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Angaben zur Veröffentlichung / Publication details:

Janke, Stefan, Sebastian Nitsche, Anna-Katharina Praetorius, Katharina Benning, Michaela Fasching, Markus Dresel, and Oliver Dickhäuser. 2016. "Deconstructing performance goal orientations: the merit of a dimensional approach." *Learning and Individual Differences* 50: 133–46. <https://doi.org/10.1016/j.lindif.2016.08.013>.



Deconstructing performance goal orientations: The merit of a dimensional approach

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1. Introduction

Achievement goal approach is one of the most influential theories in the field of achievement motivation. Researchers within this theoretical framework have investigated human goal striving in achievement domains like sports (Duda, 2005) and schools as places for learning (Meece, Anderman, & Anderman, 2006) or working environments (Butler, 2007; Retelsdorf, Butler, Streblow, & Schiefele, 2010). The theory distinguishes the striving for qualitatively different goals into performance goal orientation (striving for competence demonstration) and learning goal or mastery goal orientation (striving for competence development), which can both be subsumed as classes of achievement goal orientations (Dweck & Leggett, 1988; Elliot, 2005). The majority of research

(e.g., Elliot, 1999; Elliot & Harackiewicz, 1996) further distinguishes performance goal orientations into performance approach goal orientation (striving to demonstrate high competencies) and performance avoidance goal orientation (striving to cover the lack of own competencies). This distinction was originally introduced to explain differential associations of performance goal orientations to pattern of learning: A performance approach goal orientation was meant to facilitate adaptive patterns of learning (indicated by intrinsic task motivation and deep learning strategies), while a performance avoidance goal orientation was meant to be more maladaptive (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Graham & Golan, 1991). Researchers found some empirical proof for the maladaptive nature of a performance avoidance goal orientation (e.g., positive associations with performance anxiety and negative associations with intrinsic motivation, see Elliot & Harackiewicz, 1996; Elliot & McGregor, 1999). Empirical findings regarding a performance approach goal orientation, however, were more complex: Some studies showed positive associations to achievement or persistence (Elliot & Church, 1997; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997), while other studies showed associations to rather maladaptive learning strategies (e.g. surface learning, Elliot, McGregor, & Gable, 1999; Ryan & Pintrich, 1997). With these findings in mind, critics questioned the necessity of the

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dichotomization of performance goal orientations and argued that other approaches like multi-goal perspectives¹ could better explain the complex associations of performance goal orientations with patterns of learning (Midgley, Kaplan, & Middleton, 2001). Some researchers even questioned the ability of individuals to differentiate between both performance goal orientations in daily life situations (Urdañ & Mestas, 2006). Children in particular did not seem to differentiate between performance approach and performance avoidance goal orientations (Bong, 2009; Bong, Woo, & Shin, 2013) and, even within adults, the observed associations between them were considerably high (often larger than $r = 0.50$ according to Murayama, Elliot, & Yamagata, 2011). However, most achievement goal researchers still insist on the importance of the dichotomization of performance goal orientations, especially because a performance avoidance goal orientation yields stronger negative results than a performance approach goal orientation (Murayama et al., 2011).

We think that this paradox within achievement goal research (high associations between performance goal orientations, partially different outcome patterns) can be resolved by focusing on the dimensions behind performance goal orientations as especially highlighted by Elliot and McGregor (2001): While both performance goal orientations might be characterized by the same normative evaluation standard (i.e., own competencies are assessed by comparing one's achievement within a reference group; Elliot, McGregor, & Thrash, 2002), they are meant to differ in their goal valence by either focusing on accomplishment of positive outcomes (approach goal valence) or prevention of negative outcomes (avoidance goal valence; see Elliot, 1999; Elliot & Harackiewicz, 1996). Normative evaluation standard and goal valences as goal underlying dimensions are suitable to explain the interdependence of both performance goal orientations (based on the shared normative evaluation standard) as well as their differential effects on some outcome variables (based on the respective goal valence). Although the described dimensional model is neither our invention nor new to achievement goal research, empirical evidence on the validity of the dimensional foundation of performance goal orientations is lacking. We intend to provide this crucial empirical evidence by extracting the postulated goal underlying dimensions from items measuring performance goal orientations with latent bifactor models. Furthermore, we want to demonstrate that goal underlying dimensions are indeed suitable to explain the complex association pattern as well as inter- and independence of performance goal orientations.

2. Testing the dimensional nature of performance goal orientations

In order to understand why we need to put the foundation of performance goal orientations to the test, we first have to address how assumptions of dimensional models of performance goal orientations have been tested by empirical research in the past. The claim that performance goal orientations are characterized by a normative evaluation standard as well as two diverging goal valence dimensions was explicitly issued by Elliot and McGregor (2001) and has been repeated by achievement goal theorists on regular bases ever since (for contemporary examples, see Elliot, Murayama, & Pekrun, 2011; Murayama et al., 2011; Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). We would even say that the dimensional nature of achievement goal orientations became one of the core tenets of achievement goal approach in the course of the last two decades of research. Considering the growing popularity of dimensional models (Elliot et al., 2011) and the key relevance of goal underlying dimensions, one could expect that the existence of goal underlying dimensions would be an empirically fortified fact for the time being. At least, we would expect some empirical

evidence for the existence of goal underlying dimensions within performance goal orientations since the introduction of goal valence in the conceptualization of performance goal orientations sparked the discussion about goal underlying dimensions. Therefore, it is rather remarkable that almost no research has actually empirically addressed the mere existence of goal underlying dimensions.

More specifically, research most often tried to validate dimensional models by extracting the appropriate number of achievement goal orientation instances (i.e., compounds of goal underlying dimensions) rather than accounting for the postulated dimensional structure. When considering the dimensional model of performance goal orientations, most research work actually tested whether performance approach goal orientations and performance avoidance goal orientations can be differentiated from each other (Day, Radosevich, & Chasteen, 2003; Midgley et al., 1998; Murayama et al., 2011; VandeWalle, 1997). The empirical evidence on this question has then often been interpreted as evidence for the core assumption that performance goal orientations are heterogeneous constructs founded in a normative evaluation standard but diverging goal valence (Murayama et al., 2011). However, there is no clear logical connection between the mere existence of two clearly separable constructs and the question which dimensions actually constitute the founding fabric of these constructs.

To our knowledge, only one study takes goal underlying dimensions into consideration while validating an achievement goal measure: Elliot and Murayama (2008) modeled goal underlying dimensions as second-order factors to support their assumption that first-order factors extracted from the items of their revised Achievement Goal Questionnaire (AGQ-R) can be understood as compounds of goal valence (approach and avoidance) and evaluation standard (normative and intrapersonal). The results of their analyses showed that second-order factors are extractable in a way that could indeed support a dimensional model of achievement goals. However, the authors did not provide any additional evidence for the construct validity of the second-order factors. Thus, one can solely draw the conclusion that performance goal orientations are actually heterogeneous constructs founded in two underlying dimensions without knowing whether these dimensions actually resemble a normative evaluation standard and diverging goal valence as issued by Elliot and McGregor (2001). The authors of the study in question neither provide a validation via external criteria, nor do they show that previous research can be explained under consideration of these second-order factors. Instead, Elliot and Murayama (2008) once again use the first-order factors to account for the construct validity of their measure.

Moreover, we think that the extraction of goal relevant dimensions as second-order factors (as done by Elliot & Murayama, 2008) might not represent the best way to account for the supposed dimensionality of performance goal orientations. A more direct way would be to use bifactor models (Chen, Hayes, Carver, Laurenceau, & Zhang, 2012), since these models are suitable to answer the question of whether each item that measures performance goal orientations actually reflects two dimensions (normative evaluation standard as well as approach or avoidance goal valence). In the past decade, the use of such bifactor models has brought new insights to individual differences in constructs like intelligence (Valerius & Sparfeldt, 2014), the academic self-concept (Brunner et al., 2010) and well-being (Chen, West, & Sousa, 2006). In Fig. 1, we provide a graphical representation of a bifactor model applied to items measuring performance goal orientations in comparison to more classical factor analytic models reflecting the univariate and dichotomous approach to performance goal orientations.

3. Further elaborations on goal underlying dimensions

The application of bifactor models within achievement goal research is not just a switch in methodology. It also offers new possibilities for investigating the relevance of goal underlying dimensions. In other words, we can test whether the dimensional foundation of performance goal orientations is in fact responsible for converging and diverging

¹ The multi-goal perspective postulates that different combinations of achievement goal orientations might lead to differential outcome patterns. Midgley et al. (2001) stated, for instance, that a strong performance goal orientation would only lead to positive patterns of learning when it is accompanied by a strong learning goal orientation.

