regard to the hierarchical perspective on goal striving, it may be possible to foster a learning goal orientation by establishing possibilities for the academic staff to act alongside broader intrinsic life aspirations. This may, for example, be done by providing dual-career options (family goals) as well as by promoting collaborations between research teams and the local community (communal goals). Additionally, we think that need satisfaction could be targeted with small workplace interventions. Providing autonomy might be crucial in this regard because it seems to be an important foundation for personal goals in general, while also facilitating learning goals in particular. Autonomy could be fostered by providing the academic staff with authority over their own research process and teaching as well as the necessary resources (e.g., time, money, skills) to conduct their own projects. However, it seems important to ensure that teaching and research are still supervised because a high degree of autonomy can lead to feelings of distress if it is not accompanied by a minimum degree of structure (Jang, Reeve, & Deci, 2010). Therefore, senior advisors should help young

colleagues on their academic path by providing them with encouraging feedback and personal guidance. Advisors that act as personal guides might enhance the feeling of competence within young scholars. This feeling of competence in turn could enhance performance approach goals in members of the academic staff, which may eventually even lead to higher performance (Elliot & Church, 1997; see Midgley et al., 2001 for a closer investigation of this issue).

Another important duty for university executives and supervisors would be to foster a positive working climate between the different team members in order to sustain high feelings of relatedness in the different employees. An introduction to other researchers from different institutes (e.g., during conferences or summer schools) might also help to foster personal belongingness to academia itself. However, it has to be noted that situational perceived relatedness was positively related to situated performance avoidance goals. This might reveal a possible downside of social support, which is that academic staff members in a supportive working environment may be more fearful of disappointing their colleagues and advisors through their lack of scientific performance. It is possible that such negative effects could be reduced through adding a positive error climate to the potential interventions (Steuer, Rosentritt-Brunn, & Dresel, 2013), which may prevent academic staff members from thinking that they may disappoint their fellow colleagues or the scientific community itself through an anticipated lack of competencies. While our process model might in sum deliver a first outlook on potential interventions, it also contributes to the ongoing challenge to integrate different theoretical traditions into a central model for human motivation.

The Broader Picture: Integrating Achievement Goal Approach and SDT

The present research strengthens the ties between Achievement Goal Approach and SDT. While intrinsic motivation as a consequence of learning goals has been the only link between both approaches to human motivation for quite some time (Dickhäuser, Dinger, Janke, Spinath, & Steinmayr, 2016; Elliot & Church, 1997; Harackiewicz et al., 1997), we

think it is time to reconsider what SDT can contribute to the understanding of antecedents of achievement goals. Thereby, our research contributes some interesting insights that may allow for a fresh look at the nature of achievement goals, which in our opinion should be seen as a) hierarchically linked to life aspirations and b) differentially tied to need satisfaction.

By showing hierarchical dependencies between goals, we build on old assumptions in goal research: Neither the distinction between situated and broader goal classes (most notably Pintrich, 2000), nor the hypothesized dependencies between tiers of goal hierarchies (Boekaerts et al., 2006; Janke & Dickhäuser, 2016; Mouratidis et al., 2013; Payne et al., 2007) are new to achievement goal research. However, no study has linked all three tiers of human goal striving (i.e., life aspirations, personal goal orientations, situated achievement goals). Most goal theories lacked a common denominator that would be applicable to link the different tiers. We think that an analytic view of the goal content under the lens of SDT can deliver the communality that is important to explain how life aspirations can indirectly influence situated achievement goal striving through personal goal orientations. Our empirical evidence supports this view and shows that life aspirations predict personal goal orientations that align with them alongside their connection to inner strivings (intrinsic goal content) or external motivators (extrinsic goal content).

