A new rationale on environmental antecedents of teachers' work related learning goal orientation

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Abstract

In the present study, we investigate whether perceived satisfaction of the basic psychological needs for autonomy, competence, and relatedness in teachers' working environment at school predicts their work-related learning goal orientation. Structural equation modeling was used to test this hypothesis ($N = 334$ German teachers). The expected relationship between perceived need satisfaction and teachers' work-related learning goal orientation could be shown and was not mediated by teachers' intrinsic work motivation. These results give room for speculation on new ways to foster teachers' work-related learning goal orientation via workplace modifications which address teachers' basic psychological needs.

Keywords: teacher motivation, goal orientation, psychological needs, work environment

The role of perceived need satisfaction at work for teachers' work-related learning goal orientation

1. Introduction

Teachers face many achievement situations in their daily work lives, such as teaching difficult students, fulfilling the expectations of parents, and keeping up with the intended curriculum. While all teachers experience these situations, they differ in what goals they ultimately aim to achieve. These individual goal preferences are typically referred to as teachers' work-related achievement goal orientations (Butler, 2007, Nitsche, Dickhäuser, Fasching & Dresel, 2011). In this article we focus on one specific work-related achievement goal orientation, namely teachers' work-related learning goal orientation. This can be conceptualized as the striving for professional development in work-related achievement situations. Hence, teachers with a high work-related learning goal orientation experience accomplishment when they are able to acquire new job related skills. Teachers' work-related learning goal orientation is positively associated with a wide range of beneficial outcome variables. For instance, students of teachers with a stronger work-related learning goal orientation view their teachers as more supportive (Butler & Shibaz, 2008). Furthermore, teachers reporting a higher work-related learning goal orientation also reported more instructional practices aiming at the development of learning goals in their students (Retelsdorf, Butler, Streblow, & Schiefele, 2010), more self-reflection regarding their own teaching practices (Runhaar, Sanders, & Yang, 2010) and a higher emphasis on comprehensive learning (Retelsdorf & Günther, 2011). These teachers also reported lower burn-out tendencies (Tönjes & Dickhäuser., 2009; Parker, Martin, Colmar, & Liem, 2012), fewer sick days and a higher attendance at training workshops (Nitsche, Dickhäuser, Fasching & Dresel, 2013). Lastly, teachers' work-related learning goal orientation is associated with a positive attitude towards seeking help from colleagues (Butler, 2007). These studies were conducted in Australia (Parker et al., 2012), Germany (Nitsche et al., 2013; Retelsdorf et al.,

2010; Retelsdorf & Günther, 2011; Tönjes & Dickhäuser, 2009), Israel (Butler, 2007; Butler & Shibaz, 2008) and the Netherlands (Runhaar et al., 2010). Evidence for the importance of teachers' work-related learning goals was also found in Canada (Daniels, Frenzel, Stupnisky, Stewart & Perry, 2013), Finland (Malmberg, 2006, 2008), and Greece (Papaioannou & Christodoulidis, 2007). Thus, the beneficial effects of teachers' work-related learning goal orientation are generalizable to different Western educational systems. From the viewpoint of society and school boards, it might therefore be useful to know which methods and strategies may enhance teachers' work-related learning goal orientation. However, we know very little about which aspects of the working environment could be addressed to enhance the strength of teachers' work-related learning goal orientation. In this article, we investigate teachers' perception of their working environment as a possible influencing factor for their work-related learning goal orientation. More specifically, we will address the perceived satisfaction of the basic psychological needs for autonomy, competence and relatedness in teachers' working place. We assume that teachers are more likely to develop a work-related learning goal orientation when they feel their basic psychological needs are satisfied in their current working environment. This assumption is based on the theoretical framework of Self-Determination Theory.

2. Teachers' motivation through the lens of Self-Determination Theory

Self-Determination Theory (SDT) serves as a theoretical lens for our reflections on teachers' work-related learning goal orientation. The theory centers on the human striving to satisfy the three basic psychological needs for autonomy, competence, and relatedness as well as the importance of need satisfaction for human motivation and well-being (Deci & Ryan, 1985; 2000) The need for *autonomy* is defined as the urge to be under control of one's own life decisions. Individuals experience autonomy when they come to believe that they are free to choose between different meaningful options regarding one's actions and goals (see Assor, Kaplan, & Roth, 2002; Deci & Ryan, 2002; Reeve, Nix, & Hamm, 2003). Research has

shown that impairment of this need in teachers' working environment can lead to a decrease in teachers' intrinsic work motivation and also reduce support for student autonomy (Pelletier, Séguin-Lévesque, & Legault, 2002; Reeve, 2009). The need for *competence* is defined as the urge to feel as though one's actions are effective (Arkes, 1978; Deci & Ryan, 2002; White, 1959). Teachers who perceive themselves as competent at their job are less stressed and report more enthusiasm for their job compared to teachers reporting a low degree of competence (Caprara, Barbaranelli, Steca, & Malone, 2006; Skaalvik & Skaalvik, 2010). Finally, the need for *relatedness* emphasizes the importance of social inclusion and feeling connected to other people (Baumeister & Leary, 1995; Deci & Ryan, 2000). Researchers have emphasized the importance of relatedness to colleagues for motivation and well-being at work (Baard, Deci, & Ryan, 2004).

To explain the relationship between teachers' basic psychological needs and their work-related learning goal orientation, it is important to understand how need satisfaction affects humans. First and foremost, need satisfaction is always a subjective experience. Previous studies have shown that perceived need satisfaction is sensitive to environmental cues such as choice (Assor et al., 2002; Katz & Assor, 2007), feedback (Deci, Koestner, & Ryan, 2001; Vallerand & Reid, 1984), interpersonal signs of affection (Baumeister & Leary, 1995), or ostracism (Williams, 2009). However, the effects of these environmental cues always depend on the personal interpretation of them (Deci & Ryan, 1985, 2002). This makes self-reported perceived need satisfaction a more accurate predictor of human motivation and well-being than objective need support (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010; Gagné & Deci, 2005; Sheldon & Hilpert, 2012). Hence, we will focus on teachers' perceived need satisfaction in order to gauge its importance at their workplace. Another important aspect of the mechanism behind need satisfaction is the interdependence of the different basic psychological needs. Deci and Ryan (2000) pointed out that none of the basic psychological needs can be compensated. All three needs are assumed to be equally important for healthy

human functioning. Hence, the effect of need satisfaction can only be fully experienced when all three are satisfied. While it might still be interesting to investigate unique effects of the different needs (e.g., Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), researchers have often aggregated them into one construct labeled *need satisfaction* in order to properly address their shared effect on human motivation (Deci et al., 2001; Niemiec, Ryan, & Deci, 2009). This approach was also applied to research on need satisfaction at work (Gagné & Deci, 2005) and, specifically, in the teaching profession (Hanfstingl, Andreitz, Müller, & Thomas, 2011). In our research, we will address the shared influence of the three basic psychological needs as well as their unique impact. While the shared influence shows the importance of perceived need satisfaction in general, the differential effects by perceived autonomy, perceived competence and perceived relatedness help to uncover the individual importance of each basic psychological need.

