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RUNNING HEAD: Competitiveness

Trait and perceived environmental competitiveness in achievement situations

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## Abstract

**Objective:** Trait and perceived environmental competitiveness are typically studied separately, but they undoubtedly have a joint influence on goal pursuit and behavior in achievement situations. The present research was designed to study them together. We tested the relation between trait and perceived environmental competitiveness, and tested these variables as separate and sequential predictors of both performance-based goals and performance attainment. **Methods:** In Studies 1a (n=387) and 1b (n=322), we assessed participants' trait and perceived environmental competitiveness, as well as third variable candidates. In Study 2 (n=434), we sought to replicate and extend Study 1 by adding reports of performance-based goal pursuit. In Study 3 (n=403), we sought to replicate and extend Study 2 by adding real-world performance attainment. The studies focused on both the classroom and the workplace. **Results:** Trait and perceived environmental competitiveness were shown to be positively related, and were shown to positively predict separate variance in performance-approach and performance-avoidance goal pursuit. Perceived environmental competitiveness and performance-based goal pursuit were shown to be sequential mediators of the indirect relation between trait competitiveness and performance attainment. **Conclusions:** These studies highlight the importance of attending to the interplay of the person and the (perceived) situation in analyses of competitive striving.

**Keywords:** competitiveness, trait, perceived environmental, performance-approach goals, performance-avoidance goals

In interpersonal competition, success is defined in terms of how one person does relative to another person or persons (Deutsch, 1949). People vary in the degree to which they desire to compete with others across time and situations – this is *trait competitiveness*. People also vary in the degree to which they view situations and the people within them as competitive – this is *perceived environmental competitiveness*. Both of these conceptualizations of competitiveness are commonly studied (Murayama & Elliot, 2012), but they are typically studied separately. In the present research, we study them together.

Three foci guide the present research. First, we investigate the link between trait competitiveness and perceived environmental competitiveness, anticipating a positive relation between individuals' own competitive desires and the competitiveness they perceive in the environment. Second, we investigate trait and perceived environmental competitiveness as separate and sequential predictors of achievement goal pursuit. Third, we investigate trait and perceived environmental competitiveness as separate and sequential predictors of performance attainment through achievement goal pursuit. By studying trait and perceived environmental competitiveness together, we hope to acquire a deeper and broader understanding of competitive processes and their implications in achievement contexts.

### **Trait competitiveness and perceived environmental competitiveness**

There is a long history in scientific psychology of theorists positing a positive correlation between one's own thoughts, feelings, and behavioral tendencies, and the thoughts, feelings, and behavioral tendencies of others (Freud, 1915/1953; Allport, 1924; for reviews, see Holmes, 1968; Krueger, 2007). The presumed reason for such self-other correlations is social projection – inferring that others think, feel, and behave as we do (Krueger, 2000). Social projection has been studied under a variety of different labels, including false consensus, egocentrism, self-anchoring, and assumed similarity (Alicke, Dunning, & Krueger, 1995; Cadinu & Rothbart, 1996; Cronbach & Meehl, 1955; Eply,

Keyser, Van Boven, & Gilovich, 2004; Ross, Greene, & House, 1977). It has been shown to occur with regard to states, traits, attitudes, beliefs, preferences, behaviors, and demographic characteristics, and with individuals (familiar and unfamiliar) and groups (ingroups and outgroups) as the target (for reviews, see Mullen et al., 1985; Krueger, 2000). In addition to social projection, various forms of self-stereotyping, in which individuals respond or infer things about themselves on the basis of their understanding of others, can also contribute to positive self-other correlations (Ames, 2004; Bazinger & Kühberger, 2012; van Veelen, Otten, Cadinu, & Hansen, 2016).

Competitiveness has been examined in some existing research on positive self-other correlations. This research may be divided into two types. First, and most prevalent, is experiments testing the link between players' own behavior or preferences to compete in a game (e.g., Prisoner's Dilemma, Dictator, Decomposed) and players' expectations of other players' behavior or preferences. Data from such experiments clearly show a positive correlation between one's own and one's expectations of others' competitiveness (Ames, Weber, & Zou, 2012; Askoy & Weesie, 2012; Kelley & Stahelski, 1970; Kuhlman & Wimberly, 1976; Iedema & Poppe, 1999; Miller & Holmes, 1975; Schlenker & Goldman, 1978; see also Kawada, Oettingen, Gollwitzer, & Bargh, 2004; cf. Maki & McClintock, 1983). These experiments are informative, but limited in that they focus on game-specific behavior or preferences, they are situated in an artificial laboratory context, and they assess competitiveness in relative (e.g., versus cooperativeness) and usually categorical terms.

