

Shaping achievement goal orientations in a mastery-structured environment and concomitant changes in related contingencies of self-worth

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Abstract Across three time-points spanning 9 months, changes in achievement goal orientations and contingencies of self-worth were assessed as a function of participating in a mastery-structured academic program for high-ability adolescents ($N = 126$). Endorsement of mastery goal orientations increased during the program and remained high even after students returned to their home learning environments. In contrast, performance-approach and performance-avoidance goal orientations decreased during the summer program, but returned to previous levels when assessed 6 months later. Latent growth curve models assessed the covariation of performance goal orientations and two contingencies of self-worth (outperforming others and others’ approval) hypothesized to represent elements of performance goal orientations. Changes in the contingency of self-worth based on outperforming others positively covaried with observed changes in both performance goal orientations; however, changes in self-worth contingent on others’ approval did not. Results are discussed in terms of mastery-structured environments’ potential to alter achievement goal orientations via their underlying psychological processes. Implications for achievement goal

theory and the design of achievement-oriented environments are discussed.

Keywords Achievement goals · Achievement motivation · Classroom context · Contingencies of self-worth · Goal orientations

Introduction

People vary in their reasons for engaging in particular achievement behaviors and endorse various achievement goal orientations (Dweck and Leggett 1988; Elliot 2005; Elliot and McGregor 2001). Similarly, achievement contexts vary with respect to the achievement goal orientations they invoke. Environments may stress the importance of outperforming others, developing competencies, or both (Ames 1992b; Patrick et al. 2001). Theory and research has sought to understand how these contextual goal structures influence personal goal orientations, with a particular interest in understanding how to design environments that engender adaptive patterns of motivation and learning (see Ames 1992a, b; Epstein 1988; Maehr and Midgley 1996; Urda 2010). The nature and trajectory of their influence, however, are not fully understood.

Research in this area has generally investigated the effect of goal structures on motivation and learning by examining shifts in goal orientations across school transitions (Anderman and Midgley 1997; Gutman 2006) as well as the relation between students’ perceived classroom goal structure and their own goal endorsement (Church et al. 2001; Kaplan and Maehr 1999; Midgley and Urda 2001; Murayama and Elliot 2009; Nolen and Haladyna 1990; Urda 2004; Wolters 2004). Little is known, however, about the intervening effects of an intensive mastery-structured environment and

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how experiencing such an environment may continue to shape personal goal orientations once individuals move to other achievement contexts. And we know even less about the concomitant psychological mechanisms through which goal structures shape personal goal orientations. As such, the purpose of the current study was to (a) examine the temporally proximal and distal effects of engaging in a mastery-structured learning environment on personal achievement goal orientations and theoretically related contingencies of self-worth, and (b) to consider whether these contingencies of self-worth serve as underlying psychological processes through which environmental goal structures shape performance goal endorsement.

Theoretical background

Achievement goal theory proposes two main goal orientations that influence individuals' interpretations and reactions to achievement situations (Ames 1992b; Dweck and Leggett 1988; Kaplan and Maehr 2007; Maehr and Nicholls 1980; Maehr and Zusho 2009). A *mastery goal orientation* refers to a focus on *developing* competence. With a *performance goal orientation*, the focus is on *demonstrating* competence. Goal orientations can be thought of as interpretative frameworks or schemas, which focus the individual's attention towards the self or the task (Maehr 2001). In this way, a performance goal orientation activates a focus on demonstrating competence, which is realized through impression management (showing others that you are smart) and outperforming others (normative strivings). In contrast, a mastery goal orientation activates a focus on developing competence through an emphasis on improvement, learning, and deepening understanding. Goal orientations include beliefs about the purposes for engaging in goals, how competence and standards are defined, and the meaning of success, ability, effort, and failure (Kaplan and Maehr 2007; Maehr and Zusho 2009; Pintrich 2000a). This goal orientation perspective is distinct from the conceptualization of achievement goals as standards that define competence (see Elliot and Thrash 2001; Elliot et al. 2011; Hulleman et al. 2010; Senko et al. 2011). The standards approach focuses on goals, not goal orientations, and defines goals more narrowly as competence-related aims (e.g., earning a higher grade than before, or earning a better grade than one's classmates), while the goal orientation approach reflects a broader schema-based goal construct.

Both goal orientations and goals can have an approach or avoidance focus (Elliot 1997, 1999; Middleton and Midgley 1997; Pintrich 2000a). People endorsing a performance-approach goal orientation are concerned with appearing competent, while those endorsing a performance-avoidance goal orientation are concerned with

evading appearing incompetent. This same approach-avoidance distinction has been applied to mastery goal orientations (Elliot 1999; Elliot and McGregor 2001; Pintrich 2000b), although there is less empirical evidence supporting mastery-avoidance goal orientations (Maehr and Zusho 2009) and it is generally more aligned with the goals as standards perspective (see Elliot et al. 2011). Thus in the current paper, we employ the commonly used trichotomous model of achievement goal orientations, examining performance-approach, performance-avoidance, and mastery (approach) goal orientations.

Goal structure

Researchers have long sought to understand how environments can be structured to most effectively elicit achievement motivation (Brophy 2008). This research on contextual supports spans multiple theoretical perspectives, but has been most thoroughly researched from a self-determination theory perspective (Ryan and Deci 2000), social cognitive perspective (Bandura 1993), or an achievement goal theory perspective (Ames 1992b). Given our focus on supporting goal orientations, we highlight the latter perspective, although there is substantial overlap among them, especially regarding autonomy support and the use of challenging tasks.

Most goal theorists have focused on the primary dimensions of TARGET, identified by Ames (1992a) and Epstein (1988), as key structures within a school or classroom. TARGET identifies six main areas that are thought to shape the endorsement of achievement goal orientations within a particular context. These include the nature of the *Tasks* in which students engage (e.g., the extent to which they are novel or challenging), the *Authority* in the classroom (e.g., the extent to which instructors provided autonomy support), how students are *Rewarded* (e.g., how instructors acknowledge and reinforce student achievements and their learning progress), how students are *Grouped* (e.g., organizing students based on their similarities or differences), *Evaluation* and recognition practices (e.g., the standards, procedures, and methods used to ensure students are learning and progressing), and flexibility of *Time* (e.g., the pace of the instruction and assignments). In more recent work, the importance of considering the socio-emotional climate has also been noted (Patrick et al. 2001).