Perceived need satisfaction has mainly been investigated in terms of its positive influence on healthy functioning (Reis et al., 2000; Ryan, Huta, & Deci, 2008) and the development of intrinsic motivation (Deci & Ryan, 1985; 2000; for more details see section 2.2). However, we are more interested in the importance of perceived need satisfaction for goal setting. More specifically, we want to uncover possible relations between perceived need satisfaction at the workplace and the development of teachers' work-related learning goal orientation. SDT provides a broad conceptualization of goals into which teachers' work-related learning goals can easily be incorporated. This also provides some interesting implications on possible associations with perceived need satisfaction. However, there has been little to no research bridging the gap between goal conceptualizations in SDT and achievement goals to date.

2.1. Teachers' work-related learning goal orientation as preference for intrinsic goals

SDT differentiates goals according to their content into extrinsic and intrinsic goals (Deci & Ryan, 2000; Kasser & Ryan, 1996). *Extrinsic goals* are defined as the striving for

extrinsic motivators, such as fame or money. *Intrinsic goals* conversely are defined as the striving for motivators with intrinsic worth. Typical contents of intrinsic goals are affiliation, personal growth, health, and freedom. Intrinsic goals and teachers' work related learning goals share some interesting similarities. We will now elaborate on the definition of teachers' work-related learning goal orientation to make it comparable to an orientation on intrinsic goals.

Teachers' work-related learning goal orientation is an achievement goal orientation defined on the basis of three components: aggregation level, goal content and goal valence. First, the aggregation level describes how broadly the associated achievement goal is conceptualized. While the term "achievement goals" is oftentimes used to refer to goals that only affect human motivation and behavior in specific situations, achievement goal orientations describe more stable preferences for a specific kind of achievement goals (Kaplan & Maehr, 2007). This preference influences the process of goal setting in a wide array of achievement related situations (generalized achievement goal orientations) or in a specific achievement related context (domain specific achievement goal orientations). Teachers' work-related achievement goal orientations can be described as domain specific goal orientations located between very specific situational goals and more generalized goal orientations. Second, teachers' work-related achievement goal orientations are characterized by content and are thereby often differentiated in work-related performance goal orientation and work-related learning goal orientation. The goal content is mainly defined by individuals' definition of job success (Butler, 2007). Teachers with a strong work-related learning goal orientation define job success as the acquisition of new job relevant skills and see their job as an opportunity for ongoing learning and professional development. Teachers with a strong work-related performance goal orientation primarily define success as the demonstration of competence and therefore strive to outperform others (Butler, 2007; Nitsche et al., 2011). Besides differentiation in goal content, achievement goals have also been differentiated regarding their valence, where achievement goals are separated into approach and avoidance goals (Elliot &

Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001). Consequently, teachers' work-related learning goal orientation can either be characterized by an approach valence (ongoing professional development) or an avoidance valence (meeting requirements without losing existing professional skills). However, most research on teachers' work-related achievement goal orientations solely addresses teachers' learning approach goal orientation (Butler, 2007; Nitsche, et al., 2011). Typically the term *teachers' work-related learning goal orientation* is used synonymously with *teachers' work-related learning approach goal orientation*. In order to connect our research to the existing body of research, we also use the term *learning goals* to describe learning approach goals.

After having established this definition of teachers' work-related learning goal orientation, we will now point out the similarities between intrinsic goals and teachers' learning goals. The main similarity lies in the strong parallels between the content of both goal types. Personal growth is a key feature of both teachers' learning goals and intrinsic goals (Vansteenkiste, Lens, & Deci, 2006). However, intrinsic goals can be applied to all sorts of contexts and situations, while teachers' work-related learning goals are limited to work-related achievement situations. In the terminology of SDT, teachers' work-related learning goal orientation can therefore be defined as teachers' preference for intrinsic goals centering on professional development in achievement situations at work.

At this point we can finally elaborate on the relationship between perceived need satisfaction and teachers' work-related learning goal orientation. Intrinsic goals are assumed to be grounded in the striving to satisfy the basic psychological needs (Kasser & Ryan, 1996; Deci & Ryan, 2000; Vansteenkiste et al., 2006). Hence, individuals have to perceive opportunities for need satisfaction in a given environment in order to develop intrinsic goals. We assume that environments that are perceived as need satisfying meet this criterion because they have provided the basis for need satisfaction in the past. Therefore, teachers who experience need satisfaction in their current working environment might be more likely to

develop a work-related learning goal orientation. Conversely, teachers who experience need thwarting in their current working environment might abandon possible learning goals and refocus on external goals such as acquiring their next paycheck. The assumption of a possible relationship between perceived need satisfaction and teachers' work-related learning goals is supported by empirical research on achievement goal orientations in students.

2.2. Perceived need satisfaction and learning goals

Due to lack of research on antecedents of teachers' work-related learning goal orientation, we will have to take a step back and look at research conducted with students. First of all, research conducted by Ames (1992) emphasizes that support for student autonomy enhances their learning goal orientation. Additionally, research on intrinsic goals has also shown that autonomy support strengthens the effect of intrinsic goal framing on outcome variables like depth of processing and task persistence (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Furthermore, the need for competence can be addressed with the provision of supportive feedback focusing on personal improvement (Deci et al., 2001; Vallerand & Reid, 1984). Therefore, empirical evidence linking this kind of feedback in the classroom to the development of students' learning goal orientation (Ames, 1992; Meece, Anderman, & Anderman, 2006) supports the hypothesis that the need for competence plays an important role in the development of a learning goal orientation. To illustrate, Senko and Harackiewicz (2005) showed that thwarting the need for competence via negative feedback effectively reduces learning goals. The need for relatedness is actually the most challenging basic psychological need with regard to the provision of empirical proof for its relationship to learning goals. Theorists have pointed out the importance of this need for the development of intrinsic goals (Deci & Ryan, 2000; Vansteenkiste et al., 2006), but have not investigated the assumed relationship between the two constructs. However, research on learning supportive classroom structures points out that a collaborative atmosphere is an important foundation for the development of students' learning goals (Ames, 1992; Meece et al., 2006). Furthermore,

need thwarting via social ostracism directly leads to a stronger striving to outperform others (i.e., performance goals; Jamieson, Harkins, & Williams, 2010), possibly at the cost of learning goals.

Based on the abovementioned empirical studies, we assume that each of the basic psychological needs plays an important role for the development of a learning goal orientation. The empirical evidence is strongest for the importance of perceived competence, while perceived relatedness has inspired less research in the field of goal setting. However, due to the interdependence of basic psychological needs, we can assume that all basic psychological needs are jointly important for the development of a learning goal orientation. This leads us to the conclusion that teachers' perception of need satisfaction at work should predict the strength of their work-related learning goal orientation.