Our empirical findings concerning the importance of perceived need satisfaction as a predictor for achievement goal striving further highlight critical linchpins that can link achievement goal approach to SDT. Autonomy seems to be especially crucial as our data delivers evidence for the importance of perceived autonomy for fluctuations in learning goal striving and performance avoidance goal striving and also first hints at the possibility that the general strength of perceived autonomy forms a foundation for learning goals and performance goals alike. However, competence and relatedness also seem to play crucial roles in the facilitation of situated learning and performance goals. It is interesting to note that the degree of explained variance for situated learning goals and for both situated performance

goals is of comparable size. This means that need satisfaction is an important factor for the development of all three goal classes.

Future Directions

In the conducted study, we treated the work of various universities' academic staff as a singular challenge, while university employees in fact have to struggle with at least three task groups that might be applicable for achievement goals (that is, teaching, research, and administration). Thus, it would be very interesting to investigate how situated achievement goals for these different task groups are differentially intertwined. It is possible that achievement goal striving in one academic domain (i.e., conducting research) may limit achievement goal striving in another domain (i.e., teaching). Such considerations seem plausible because personal resources (e.g., time) are limited, which might lead to prioritization of one domain over another (Bak, 2015). Need supportive working conditions may help to overcome this co-dependency of goals due to their positive effects on work engagement and flow, which may possibly lead to a better usage of limited resources (e.g., by limiting procrastination). Esdar, Gorges, and Wild (2015) investigated this assumption in a pioneer study and fund that a high level of perceived need satisfaction at work leads to less goal conflicts in doctoral candidates. However, perceived need satisfaction could also reach different levels in the different domains (e.g., hostile colleagues, benevolent students), eventually leading to a shift in achievement goals. It would also be interesting to investigate the impact of the frequency of task fluctuations at work since academia will often confront academic staff members with diverse working contexts as well as rapidly changing working tasks. For example, members of the academic staff might teach undergraduates at the beginning of the week, correspond with fellow researchers at a small group meeting midweek and work at home to apply for a research grant at the end of the week. This ever-changing nature of the working situation may also affect fluctuations in achievement goal striving as well. We could imagine that need satisfaction may buffer the distressing and possible

demotivating impact of such job demands very similar to the aforementioned effect on goal conflicts. Future studies could, thus, investigate whether the impact of working task fluctuation on vocational motivation depends on perceived need satisfaction.

We are aware that our analyses cannot perfectly dissolve the question of causality. It is possible that individuals who adopt a learning goal perspective are also more likely to feel personal control over their working process since academic learning processes are more easily to control than getting papers published for instance. This internal locus of control could in turn lead to stronger feelings of personal autonomy. Thus, it cannot be ruled out that the association between need satisfaction and learning goals is more complex than we expected. In conclusion, future studies should use longer time intervals that allow for actual investigation of systematic growth and decline in the targeted constructs.

Finally, we investigated the importance of situated achievement goals for situational work engagement and intrinsic work motivation. Both variables are motivational states that may eventually relate to beneficial work outcomes like student learning as well as scientific progress. Future studies should investigate whether achievement goals can affect outcome variables like students' performance in tests, scientific output (number of papers, differential impact of papers) and participation in professional training (e.g., voluntary workshops) as has been done for secondary teachers (Butler & Shibaz, 2008; Nitsche et al., 2013; Retelsdorf et al., 2010).

Conclusion

In sum, our situated process model of vocational achievement goal striving contributes first empirical evidence on the importance of situated as well as dispositional antecedents for the facilitation of situated achievement goals at university. We are convinced that these findings contribute to the integration of two major approaches to human motivation (SDT and achievement goal approach) into one model of achievement goal striving. Furthermore, we hope that our empirical findings can help to find new ways to establish (need-supportive)

working contexts at university. It has to be noted that all personal strivings of university executives to enhance need satisfaction and the intrinsic meaning of one's occupation within academia are still limited by factors that are deeply rooted in the scientific system itself. Insecurity in personal job perspectives can lead to a highly competitive climate that may undermine relatedness. Insufficient funding undermines autonomy and critical responses after the submission of journal articles may also diminish feelings of personal competence (at least temporarily). However, our results suggest that the proposed measures may be worthwhile because they have the potential to facilitate a better workflow within academia.