Second, and less prevalent (but more relevant), is studies examining the link between one's dispositional competitiveness and one's perception of the competitiveness of others or of a particular environmental context. In Ross, Green, and House's (1977) classic work on the false consensus effect, participants categorized themselves as competitive or not competitive, and then estimated the percentage of college students in general within each of these

categories. Descriptively, individuals who put themselves in the competitive category were more likely to report that their fellow college students fit that category, although the trend did not reach statistical significance (possibly due to the use of a single item and a crude categorical approach). In a few articles in the industrial-organizational literature, trait competitiveness and perceived environmental competitiveness in a job context have been included, as well as the zero-order correlation among the measures (Brown, Cron, & Slocum, 1998; Fletcher, Major, & Davis, 2008; Fletcher & Nusbaum, 2010; Schrock, Hughes, Fu, Richards, & Jones, 2014). Although the correlation between these two constructs was not the main focus of any of these studies, the association was positive and significant in each study. Given the peripheral nature of the correlation in these studies, none of them controlled for plausible third variables; another limitation is that all of these studies were conducted within a job context.

In the present research, we examine the relation between trait competitiveness and perceived environmental competitiveness in both the classroom and the workplace. Trait competitiveness is a dispositional construct, whereas perceived environmental competitiveness is a situation-specific construct that emerges upon encountering a particular context and the people within it. Persons bring trait competitiveness with them to each new situation that they encounter. This trait competitiveness is presumed to guide their perception of that situation, making competitive evaluative structures and competitive characteristics of coworkers particularly salient and increasing the likelihood that ambiguous situations will be interpreted as competitive. As such, trait competitiveness and perceived environmental competitiveness are predicted to be positively related. Unlike the prior studies from the industrial-organizational literature, our focus is on perceptions of school contexts, as well as work contexts, and given the self-report nature of this aspect of the research, we control for potential third variables that could produce a spurious positive correlation between trait

competitiveness and perceived environmental competitiveness.

### **Trait and perceived environmental competitiveness as predictors of performance-based goals**

Motivation encompasses the energization and direction of behavior, and a full account of motivation needs to account for both (Elliot, 2006). In achievement settings, trait competitiveness and perceived environmental competitiveness are similar in that they each make social comparison salient and activate a general concern about one's own competence relative to that of others (Ames, 1992; Festinger, 1954; Tesser, 1988). These concerns energize individuals and orient them to normative comparison, but they don't provide specific guidance on how to behave.

Achievement goals are competence-relevant aims that individuals adopt and pursue in achievement situations. These goals serve the directional function of channeling competitive concerns toward more concrete competence-relevant possibilities (Elliot, 1999). Competitive concerns prompt goals focused on normative standards, and these other-focused goals may be directed toward success (i.e. performance-approach goals) or away from failure (i.e. performance-avoidance goals). In short, individuals are posited to regulate their trait- or perception-based competitive concerns through the adoption and pursuit of performance-approach and performance-avoidance goals. Several studies have provided empirical support for links between trait competitiveness and both performance-approach and performance-avoidance goals (Baranick, Barron, & Finney, 2007; 2010; Elliot, Kobeisy, Murayama et al., 2016; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Murayama & Elliot, 2012; Pastor, Barron, Miller, & Davis, 2007; Tanaka & Yamauchi, 2004), and between perceived environmental competitiveness and both performance-approach and performance-avoidance goals (Jones, Davis, & Thomas, in press; Koul, Roy, & Lerdpornkulrat, 2012; Lochbaum, Jean-Noel, Pinar, & Gilson, in press; Midgley & Urdan, 2001; Murayama &



Elliot, 2012; Papaioannou, Ampatzoglou, Kalogiannis, & Sagovits, 2008; Shih, 2007; Wolters, 2004; cf. Bong, 2005). However, no study to date has examined trait and perceived environmental competitiveness together as predictors of performance-based goals to test if they account for separate variance.

Above we emphasized the similarities between trait and perceived environmental competitiveness (e.g., both are grounded in social comparison, both evoke normative concerns), but these constructs are also different in important ways. Trait competitiveness is a general disposition that encompasses affective, cognitive, and behavioral tendencies regarding normative success, whereas perceived environmental competitiveness is a situation-specific belief that represents a cognitive appraisal about normative success. Furthermore, trait competitiveness has an internal point of reference – me desiring to succeed versus others, whereas perceived environmental competitiveness has an external point of reference – others desiring to succeed versus me. As such, we posit that trait competitiveness and perceived environmental competitiveness will be *separate* positive predictors of performance-approach and performance-avoidance goals. Given that individuals bring trait competitiveness to the achievement situations that they perceive, we additionally posit a *sequential* pattern whereby trait competitiveness positively predicts perceived environmental competitiveness, which then positively predicts performance-approach and performance-avoidance goal pursuit.