Apart from giving first evidence for the importance of need satisfaction as an antecedent of a learning goal orientation, research on students' learning goal orientation also raises an interesting question on the association between intrinsic motivation and a learning goal orientation. Some teaching strategies applied to strengthen students' learning goal orientation directly aim to enhance students' interest in the current task (Ames, 1992). This is important because interest has been established as a core dimension of intrinsic motivation (Deci, 1976), which is a direct consequence of perceived need satisfaction (Deci & Ryan, 1985; 2000). If intrinsic motivation fosters the development of a learning goal orientation as implied by the research on learning goal supportive classroom structures (Ames, 1992; Meece et al., 2006), it could also serve as a mediator for the relationship between need satisfaction and the strength of the learning goal orientation. This means that when investigating the relationship between perceived need satisfaction at work and teachers' work-related learning goal orientation, we also have to carefully consider the role of teachers' intrinsic work motivation – defined as teachers' motivation to engage in their job because they find it interesting and enjoyable (Malmberg, 2006; Roth, Assor, Kanat-Maymon, & Kaplan, 2007).

2.3. The role of teachers' intrinsic work motivation

It is unclear whether intrinsic motivation should be seen as an antecedent or a consequence of learning goal orientation. Elliot and Harackiewicz (1996) argued that people with a strong learning goal orientation perceive achievement situations as challenges. As a response to this challenge, individuals with a high degree of learning goal orientation would invest cognitive resources and deeply engage in the task itself. Subsequently, they would be more likely to experience success, positive task related emotions and, consequently, intrinsic motivation. Related to this, Vansteenkiste et al. (2006) established intrinsic motivation as a potential mediator of the relationship between intrinsic goals and achievement related outcome variables.

While the aforementioned literature seems to support the view that intrinsic motivation is a consequence of a learning goal orientation as well as perceived need satisfaction, there is also empirical evidence that intrinsic motivation predicts a learning goal orientation (as implied by Ames, 1992; Meece et al., 2006). Ciani, Sheldon, Hilpert, and Easter (2011) argue and found that broader motives, such as students' intrinsic motivation for a certain subject, should influence smaller, more situated motives, such as students' learning goals in a certain course on this subject. This line of reasoning is valid if intrinsic motivation is actually conceptualized on a higher aggregation level than learning goals. However, both constructs can be applied to specific situations (situation-specific goals, task-related intrinsic motivation), a specific context (domain-specific goal orientations, intrinsic motivation for tasks in a certain domain), or in the case of goal orientation, on a more dispositional aggregation level (generalized goal orientations). Teachers' work related learning goal orientation and their intrinsic work motivation can both be described as domain-specific motivational variables, applicable for the working context of teachers. Hence, both variables share the same aggregation level. A study investigating the relationship between those two variables could help to uncover how they are related without capitalizing on differences in the

aggregation level. To illustrate, one teacher motivation study investigated the relationship between intrinsic motivation and learning goal orientation in two cross-sectional samples of teacher applicants (Malmberg, 2006). In the first sample, the (generalized) learning goal orientation of teacher applicants at the beginning of their studies predicted their intrinsic motivation for the teaching job they would later acquire. In light of the argumentation on construct aggregation applied by Ciani et al. (2011), these results might actually reflect different aggregation levels of the two constructs. In this case, a broader conceptualized learning goal orientation predicts a domain specific intrinsic motivation. However, in the second sample of students who were further into their studies than the first sample, the intrinsic job motivation predicted the degree of learning goal orientation regarding own professional development. Here both constructs shared the same aggregation level. While Malmberg (2006) concluded that both constructs might affect each other bidirectionally, this empirical evidence also supports the hypothesis that intrinsic motivation might stimulate the development of learning goals when conceptualized on the same aggregation level.

It remains unclear how the association between teachers' work-related learning goal orientation and their intrinsic work motivation can be disentangled. However, with the studies by Ciani et al. (2011) and Malmberg (2006) in mind, we have to take the possibility of intrinsic motivation causing the development of a learning goal orientation into account. This has consequences for the assumption of a direct relationship between teachers' perceived need satisfaction at work and teachers' work-related learning goal orientation. Teachers' intrinsic work motivation could indeed mediate the relationship between these two variables. Need satisfaction at work may provide teachers with a higher degree of intrinsic work motivation. This may eventually enhance their tendencies to form a work-related learning goal orientation. While we still believe that a direct effect of perceived need satisfaction at work on teachers' work-related learning goal orientation is plausible, the presented arguments make it

necessary to control this effect for a potential mediation by teachers' intrinsic work motivation.

2.4. Summary and hypotheses

By adopting an SDT perspective on teacher motivation, we conclude that the perceived satisfaction of the basic psychological needs for autonomy, competence and relatedness in teachers' working context should be predictive for the strength of teachers' work-related learning goal orientation. More concretely, we expect perceived need satisfaction at work to positively predict teachers' work-related learning goal orientation. While this relationship might be partly mediated by intrinsic work motivation, we assume that intrinsic motivation cannot fully explain the predicted direct effect of perceived need satisfaction at work on teachers' work-related learning goal orientation. In the following study, we will test the assumed direct effect of perceived need satisfaction at work on teachers' work-related learning goal orientation in three steps, ranging from weak to strong empirical evidence for the relevance of teachers' basic psychological needs. In step 1, we will test that the shared effect of all three needs (perceived need satisfaction) predicts teachers' work-related learning goal orientation (Hypothesis 1). In step 2, we will investigate that this direct effect still occurs after controlling for teachers' intrinsic work motivation (Hypothesis 2). Even though we have no clarity on the exact causal mechanism behind the relationship between teachers' intrinsic work motivation and their work-related learning goal orientation, we will include intrinsic work motivation as a potential mediator of the relationship between teachers' need satisfaction at work and teachers' work-related learning goal orientation. This approach delivers a conservative test for our assumed association between teachers' perceived need satisfaction at work and their work-related learning goal orientation. In the third and final step, we will investigate whether – beyond the shared impact of perceived need satisfaction - differential effects of perceived need satisfaction for autonomy (Hypothesis 3a), competence (Hypothesis 3b) and relatedness (Hypothesis 3c) on the strength of teachers'

work-related learning goal orientation can be observed. The occurrence of such differential effects would make a strong point for the unique importance of each basic psychological need for teachers' work-related learning goal orientation.

3. Method

We conducted a quantitative cross-sectional survey study to address our research question. In the following section, we will describe our sample, the scales used to assess the relevant variables, and our analysis procedures.