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Table 1

Descriptives and Zero-order correlations.

	M	*SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Intrinsic Life Aspirations	5.92	0.61															
(2) Extrinsic Life Aspirations	2.70	0.86	-.12														
(3) Learning GO	6.21	0.63	.33**	-.19*													
(4) Performance approach GO	4.52	1.09	.01	.45**	.18*												
(5) Performance avoidance GO	3.22	1.25	.05	.32**	-.04	.48**											
(6) Work avoidance GO	2.21	0.91	-.14	.18	-.17	.13	.21*										
(7) Learning goals	4.63	1.55	.17	-.01	.34**	.14	.17	-.11		.20**	.00	-.19**	.19**	.16**	.17**	.46**	.43**
(8) Performance approach goals	4.52	1.60	.01	.23*	.08	.44**	.33**	-.10	.41**		.38**	-.13**	.04	.20**	.12**	.23**	.24**
(9) Performance avoidance goals	2.74	1.57	-.07	.23**	-.04	.22*	.51**	.22*	.22	.53**		.08	-.20**	-.10**	.10**	-.02	.01
(10) Work avoidance goals	2.74	1.46	-.05	.25*	-.08	.20	.15	.60**	.01	.25*	.43**		-.01	-.06*	-.01	-.18**	-.19**
(11) Perceived Autonomy	5.36	1.46	.19	.06	.07	.06	.12	-.06	.37**	.31*	.17	.01		.42**	.04	.39**	.35**
(12) Perceived Competence	5.24	1.14	.17	-.03	.19*	.11	-.11	-.24**	.36**	.31*	-.07	-.06	.61**		.30**	.51**	.52**
(13) Perceived Relatedness	4.64	1.55	.08	.05	.15	.02	-.02	-.16	.39**	.16	.05	-.11	.51**	.62**		.27**	.30**
(14) Intrinsic work motivation	5.03	1.36	.11	.00	.24*	-.01	-.05	-.30**	.56**	.29*	.11	-.16	.72**	.68**	.68**		.83**
(15) Work engagement	4.44	1.42	.07	.05	.21*	-.01	-.05	-.26**	.54**	.28*	.14	-.09	.65**	.72**	.75**	.91**	

Note. GO = Goal Orientation. All used scales ranged from 1 (*total disagreement*) to 7 (*total agreement*). The reported mean scores and standard deviations of situational measures have been aggregated over all 20 measurement occasions. Coefficients above the main diagonal indicate associations on the within-level, while associations under the main diagonal indicate associations on the between-level. The zero-order correlations are derived from a saturated base model in which undirected paths between all variables were freed.

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

Table 2

Undirected paths within the structural equation model.

	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Learning GO												
(2) Performance approach GO	.29**											
(3) Performance avoidance GO	-.02	.39**										
(4) Work avoidance GO	-.13	.05	.17									
(5) Learning goals					.17**	.03	-.18**					
(6) Performance approach goals				.34**		.40**	-.12**					
(7) Performance avoidance goals				.17	.52**		.08					
(8) Work avoidance goals				.09	.34**	.46**						
(9) Perceived Autonomy									.42**	.04		
(10) Perceived Competence								.61**		.30**		
(11) Perceived Relatedness								.51**	.62**			
(12) Intrinsic work motivation												.70**
(13) Work engagement											.72**	

Note. GO = Goal Orientation. Coefficients above the main diagonal indicate associations on the within-level, while associations under the main diagonal indicate associations on the between-level.