### **The link to performance attainment**

If, as we anticipate, trait and perceived environmental competition predict goal pursuit, the next step is to link these two aspects of competition to performance attainment via this goal pursuit. Here we rely on the recently proffered opposing processes model of competition for guidance (Murayama & Elliot, 2012). This model posits that competition has a null (or negligible) direct relation with performance, but instead has an indirect relation through achievement goals. Competition, be it trait or perceived environmental, is posited to prompt

the pursuit of performance-approach and performance-avoidance goals, and these goals are posited to have an opposing influence on performance such that they cancel each other out and produce the null direct relation. That is, the general energization of trait- or perception-based competitive concerns have a positive or negative influence on performance outcomes depending on whether individuals regulate these concerns by pursuing performance-approach goals (positive influence) or performance-avoidance goals (negative influence; for meta-analytic work on these goal-performance links, see Baranik, Stanley, Bynum, & Lance, 2010; Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Cellar et al., 2011; Huang, 2012; Hulleman, Schrage, Bodman, & Harackiewicz, 2010; Lochbaum & Gottardy, 2015; Murayama & Elliot, 2012; Van Yperen, Blaga, & Postmes, 2014; 2015; Withwein, Sparfeldt, Pinquart, Wegerer, & Steinmayr, 2013).

This opposing processes model is examined in the present work in a unique way, with the indirect relation of trait competitiveness and perceived environmental competitiveness tested simultaneously. Neither trait nor perceived environmental competitiveness are posited to have a direct influence on performance, rather both aspects of competitiveness are posited to positively predict performance-approach and performance-avoidance goals, and these goals are then posited to proximally predict performance; performance-approach goals are predicted to have a positive influence on performance and performance-avoidance goals are predicted to have a negative influence on performance.

### **Overview of the Present Research**

The present research is comprised of three studies. Study 1 encompasses two sub-studies – 1a and 1b – that focused on the anticipated positive relation between trait competitiveness and perceived environmental competitiveness in a classroom context; possible third variables were attended to in this study. Study 2 sought to replicate Study 1 in a job context, and to extend it by including links to performance-approach and performance-

avoidance goal pursuit. Study 3 sought to replicate Study 2 in a classroom context and to extend it by including the link to performance attainment. Conducting our research in both classroom and work contexts afforded a test of the domain-generalizability of the focal relations. Data in line with our hypotheses would be valuable, as they would both highlight the functional difference between the two focal competitiveness constructs, and provide a richer conceptual analysis of the nature of competitive striving than that currently available.

### **Study 1**

Study 1 tested the predicted positive relation between trait competitiveness and perceived environmental competitiveness, and considered several third variable explanations. Study 1a sought to establish the focal relation, and to do so while controlling for two indicators of social desirability, and one indicator of prior competence (cumulative GPA).

Study 1b sought to replicate Study 1a with multiple indicators of trait competitiveness, and to do so while controlling for a different indicator of social desirability and a different indicator of competence (general perceived competence). Social desirability could lead participants to provide a high score on any positively valenced variable, and those with a high GPA or high perceived competence could put a high value on any form of competitiveness and provide a high score on any competitiveness-relevant variable accordingly; either or both of these possibilities could produce a spurious positive correlation between trait and perceived environmental competitiveness. Both Study 1a and 1b were conducted within a classroom context.

#### **Study 1a**

##### **Method**

**Participants and procedure.** Three hundred and eighty-seven (268 female, 119 male) U.S. undergraduates in a psychology class completed the study for extra course credit. This sample size represents the maximum number of participants that could be recruited during the

designated data collection period. The mean age of participants was 19.29 years ( $SD = 1.42$ ); ethnicity was: 59% Caucasian, 5% African American, 26% Asian, 6% Hispanic, 4% unspecified. Participants completed demographic information during the first class session, trait competitiveness and perceived environmental competitiveness measures online later during the first week of the semester, and social desirability measures online during the second week of the semester. Prior cumulative GPA was obtained from school records.

The data for this study, as well as for Studies 1b and 3, were collected in the context of larger projects<sup>1</sup>; none of the findings from the research herein have been presented in any prior work. In this and all subsequent studies in this research, no manipulations were used, no data exclusions were used, all variables analyzed are reported, and all data were collected before any analyses were conducted.