3.1. Sample

We questioned German teachers in an online survey. The survey was distributed via online newsgroups and mailing lists for people working in the teaching profession. Participants were assured that their responses would remain confidential and would be used for scientific purposes only. Among all participants, 10 vouchers worth €15 each from a well-known online marketplace were raffled. A total of 334 participants completed the survey, 65.7% of which were female, with a mean age of 42.1 years ($SD = 11.2$). Their teaching experience ranged from 0 to 41 years ($M = 13.3$, $SD = 11.5$) and they were employed in all tracks of the German school system. Elementary school teachers made up 11.1% of the sample but the majority of teachers (73.7 %) worked in secondary schools [Insert Footnote 1]. Most of these teachers (45.8%) worked in academic track secondary schools (i.e., *Gymnasium*), preparing students for university. Additionally, 4.2% of the teachers worked in lower track secondary schools (i.e., *Hauptschule*), 8.1% in intermediate track secondary schools (i.e., *Realschule*) and 10.5% worked in comprehensive schools, which combine all three tracks (i.e., *Gesamtschule*). Also, 5.1% of the teachers worked in special schools for physically and mentally handicapped students (i.e., *Sonderschule*). Besides those teachers working in primary or secondary education, there was a minority (10.7%) working in vocational schools (i.e., *Berufsschule*), which are part of tertiary education. The last 4.5% of the questioned teachers reported to work in another school type.

3.2. Measures

  3.2.1. Need satisfaction at work. *Perceived need satisfaction* was measured with the German version of the *balanced measure of psychological needs* (*BPMN*; Sheldon & Schüler, 2011). The questionnaire consists of three subscales, one for every basic psychological need, using a 5-point Likert-type scale ranging from 1 (*no agreement*) to 5 (*strong agreement*). Each subscale consists of six items. Three items are positively and three negatively worded. Sheldon and Hilpert (2012) pointed out that the items therefore included variance of three content factors (perceived autonomy, perceived competence, perceived relatedness) as well as two methodological factors, due to the item wording (*need satisfaction* and *need dissatisfaction*). The items were slightly altered to properly address the working conditions at school. For instance, the original item "I am free to do things my own way" from the subscale *perceived autonomy* was changed to "During my everyday work as a teacher, I am free to do things my own way." An example for *perceived competence* is "During my everyday work as a teacher, I successfully complete difficult tasks and projects." *Perceived relatedness* was assessed with items such as "During my everyday work as a teacher, I feel close and connected with colleagues who are important to me." Our adapted scale was pretested with a sample of 129 teachers in training. Convergent validity was verified by associations between the subscales for perceived autonomy, perceived competence and perceived relatedness and the corresponding subscales of the basic psychological needs at work scale (*BPNS*; Gagné, 2003 translated by Hanfstingl et al., 2011) [Insert Footnote 2]. All subscales had acceptable internal consistencies [Insert Footnote 3] in the pretest ($\alpha_{Autonomy}$ =.78, $\alpha_{Competence}$ =.74, $\alpha_{Relatedness}$ =.81) as well as in the main study (see Table 1).

  3.2.2. Work-related learning goal orientation. We used the nine-item corresponding subscale from the *goal orientation questionnaire for teachers* (Nitsche et al., 2011) to assess teachers' work-related learning goal orientation. Previous studies have shown that the utilization of a 5-point Likert-type scale often leads to ceiling effects in samples of teachers

(Nitsche et al., 2011, 2013). We hoped to avoid these ceiling effects by extending the scale range to a 7-point Likert-type scale with scale limits from 1 (*total disagreement*) to 7 (*total agreement*). The nine items of the questionnaire form three subscales addressing teachers' *pedagogical learning goal orientation*, *pedagogical content learning goal orientation*, and *content-related learning goal orientation*. An example item for addressing the pedagogical learning goal orientation is "In my vocation, I aspire to improve my pedagogical knowledge and competence," (the items of the scale are completely depicted by Nitsche et al., 2011). Since we were not interested in the subscales but rather in the overall work-related learning goal orientation, we conducted a reliability analysis with all nine items according to the recommendation by Nitsche et al. (2011). This analysis provided a good internal consistency ($\alpha = .88$) and thereby an argument for the extraction of a general factor.

       3.2.3. Intrinsic work motivation. The strength of *intrinsic work motivation* was assessed with the corresponding subscale of the *teachers' motivation scale* (Müller, Hanfstingl, & Andreitz, 2009). The scale consisted of five items. All items were positively worded and used the same 5-point Likert-type scaling as the *balanced measure of psychological needs*. A sample item for this subscale is "I engage in my job as a teacher because I find my job very exciting." The scale showed an acceptable internal consistency in our sample ($\alpha = .79$).

3.3. Analyses

       We analyzed our data in two steps to answer our research questions. In a first step, we conducted preliminary analyses to assess the multivariate normality of our data. In this step, we also tested if the zero-order-correlation between the perceived satisfaction of teachers' basic psychological needs at work and their work-related learning goal orientation was significant and pointed in the right direction. In a second step, we tested the robustness of the association using structural equation models. We thereby conducted analyses in ascending strictness, ranging from liberal to more conservative approaches to assess the relationship

between teachers' basic psychological needs and their work-related learning goal orientation. In this section, we will first describe the subsequent analyses steps in detail and then provide an overview on the standards used for the evaluation of the conducted structural equation models.

3.3.1. Procedures

In the preliminary analyses we checked if anomalies occurred in our data. We primarily focused on aberrations from the univariate normal distribution of the obtained scales. This test was important because univariate normality of all used subscales is a required prerequisite for the assumption of multivariate normality (Looney, 1995). Furthermore, the degree of multivariate normality has implications for the decision on the adequate model estimator for structural equation modeling: Multivariate Normality is an important prequisite for the use of the maximum likelihood estimator (ML), which is typically applied in SEM analyses with Mplus. On the contrary, in cases of non-normality the more robust maximum likelihood estimator with mean- and variance-adjusted chi-square test statistics (MLMV) has to be applied. Consequently, the univariate normality was assessed with the Komolgorov-Smirnov test for normality (Lilliefors, 1967). When non-normality occurred, the skewness of the scale was used to indicate the degree of non-normality. In our preliminary analyses, we also took a first look at the zero-order-correlations between all variables to see if the assumed relationship between teachers' need satisfaction at work and their their work-related learning goal orientation was plausible.

Following the order of the hypotheses in section 2.4, three structural equation models were conducted with Mplus Version 7 (Muthén, & Muthén, 1998-2012). In the first model, we addressed the assumed direct effect of perceived need satisfaction on teachers' work-related learning goal orientation in a simple model solely focusing on this relationship. All included constructs were modeled as latent factors. We used item parceling to minimize methodological invariance. As mentioned above, Sheldon and Hilpert (2012) showed that the

scales of the *balanced measure of basic psychological needs* incorporated variance of two methodological factors due to the item wording. While these method factors might be interesting for different research questions, we wanted to strictly focus on the content factors (perceived autonomy, perceived competence and perceived relatedness). Thus, we restrict the methodological invariance by aggregating two item parcels for each content factor: one consisting of positively worded items and the other consisting of negatively worded items. Also, we parceled the three subscales of the goal orientation questionnaire for teachers, because we were only interested in work-related learning goal orientation in general and did not wish to include a two-level factorial structure in our analyses. In our first model, we focused solely on the shared effect of the perceived satisfaction of teachers' basic psychological needs on teachers' work-related learning goal orientation. We therefore modeled one latent second-order factor representing perceived need satisfaction at work indicated by the first-order factors for perceived autonomy, perceived competence and perceived relatedness. From a methodological viewpoint, this approach guaranteed that the expected collinearity of the three indicators would not lead to misspecification of singular beta-weights and misconceptions of their relative importance (Grewal, Cote, & Baumgartner, 2004).