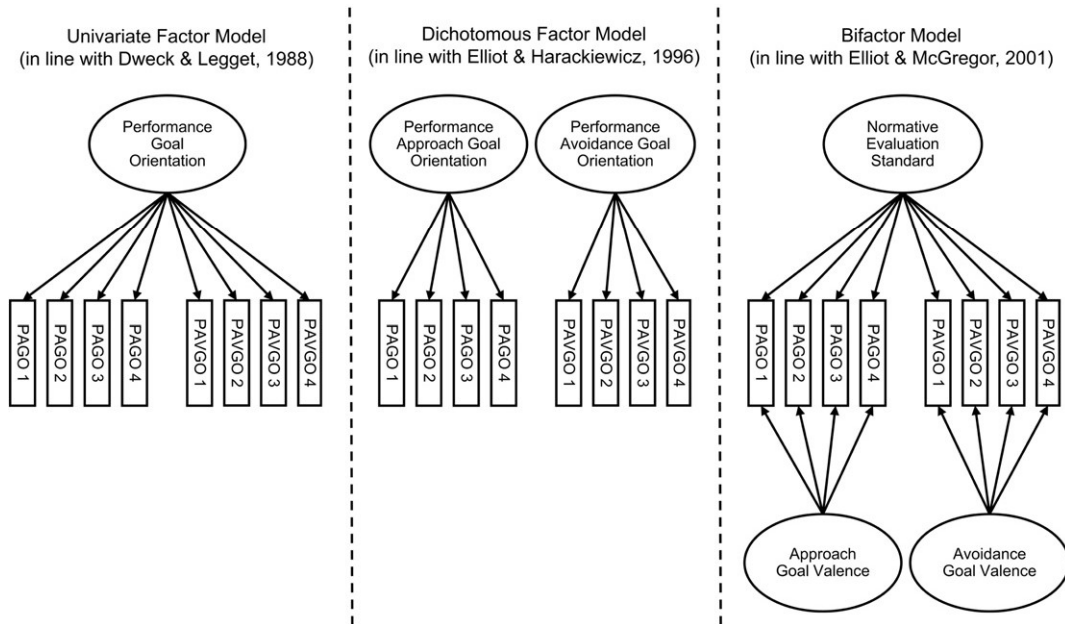


Fig. 1. Graphical representation of the measurement models behind different theoretical conceptualizations of performance goal orientations. PAGO = Items measuring a performance approach goal orientation, PAVGO = Items measuring a performance avoidance goal orientation.

association patterns of performance approach and performance avoidance goal orientations, which is a central tenet of achievement goal research (Elliot & McGregor, 2001). On a related note, the consequent investigation of bifactor models in different age groups also allows us to draw reliable conclusions on the comparability of the dimensional foundation in different developmental stages which has been a concern for fellow researchers (Bong, 2009; Bong et al., 2013). In order to provide empirical evidence on the assumed dimensional nature of performance goal orientations, we need to form clear hypotheses on relationships between goal underlying dimensions and other variables. Thus, we have to elaborate further on the dimensions themselves as well as on possible antecedents and their consequences. We start this in depth elaboration with the one dimension that is likely to be responsible for high associations between both performance goal orientations: their normative evaluation standard.

3.1. Evaluation standard of performance goal orientations

Evaluation standards were first addressed by Rheinberg (1983), who labeled them reference norm orientations. Similar to the definition of evaluation standards applied by Elliot and McGregor (2001), reference norm orientations are defined as individuals' preferences for certain comparison standards to evaluate the achievement of others (especially within teachers judging students' achievement, see Mischo & Rheinberg, 1995; Rheinberg, 1983) and themselves (O. Dickhäuser & Rheinberg, 2003). Thereby, a social reference norm orientation essentially describes a normative evaluation standard and, thus, indicates that current achievement is compared interpersonally within a specific reference group (O. Dickhäuser & Rheinberg, 2003). The conceptual familiarity between the reliance on a social reference norm orientation and the adoption of a performance goal orientation has been stressed by researchers who investigated reference norm orientations in the past (e.g., O. Dickhäuser & Rheinberg, 2003). Moreover, Schöne, Dickhäuser, Spinath, and Stiensmeier-Pelster (2004) empirically investigated the relationship between reference norm orientations and achievement goal orientations in six different samples (including students in primary as well as secondary education and university students). Schöne et al. (2004) found that performance approach and performance avoidance goal orientations were both positively associated with a social reference norm orientation and these associations

showed a comparable size (correlations ranged from $r = 0.24$ to $r = 0.57$ depending on the sample).

While the research on reference norm orientations is rarely considered in the international literature on achievement goal orientations - mainly because it was almost exclusively published in German - the empirical findings within this approach strengthen the assumption that both performance goal orientations are characterized by the same normative evaluation standard as pointed out by Elliot and McGregor (2001). Thus, antecedents and consequences that are commonly associated with both performance goal orientations could be a result of their shared normative evaluation standard. This makes the perception of competition within the learning environment an especially possible antecedent of a normative evaluation standard.

3.1.1. Perceived competitiveness as antecedent of a normative evaluation standard

Situations that emphasize competition clearly stress the need to outperform others and could, thus, facilitate a normative evaluation standard within the individual. In line with this argumentation, empirical findings show that a competitive class climate predicts the adoption of both performance goal orientations by students (Meece et al., 2006; Wolters, 2004). These findings are supplemented with the results of experimental research that successfully induced performance goals by emphasizing competition between participants (e.g., C. Dickhäuser, Buch, & Dickhäuser, 2011; Elliot & Harackiewicz, 1996; Elliott & Dweck, 1988). Hence, we can assume that the normative evaluation standard of performance approach and performance avoidance goal orientations should be more likely to emerge in a climate that emphasizes strong competition than in a more collaborative social climate. Furthermore, a normative evaluation standard in a seemingly competitive situation might also induce performance anxiety, a typical outcome of both performance goal orientations.

3.1.2. Performance anxiety as consequence of a normative evaluation standard

A meta-analysis by Huang (2011) showed that both performance goal orientations are linked to performance anxiety. This shared relationship could be based in the underlying normative evaluation standard. We assume that the possibility of failure is very salient to individuals adopting a normative evaluation standard when compared

to individuals adopting an intrapersonal evaluation standard (evaluation of own achievement by comparing it with own prior achievement) because in the former case failure is not completely under individuals' control (as it also depends on the achievement of others). The resulting loss of control and higher accessibility of failure could induce anxiety over being outperformed by others. In fact, research has shown that fear of failure in particular is associated with both performance goal orientations (Dinger, Dickhäuser, Spinath, & Steinmayr, 2013; Elliot & Church, 1997). This leads us to the assumption that the more individuals adopt a normative evaluation standard, the more likely they are to perceive possibilities to fail in their task and as a result experience performance anxiety. Furthermore, we assume that this effect becomes even stronger as the strength of the adopted avoidance goal valence increases, which we will elaborate on in the next section.

3.2. Goal valence of performance goal orientations

The differentiation of achievement motivation in terms of an avoidance versus approach focus is related to very early research on human motivation, most notably early drive theories (Hull, 1943), which differentiated between appetitive drives (i.e., stimuli like food or water that facilitate approaching behavior within the organism) and aversive drives (i.e., stimuli like pain from electric shocks that facilitate avoidance behavior within the organism). Other examples for conceptualizations of approach versus avoidance motivation can be found in biologically grounded personality theories (e.g., Eysenck, 1967; Gray, 1990) and more recently in regulatory fit theory by Higgins (1997) that differentiates between a promotion and a prevention focus.

It seems plausible that more general dispositional tendencies like promotion and prevention focus might predict the more situation specific goal valence of performance goal orientations. In fact, some research ties performance approach and performance avoidance goal orientations to general approach versus avoidance tendencies (Bjørnebekk & Diseth, 2010; Elliot & Thrash, 2002). While both performance goal orientations proved to be related to the corresponding behavioral tendency in these studies, performance approach goal orientation also showed positive associations to avoidance tendencies. This result pattern might be explainable by the fact that negative emotionality and, thus, fear of failure was often used as a contributing indicator for avoidance tendencies. Hence, the positive association between performance approach goals and avoidance tendencies might be a result of the underlying association between a normative evaluation standard and fear of failure. We assume that extracting both goal valence dimensions in a bifactor model would allow us to show a clearer association between approach goal valence and approach tendencies, while no associations to avoidance tendencies should occur. Furthermore, we suggest that motivational variables (like promotion and prevention focus as suggested by Higgins, 1998) rather than affective variables like fear of failure should be used as proxies for approach and avoidance tendencies. Results linking these motivational variables to goal valence would strengthen the assumption that the somewhat controversial findings on the relationship between performance approach goal orientation and avoidance tendencies indeed reflect the complex dimensional nature of performance goal orientations. Moreover, we think that goal valence could explain the diverging relationships of performance goal orientations to perceived competence support.