** $p < .01$

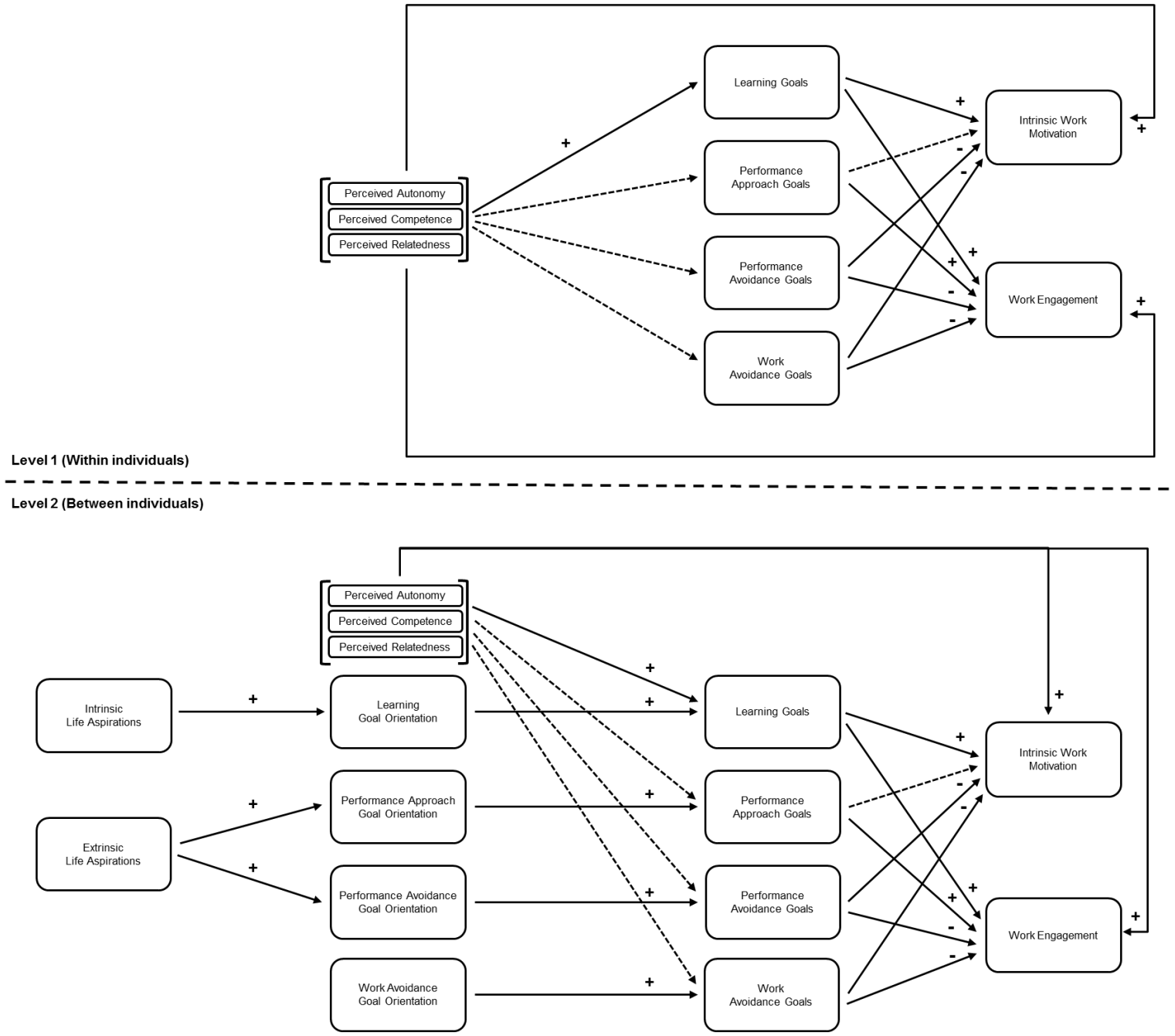

Figure 1. Postulated two-level (means-as-outcomes) process model of situated achievement goal striving within members of the academic staff. Dashed lines indicate exploratory research questions.