Using this framework as a guide, researchers have investigated how the presence (or absence) of these contextual qualities invoke or support particular goals or goal orientations as well as other academic outcomes (see Urdan 2010 for a review). Much of the research on goal structures has emphasized how they shape key educational outcomes (e.g., Ames and Archer 1988; Gutman 2006;

Karabenick 2004; Ryan et al. 1998; Urdan et al. 1998). However, a number of studies also considered how the educational context shapes students' goals and goal orientations. Although most of this work has been conducted from the goal orientation perspective, compelling evidence also comes from the goals as standards perspective. Church et al. (2001), for example, examined how students' perceptions of particular characteristics of the classroom environment determined their goal adoption. Students endorsed mastery goals when the lectures were engaging and when an evaluation focus and harsh evaluation were absent. In contrast, performance-approach goals were adopted when students perceived the classroom to have an evaluation focus, while performance-avoidance goals resulted when students perceived a presence of evaluation focus and harsh evaluation.

There is also research suggesting that perceptions of the classroom goal structure and the goal orientations endorsed by socialization agents (e.g., teachers and parents) shape personal goal orientation endorsement (e.g., Ciani et al. 2010; Friedel et al. 2007; Kaplan and Maehr 1999; Midgley and Urdan 2001; Murayama and Elliot 2009; Roeser et al. 1996; Urdan 2004; Wolters 2004). Qualitative examinations of classroom goal structures have further clarified that there are clear variations in classroom goal structures that can be readily identified by both students in the classroom and outside observers (Patrick et al. 2001; Urdan 2004).

Taken together, there is fairly strong empirical evidence to suggest that the perceived goal structure of the classroom is related to personal goal endorsement as well as achievement-related behavior and beliefs, and that perceived mastery goal structures are generally more beneficial for achievement-related behaviors and beliefs than performance-goal structures (Urdan 2010). Despite the apparent benefits of mastery goal structures, very little research has explicitly examined it as an educational intervention and identified its potential effects on student motivation over time. Maehr and Midgley (Anderman et al. 1999; Maehr and Midgley 1996; Midgley and Maehr 1999) engaged in a 3-year intervention study working with both elementary and middle school administrators to shift the schools' focus towards a mastery mindset. At the elementary level, there were no significant differences in students' reports of the motivational environment—although this may be due to the use of self-report instruments with younger elementary school students. For middle school students, both performance-approach goal orientations and perceived classroom goal structures were lower in the intervention school; however, there were no differences in self-reported mastery goals. While not using an intervention framework, per se, Linnenbrink's (2005) quasi-experimental study also provides evidence that the classroom goal structure shapes students' goal endorsement as well as other

academic-related outcomes such as help-seeking and achievement.

Some insight can also be gained from prior research on the transition from elementary school to middle school, which often reflects a shift from a mastery- to a performance-structured learning environment (see Anderman and Midgley 1997; Midgley 1993; Midgley et al. 1995). These studies have demonstrated that the transition to middle school is associated with increased endorsement of performance goals and decreased endorsement of mastery goals, increased perception of the classroom as performance-structured and decreased perception of the classroom as mastery-structured, and decreased perceived competence (Anderman and Midgley 1997).

Aside from the few intervention and observational studies noted, the majority of research on classroom goal structures has relied on students' perceptions of the classroom goal structure. As Urdan (2010) discussed, this may be problematic in that studies employing hierarchical linear modeling (HLM) report the majority of variability in classroom goal structures occurs within, rather than between, classrooms. Moreover, Koskey et al. (2010) analysis of students' interpretation of the mastery goal structure scale suggests that some students may interpret the items relative to their own views rather than the classroom goal structure itself, especially when items are framed in terms of the class in general (“In my science class...”) rather than in terms of the teacher (“My teacher...”). Finally, prior research has primarily investigated how perceived classroom goal structures relate to changes in personal goal orientations, other forms of motivation (e.g., perceived competence and interest), and subsequent behaviors and achievement. Little attention has been paid to how the classroom environment shapes other psychological processes, such as contingencies of self-worth, that may underlie changes in achievement goal orientations. Accordingly, we now turn to a discussion of these related psychological processes through which classroom goal structures may shape personal goal endorsement.

Performance goal orientations and related contingencies of self-worth

Goal orientations comprise a host of beliefs regarding the purpose of goal engagement, the development of competencies, standards of success, and the meaning of failure (Kaplan and Maehr 2007; Maehr and Zusho 2009; Pintrich 2000a). Because they are composed of various elements, it is reasonable to assume that changes in any of these elements may influence changes in goal orientations themselves. Thus, another major goal of the current study was to examine how goal orientations and theoretically related elements change in response to a mastery-structured

intervention, and whether these responses covary. In particular, we examined two relevant contingencies of self-worth, as they represent two major underlying elements of performance goal orientations.

Crocker and her colleagues (see Crocker and Wolfe 2001 for a review) note that individuals judge their self-worth based on domain-specific criteria and that these judgments can exert situational effects on self-esteem. For example, an individual whose self-worth is contingent on academic competence may suffer decrements in self-esteem when he or she fails an exam. Conversely, that same individual may experience an increase in self-esteem after earning an A. Those whose self-worth is not contingent on academic competence, however, would not experience such dramatic shifts in state self-esteem under the same circumstances. Of particular relevance to the present study are self-worth contingent on outperforming others and approval from others. As we discuss below, both constructs are theoretically related to performance goal orientations. Importantly, we were not interested in these constructs as they relate to the assessment of self-worth, *per se*, but rather their relation to the contingencies for success associated with the endorsement of performance goal orientations. Therefore, we operationalized these related contingencies of self-worth as two central elements of performance goal orientations, and conceive of these contingencies as being susceptible to situational change.

First, we hypothesize that performance goal orientations are linked to beliefs about self-worth contingent on outperforming others. This proposed relation is based on convergent evidence that a major element of performance goal orientations is the desire to outperform others as a means of demonstrating normative ability (Grant and Dweck 2003; Urdan and Mestas 2006). Specifically, Urdan and Mestas' (2006) interviews of students identified as having a performance goal orientation revealed that the orientations consisted of several distinct categories that represented the reasons for pursuing performance goals. Among these are competition-related goals, which refer to students' desire to outperform others. Research by Grant and Dweck (2003) yielded a similar element of performance orientations, which they termed a "normative outcome goal." These, too, reflect a heightened concern for normative standards of success and a desire to outperform others. Although the contingency of self-worth based on outperforming others largely reflects a social concern rather than a discrete goal or broader goal orientation, the normative element of performance goal orientations is conceptually similar; people who endorse performance goal orientations are theoretically motivated by a concern for normative success as a mechanism for demonstrating competence.