3.2.1. Perceived competence support as antecedent of goal valence

In experimental research on achievement goals, a performance approach goal orientation is often differentially induced by highlighting the possibility of success, while a performance avoidance goal orientation is induced by highlighting the possibility of failure in task descriptions (C. Dickhäuser et al., 2011; Elliot & Harackiewicz, 1996). These experimental procedures match the empirical finding that competence expectations are positively associated to a performance approach goal orientation and negatively to a performance avoidance goal orientation

(Elliot & Church, 1997). We think that highlighting personal capability leads to approach motivation since the individual might find positive outcomes more attainable. In contrast, highlighting personal incapability should lead to avoidance motivation since it highlights the possibility of personal failure. Thus, we assume that the strength of perceived competence support in a given achievement situation can effectively influence the strength of the goal valence dimensions. In more detail, we presume that perceived competence support (i.e., highlighting the possibility to succeed) enhances the strength of approach goal valence and suppresses the strength of avoidance goal valence. While this makes perceived competence support an important antecedent of goal valence dimensions, we also assume that they are differentially associated with typical consequences of achievement goal orientations like performance anxiety, intrinsic motivation and performance.

3.2.2. Consequences of goal valence

Even though we have argued that performance anxiety might be associated with a normative evaluation standard, we assume that it is also associated with an avoidance goal valence. This would at least effectively explain why the association between performance anxiety and a performance avoidance goal orientation is closer than its association to a performance approach goal orientation (Huang, 2011). Elliot and McGregor (1999), in particular, found a strong association between a performance avoidance goal orientation and the worry component of state performance anxiety. This association could very likely reflect the maladaptive influence of an avoidance goal valence: We presume that the avoidance goal valence constantly highlights the possibility of failure that needs to be prevented, subsequently leads to worries and in the long run to an increase in performance anxiety. Furthermore, we assume that typically observed negative associations between performance avoidance goal orientation and intrinsic motivation (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) also reflect the impact of avoidance goal valence. This assumption is in line with Elliot and Harackiewicz (1996), who argued that inherent threats to the basic human need for competence fuel avoidance tendencies that subsequently impair intrinsic motivation (also in line with Self-Determination Theory, see Deci & Ryan, 1985; Deci & Ryan, 2000). Lastly, the goal valence dimensions ought to be differentially linked to actual performance. While a performance approach goal orientation has sometimes been shown to be positively associated with (graded) performance, a performance avoidance goal orientation was negatively related to this outcome variable in most cases (Elliot & Church, 1997; Elliot & McGregor, 1999; Elliot et al., 1999). We assume that the more individuals endorse an approach goal valence, the more they might also undertake efforts to acquire success, whereas the more individuals endorse an avoidance goal valence, the stronger their concerns about the possibility of failure become, which might lead to less adaptive learning strategies as shown by Elliot et al. (1999).

4. Research questions

In the last sections we explained how goal underlying dimensions can be tied to previous research on performance goal orientations. Thereby, we have shown that the dimensional model of performance goal orientations can be used (and in fact has been used) to explain past findings within achievement goal research but has not been accordingly validated through empirical research. In the following two-staged process we aimed to provide the necessary empirical evidence on the existence of goal underlying dimensions within performance goal orientations and on their validity:

In the first stage (study 1), we isolated independent goal relevant dimensions from items measuring performance approach or performance avoidance goal orientations in a bifactor model. Within this model, one factor represents the normative evaluation standard and two factors represent (approach or avoidance) goal valence. We address the construct clarity of the extracted factors by linking them to conceptually

similar motivational constructs (social reference norm orientation, promotion & prevention focus). The first stage can therefore be subsumed under the two essential research questions whether the often proclaimed dimensional structure actually exists within performance goal orientations and whether the extracted goal underlying dimensions actually resemble aspects of goal valence as well as a normative evaluation standard as postulated by achievement goal researchers (Elliot & McGregor, 2001; Elliot et al., 2011). During the second stage (study 2), we investigated the criterial validity of the extracted goal underlying dimensions by relating them to possible antecedents (perceived competence support, perceived competitiveness) and consequences (interest, performance anxiety, graded performance). The second stage could accordingly be subsumed under the research question whether goal underlying dimension can sufficiently explain diverging as well as converging association patterns of performance goal orientations with external criteria.

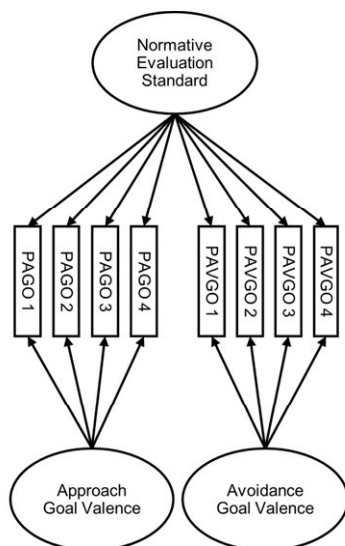
The ultimate goal of both studies is to address the fabric of performance goal orientations. While previous research has often solely focused on the mere separation of performance approach from performance avoidance goal orientations, we want to explain which dimensions actually distinguish these achievement goal orientations and which dimension is responsible for their communality. This is important since it explains why we not solely focus on goal valence as the possible explanation for the distinctiveness of performance goal orientations but also on the rarely addressed normative evaluation standard. Thereby, we hope that empirical evidence on both dimensions can simultaneously explain why performance goal orientations are differentially associated to some learning related constructs, while sharing strong correlations with each other and other learning related constructs.

Arguably, it would be possible to address all presented problems within a single sample and, thus, a one-stage process. However, we find that a two-staged process has stronger implications regarding the generalizability of the dimensional model to different achievement related contexts and age groups. Thus, we decided to conduct a two-staged process in two different populations (university and school students). Moreover, the acquired samples are of different age groups, which made it possible for us to investigate whether the dimensional structure can be generalized to different developmental stages (childhood, adulthood). This is of special importance since previous research indicates that individuals in diverging developmental stages might also differ in their personal conception of performance goal orientations with children presumably having difficulties to distinguish performance goals alongside their goal valence dimension (Bong et al., 2013). The whole analytic process is depicted in Fig. 2. This figure shows the postulated measurement model that was investigated in both conducted studies. Furthermore, it gives a quick overview on the postulated structural models that were tested within our two consecutive studies.

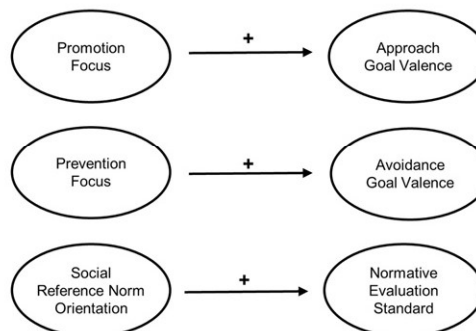
5. Study 1

In our first study we wanted to identify and validate goal underlying dimensions that constitute performance goal orientations. Thereby, we aimed to extract a shared normative evaluation standard and two diverging goal valence dimensions from items measuring performance goal orientations. In order to investigate whether the extracted factors actually resemble the postulated goal underlying dimensions, we validated them on conceptually similar motivational dispositions: We expected a social reference norm orientation to predict the normative

**Postulated measurement model
(Study 1 & Study 2)**



**Postulated Structural model for investigating construct clarity
(Study 1)**



**Postulated Structural model for investigating criterial validity
(Study 2)**

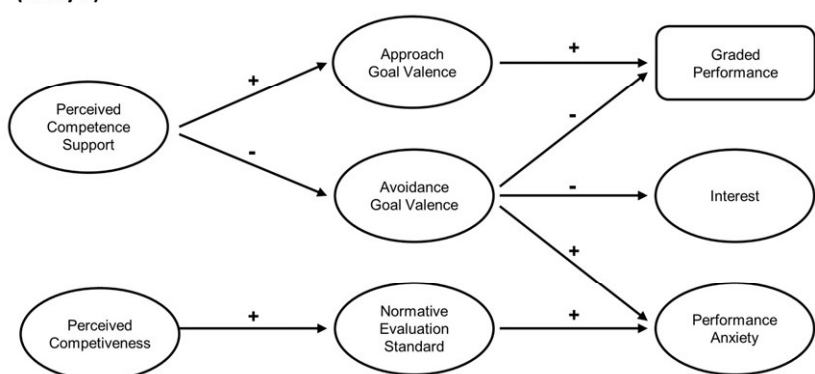


Fig. 2. Illustration of the two-staged analytic process depicting the investigated bifactor model as well as both postulated structural models that serve to investigate the construct clarity and criterial validity of the extracted goal underlying dimensions.

evaluation standard since both constructs share a large degree of conceptual similarities (i.e., a preference for social comparison when evaluating own achievement). Furthermore, a promotion focus should positively predict the approach goal valence dimension. This assumption is made because both constructs reflect approach tendencies and should have ties to the behavioral activation system. In contrast, we expect a prevention focus to positively predict the avoidance goal valence dimension. The investigated measurement model as well as the postulated structural model are depicted in Fig. 2.