In the second model, we added intrinsic motivation to our analyses as a potential mediator of the direct effect from teachers' perceived need satisfaction at work on their work-related learning goal orientation. In this step we wanted to show that the direct relationship between perceived need satisfaction at work and teachers' work-related learning goal orientation persists, even after controlling for the potential mediation by intrinsic work motivation. Since we wanted to compare the mediational model with the base model, it was important to ensure invariance of factor loadings, which we achieved by fixing the unstandardized factor loadings to the values of the base model. Intrinsic motivation was also modeled on a latent level.

In the third and last model, we tested if unique influences of the different predictors could be observed, which go beyond their shared influence represented in the second-order factor perceived need satisfaction at work. Therefore, we again ensured factorial invariance by fixing the unstandardized factor loadings to the values of the base model, but this time we also modeled the unique variances of all basic psychological needs not explained by the second-order factor *perceived need satisfaction*. We fixed covariances between the different factors representing unique variance to zero in order to ensure that the factors were perfectly orthogonal to each other. Our method therefore used a similar approach as relative weight analysis (Breland & Donovan, 2005; Johnson, 2000), which is used to approximate the differential impact of correlated predictors in multiple regressions. In a nutshell, relative weight analysis creates a new set of uncorrelated predictors, which are maximally correlated with the corresponding original predictors. In a second step, the criterion is regressed on the new predictors. The resulting standardized regression weights reflect the relative weight of the predictive variable and are thus combined with the original regression weights to assess the predictors' importance in the equation. In comparison to relative weight analysis, our method only accounts for unique variance and gives no information on the contribution of a variable to the shared variance of a predictor set. It should be noted that the specified paths will only reach significance if there are any associations beyond the shared influence of the predictors. This makes the method a conservative approach for testing the differential influence of exogenous variables.

3.3.2. Evaluation of model fit

The model fit of all estimated structural equation models is reported according to the recommendation of Hu and Bentler (1999), using not only the χ^2-test for model fit, but also a combination of certain misfit (*SRMR*, *RMSEA*) and fit indices (*CFI*). The suggested rules of thumb for cut-off values by Schermelleh-Engel, Moosbrugger, and Müller (2003) were applied to evaluate the goodness of fit of the conducted models. According to these

guidelines, we distinguished between an acceptable model fit ($SRMR \leq .10$, $RMSEA \leq .08$, $CFI \geq .95$) and a good model fit ($SRMR \leq .05$, $RMSEA \leq .05$, $CFI \geq .97$). Furthermore, Mplus delivers modification indices indicating possible reasons for model misfit. We used these indices to detect possible residual correlations between indicators of the latent variables. We freed such residual correlations when necessary in order to sustain a good model fit. We neither relocated indicators between latent variables, nor adjusted the hypothesized structural model. Therefore, we ensured a clear approach of deductive hypothesis testing.

4. Results

We will follow the aforementioned analysis steps to describe the results of our study. Therefore, we start with the preliminary analyses, followed by the structural equation modeling to test the assumed relationship between teachers' perceived need satisfaction and teachers' work-related learning goal orientation.

4.1. Preliminary analyses

The mean scores and standard deviations as well as the zero order correlations of all used scales are shown in Table 1. We first want to focus on the normality of the scales in question and then on their zero-order correlations for an initial view of the obtained data.

--- Insert Table 1 about here ---

4.1.1. Univariate normality

The obtained scales significantly deviated from univariate normality ($p < .001$ in all Kolmogorov–Smirnov tests). The most severe deviation was observed for the scale measuring teachers' work-related learning goal orientation (*skewness* = -1.14). This shows that the teachers in our sample were more likely to report a high than a low work-related learning goal orientation, which is rather typical for the self-reported work-related learning goal orientation in samples of teachers (Nitsche et al., 2011). Similar high skewness was observed for intrinsic work motivation (*skewness* = -1.10). All items measuring intrinsic work motivation showed severe skewness with at least 96% of the participants choosing one of the upper three out of

five categories. This ceiling effect of intrinsic motivation indicates that the teachers in our sample reported to be mostly intrinsically motivated for their job. While their deviation from the normal distribution was still significant, the scales measuring perceived autonomy (*skewness* = -0.25), perceived competence (*skewness* = -0.64) and perceived relatedness (*skewness* = -0.70) deviated less strongly than the previously accounted scales. The observed pattern indicated that the assumption of multivariate normality had to be rejected. As a response, the maximum likelihood estimator with mean- and variance-adjusted chi-square test statistics (MLMV) was applied in the later conducted structural equation models, because it is superior to the standard maximum likelihood estimator (ML) in cases of non-normal data.

4.1.2. Zero-order correlations

A look at the zero-order correlations reveals that perceived autonomy, perceived competence and perceived relatedness positively correlate with teachers' work-related learning goal orientation. This provides a first hint at the importance of need satisfaction for teachers' work-related learning goal orientation. However, intrinsic work motivation was also associated with all other constructs. Hence, a mediation of the relationship between perceived need satisfaction and teachers' work-related learning goal orientation was still possible and had to be ruled out in the later analyses. The correlation matrix also shows collinearity between perceived autonomy, competence, and relatedness. It was expected that the collinearity between the predictors would increase when dealing with the constructs on a latent level due to the suppression of unsystematic variance. Therefore our preliminary analyses support the later applied approach to include a second order factor representing perceived need satisfaction to avoid problems of model misspecification outlined by Grewal et al. (2004).

4.2. Structural Equation Modeling

In the next step of our analyses, we conducted a simple model assessing the relationship between the second order factor "perceived need satisfaction" as predictor and work-related learning goal orientation as criterion. Our model achieved a good fit (χ^2 (23; n =

334) = 42.09, $p < .001$, *SRMR* = .05, *RMSEA* = .05, *CFI* = .97). The obtained modification

indices suggested to free covariance between the three item parcels, reflecting dissatisfaction

of the basic psychological needs. We freed the three residual correlations between the item

parcels in question ($r = .18 - .23$) to control for the remaining methodological invariance.

Subsequently, the fit indices improved and the model fitted the data very well (χ^2 (20; n =

334) = 27.37, $p = .251$, *SRMR* = .04, *RMSEA* = .03, *CFI* = .99). The path coefficients are

shown in Figure 1. The figure shows that the direct effect of perceived need satisfaction on

teachers' work-related learning goal orientation occurred and proved to be quite substantial in

our first simple model ($R^2 = .20$). The obtained association between the two constructs points

in a positive direction as predicted.