Second, self-worth contingent on others' approval is also hypothesized to relate to performance goal

orientations. As noted previously, performance goal orientations are primarily concerned with either demonstrating competence, or the avoidance of appearing incompetent (Kaplan and Maehr 2007). This can be further tied to a desire to gain the approval of others (e.g., demonstrate competence to others). Consistent with this reasoning, Urdan and Mestas' (2006) research suggested that appearance-related concerns are also an important element of performance goal orientations. Because many achievement contexts are social in nature, performance can become a means of self-presentation (Baumeister 1982). People are often inclined to manage their impression to others, including impressions of competence, in the service of social approval (Leary 1995). Therefore, it is reasonable to assume that the focus on demonstrating competence arises, at least in part, from a poignant desire to gain others' approval.

By this reasoning, contingencies of self-worth relating to outperforming others and desiring approval from others represent major elements of performance goal orientations. However, the distinction between goal orientations and contingencies of self-worth is also worth noting. Performance goal orientations reflect the reasons why individuals engage in achievement-related activities, thus reflecting the purpose for their engagement. Contingencies of self-worth, on the other hand, reflect deeper beliefs about the self and, in the context of the current research, capture the degree to which success is tied to outperforming others or others' approval.

In summary, we propose that the contingencies of self-worth based on outperforming others and others' approval represent critical elements of performance goal orientations. We also propose that these contingencies of self-worth are subject to situational change depending on the goal structure of the environment in which one is engaged. To this end, we hypothesize that changes in these contingencies of self-worth may underlie and accompany changes in performance-approach and performance-avoidance goal orientations. Understanding the relation between performance goal orientations and their core elements will help to shed light on the psychological mechanisms through which achievement goal orientations change as a function of classroom settings.

The present research

The present study had two main objectives. Its first purpose was to identify the temporally proximal and distal changes associated with engaging in a mastery-structured learning environment. In particular, we examined changes in personally endorsed achievement goal orientations and related contingencies of self-worth. Observing how goal orientations change in response to a mastery-structured

environment extends prior research, which has largely been limited to the study of students' perceptions of the classroom. This is an important extension, as students' own goal orientations may alter their perceptions of the context (Linnenbrink 2004; Urdan 2001).

The second purpose was to examine whether the observed changes in performance goal orientations covaried with the contingencies of self-worth hypothesized to represent two of its primary elements. This latter objective is of particular interest, as it might help explain the psychological processes involved in the modification of goal orientations and the role of the environment's goal structure. Theoretically, we assert that the goal structure of a learning environment exacts change on performance goal orientations by manipulating these two elements. Because learning environments may emphasize or de-emphasize normative ability and the desire for others' approval, they may also augment or attenuate these performance goal-related concerns, thus altering broader goal orientations. As an initial step in addressing this theoretical issue, we examined the covariation of growth trajectories between performance goal orientations and the contingencies of self-worth based on outperforming others and others' approval.

We investigated these two primary research questions by examining high-ability adolescents participating in a mastery-structured residential summer program. Using a short-term, 3-phase longitudinal design to follow participants over the course of 9 months, we surveyed participants before, during, and after their participation in the 3-week summer program.

We hypothesized that engagement in the mastery-structured learning environment would alter students' personal achievement goal orientations and related contingencies of self-worth. First, given the summer program's focus on enrichment and learning, we hypothesized that mastery goal orientations would be enhanced during the summer program, but would return to prior levels once students returned home. Second, because the academic summer program explicitly deemphasized normative evaluation, we hypothesized that students' performance-approach and performance-avoidance goal orientations would be attenuated during the summer program, as well as their judgments that their self-worth was contingent on outperforming others and others' approval. As with mastery goal orientations, we hypothesized that this shift would be temporary, and that students would return to pre-program levels after returning to their traditional educational contexts. Moreover, because contingent self-worth based on outperforming others and others' approval represent core elements of performance goal orientations (see Grant and Dweck 2003; Urdan and Mestas 2006), we hypothesized that changes in these contingencies would covary

with changes in performance goal orientations over time. That is, these constructs should all decrease while attending the summer program and return to baseline levels after leaving the program, and the growth trajectories of self-worth contingent on outperforming others and others' approval should positively correlate with the growth trajectories of performance-approach and performance-avoidance goal orientations.

Method

Participants

Participants were 8th through 10th grade students ($N = 126$; 54 % male, 46 % female). The mean age was 14.61 years ($SD = .91$). All participants were enrolled in science courses during a rigorous 3-week residential summer educational enrichment program for high-ability adolescents. Qualification for enrollment in the summer program was based on a national talent search. Talent search participants took a standardized test (either the ACT or the SAT) in the 7th grade, with students scoring 500 or higher on either the math or critical reasoning SAT (or the ACT equivalent) qualifying for participation in the summer program.

The sample included adolescents from a variety of ethnic/racial groups: 71 % Caucasian, 11 % Asian, 6 % Latino/a, 3 % African Americans. An additional 3 % of participants responded "Other", and 6 % either did not respond to the item or responded as "Unknown." Socio-economic background was also diverse, as financial aid was provided for students to help reduce the costs of attending the summer program.

Additionally, 16 (10 females) of the 17 summer program instructors agreed to complete a survey regarding their instructional practices during the summer program. The mean age of the instructors was 26.94 ($SD = 6.19$), ranging from 21 to 48 years old. All but one instructor was under the age of 30. Fifteen instructors were Caucasian; one instructor did not report his ethnicity. Course instructors varied in teaching experience. About 70 percent of the instructors had taught as part of the summer program in previous years; all instructors were required to have at least 1 year of experience at the graduate or secondary level or in professional employment related to the topic area they would be teaching. Instructors were selected based on their experience level and their depth of knowledge in the course-specific material. Each instructor was required to create a course syllabus, develop a challenging course curriculum, and attend an orientation session prior to the start of the summer program. Instructors received training regarding the goals of the program (see description

of summer program below) as well as individual guidance regarding course creation and teaching methods.