5.1. Method

5.1.1. Sample

We questioned 321 German university students using an online survey (86.3% female, mean age of 21.2 years; $SD = 3.5$ years). All participants were enrolled as pre-service teachers and had studied for three semesters on average ($SD = 2.4$ semesters). The survey was distributed via online newsgroups and mailing lists. Participants were assured that their responses would remain confidential and would be used for scientific purposes only. Among all participants, 10 vouchers worth 10 Euro for a well-known online marketplace were raffled.

5.1.2. Measures

Performance goal orientation items were derived from a German self-report questionnaire ("Skalen zur Erfassung der Lern- und Leistungsmotivation"; SELMO; Spinath, Stiensmeier-Pelster, Schöne, & Dickhäuser, 2002). This inventory has been well validated in samples of students in secondary education as well as university students (Spinath et al., 2002). Moreover, it is very commonly used within studies in German populations (e.g. Dinger et al., 2013; Schwinger & Stiensmeier-Pelster, 2011; Spinath & Steinmayr, 2012). Our short version of the scale consisted of four items measuring performance approach goal orientation ($\alpha = 0.71$) as well as four items measuring performance avoidance goal orientation ($\alpha = 0.90$). A sample item measuring performance approach goal orientation is "At university, it is my goal to show that I am good at something." Furthermore, the performance avoidance goal orientation was measured with items like "At university, it is my goal to conceal if I know less than others." A complete list of items is depicted in the appendix.

The social reference norm orientation regarding own achievement was assessed with an established German questionnaire (O. Dickhäuser & Rheinberg, 2003) consisting of four items ($\alpha = 0.75$). A sample item for this scale is "When I speak of a good performance, I actually mean a result that is above average compared to the results of my fellow students".

The regulatory focus was assessed with a German short version of the General Regulatory Focus Measure (Lockwood, Jordan, & Kunda, 2002) developed by Greifeneder and Keller (2012). This measure consists of two subscales (prevention versus promotion focus) with three items each, which have proven to be good proxies for approach and avoidance tendencies (Summerville & Roese, 2008). The subscale for promotion focus ($\alpha = 0.72$) consisted of items like "I typically focus on the success I hope to achieve in the future." Prevention focus ($\alpha = 0.70$) was measured with items like "I frequently think about how I can prevent failures in my life."

The items of all aforementioned scales were measured with a Likert-type scale ranging from 1 (*total disagreement*) to 7 (*total agreement*).

5.1.3. Analyses

We used Mplus Version 7.1 (Muthén & Muthén, 1998–2012) for all subsequent analyses in which we utilized the robust maximum likelihood estimator (MLR). At first, we computed a confirmatory factor analysis to test the postulated bifactor model. We modeled one factor indicating the normative evaluation standard with loadings from all 8 items of the performance goal orientation measure. Additionally, we modeled two factors supposed to reflect the goal valence dimensions.

Thereby, we freed loadings from the four items measuring a performance approach goal orientation on the first (approach) goal valence factor and loadings from the four items measuring performance avoidance goal orientation on the second (avoidance) goal valence factor. We fixed the covariance between approach goal valence and normative evaluation standard as well as between avoidance goal valence and normative evaluation standard to zero. Thereby, we ensured that goal valence and evaluation standard were represented as independent, and therefore orthogonal, factors.

In a second step, we tested the construct validity of the postulated dimensions by associating them to the personal regulatory focus and social reference norm orientation. Thereby, we fixed factor loadings of the goal valence and the normative evaluation standard factors to the values obtained in the confirmatory factor analysis to ensure that the inclusion of validation criteria would not change the factor structure itself. Then, we included promotion and prevention focus as well as the social reference norm orientation as latent variables into the structural model. We freed three direct paths from these variables on the extracted factors: The first path indicated the expected relationship of a social reference norm orientation on the normative evaluation standard, whereas the second and the third paths indicated the assumed direct effects of the promotion as well as the prevention focus on their respective goal valence counterpart (promotion/approach; prevention/avoidance). All paths were expected to represent positive relationships.

The model fit of all computed models is reported according to recommendations by Hu and Bentler (1999). Hence, we used the χ^2 -test for model fit in combination with certain 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 ($SRMR \leq 0.10$, $RMSEA \leq 0.08$, $CFI \geq 0.95$) and a good model fit ($SRMR \leq 0.05$, $RMSEA \leq 0.05$, $CFI \geq 0.97$). In order to further investigate the construct validity of the extracted factors, we used a chi-square difference test with scaling correction (Satorra & Bentler, 1994) to compare the postulated structural equation model with a less restrictive model. In this model, we freed direct paths from all three potential predictors (social reference norm orientation, promotion focus and prevention focus) on all three goal underlying dimensions. We expected that this inclusion of additional paths into the structural equation model would not enhance the obtained model fit significantly.

5.2. Results

Means, standard deviations and zero-order correlations between all applied scales are depicted in Table 1. The obtained zero-order correlations cannot be seen as conclusive evidence for our dimensional model because they solely show association patterns for goal orientation instances. Nevertheless, the overall association pattern supports the validity of these goal orientation instances since both performance goal orientations are linked positively to a social reference norm and the respective goal valence. However, the

Table 1

Zero order correlations, descriptives and internal consistencies for the scales applied in study 1.

	<i>M</i>	<i>SD</i>	α	(1)	(2)	(3)	(4)
(1) Performance approach goal orientation	4.66	1.00	0.71				
(2) Performance avoidance goal orientation	2.84	1.18	0.90	0.42**			
(3) Promotion focus	4.98	1.00	0.72	0.36**	0.13*		
(4) Prevention focus	3.84	1.23	0.70	0.07	0.30**	0.27**	
(5) Social reference norm orientation	3.85	1.14	0.75	0.37**	0.38**	0.20**	0.13*

Note. All used scales ranged from 1 (*total disagreement*) to 7 (*total agreement*).

** $p < 0.01$.

* $p < 0.05$.

promotion focus was unexpectedly also slightly associated to a performance avoidance goal orientation.

5.2.1. Dimensional structure

The initial factor analysis did not result in the assumed bifactor structure. Although the model fit was good, $\chi^2 (11; n = 321) = 9.37, p = 0.58, SRMR = 0.01, RMSEA = 0.00, CFI = 1.00$, only 7 out of 16 postulated factor loadings reached significance. These factor loadings were distributed between two factors (none of the loadings on the approach goal valence dimension reached significance), which if anything would have resembled the two original performance goal orientations but in an orthogonal fashion. The observed factor loadings of this first solution seemed rather random and unconventional. Nevertheless, the data gave us a clear hint as to why this strange pattern occurred: The factor loadings of one particular item of the approach goal orientation subscale diverged in its pattern from the loadings of the other three items. None of the factor loadings of this item on either factor reached significance and one of the two assumed factor loadings even pointed in the wrong direction. Interestingly, the item was not only more strongly associated with performance avoidance goal orientation items than the other three performance approach goal orientation items,² but also more strongly associated with the social reference norm orientation.³ Hence, we concluded that the item itself resembled the evaluation focus in a much stronger fashion than the other items measuring performance approach goal orientation. This was also plausible by the wording of the item, which was "At university, it is my goal that others think that I am smart." The item did not include any information on the question of whether this goal would typically be accomplished by demonstrating capability or if it would be accomplished by covering up incapability.