--- Insert Figure 1 about here ---

After the inclusion of intrinsic work motivation as a potential mediator of the

relationship between perceived need satisfaction at work and teachers' work-related learning

goal orientation, the model fit dropped (χ^2 (75; n = 334) = 146.23, p < .001, *SRMR* = .06,

RMSEA = .05, *CFI* = .92). We then included two residual correlations ($r = .30$ and $r = -.21$)

between items of the scale measuring intrinsic work motivation. This improved the model fit

to an acceptable level (χ^2 (73; n = 334) = 124.51, p < .001, *SRMR* = .06, *RMSEA* = .05, *CFI* =

.94). While this might still not be considered a good model fit, the fit statistics nevertheless

suggests that it is acceptable to consider the path coefficients. As Figure 2 shows, perceived

need satisfaction at work is predictive for intrinsic work motivation as well as work-related

learning goal orientation. However, while the direct effect of intrinsic work motivation on

work-related learning goal orientation did point in the right direction, it did not reach

significance ($\beta = .17$, $p = .079$).

--- Insert Figure 2 about here ---

In the last step, we investigated the unique effects of perceived autonomy, competence and relatedness beyond their shared influence on teachers' work-related learning goal orientation. Therefore, we extracted the unique variance of the three predictors on a latent level and used the new variables representing the unique variance as predictors for teachers' work-related learning goal orientation (as described in section 3.3.1.). The model showed a very good fit to the data (χ^2 (25; n = 334) = 24.85, *p* = .471, *SRMR* = .04, *RMSEA* = .00, *CFI* = 1.00). Figure 3 shows that perceived autonomy, perceived competence and perceived relatedness have differential predictive power regarding teachers' work-related learning goal orientation. All observed path coefficients were positive as expected. While the explained variance cannot easily be compared to the base model due to the suppression of variance, it is important to note that it reaches significance (R^2 = .68, *p* = .026). Thus, the three predictors can individually account for a substantial amount of variance even when their shared variance is not included in the equation.

--- Insert Figure 3 about here ---

5. Discussion

In the presented study, we investigated the relationship between teachers' perceived need satisfaction at school and their work-related learning goal orientation. We were able to show that perceived need satisfaction at work is predictive for teachers' work-related learning goal orientation and explains a substantial amount of variance on that criterion. As expected, the path between the two variables pointed in a positive direction. This relationship was robust even after the inclusion of intrinsic work motivation as a possible mediator. Contrary to our expectations, no direct effect of intrinsic work motivation on teachers' work-related

learning goal orientation occurred. This lack of a direct effect is rather surprising because previous studies have often found an association between learning goal orientations and intrinsic motivation (Elliot & Church, 1997; Harackiewicz et al., 1997). In our opinion, two possible reasons might be responsible for the absence of the relationship. First of all, associations between intrinsic motivation and learning goal orientation found in previous studies could indeed reflect the shared influence of need satisfaction on both constructs. Therefore, the association would be a spurious correlation reflecting the influence of an unassessed variable. This explanation could be applicable for correlative research on the relationship between the two variables. However, it would not be applicable for experimental research. A second explanation could be that the variance reduction in teachers' intrinsic work motivation, which occurred because of strong ceiling effects, limited the detection of possible associations with teachers' work-related learning goal orientation. We think this explanation is very plausible and will discuss it in more detail later on (see section 5.3). Finally, we tested the independent influence of the perceived satisfaction for each of the three basic psychological needs at work by focusing on their unique variances. While this is a rather conservative approach, all three expected paths were significant and pointed in the expected positive direction. The results therefore highlight the possibility that the perceived satisfaction of each basic psychological need has a unique predictive value for teachers' work-related learning goal orientation.

Our results strongly support our assumption that perceived need satisfaction at work predicts teachers' work-related learning goal orientation. Therefore, we found first evidence that previous research linking students' learning goal orientation to need satisfying classroom structures (e.g., Ames, 1992; Meece et al., 2006) might be generalized to teachers' working environment. Just as learning goal orientation can be fostered in students, our study delivers first evidence on the possibility that teachers' work-related learning goal orientation might also be fostered by means of need support. Furthermore, the presented study is also a crucial

step towards an incorporation of achievement goal orientations into the theoretical framework of SDT.

5.1. A broader view on achievement goals

From a theoretical point of view, the obtained results provide evidence for a new connection between the theoretical frameworks of Self-Determination-Theory and Achievement Goal Approach. It has been shown that perceived need satisfaction is not only important for the development of intrinsic motivation, but also closely associated to teachers' work-related learning goal orientation. Studies combining research on SDT and achievement goal orientations are relatively rare. This is rather surprising as the theoretical framework of SDT (especially Deci & Ryan, 2000 as well as Vansteenkiste et al., 2006) strongly emphasizes direct connections between perceived need satisfaction and goals that emphasize personal growth such as learning goals. Our research tested this theoretical assumption and provides empirical evidence that learning goals may be included in the theoretical framework of SDT as specific kinds of intrinsic goals that occur in achievement related environments. Furthermore, we provide evidence that perceived competence, autonomy, and relatedness have a unique impact on the degree of teachers' work-related learning goal orientation beyond their shared influence. While the research on learning goals has often centered on the striving for competence (see Elliot, 2005), our results underline the possibility that the striving for autonomy and relatedness may also play crucial roles in the development of a learning goal orientation. This also underlines the importance to look beyond competence related variables like self-efficacy and fear of failure when investigating possible antecedents of achievement goal orientations and, more specifically, learning goal orientations. Beyond the theoretical implications, our study also provides some important practical implications regarding workplace interventions and ongoing debates on teaching and teacher education.

5.2. Practical implications for teachers' working environment

As stated, the provided results suggest that teachers' work-related learning goal orientation might be enhanced by focusing on the satisfaction of their basic psychological needs in their work environment. There are multiple ways to achieve this: For instance, previous studies have shown that providing meaningful freedom of choice can enhance autonomy (Agran, Storey, & Krupp, 2010; Katz & Assor, 2007). In teachers' work environment, autonomy support can be implemented by encouraging teachers to decide which voluntary training courses they want to join in order to enhance their teaching skills. Perceived competence can be supported by offering feedback on one's skill development (Vallerand & Reid, 1984). Feedback procedures can be applied in school by establishing peer-to-peer-evaluations, which also addresses the need for relatedness. Moreover, relatedness can be addressed by fostering teamwork (Turner, Barling, & Zacharatos, 2002) and a positive social climate. Future research should investigate if the described strategies support both need satisfaction in younger teachers as well as the maintenance of perceived need satisfaction. This is important because previous research has shown that older teachers report a lower degree of need satisfaction compared to younger colleagues (Evelein, Korthagen, & Brekelmans, 2008).

Beyond implications for workplace interventions, our research also has some pressing implications for current international debates on education. For example, most Western countries have implemented methods of quality control in their education systems, which often include assessing the performance of students. These assessments differ in the way their results are reported to the responsible teachers (OECD, 2013). Usually, norm- or criterion-based class results are delivered. However, not all reports include guidelines that help to counter problematic results by means of teaching or classroom management. A combination of negative test results and this lack of guidelines might decrease teachers' sense of competence and, subsequently, their work-related learning goal orientation. Hence,

performance evaluations should include supportive guidelines to reduce these anticipated negative effects on teachers' motivation.