Summer program

The residential summer program was designed as an enrichment opportunity for high-ability students. The program lasted for 3 weeks, during which students attended an academically rigorous class for 7 h on weekdays and 3 h on Saturday for a total of 120 class hours. The topics of the courses were varied, including subjects such as Aerospace Engineering, Introduction to Medical Science, Marine Biology, and Pharmacology, and courses were taught by instructors who specialized in the course subject. Prior to the summer program, instructors participated in an orientation program and received training materials that detailed specific pedagogical methods that they were expected to carry out in their classrooms.

The pedagogical approach of the summer program was aligned with the principles delineated by Ames (1992a, b) for creating a mastery goal structure and de-emphasizing performance-related concerns. The curriculum and instruction combined elements of enrichment and acceleration, intellectual risk-taking, and non-normative evaluation. Instructors were encouraged to assess students' knowledge and interests at the beginning of the program so that they could tailor activities to the students' level of knowledge and interest in the subjects.

As previously discussed, tasks that are challenging and varied help to create a mastery-structured educational context (Ames 1992a, b). In the summer program, activities were developed to build on prior knowledge, while also challenging students and introducing new materials; instructors also aimed to support connections between the course materials and their students' daily lives. Instructors employed a range of class activities such as lectures, small group work, experiments, other hands-on and/or inquiry-based activities, and discussion, with an emphasis on collaboration and creativity. There was also an explicit emphasis on exposing students to complex principles and concepts, with the goal of enhancing and progressing students' learning. Thus, activities were designed to be challenging, but not intimidating, allowing enough time for students to process the information while fostering a collegial attitude towards fellow learners.

Another classroom characteristic that facilitates a mastery goal structure is autonomy support (Ames 1992a, b), which instructors were trained to implement in several ways. They were coached to encourage students' research and exploration for the sake of learning rather than to directly provide answers to students. In this way, students were encouraged to be independent and self-directive in their learning. For instance, instructors were trained to pose

questions such as "What do you think?" rather than providing an answer themselves. Moreover, instructors encouraged students to draw their own conclusions and justify them, explore aspects of class subjects that interest them most, and make decisions regarding what they prefer to learn and how they would like to learn those materials. This encouraged the students to be active, creative learners.

Furthermore, the evaluation and recognition methods employed in the program adhered to those that promote a mastery-structured environment (and de-emphasized performance goal-related concerns) by encouraging improvement and recognizing effort and growth, while de-emphasizing normative comparison. Instructors were told to place an emphasis on problem-solving, rather than achieving a high grade. Additionally, the feedback given to students was formative and focused on the learning processes rather than the learning outcome. For example, students' papers and presentations were evaluated with respect to their coherent organization, effective transitions, appropriate vocabulary, and substantive and relevant content. Furthermore, students did not receive formal grades for their course work. Instead, after the program was completed, students received more general feedback from their instructors on the components of learning and strategy use (rated from 1 = never or rarely met course expectations to 5 = exceeded course expectations). Throughout the course, there was also an explicit focus on reducing social comparison among summer program participants and providing opportunities for all students to participate and engage in the instruction, thereby de-emphasizing normative comparisons that are indicative of a performance goal structure.

In addition to academics, social activities provided opportunities to interact with peers in non-academic settings. Students were encouraged to build friendships with others in the program and were consequently not assigned homework. The emphasis on the social aspect of the learning environment is in line with current research suggesting that an academically and emotionally supportive classroom coincides with a mastery goal structure (Patrick et al. 2011). Creating an environment where amicable social interactions are valued is crucial in providing opportunities for group work, promoting collaboration and discussions, and sharing, all of which are indicative of a mastery-structured environment.

In summary, the program explicitly encouraged intellectual risk-taking, academic engagement, self-direction, and academic excellence through knowledge-building, all of which are in line with a mastery classroom goal structure. Moreover, it discouraged normative evaluations, social comparison, and competition, which is in keeping with a de-emphasis of a performance goal structure.

Procedure

Recruitment for study participation occurred prior to students' arrival at the program. Potential participants (those registered for a science course at the summer program) were contacted by mail in the spring before their participation in the summer program and were invited to complete an assent form and the Phase 1 (baseline) survey; parental consent was also obtained at that time. A second survey (Phase 2) was administered at the end of the 3-week summer program. Finally, 6 months after students returned home from the summer program, participants received a Phase 3 survey by postal mail. All measures (described below) were completed during each of the three phases, with the exception of perceived classroom goal structure, which was only administered in Phase 2.

As might be expected in a longitudinal design, there was some attrition across the three phases (Phase 1, $n = 126$; Phase 2, $n = 110$; Phase 3, $n = 83$). Attrition analyses indicated that there were no significant differences in gender, race, or any of the other variables included in the study between participants who completed and did not complete Phase 1, Phase 2, and/or Phase 3. There were also no differences between students who participated only in Phase 1, those who participated in Phases 1 and 2 but not 3, or those who participated in Phases 1 and 3 but not 2. This suggests that the attrition resulted in data that was missing at random without any specific demand characteristics in a certain group of participants.

Measures

Personal achievement goal orientations

Students' mastery (5 items; $\alpha_{\text{Phase1}} = .89$, $\alpha_{\text{Phase2}} = .91$, $\alpha_{\text{Phase3}} = .93$), performance-approach (5 items; $\alpha_{\text{Phase1}} = .94$, $\alpha_{\text{Phase2}} = .95$, $\alpha_{\text{Phase3}} = .95$), and performance-avoidance (4 items; $\alpha_{\text{Phase1}} = .86$, $\alpha_{\text{Phase2}} = .87$, $\alpha_{\text{Phase3}} = .90$) goal orientations in science were assessed at all three phases using the Patterns of Adaptive Learning Survey (PALS) (Midgley et al. 2000). To assess mastery, participants responded to items such as "It's important to me that I learn a lot of new concepts in science" (mastery). In line with the conceptualization of performance goal orientations as schemas that include both an appearance and a normative/evaluative component, the performance scales included both appearance (performance-approach: "One of my goals is to show others that I'm good at science"; performance-avoidance: "One of my goals is to keep others from thinking I'm not smart in science class") and normative/evaluative (performance-approach: "One of my goals is to look smart in comparison to the other students in my science class"; performance-avoidance: "It's important

to me that my teacher doesn't think that I know less than others in science class") items. Items were rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Contingencies of self-worth