Thus, we modified our model by excluding the factor loading of this item on the approach goal valence factor. After this step, the resulting model obtained a good model fit; $\chi^2 (12; n = 321) = 11.35, p = 0.50, SRMR = 0.01, RMSEA = 0.00, CFI = 1.00$. A chi-square difference test revealed that there was no significant difference between the model fit of the original and the second factor model, $\Delta\chi^2 (1) = 2.40, p = 0.12$. Moreover, in the second factor model, all postulated factor loadings were significant and pointed in the assumed direction. The resulting bifactor model consists of three factors representing goal underlying dimensions and is depicted in Fig. 3. Our dimensional approach covered 59% of the total item variance in total. Thereby, the factor indicating the normative evaluation standard covered bigger parts of the explained variance (62% for items measuring performance approach goal orientation and 66% for items measuring performance avoidance goal orientation) than the factors indicating goal valence. Although we did not assume that both goal valence dimensions were independent, no significant association between the two factors could be observed.

5.2.2. Associations to reference norm and regulatory focus

In the next step of our analyses, we included promotion focus, prevention focus and social reference norm orientation as latent variables.

² The mean correlation between the other three items measuring performance approach goal orientation with the four items measuring performance avoidance goal orientation was $r = 0.17$, with a range from $r = 0.04$ ($p = 0.463$) to $r = 0.29$ ($p < 0.001$). The mean correlation between the four performance avoidance goal orientation items with the item in question was $r = 0.52$, ranging from $r = 0.48$ ($p < 0.001$) to $r = 0.58$ ($p < 0.001$). A z -test on the difference of the two mean correlations (as depicted by Steiger, 1980) reached significance ($z = -5.95, p < 0.001$).

³ The item in question correlated to $r = 0.38$ ($p < 0.001$) with the scale measuring the social reference norm orientation. The mean correlation between the other three items measuring the performance approach goal orientation with the social reference norm orientation scale was $r = 0.23$, ranging from $r = 0.18$ ($p < 0.001$) to $r = 0.27$ ($p < 0.001$). The difference between the scale-item correlation of the item in question and the mean scale-item correlation of the other items was significant ($z = -2.46, p = 0.007$).

We freed direct paths from these variables on the goal underlying dimensions according to the postulated path model. The obtained model fit was acceptable, $\chi^2 (134; n = 321) = 212.51, p < 0.001, SRMR = 0.07, RMSEA = 0.04, CFI = 0.96$, and the observed path coefficients are depicted in Fig. 4.

As expected, the social reference norm orientation regarding own achievement was positively predictive for the factor resembling a normative evaluation standard. Furthermore, both regulatory foci proved to be statistically significant predictors for the factors indicating goal valence. Thereby, a promotion focus was positively predictive for the strength of the approach goal valence, whereas a prevention focus was positively predictive for the strength of the avoidance goal valence. Moreover, the amount of explained variance on the goal valence factors as well as on the factor representing the normative evaluation standard proved to be substantial and resembled medium to strong effect sizes.

At last, we compared the postulated model to a less restrictive model in which we freed all direct paths from the predictive variables (promotion focus, prevention focus and social reference norm orientation) on the factors representing goal underlying dimensions. In contrast to our initial assumptions, the less restrictive model showed a significantly better model fit than the postulated model, $\Delta\chi^2 (6) = 15.38, p = 0.018$, although the overall model fit did not improve drastically; $\Delta SRMR = 0.01, \Delta RMSEA = 0.00, \Delta CFI = 0.00$. Two out of six newly included paths reached significance: The promotion focus was negatively predictive for the factor indicating an avoidance goal valence ($\beta = -0.25, p = 0.020$) and the prevention focus was negatively predictive for the factor indicating an approach goal valence ($\beta = -0.26, p = 0.004$). The remaining path structure (depicted in Fig. 4) was quite similar to the postulated model. The two obtained unexpected paths support the assumption that the goal valence factors indicate the respective goal valence in absence of the opposing goal valence.

6. Study 2

The main goal of our second study was to supplement the findings of the first study regarding the construct clarity of goal underlying dimensions with empirical support for their criterial validity by tying these dimensions to possible antecedents and consequences. With regard to antecedents, we anticipated that the perception of competition lays the foundation for normative comparisons and, thus, positively predicts the strength of the normative evaluation standard. With past findings concerning the importance of competence expectancies in mind (Elliot & Church, 1997), we assumed that perceived competence support would impact goal valence: We anticipated that competence support enhances the personal expectation to succeed and, therefore, facilitates an approach goal valence and suppresses an avoidance goal valence. In other words, we expected perceived competence support to be a positive predictor for approach goal valence and a negative predictor for avoidance goal valence. When focusing on consequences, we expected that a normative evaluation standard positively predicts performance anxiety because it should enhance the perceived possibility of failure. However, we also assumed that an avoidance goal valence is positively predictive for performance anxiety since it should enhance the subjective importance of failure prevention. These postulated associations should explain why a performance avoidance goal orientation is more strongly tied to performance anxiety than a performance approach goal orientation (Elliot & McGregor, 1999; Huang, 2011). Furthermore, we assumed that an avoidance goal valence negatively predicts intrinsic motivation and graded performance, whereas an approach goal valence should positively predict graded performance. These predictions are in line with past findings on the differential effects of performance goal orientations (Dinger et al., 2013; Elliot & Church, 1997). All resulting hypotheses are summarized within the respective structural model depicted in Fig. 2.

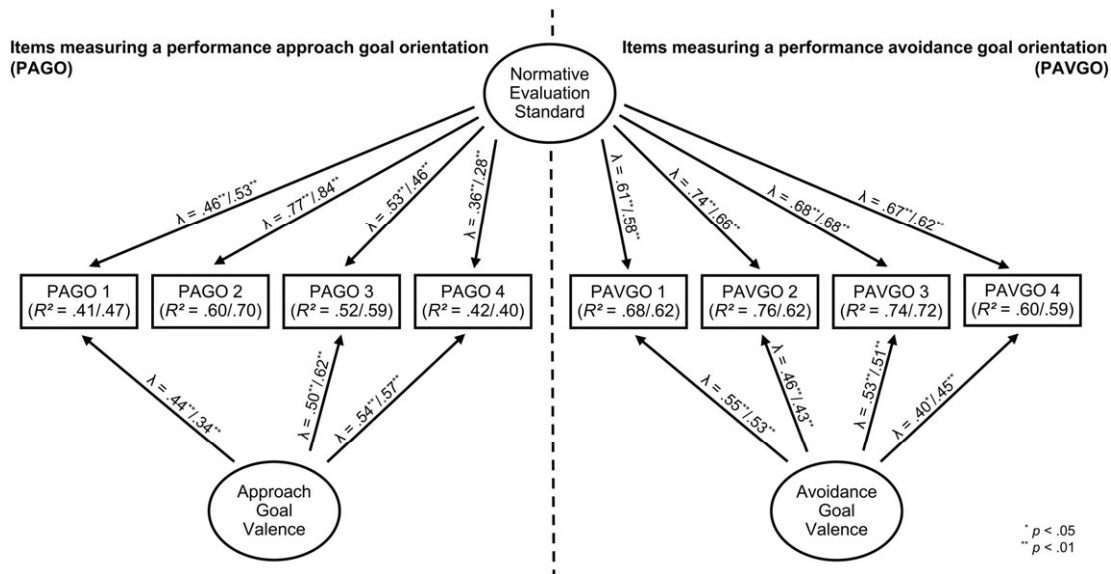


Fig. 3. Obtained factor loadings and explained variance of the bifactor model. Values for both studies are given (first number = study 1; second number = study 2). The depicted items are provided in the appendix of this article.

6.1. Method

6.1.1. Sample

We used a subsample from a longitudinal study consisting of 1290 German secondary school students (53.7% female, mean age at measurement point 1 = 10.0 years; $SD = 0.45$ years) clustered in 70 classes. The students were questioned with pen-and-paper questionnaires at three measurement points during their first two years in the academic track of the German school system (classes 5 and 6). We only included students in our analyses who participated at all three measurement points.⁴ The first measurement point (halfway through the first year in the academic track) contained data on the perceived working climate in class and therefore on possible antecedents of goal underlying dimensions. We used the data from the second measurement point (end of the first year in the academic track) to model the goal underlying dimensions and data from the third measurement point (first months in the second year in the academic track) to address possible consequences.

6.1.2. Measures

We used the same items to assess performance goal orientations as in study 1. However, all items focused on the performance goal orientations of the questioned students in mathematics classes. All other measures were also related to mathematics classes.

Competence support by the students' math teacher was assessed with a questionnaire developed for the longitudinal study, which partly consisted of items derived from a well validated German scale developed for a research program on teacher competencies (Kunter, Baumert, & Blum, 2011). In total, the questionnaire had seven items

($\alpha = 0.79$); including, for example, "In math class, our teacher recognizes when I am doing well."