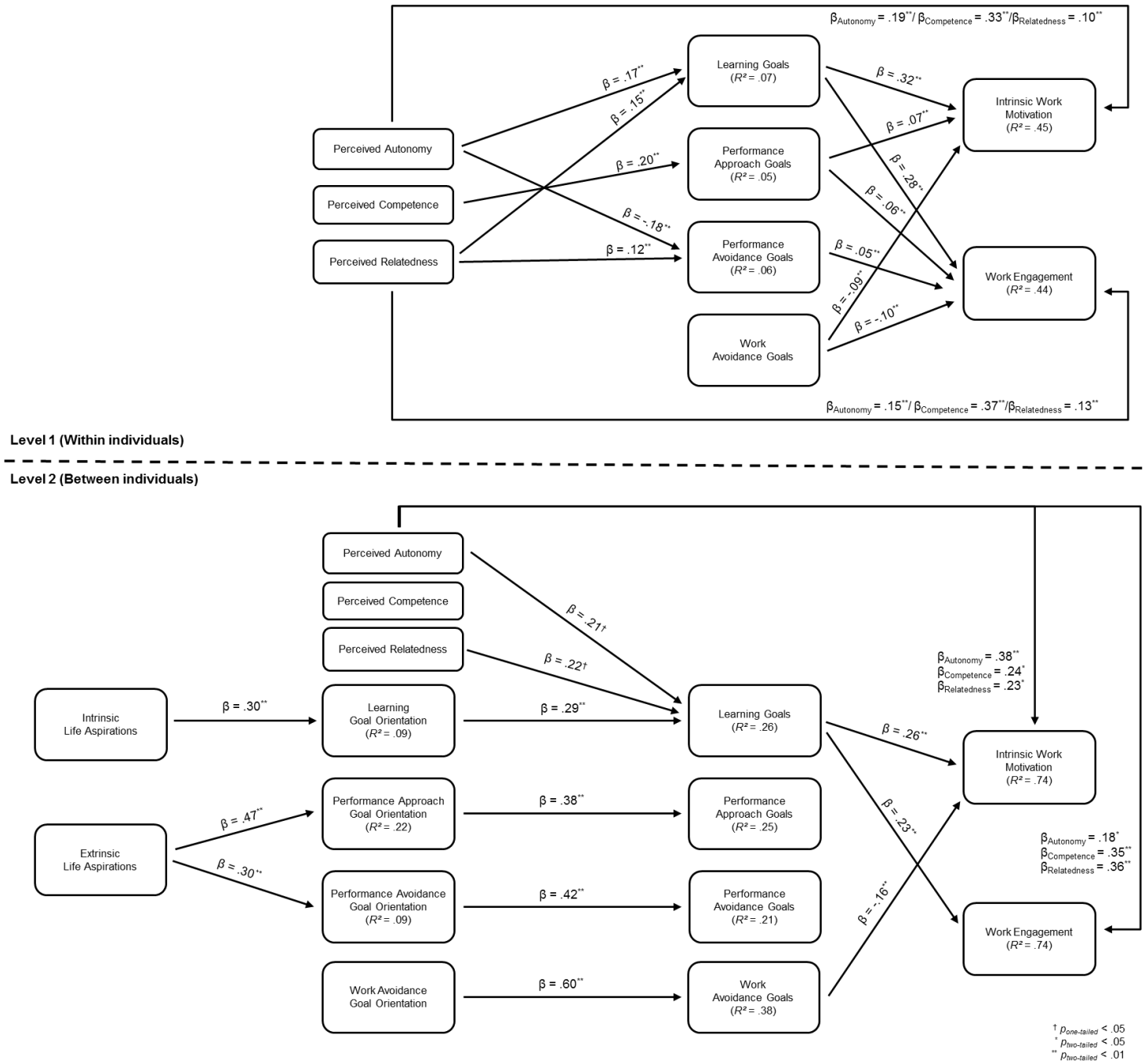

Figure 2. Resulting path coefficients in the investigated structural model. Only statistical significant and no undirected relationships between achievement goals, personal goal orientations and endogenous variables are displayed for better comprehensibility (see *Table 2* for further details).