Another example for implications of our research is the debate on the implementation of standardized teaching procedures, such as scripted curricula, which is particularly topical in the USA at present. The critics of standardized or scripted teaching often point out that it might conflict with teachers' capability to address the individual learning progress and interests of their students (Dresser, 2012). Besides this possible negative aspect of scripted teaching, it could also reduce teachers' perception of autonomy at work and, in turn, reduce their work-related learning goal orientation. Therefore, another downside of scripted teaching could be its negative impact on teachers' motivation.

Addressing the issues arising in the ongoing educational debate in a way that takes need satisfaction into account could lead to an increase in teachers' work-related learning goal orientation. Eventually, this should also result in the previously described positive effects on their well-being and engagement in professional development. However, while we are convinced of the importance of our results, we have to address some limitations of our study. The discussion of these limitations may help to shape future research on the relationship between need satisfaction and teachers' work-related learning goal orientation.

5.3. Limitations of the study

One limitation of the results lies in the restricted range of intrinsic work motivation in our sample. A strong ceiling effect concerning intrinsic work motivation occurred, which means that we reached a highly motivated sample of teachers. This ceiling effect might be the reason for the insignificant direct effect on teachers' work-related learning goal orientation as well as for the substantial decrease of the model fit after the inclusion of intrinsic work motivation. The observed ceiling effects might be explained by the fact that we distributed our questionnaires via newsgroups and mailing lists for teachers. This distributional method as well as the voluntary nature of participation makes it very likely that our sample does not

represent the normal range of teachers' work motivation. We used a wide array of different newsgroups and mailing lists, which were primarily administered by practicing teachers and not by scientists. Therefore we cannot provide our response rate (due to lack of information on the size of the different channels) nor can we compare respondents and non-respondents. However, as represented in the data, we have to assume that mainly highly motivated teachers participated in our assessment. This limits the variance of intrinsic work motivation in our sample and its explanatory value regarding the association between perceived need satisfaction and teachers' work-related learning goal orientation. Thus, our results are probably a conservative estimation of a potential mediating effect by teachers' intrinsic work motivation.

Furthermore, we solely used self-report measures in our study. Self-report measures do not necessarily solely assess how need supportive the working environment of teachers actually is, but rather how supportive it is perceived to be by the individual. Nevertheless, research has shown that the perception of need satisfaction does not only depend on environmental influences (Evelein et al., 2008; Levesque, Zuehlke, Stanek, & Ryan, 2004) but on personality as well (Deci & Ryan, 1985, 1991). Therefore, the described analyses cannot be considered perfectly accurate for the described working conditions. However, it is also unlikely that they only reflect aspects of the personality of the questioned participant. The best way to interpret the results might be to view perceived need satisfaction of teachers as a subjectively biased approximation of need support in their actual working environment. Thus, it is likely that the observed association between perceived need satisfaction and teachers' work-related learning goal orientation is at least partly grounded in the environment. However, the estimated effect sizes might not be entirely accurate for the relationship between actual need support in the working environment and teachers' work-related learning goal orientation.

Another limitation of the results is that, even though our theoretically well-established model shows a good fit to the data, it cannot deliver final proof for the assumed causal mechanism that perceived need satisfaction at work indeed influences teachers' work-related learning goal orientation. This is due to the fact that the analyses are grounded in data from a survey with only one measurement point. While our analyses suggest an association between perceived need satisfaction at work and work-related learning goal orientation, it is possible that learning goal-oriented teachers perceive more possibilities to satisfy their basic psychological needs at work. However, as carefully addressed in our literature review, previous research supports the view that perceived need satisfaction has to be considered an antecedent rather than a consequence for variables indicating human motivation (in general: Deci & Ryan, 2000; additional examples for perceived competence: Senko & Harackiewicz, 2005; for perceived autonomy: Vansteenkiste et al., 2004; for perceived relatedness: Jamieson et al., 2010; Lustenberger & Jagacinski, 2010). The theoretical background from SDT and the Achievement Goal Approach make the assumed causal mechanism (that perceived need satisfaction at work strengthens teachers' work-related learning goal orientation) more plausible than the reverse.

5.4. Future directions

Our research is a first step toward a broad understanding of environmental antecedents for domain-specific learning goal orientations. While this study focused on teachers and their working conditions, the pattern of results should be replicated in other educational contexts (e.g., institutions of primary, secondary and higher education) to investigate its generalizability. If the results of our study can be replicated in other domains, a generalized model on environmental antecedents of learning goal orientations might expand the theoretical network of SDT. This theoretical expansion would be very helpful to establish new environment-centered interventions aiming at the enhancement of domain-specific learning goal orientations in a broad set of educational environments. Furthermore, the underlying

causation should be investigated with experimental or longitudinal designs, which could also include objective measures of the working context.

In teacher' motivation research, longitudinal data would be necessary to explore the role of perceived need satisfaction in the development of a work-related learning goal orientation. For now, we can only state that perceived need satisfaction at work and teachers' work-related learning goal orientation are associated. However, SDT researchers often postulate that need satisfaction is the breeding ground for variables reflecting human motivation (Deci & Ryan, 2000). Therefore, we assume that perceived need satisfaction in teachers' work environment triggers the development of a work-related learning goal orientation. This assumption that should be tested in future research.

6. Conclusion

The present research provides new insights into the importance of perceived need satisfaction at teachers' workplace and might inspire new ideas to foster teachers' work-related learning goal orientation. Consequently, these ideas should be put into practice by implementing and subsequently testing workplace modifications aimed at teachers' basic psychological needs for autonomy, competence, and relatedness. For the time being, we can conclude that our results are of utmost importance for current debates on educational programs. This is especially true when educational programs include the introduction of new teaching techniques. Such programs rely on teachers' willingness to invest time in professional development (in other words, on their work-related learning goal orientation). The observed relationship between need satisfaction and teachers' work-related learning goal orientation makes it likely that efforts to motivate teachers to engage in professional development will fail when teachers' basic psychological needs are not considered or are even thwarted. Therefore, we advise to consider the importance of school as a workplace and teachers' inherent striving to satisfy the needs for autonomy, competence, and relatedness in current scientific and political debates on educational programs.

Acknowledgements

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Footnotes

[Footnote 1]: German students are assigned to one of the three possible secondary tracks of the German school system after forth class.

[Footnote 2]: The following validity coefficients were obtained between the corresponding subscales of the BPNS and the BPMN: perceived autonomy: r = .85, perceived competence: r = .67, perceived relatedness: r = .86

[Footnote 3]: There are no strict guidelines on the evaluation of reliability by means of internal consistency as this measure depends on the reliability of the measurement as well as the homogeneity of the depicted construct. However, we used the often applied rules of thumb by Cicchetti (1994), which defined the cut-off for an acceptable reliability at $\alpha \geq .70$ and for a good reliability at $\alpha \geq .80$.