Interest in mathematics was measured as a self-report measure for mathematics related intrinsic motivation with a subscale from a German questionnaire designed specifically to assess different aspects of students' learning motivation (Dresel, Ziegler, Schober, & Stöger, 2005). One example of the four items measuring interest in mathematics ($\alpha = 0.90$) is "I am interested in math."

The subscale for performance anxiety in mathematics was also derived from the aforementioned questionnaire developed by Dresel et al. (2005). It consisted of six items ($\alpha = 0.92$) like "When I think of math, I experience fear of getting a bad grade."

The items of all aforementioned scales (performance goal orientation, competence support, interest in mathematics, performance anxiety) were measured with a Likert-type scale ranging from 1 (*total disagreement*) to 6 (*total agreement*).

The degree of perceived competitiveness in the classroom was assessed with three items directly developed for the longitudinal study ($\alpha = 0.67$). The scale applied a Likert-type scale ranging from 1 (*never*) to 5 (*always*). A sample item is "In our math class, our teacher makes us compete against each other in contests".

Finally, graded performance was assessed by asking the participating students about their last overall math grade at the end of class 5. Even though this overall math grade was assessed at the third measurement point, it was actually assigned to the students in the time span between the second and the third measurement point. It should be noted that the best grade in Germany is a 1 (very good) and the worst grade is a 6 (insufficient). We recoded the variable to ensure that the interpretation of paths on graded performance would be more intuitive. After recoding, the variable ranged from 1 (insufficient) to 6 (very good). Hence, a positive association with the variable reflected a positive effect on performance, whereas a negative association reflected a negative effect on performance. While we are aware that self-reported grades can be considered as biased proxies for actual grades at best (Kuncel, Credé, & Thomas, 2005), due to legal reasons it was not an option to link our data to the actual grades of the students.

6.1.3. Analyses

Our procedures were similar to the procedures applied in study 1. At first, we extracted the three goal underlying dimensions from the items

⁴ We conducted survival analyses to investigate whether the students participating at the first two measurement points differed in their profile from those participating at all three measurement points since a substantial drop-out occurred between the second measurement point and the third measurement point. These analyses indicated that those students who dropped-out reported a significantly higher performance avoidance goal orientation, $F(1, 3301) = 22.819, p < 0.001, \eta^2 = 0.003$, and perceived their surroundings to be more competitive, $F(1, 3301) = 11.349, p = 0.001, \eta^2 < 0.001$, than those students in our final sample. However, we cannot speak of small effect sizes ($\eta^2 > 0.01$ according to Cohen, 1992) and would, thus, conclude that the motivational profile of our final sample is not substantially biased.

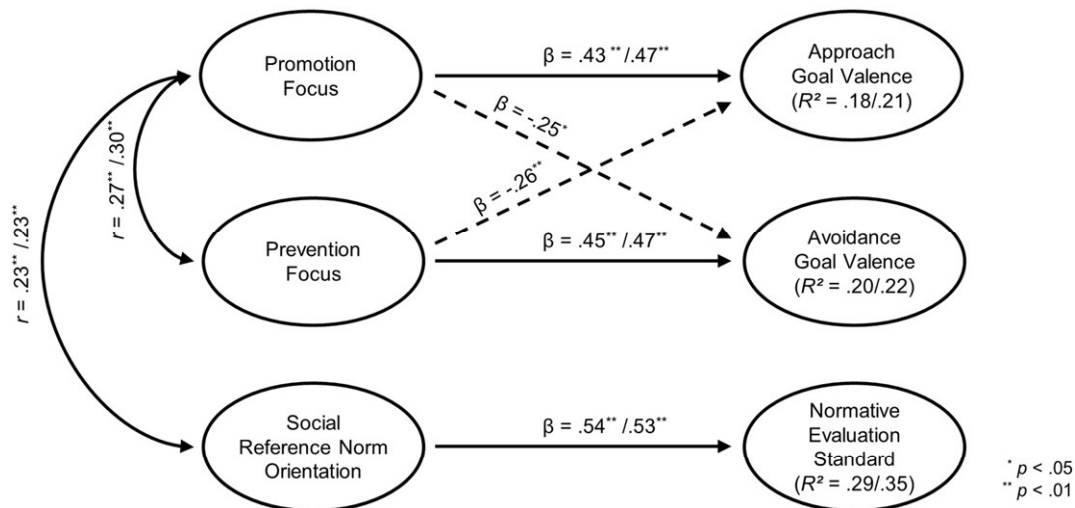


Fig. 4. Structural equation model conducted in study 1. No factor loadings are displayed for better comprehensibility. Factor loadings of the goal valence and normative evaluation standard factors are presented in Fig. 1. All other factor loadings ranged from $\lambda = 0.51$ to $\lambda = 0.84$ and were significant ($p < 0.001$). Path coefficients for the postulated as well as the base model are given (first number = postulated model; second number = base model). The dashed arrows were the only additional paths that reached significance within the base model.

measuring performance goal orientations.⁵ Afterwards, we fixed the factor loadings to the obtained values and computed a Structural Equation Model with the assumed antecedents and consequences of the goal underlying dimensions. All constructs were modeled on a latent level. We freed paths according to the previously defined hypotheses. We compared this model with a less restrictive model where all direct paths from potential antecedents on goal underlying dimensions as well as all direct paths from goal underlying dimensions on potential consequences were freed. As in study 1, we utilized the robust maximum likelihood estimator (MLR) for our analyses and evaluated the model fit according to the same guidelines. Additionally, we corrected the standard errors with the type = complex command, which was necessary because the school students were clustered within classes. Missing data was handled with the Full Information Maximum Likelihood Imputation provided by Mplus.

6.2. Results

Means, standard deviations and zero-order correlations of the applied scales are depicted in Table 2. As highlighted in study 1, the obtained zero-order correlations should be interpreted with caution. That said, the association pattern seems rather typical for research on performance goal orientation instances: Both performance goal orientations shared positive associations to perceived competitiveness and diverged in their associations to perceived competence support. Furthermore, we found both performance goal orientations to be positively associated to performance anxiety. Moreover, this relationship was stronger for a performance avoidance goal orientation. Altogether, the association pattern seems to confirm that our sample has a rather typical motivational profile, even though the associations of both performance goal orientations with interest and graded performance were not as clear as expected within the zero-order correlations.

6.2.1. Dimensional structure

We applied the bifactor model obtained in study 1 to our data and it fitted the data very well, $\chi^2 (12; n = 1290) = 7.79, p = 0.80$, SRMR = 0.01, RMSEA = 0.00, CFI = 1.00. The factor loadings are

⁵ As in study 1, we only freed factor loadings from three out of four items measuring performance approach goal orientation on the factor representing an approach goal valence. The item "In math class, it is my goal that others think that I am smart." indicated the normative evaluation standard but none of the goal valence dimensions.

shown in Fig. 3 alongside those obtained in study 1. The three goal underlying dimensions were again applicable for 59% of the total item variance. The normative evaluation standard was applicable for 62% of the explained variance on the items measuring performance approach goal orientation and for 63% of the explained variance on the items measuring performance avoidance goal orientation. The amount of item variance explained by the obtained factors is very similar to the amount of explained item variance in study 1. Moreover, the factor loadings also resembled their respective counterparts from study 1. However, in contrast to study 1, a significant negative correlation between the two goal valence factors occurred ($r = -0.43, p < 0.001$), which might be due to the higher power in the second sample.

6.2.2. Antecedents and outcome variables

The tested structural equation model had an acceptable model fit, $\chi^2 (292; n = 1290) = 785.37, p < 0.001$, SRMR = 0.04, RMSEA = 0.04, CFI = 0.96, and is presented in Fig. 5. Starting with antecedents of the three obtained dimensions, we can see that perceived competitiveness predicted a normative evaluation standard, while perceived competence support differentiated between the approach and avoidance goal valence (positive relationship to approach goal valence, negative relationship to avoidance goal valence). In line with our hypotheses, normative evaluation standard as well as avoidance goal valence both negatively predicted performance anxiety. Furthermore, a direct negative effect of avoidance goal valence on interest in mathematics could be observed, as expected. Even though avoidance goal valence predicted graded performance, the explained variance did not reach significance ($R^2 = 0.01, p = 0.28$). Furthermore, the path from approach goal valence on graded performance did not reach significance nor did it point in the expected direction. The other obtained effect sizes ranged from 5 to 13% of explained variance, which corresponds with small to medium effect sizes.

In a last step, we compared the postulated model with a less restrictive model where all paths from potential antecedents (competence support, perceived competitiveness) on goal underlying dimensions as well as all paths from goal underlying dimensions on potential consequences (performance anxiety, interest, reported grades) were freed. The less restrictive model did not achieve a significantly better fit than the postulated model, $\Delta\chi^2 (7) = 13.61, p = 0.059$, which led us to the conclusion that none of the additional paths had to be added to our postulated model.