Two sub-scales of the contingency of self-worth scale were used to assess the extent to which self-worth judgments were based on outperforming others (5 items; $\alpha_{\text{Phase1}} = .89$, $\alpha_{\text{Phase2}} = .93$, $\alpha_{\text{Phase3}} = .90$) and others' approval (5 items; $\alpha_{\text{Phase1}} = .86$, $\alpha_{\text{Phase2}} = .87$, $\alpha_{\text{Phase3}} = .86$) (Crocker et al. 2003). Examples include "Doing better than others gives me a sense of self-respect" (outperforming others), and "What others think of me has no effect on what I think about myself" (others' approval). Participants rated the items using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Individual interest

Individual interest in science was measured using Linnenbrink-Garcia et al.'s (2010) individual interest scale (8 items; $\alpha = .92$). The scale assessed the extent to which students enjoy science, as well as whether they found science to be personally meaningful and relevant. Participants responded to statements such as "Science is exciting to me" and "Science helps me in my daily life outside of school" on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Interest was used as a control variable in one of the analyses; thus, we only utilized the Phase 1 assessment.

Classroom goal structure

Using an adaptation of the Patterns of Adaptive Learning Survey (PALS) (Midgley et al. 2000), we assessed students' perceptions of their classroom environment during Phase 2, as well as teachers' self-reported instructional practices. Students were asked to rate their level of agreement with statements to measure perceptions of a mastery (7 items; $\alpha = .78$) and performance goal structure (5 items; $\alpha = .88$) on a 5-point Likert scale anchored at 1 (*strongly disagree*) and 5 (*strongly agree*). For example, participants responded to items such as "In our class, it's important to understand the work, not just memorize it" (mastery goal structure) and "In our class, the most important thing is to look smart" (performance goal structure). Similarly, instructors answered questions related to mastery instructional practices, such as "During class, I often provide several different activities so that students can choose among them" (3 items; $\alpha = .71$), and performance instructional practices, such as "I point out those

students who do well academically as a model for the other students” (5 items; $\alpha = .79$).

Results

In this section, we first report results regarding students’ perception of their classroom goal structures and teachers’ reports of their instructional practices to further support our claim that the summer program did, indeed, emphasize mastery and de-emphasize performance goal-related concerns. Next, we report results pertaining to changes in achievement goal orientations and related contingencies of self-worth across the three phases. Finally, we examine the covariation of performance goal orientations and contingencies of self-worth based on outperforming others and others’ approval.

Perceptions of the learning environment and instructional practices

As previously discussed, the summer academic program was designed to promote engagement in the course material and intrinsic motivation, with a decreased focus on normative evaluation and competition. It also emphasized intellectual curiosity and self-directed learning, which are elements of a mastery goal structure (Ames 1992a, b). That said, the program was not modeled on achievement goal theory, so it was necessary to first test the assumption that the goal structure of the program was more mastery- than performance-focused. To this end, we examined students’ perceptions of the classroom goal structure during the summer program. As expected, students perceived their learning environments to be significantly more mastery-structured ($M = 4.24$, $SD = .49$) than performance-structured ($M = 1.51$, $SD = .56$), $t(104) = 33.41$, $p < .001$, $d = 5.17$. This was also consistent with what instructors reported regarding their instructional practices. They reported using significantly more mastery-related practices ($M = 3.63$, $SD = .96$) than performance-related practices ($M = 2.14$, $SD = .81$); $t(19) = -6.53$, $p < .001$, $d = 1.68$). Taken together, these results suggest that students’ perceptions of their classroom goal structures were consistent with what instructors had intended to create.

Changes in goal orientations and related contingencies of self-worth

Our first research question concerned the effect of a mastery-structured learning environment on students’ personally endorsed goal orientations and related contingencies of self-worth. To control for the interrelation of the dependent variables (see Table 1 for correlations between variables),

we conducted a multivariate analysis of variance (MANOVA), which included four of the dependent variables (performance-approach and -avoidance goal orientations, and contingencies of self-worth based on outperforming others and others’ approval). Changes in mastery goal orientation (the remaining dependent variable) were examined in a separate analysis of covariance (ANCOVA), because it was the only analysis for which we included a covariate. We begin with this latter analysis and follow with the MANOVA analysis.

To examine changes in mastery goal orientations, we conducted a repeated measures ANCOVA of students’ mastery goal orientations across the three phases, controlling for individual interest in science. There was a significant effect of time ($F(2, 138) = 6.46$, $p = .002$, $\eta_p^2 = .09$) suggesting that personal mastery goal orientations changed across the three phases. Interest was employed as a covariate because the students in our sample had high initial levels of interest ($M = 4.16$, $SD = .64$), and prior research suggests that interest is reciprocally related to a mastery-approach goal orientation (Harackiewicz et al. 2008). Specifically, the students in our sample had elected to enroll in a science course from a variety of available courses in the social and natural sciences, as well as the humanities. Therefore, we wished to examine changes in mastery goal orientation independent from the influence of their interest. As depicted in Fig. 1, a significant linear trend was also found ($F(1, 69) = 13.40$, $p < .001$, $\eta_p^2 = .16$; $M_{adj1} = 4.30$, $M_{adj2} = 4.36$, $M_{adj3} = 4.37$), suggesting an increase in mastery goal orientations over time. In an effort to understand the nature of this trend, planned contrasts were performed, which indicated that there was an increase from Phase 1 to Phase 2 ($F(1, 69) = 7.62$, $p = .007$, $\eta_p^2 = .10$), but not from Phase 2 to Phase 3 ($F(1, 69) < 1$, $p = .45$, $\eta_p^2 = .01$). Taken together, these results suggest that students’ mastery goal orientations were augmented while engaging in the mastery-structured learning environment and were sustained 6 months after returning to their home learning environments.