Table 1

Zero order correlations, Descriptives and internal consistencies (Cronbachs α)

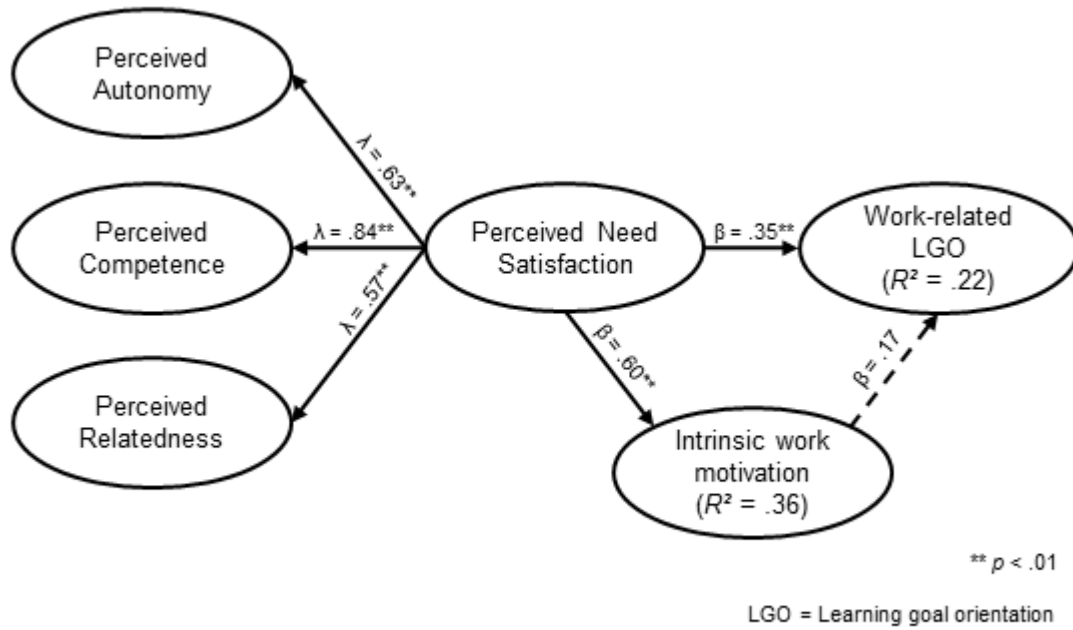|	*M*	*SD*	α	(1)	(2)	(3)	(4)
(1) Perceived autonomy	3.19	0.64	.78				
(2) Perceived competence	3.85	0.55	.77	.40**			
(3) Perceived relatedness	3.95	0.68	.78	.35**	.33**		
(4) Work related learning goal orientation	5.99[a]	0.77	.88	.19**	.21**	.16**	
(5) Intrinsic work motivation	4.40	0.56	.79	.33**	.44**	.32**	.33**

** $p < .01$

[a] While all other scales had a range from 1 to 5, teachers' learning goal orientation at work was assessed using a 7-point Likert-Scale
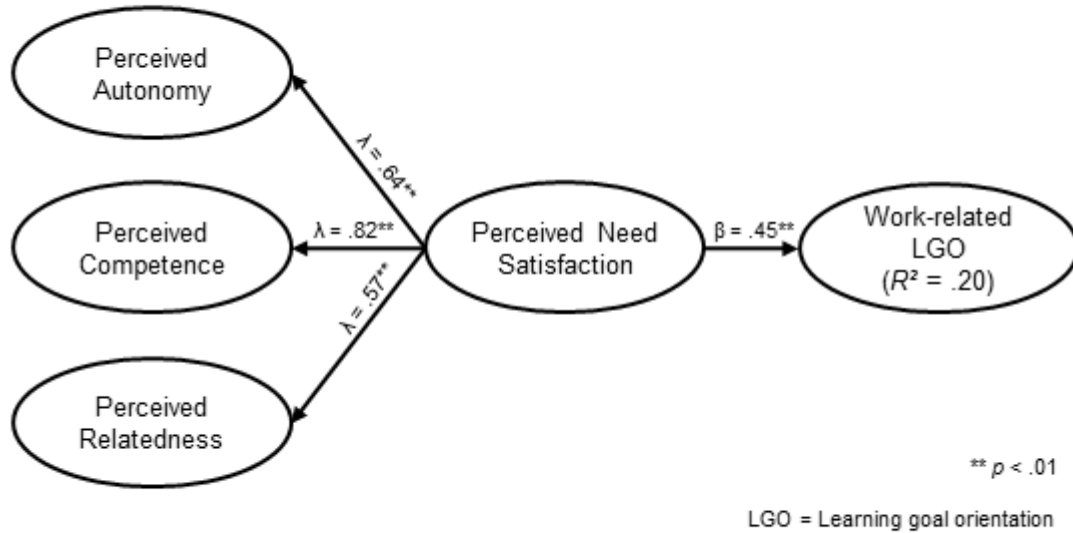
Figure 1. Base Model reflecting the relationship between perceived need satisfaction at work and teachers' work-related learning goal orientation. The loadings of the item parcels on the latent factors are excluded for better comprehensibility. The range of the factor loadings lies between λ = .54 to λ = .98. All factor loadings are highly significant.

Figure 2. Model accounting for the potential influence of intrinsic work motivation on the criterion. The loadings of the items and item parcels on the latent factors are excluded for better comprehensibility. The range of the factor loadings lies between $\lambda = .54$ to $\lambda = .98$. All factor loadings are highly significant.
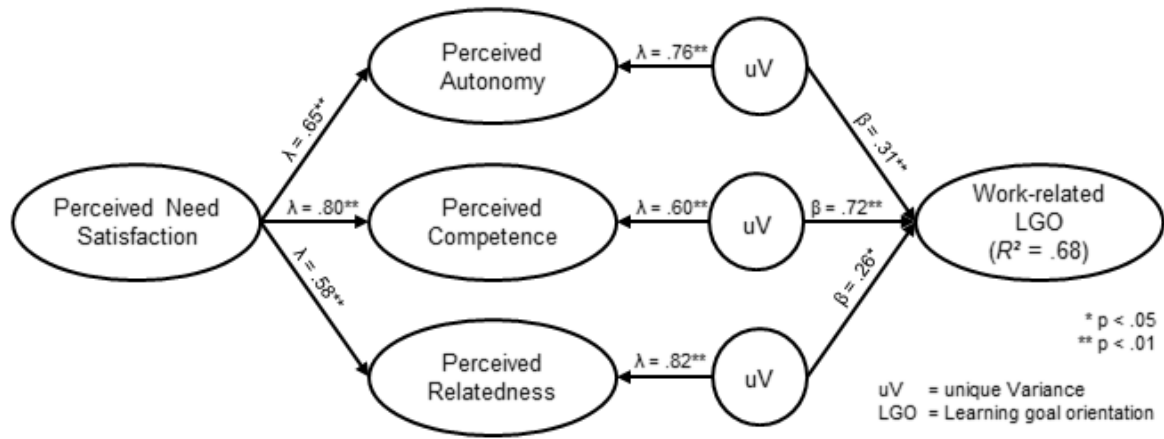
Figure 3. Model accounting for unique variance of the exogenous variables. Loadings of the

item parcels on the latent factors are identical to the base model.