Table 2
Zero order correlations, descriptives and internal consistencies for the scales applied in study 2.

	Measuring point	M	SD	α	(1)	(2)	(3)	(4)	(5)	(6)
(1) Perceived competence support	T1	4.68	0.75	0.79						
(2) Perceived competitiveness	T1	2.05	0.83	0.67	-0.03					
(3) Performance approach goal orientation	T2	3.97	1.03	0.73	0.12**	0.21**				
(4) Performance avoidance goal orientation	T2	2.38	1.17	0.88	-0.17**	0.22**	0.44**			
(5) Performance anxiety	T3	2.37	1.22	0.93	-0.20**	0.13**	0.12**	0.26**		
(6) Interest	T3	3.45	1.33	0.90	0.17**	0.05	0.14**	-0.05	-0.21**	
(7) Graded performance	T3	4.80	0.75	-	0.14**	-0.06	-0.06	-0.12**	-0.26**	0.23**

** $p < 0.01$.

7. General discussion

We conducted two studies to test the assumption that performance goal orientations are heterogeneous constructs founded in goal underlying dimensions. In the first study, we showed that it is indeed possible to extract a factor indicating a normative evaluation standard as well as two factors indicating diverging (approach versus avoidance) goal valences from items measuring performance goal orientations. We showed that the supposed normative evaluation standard factor was related to a social reference norm orientation, while the two goal valence factors were related to the corresponding regulatory focus subscales. Moreover, additional analyses unexpectedly showed that the goal valence factors were negatively associated to the opposing regulatory focus subscales. The paths seem to indicate that the extracted goal valence factors reflect the dominant goal valence in the absence of the opposing goal valence. These results are especially interesting because they deliver clear evidence on the assumption that performance approach goal orientations are indeed founded in approach tendencies that are by no means positively associated to avoidance motivation. Thus, it seems likely that previous findings supporting a small association to avoidance tendencies (see especially Elliot & Thrash, 2002) might be a result of a possible relation between the inherent normative evaluation standard and fear of failure (in line with the hierarchical model of approach and avoidance motivation, see Elliot & Church, 1997). In sum, our first study provides critical evidence on the postulate that performance goal orientations are founded in goal underlying

dimensions reflecting their normative evaluation standard and respective goal valence.

In our second study, we expanded the results of the first study by investigating the criterial validity of goal underlying dimensions. Regarding potential antecedents, we found that a strong competitive climate was predictive for a normative evaluation standard, but not for the goal valence. This indicates that individuals within a highly competitive climate are likely to adopt any or both of the two performance goal orientations. In contrast, the degree of perceived competence support was positively predictive for approach goal valence and negatively predictive for avoidance goal valence. Hence, the degree of competence support makes a difference on the goal valence of the adopted performance goal orientation. These results show that the dimensional approach can help to explain in which contexts individuals tend to adopt performance goal orientations and also which performance goal orientation becomes dominant in the situation in question. Moreover, some of the highly debated associations of performance goal orientations to outcome variables can also be explained within the dimensional approach: We could show that a normative evaluation standard and an avoidance goal valence positively predict performance anxiety. This explains why both performance goal orientations are linked to performance anxiety as well as why this association is closer for a performance avoidance goal orientation compared to a performance approach goal orientation. Avoidance goal valence also negatively predicted interest, which is in line with the finding that performance avoidance goal orientations are often found to be negatively related to intrinsic motivation.

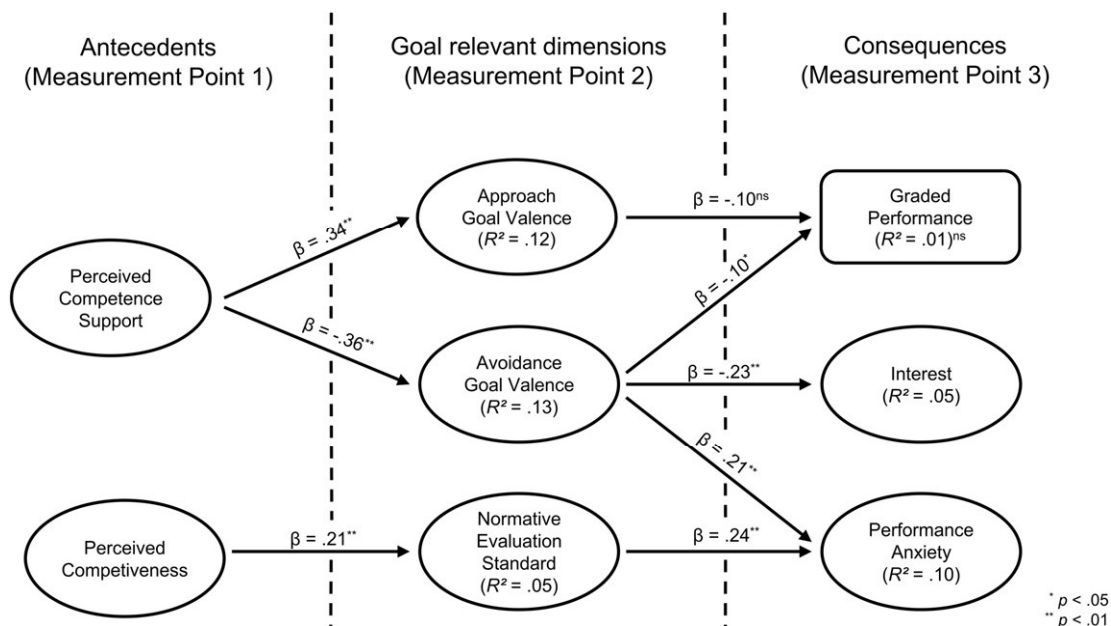


Fig. 5. Structural equation model conducted in study 2. No factor loadings or correlations between outcome variables (graded performance, interest and performance anxiety) are displayed for better comprehensibility. Factor loadings of the goal valence and normative evaluation standard factors are presented in Fig. 1. All other factor loadings ranged from $\lambda = 0.45$ to $\lambda = 0.92$ and were significant ($p < 0.001$). As indicated, the amount of explained variance on graded performance was not significant.

In conclusion, we found that the adoption of a normative evaluation standard can be considered maladaptive for learning related outcomes (e.g., performance anxiety), but that the strongest negative effects unravel when it is supplemented with an avoidance goal valence. Taken together, we think that the described findings contribute to the ongoing debate on the necessity to divide performance goal orientations alongside their goal valence.

7.1. Contribution to the theoretical debate on performance goal orientations

Although researchers have said that instances of performance goal orientations are founded within two distinct dimensions (especially Elliot & McGregor, 2001; Elliot & Thrash, 2002), these goal underlying dimensions have never been appropriately extracted or validated. We have shown that items measuring performance approach and performance avoidance goal orientations indeed reflect one of two goal valences and a normative evaluation standard. Moreover, we were able to replicate this dimensional structure within a sample of children with a mean age of 10 years, although previous developmental studies gave rise to doubts that the goal valence dimension would be present within this age group (Bong et al., 2013). The amount of explained variance and the factor loadings were quite similar in both samples, besides the fact that the samples reflected different achievement related contexts (university and school) as well as age groups. This pattern of results makes us confident that the dimensional structure of performance goal orientations can be generalized between contexts and even between stages of the lifespan.

Moreover, the distribution of item variance between the two groups of goal underlying dimensions gives us further insights into the interdependence of performance goal orientations: The normative evaluation standard was accountable for a greater proportion of variance than the respective goal valence in both samples. This could be the reason for the often obtained high association between both performance goal orientations. Furthermore, our in-depth analyses of the goal valence dimensions also gave some indications for the reasons behind some interesting aspects of the association patterns for performance goal orientations: More specifically, the factors indicating goal valence were not only positively associated with the regulatory focus that primarily indicated the respective goal valence but also negatively associated with the regulatory focus indicating the opposing goal valence. This pattern of results might partly explain why performance goal orientations are not only differentially but sometimes even oppositely associated with antecedents and consequences of achievement goal orientations (as shown in study 2 for perceived competence support).