Next, we conducted a repeated measures MANOVA on the remaining dependent variables: performance-approach and performance-avoidance goal orientations, and contingent self-worth based on outperforming others and others’ approval. The test yielded a significant multivariate effect of time ($F(8, 63) = 2.39$, $p = .025$, $\eta_p^2 = .23$) indicating statistically significant changes across time among the dependent variables. A series of follow-up repeated measures ANOVAs then tested changes in each of the dependent variables across the three phases. The first analyses yielded the predicted effects of time for performance-approach ($F(2, 140) = 4.64$, $p = .01$, $\eta_p^2 = .06$) and performance-avoidance ($F(2, 140) = 5.60$, $p = .005$, $\eta_p^2 = .07$) orientations. These results indicate that students’

Table 1 Correlations between goal orientations and related contingencies of self-worth at all three phases

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Mastery ₁	–														
2 Mastery ₂	.79***	–													
3 Mastery ₃	.68***	.71***	–												
4 Performance-approach ₁	.23**	.23*	.15	–											
5 Performance-approach ₂	.17	.11	.08	.73***	–										
6 Performance-approach ₃	.22*	.26*	.28**	.66***	.66***	–									
7 Performance-avoidance ₁	.21*	.19	.12	.91***	.67***	.67***	–								
8 Performance-avoidance ₂	.14	.09	.14	.68***	.91***	.64***	.70***	–							
9 Performance-avoidance ₃	.20	.29**	.24*	.65***	.65***	.94***	.66***	.65***	–						
10 CSW outperforming others ₁	.03	–.00	.04	.59***	.51***	.46***	.56***	.42***	.42***	–					
11 CSW outperforming others ₂	–.00	–.04	.13	.56***	.64***	.53***	.55***	.50***	.73***	.73***	–				
12 CSW outperforming others ₃	.05	.11	.20	.52***	.52***	.67***	.56***	.63***	.67***	.69***	.69***	–			
13 CSW others' approval ₁	–.21*	–.17	–.24*	.25**	.25*	.11	.28**	.10	.30***	.25**	.24*	.24*	–		
14 CSW others' approval ₂	–.19	–.15	–.23*	.25**	.30***	.08	.29**	.31***	.09	.27**	.23*	.23*	.76***	–	
15 CSW others' approval ₃	–.23*	–.12	–.17	.42***	.31**	.27*	.43***	.34**	.21	.46***	.36**	.41***	.71***	.61***	–

Subscript numbers indicate phase of data collection

CSW contingency of self-worth

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

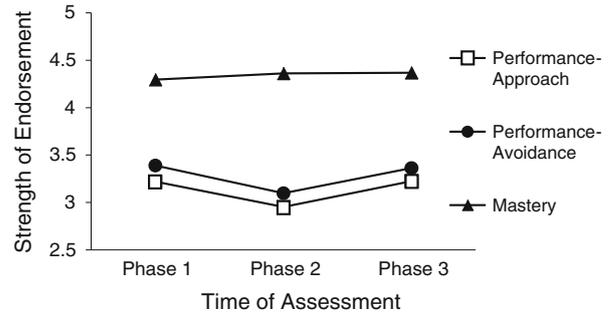


Fig. 1 Changes in mastery (controlling for initial individual interest), performance-approach, and performance-avoidance goal orientations across the three phases of data collection

endorsement of performance-approach ($M_1 = 3.22$, $M_2 = 2.95$, $M_3 = 3.23$) and performance-avoidance ($M_1 = 3.39$, $M_2 = 3.10$, $M_3 = 3.36$) goal orientations decreased during the summer program and then returned to previous levels when they returned to their home environment (see Fig. 1). The quadratic trends for these effects were also statistically significant for both performance-approach goals ($F(1, 70) = 9.92$, $p = .002$, $\eta_p^2 = .12$) and performance-avoidance goals ($F(1, 70) = 11.46$, $p = .001$, $\eta_p^2 = .14$), suggesting that the mastery goal structure may have attenuated their performance-related goals and concerns during the summer program.

A similar effect was found for students' contingency of self-worth based on outperforming others. A repeated measures ANOVA revealed a statistically significant effect for time ($F(2, 140) = 5.73$, $p = .004$, $\eta_p^2 = .08$). The quadratic trend was also significant ($F(1, 70) = 10.15$, $p = .002$, $\eta_p^2 = .13$; $M_1 = 3.82$, $M_2 = 3.60$, $M_3 = 3.79$; see Fig. 2), suggesting that concerns about outperforming other students were attenuated during the summer program and returned to previous levels when returning to their home environment.

Contrary to our predictions, however, self-worth contingent on others' approval did not significantly change across the three phases ($F(2, 140) = 1.10$, $p = .34$, $\eta_p^2 = .02$; $M_1 = 2.79$, $M_2 = 2.85$, $M_3 = 2.91$; see Fig. 2). We had anticipated the contingency of self-worth based on others' approval to decrease while participating in the mastery-structured program, but this prediction was not observed.

Growth curve covariation: performance goal orientations and related contingencies of self-worth

To examine whether the change in performance goal orientations were related to the changes in contingencies of self-worth, we tested four growth curve models, each specifically designed to test the correlation of their change rates. The models tested were performance-approach goal

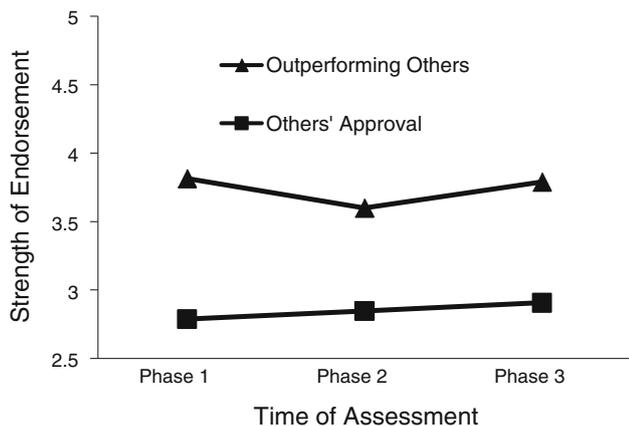


Fig. 2 Changes in the contingencies of self-worth based on outperforming others and others' approval across the three phases of data collection

orientations with self-worth contingent on outperforming others (Model 1), performance-avoidance goal orientations with self-worth contingent on outperforming others (Model 2), performance-approach goal orientations with self-worth contingent on others' approval (Model 3), and performance-avoidance goal orientations with self-worth contingent on others' approval (Model 4). The growth pattern of each variable for each model was specified heuristically with observed patterns in the repeated measures analyses previously described. Figure 3 graphically depicts the general model employed for these tests with the specific measure of two processes listed for each model.