Our findings provide a first glance at the new options of a change in perspective within achievement goal approach: Past research in this field mainly focused on achievement goal instances that confound goal underlying dimensions (e.g., performance approach and performance avoidance goal orientations). Thereby, it struggled when explaining whether different goal instances are maladaptive or adaptive for learning (Midgley et al., 2001) and whether they are universal to all people (Urduan & Mestas, 2006) or age groups (Bong et al., 2013). A shift in perspective on goal underlying dimensions offers new opportunities to address these questions on a deeper level: Instead of testing whether performance goal orientations are adaptive or maladaptive, a dimensional approach allows for investigations into how constituting elements behind performance goal orientations contribute to maladaptive or adaptive outcome patterns. Instead of asking whether all individuals differentiate between performance approach and performance avoidance goal orientations, a dimensional perspective enables us to investigate more differential questions like whether the dimensional structure stays the same through different age groups (indicated by the distribution of variance within the estimated factorial models). In sum, the shift of focus of empirical studies on the dimensions that have been the postulated foundation of achievement goal orientations for over a decade (Elliot & McGregor, 2001) holds a lot of potential for

fascinating research questions. Besides these theoretical opportunities, the dimensional approach also provides a new possibility to validate existing measurements of achievement goal orientations.

7.2. Consequences for measurement and practical implications

A major criticism regarding existing measures of performance goal orientation is their lack of construct clarity. For instance, Hulleman, Schrage, Bodmann, and Harackiewicz (2010) found in their well-regarded meta-analysis that items of achievement goal orientation questionnaires often also assess a broad range of non-goal relevant contents. This highlights the problem that many results found in achievement goal research are based on measurements assessing confounded constructs. One possible response to this problem could be to apply factor analytic methods that focus on the theoretically relevant goal underlying dimensions and suppress the parts of variance that are not applicable for these dimensions. Thereby, it would be possible to conduct research with imperfect measures without losing explanatory power due to variance representing goal irrelevant content and measurement error.

This solution can, however, only be seen as provisional because problems could occur when large systematic parts of goal irrelevant variance are represented in the items of the questionnaire (e.g. fear of failure, which is represented in a lot of items measuring performance avoidance goal orientation according to Hulleman et al., 2010). Thus, we need additional solutions to solve the problem like the construction of new, more valid questionnaires. Here, the described factor analytic methods could also be useful to ensure a higher standard of construct clarity: In our studies, a large amount of residual variance could neither be explained by goal valence nor the normative evaluation standard, even though we already used an item selection from a highly established achievement goal orientation questionnaire. Hence, an additional goal for researchers constructing new items measuring performance goal orientations should be to improve the variance explained by the assumed dimensional factor structure and simultaneously reduce the residual variance. Addressing both dimensions in the wording of new items could achieve this. For example, the normative evaluation standard can easily be addressed with phrases like "... in comparison to others", whereas an avoidance goal valence might be addressed with words like "avoid" or "prevent". With the results by Hulleman et al. (2010) and the dimensional theory by Elliot and McGregor (2001) in mind, reducing item wording that is not related to evaluation standard or goal valence should be an important goal.

Finally, the results of our studies might be valuable for practitioners within educational contexts: We found no evidence for the assumption that either of the performance goal orientations should be considered as adaptive for learning, even the expected positive effects of an approach goal valence on graded performance could not be observed. However, this particular finding could also be based on the limited validity of reported grades as a measure for performance (Kuncel et al., 2005) or the fact that we did not adopt a multi-goal perspective as recommended by Midgley et al. (2001). But even if we allow for this shadow of a doubt, we can still rely on the finding that the personal normative evaluation standard itself was positively related to performance anxiety. This finding links both performance goal orientations to a maladaptive outcome. Thus, we cannot recommend teaching practices that focus on normative comparison and competition to teaching professionals. Nevertheless, we do know that practitioners cannot abandon such strategies altogether, especially in educational contexts that rely on graded testing. While these contexts might inflict the negative consequences of the adoption of a normative evaluation standard, our results also indicate that severe negative effects will only occur when individuals simultaneously adopt an avoidance goal valence. Moreover, our findings indicate that the strength of the avoidance goal valence can be decreased with teaching strategies focusing on competence support. One possible application of this finding within teaching practices could be to use positive

feedback on personal learning in highly competitive situations, since this method has been linked to an increase in personal perceptions of competence within learners (Senko & Harackiewicz, 2005).

7.3. Limitations and future directions

An important limitation of the results of our studies concerns the postulated causal order of antecedents, goal relevant dimensions and outcome variables. Our assumption largely relied on the hierarchical model of achievement motivation (Elliot & Church, 1997; Elliot & McGregor, 1999). For instance, we assumed that intrinsic motivation would be a consequence rather than an antecedent of performance goal orientations. While there might be good reasons to expect this line of causality, there is also research framing intrinsic motivation as a possible antecedent of achievement goal orientations (Ciani, Sheldon, Hilpert, & Easter, 2011; Malmberg, 2008). Overall, the question for causality within achievement goal approach is often difficult to resolve, since a lot of research does not rely on typical causal analyses like cross-lagged panel analyses or growth curves. The objective of our research, however, was not to answer whether the chicken or the egg came first, but rather to show that previous often cited results can be explained under the lens of a dimensional approach. Nevertheless, it would be interesting to answer the aforementioned question for causality on antecedents and consequences of goal underlying dimensions in future research. Inspiration for such research might be found in the literature on regulatory focus and reference norm orientations.

Furthermore, we solely relied on self-report measures within our studies. We are aware that the usage of self-reports is strongly debated in the field of motivational research. However, many original studies about performance goal orientations also largely rely on these kinds of measures (e.g. Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & Thrash, 2002; Murayama et al., 2011). While we agree that the application of behavioral or neurological measures has a strong merit for achievement goal orientation research, we are not convinced that using such measures would allow us to connect our results to the existing body of literature on the distinction of performance approach and avoidance goal orientations. Nevertheless, we have to admit that even though past research has shown that self-reported grades in mathematics are strongly linked to actual grades within German students (O. Dickhäuser & Plenter, 2005), our reliance on this measure might limit the validity of the findings in our second study (see Kuncel et al., 2005). Thus, future research could include more objective measures of academic performance to uncover the effects of goal valence on performance under stricter control of error variance.

Both of our studies relied on data from German samples, which could affect the generalizability of our results. Yet, cross-cultural research has shown that especially the association between performance approach and performance avoidance goals corresponds between different cultures (see Murayama et al., 2011). This could mean that the distribution of variance between goal underlying dimensions is also comparable between cultures. Nevertheless, it might still be interesting to test this hypothesis by replicating our results within samples from diverging cultures. Another issue regarding the generalizability of our results concerns the fact that the findings of our second study are limited to a specific area, i.e., education in mathematics. The validity of our results could be enhanced further by replicating them within other clearly defined areas (e.g., language education, science education) or on a more general level by focusing on broader constructs (e.g., intrinsic motivation at school or academic self-efficacy).

In this article, we focused on performance goal orientations due to the common research practice of separating them into performance approach and performance avoidance goal orientations. However, there have been several additional attempts to diversify achievement goal orientations like the 2×2 model (separating learning approach from learning avoidance goal orientations, see Elliot & McGregor, 2001) or the even more complex 3×2 approach to achievement goal

orientations (Elliot et al., 2011; Lüftenegger et al., 2016). Existing research on these models also lacks the necessary evidence for the theoretically applied dimensional structure that meant to characterize the examined achievement goal orientation instances. We think that research within the aforementioned approaches should also evaluate the assumed dimensional structure of achievement goal orientations by conducting corresponding bifactor models.

8. Conclusion

While the wise phrase “the whole is greater than the sum of its parts” might often be applicable to psychological constructs, we do think that research on achievement goal orientations can greatly benefit from a systematic and theoretical plausible deconstruction of achievement goal orientations. The present approach integrates seemingly conflicting conceptions of performance goal orientations - namely univariate versus dichotomous conceptions - by focusing on goal underlying dimensions. Although such goal underlying dimensions have been theoretical assets to achievement goal research for quite a while, they have rarely been empirically addressed. Hence, we believe that our findings contribute to a better understanding of these core elements of the achievement goal research framework.

Funding acknowledgement

This study was supported by the German Federal Ministry for Education and Research (grant number 01 HJ 0901/0902).

Appendix

Performance goal orientation short scale

At university [during math lessons], it is my goal ...

Approach goal orientation

- 1) ... to demonstrate that I am good at something.
- 2) ... that others think that I am smart.
- 3) ... to demonstrate that I am proficient in the course content.
- 4) ...to demonstrate what I know and can do.

Avoidance goal orientation

- 1) ... that nobody recognizes when I fail to understand something.
- 2) ... to avoid demonstrating that I am less smart than others.
- 3) ... to conceal my lack of knowledge in situations where I know less than others.
- 4) ... to avoid exposing that a task challenges me more than others.

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