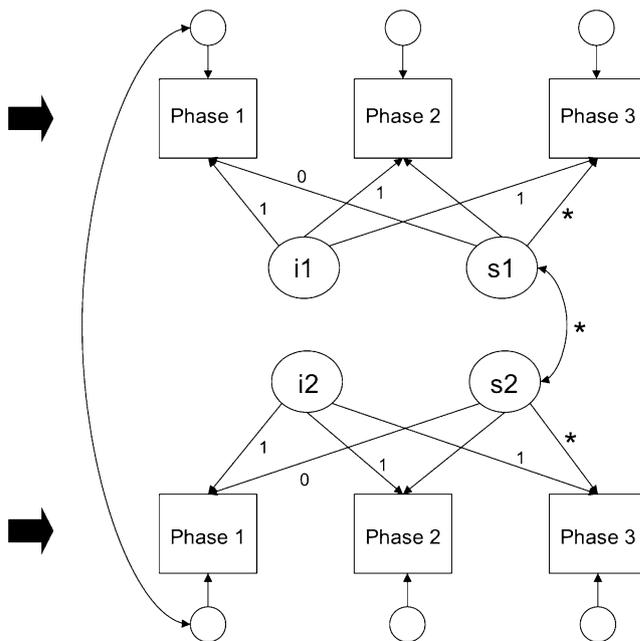
The first model examined the correlation of change rates between performance-approach goal orientations and

self-worth contingent on outperforming others (Model 1 of Fig. 3). Time scores for the first two phases of both variables were specified to be linear, while Phase 3 was allowed to be freely estimated. Furthermore, the residual variances of both variables in the first phase were set to be correlated. The model fit the data very well ($\chi^2 = 5.99$, $df = 5$, $p = .31$, CFI = .997, TLI = .992, and RMSEA = .04). Changes in performance-approach goal orientations were associated with similar changes in the contingency of self-worth based on outperforming others, as indicated by the statistically significant correlation between the two slope factors ($\phi = .670$, $z = 2.28$, $p = .01$). Thus, the decrease in performance-approach goal orientations during the mastery-structured summer program corresponded with the decrease in self-worth contingent on outperforming others; both performance-approach goal orientations and self-worth contingent on outperforming others returned to prior levels in Phase 3.

The second model examined the correlation of change rates between performance-avoidance goal orientations and self-worth contingent on outperforming others (Model 2 of Fig. 3) and was specified in the same manner as the first model. The fit of the model to the data was satisfactory ($\chi^2 = 7.58$, $df = 5$, $p = .31$, CFI = .993, TLI = .978, and RMSEA = .06). The accelerated change of performance-avoidance goal orientations was positively associated with accelerated change in self-worth contingent on outperforming others, as indicated by the significant correlation between the two slope factors ($\phi = .805$, $z = 2.51$, $p = .006$). Thus, there was a similar decrease during the mastery-structured program for performance-avoidance goal orientations and self-worth contingent on

Fig. 3 General growth curve model testing correlations between slopes of performance goal orientations and contingencies of self-worth based on outperforming others and others' approval (Models 1, 2, 3, and 4). The labels i1 and i2 refer to the intercepts for the first and second factors, respectively. Similarly, s1 and s2 refer to the slopes of the first and second factors, respectively. Paths labeled 0 and 1 were constrained accordingly, and those marked with an asterisk (*) were allowed to be freely estimated

- Model 1: Performance-Approach
 - Model 2: Performance-Avoidance
 - Model 3: Performance-Approach
 - Model 4: Performance-Avoidance
-
- Model 1: Contingencies of Self-Worth, Outperforming Others
 - Model 2: Contingencies of Self-Worth, Outperforming Others
 - Model 3: Contingencies of Self-Worth, Others' Approval
 - Model 4: Contingencies of Self-Worth, Others' Approval



outperforming others, which returned to previous levels in Phase 3.

The next set of analyses examined the relation of growth curves for both performance goal orientations and self-worth contingent on others' approval. The first model examined performance-approach goal orientations and the contingencies of self-worth based on others' approval (Model 3 of Fig. 3), and was specified in the same manner as Models 1 and 2. This model yielded a satisfactory fit ($\chi^2 = 8.16$, $df = 5$, $p = .15$, CFI = .989, TLI = .966, and RMSEA = .07), but no statistically significant correlation of slope factors ($\phi = .339$, $z = .29$, $p = .39$). Contrary to our predictions, but in line with the repeated measures analyses reported above, the trajectory of performance-approach goal orientations and self-worth contingent on others' approval did not covary across the three phases.

The final model tested the correlation of slopes between performance-avoidance goal orientations and contingencies of self-worth based on others' approval (Model 4 of Fig. 3), which was specified in the same manner as previous models. The model yielded a satisfactory fit ($\chi^2 = 8.16$, $df = 5$, $p = .15$, CFI = .989, TLI = .966, and RMSEA = .07). As with performance-approach goal orientations, there was no statistically significant correlation of slopes ($\phi = .229$, $z = .47$, $p = .32$). Again, these results did not conform to our prediction that performance-avoidance goal orientations and self-worth contingent on others' approval would covary across the three phases, but are consistent with the general patterns observed for self-worth contingent on others' approval reported in the repeated measure analyses.

Discussion

The present research assessed the intervening influence of a mastery-structured learning environment on students' personally endorsed achievement goal orientations and related contingencies of self-worth, and their concomitant changes over time. First, it was hypothesized that participating in the mastery-structured environment, which emphasized mastery goals and de-emphasized performance goals, would be associated with increases in students' personally endorsed mastery goal orientations. Whether or not this increase would be sustained over time, was not clear given the susceptibility of goal orientations to situational changes in the classroom environment. Results suggested that students' mastery goal orientations were augmented during participation in the summer program and were sustained when assessed 6 months after returning to their home learning environments. That these changes remained even after students returned to their regular school environment is intriguing, and suggests the potential long-term benefit of

mastery-structured environments for shaping mastery goal orientations.

We also hypothesized that the educational environment would attenuate students' performance goal orientations given the de-emphasis of competition and normative evaluation during the summer program. As expected, students experienced a significant decrease in performance-approach and performance-avoidance goal orientations relative to their reported performance goal orientations while in their home learning environments before and after the summer program. A similar pattern was observed for self-worth contingent on outperforming others. This was not true, however, for self-worth contingent on others' approval, which did not change significantly across the three phases.

Furthermore, it was expected that changes in contingencies of self-worth based on outperforming others and others' approval would be associated with changes in performance goal orientations. These two contingencies of self-worth represent underlying psychological processes through which performance goal orientations were predicted to change (see Grant and Dweck 2003; Urdan and Mestas 2006). As expected, the growth curve analyses suggested that changes in both performance-approach and performance-avoidance goal orientations were associated with similar changes in self-worth contingent on outperforming others. Contrary to our predictions, however, growth trajectories for both performance goal orientations were not associated with changes in self-worth contingent on others' approval. These results reveal a compelling possibility; that changes in self-worth contingent on outperforming others may be more susceptible to situational change than self-worth contingent on others' approval, making it a potentially critical factor in shaping performance goal orientations. In contrast, self-worth contingent on others' approval may be more stable over time and across contexts. Reducing its saliency in achievement contexts may be a less practical means of attenuating individuals' performance goal orientations.

Overall, our results suggest that personal performance goal orientations are highly susceptible to changes in the environmental goal structure. This may occur because performance goals depend on contextual supports due to the relative ability element, as evidenced by the concomitant changes of performance goal orientations and self-worth contingent on outperforming others. That is, the degree to which information about relative ability is available to students is strongly embedded in the context. In a high mastery-structured/low performance-structured environment, such as the summer program studied here, information about relative ability was not readily available. This may have made it difficult to pursue performance goals in that context or to make judgments about relative

levels of competence. When students returned to more typical classroom settings, however, they may have been able to engage in social comparisons, thus supporting the endorsement of performance goal orientations.

What is particularly noteworthy about these findings is that *both* performance-approach and performance-avoidance goal orientations decreased in relation to the summer program and then returned to prior levels when students returned to more traditional educational settings. While some goal theorists have argued that performance-approach goals may be beneficial (e.g., Harackiewicz et al. 1998, 2002; Senko et al. 2011), there is widespread agreement that performance-avoidance goals are detrimental. We observed similar changes in both approach and avoidance forms of performance goal orientations, and changes in both types of performance goal orientations were associated with changes in contingencies of self-worth on outperforming others. This brings into question the idea that an environment can emphasize competition and normative strivings without shaping both performance-approach and performance-avoidance goal orientations and further highlights that caution should be used in structuring environments that emphasize competition, as it is likely to shape both forms of performance goal orientations.

Importantly, the mastery-structured environment also seemed to support changes in mastery goal orientation endorsement. And, this heightened endorsement of mastery goal orientations was sustained even when students returned to a more traditional classroom environment in which performance goal orientations might be more readily endorsed. This may have occurred, in part, because mastery goal orientations are not linked to the desire for normative success, allowing it to exist in a diverse array of social climates and remain less dependent on particular situational supports.

This study helps to extend prior research on contextual supports for achievement goal orientations in several ways. First, given concerns about the reliance on self-reported classroom goal structures (Linnenbrink 2004; Urdan 2001, 2010), our findings help to support the contention that the classroom goal structure can change students' personal goal orientations. While there is some empirical evidence showing that changes in classroom goal structures relate to changes in personal goal orientations (Anderman et al. 1999; Linnenbrink 2005), most studies rely on students' perceptions of the classroom goal structure. Thus, the current study adds to the very limited body of research examining how students respond to an environment focused specifically on supporting mastery goals and de-emphasizing performance goals. Moreover, there is a lacuna of research examining how an intensive mastery-focused environment relates to both immediate and subsequent changes in achievement goal orientations. Our

findings regarding the potential of such an environment to support mastery goals even when students are no longer in the mastery-supportive environment are promising with respect to interventions. Third, by examining concomitant changes in contingencies of self-worth, the current study extends prior research by examining potential underlying psychological mechanisms that may help to explain, at least in part, changes in performance goal orientations.

Limitations and future directions

The present research provides a foundation for future investigations of the potential of environments to shape achievement goal orientations. This future research should be designed to address several limitations of the current study. First, causal conclusions cannot be drawn from correlational research, such as the study presented here. Although students perceived the summer program to be highly mastery-structured and not performance-structured, the instructors' reported practices were in keeping with a mastery goal structure, and the program's pedagogical principles were consistent with a mastery goal structure, it is possible other variables exerted an influence on the observed effects. Thus, we cannot conclude that the mastery goal structure of the learning environment was solely responsible for the observed changes in achievement goal orientations and related contingencies of self-worth. We also cannot determine if changes in self-worth contingent of outperforming others is, in part, responsible for changes in performance goal orientations, or if the inverse is true. One main intention of the present study, however, was to begin exploring the underlying mechanisms associated with changes in goal orientations. A greater understanding of these mechanisms and how their manipulation affects goal orientations will help in constructing environments that bring about the most adaptive patterns of goal engagement. Follow-up experimental research will need to be conducted in order to isolate the effects of these variables and to draw causal conclusions.

Second, and related to the first point, students' perceptions of their classroom goal structure, as well as instructors' reported classroom goal structure, were assessed only during the summer program. Although there is evidence to suggest that traditional learning environments in middle and high schools are performance-structured (e.g., Anderman and Midgley 1997; Midgley et al. 1995), students' home learning environments were not assessed either before or after their participation in the summer program. Therefore, it is difficult to definitively conclude that the changes observed for goal orientations and contingencies of self-worth after the summer program were due to a return to a performance-structured environment, per se.

Additionally, the sample for the present study was composed of high-ability adolescents who participated in a voluntary academic summer enrichment program. Our sample, therefore, is limited to a particular population and subject to self-selection biases. Thus, it will be important for future studies to replicate these findings using more typical samples for the purpose of generalization. Nonetheless, there is certainly value in understanding how goal orientations shift among high-ability populations. High-ability individuals are found in selective universities, graduate and professional schools, law firms, hospitals, think tanks, and high levels of public office, public agencies, the military, corporations, and non-profit organizations, to name just a few. It is a large population with a profound potential to influence individuals and society, for better and for worse. Examinations of how the goal orientations of highly able individuals are shaped by their achievement contexts may lead to a better understanding of how to design influential institutions and organizations to bring about optimal achievement-related outcomes.

Conclusion

The present research highlights the importance of understanding not only the temporally proximal and distal influence of goal structures on related contingencies of self-worth, but also their potential role as psychological processes through which goal orientations can be shaped. Because goal orientations comprise a host of beliefs regarding competence and achievement, they can be influenced by multiple sources. Understanding which components of goal orientations to emphasize (and which to de-emphasize) in achievement contexts will be essential to the design of work and learning environments and the effectiveness with which goals are pursued.

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