**Measures.** Trait competitiveness was assessed with Spence and Helmreich's (1983) five item competitiveness subscale from the Work and Family Orientation (WOFO) measure (e.g., "I enjoy working in situations involving competition with others"). Perceived environmental competitiveness was assessed with Murayama and Elliot's (2012) five item measure (e.g., "In this class, it seems that students are competing with each other"). Participants responded to both measures using a 1 (*strongly disagree*) to 5 (*strongly agree*) scale; their responses were averaged to create the trait and a perceived environmental competitiveness variables.

Two different measures of social desirability were used. One was Paulhus's (1991) twenty item self-deceptive enhancement (SDE) scale from the Balanced Inventory of Desirable Responding (e.g., "My first impressions of people usually turn out to be right"). Participants responded on a 1 (*not true*) to 7 (*very true*) scale, and received one point for each extreme (i.e. 6-7) response; the sum of these points was totaled for the SDE measure. The other was Anusic, Schimmack, Pinkus, and Lockwood's (2009) four item measure of self-

evaluative bias. Participants provided self-ratings on four attributes (e.g., intelligence, facial attractiveness, athletic ability, trivia knowledge) on a 1 (*very bad*) to 7 (*very good*) scale and these ratings were averaged for the self-evaluative bias measure. Means, standard deviations, reliabilities, and zero-order correlations are presented in Table 1.

## Results

In this and all subsequent studies in this research, preliminary analyses using sex as a control variable were conducted. Sex effects emerged in some studies, so this variable was retained in all analyses in all studies for the sake of consistency.<sup>2</sup> In each study, the full information maximum likelihood method was used for analyses to avoid loss of information due to missing data (Enders, 2006). All data were analyzed using the lavaan package (Rosseel, 2012) for R (R core team, 2014).

Regressing perceived environmental competitiveness on trait competitiveness revealed a significant positive relation between these variables,  $\beta = .28$ ,  $z = 5.09$ ,  $p < .001$ . This relation remained significant in regression analyses controlling (separately) for self-deceptive enhancement,  $\beta = .28$ ,  $z = 5.06$ ,  $p < .001$ , self-evaluative bias,  $\beta = .29$ ,  $z = 5.29$ ,  $p < .001$ , or GPA,  $\beta = .28$ ,  $z = 5.10$ ,  $p < .001$ . Among these control variables, only self-deceptive enhancement was significantly (negatively) related to perceived environmental competitiveness in the class,  $\beta = -.16$ ,  $z = -3.22$ ,  $p = .001$ . Sex had no effect in these analyses (all  $ps > .59$ ).

## Study 1b

### Method

**Participants and procedure.** Three hundred and twenty-two students (118 male, 200 female, 4 missing values) in a psychology class in the U.S. completed the study for extra credit. This sample size represents the maximum number of participants that could be recruited during the designated data collection period. The mean age of participants was 19.39

( $SD = 1.95$ ); ethnicity was 57% Caucasian, 3% African American, 23% Asian, 7% Hispanic, 10% unspecified. Participants completed demographic information online after the first class session, and completed all other measures online during the third week of the semester.

**Measures.** The same measures used in Study 1a for trait competitiveness and perceived environmental competitiveness were used in this study. A second measure of trait competitiveness was also used, Houston, Harris, McIntire, and Francis' (2002) nine item enjoyment of competition subscale from the Revised Competitiveness Index (e.g., "I enjoy competing against an opponent"). Participants responded to all of the above measures on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale; their responses were averaged to create the trait and a perceived environmental competitiveness variables. The correlation between the two trait competitiveness measures was  $r = .71, p < .001$ .

In this study, participants' social desirability was assessed with the thirty-three item Marlowe-Crowe Social Desirability scale (Crowe & Marlowe, 1960). Participants responded true or false (e.g., "I never hesitate to go out of my way to help someone in trouble"), and received one point for each socially desirable response; the sum of these points was totaled for the social desirability measure. Another control variable was general perceived competence, assessed using O'Brien and Epstein' (1988) nine item Multidimensional Self-Esteem Inventory (e.g., "I am usually able to learn new things very quickly"). Participants responded on a 1 (*strongly disagree/very seldom*) to 5 (*strongly agree/very often*) scale; their responses were averaged to create the general perceived competence variable. Means, standard deviations, reliabilities, and zero-order correlations are presented in Table 2.

## Results

Regressing perceived environmental competitiveness on the Spence and Helmreich (1983) trait competitiveness measure revealed a significant positive relation between these variables,  $\beta = .34, z = 7.01, p < .001$ . This relation remained significant in regression analyses

controlling (separately) for social desirability,  $\beta = .32$ ,  $z = 6.00$ ,  $p < .001$ , or general perceived competence,  $\beta = .34$ ,  $z = 6.76$ ,  $p < .001$ . Neither of these control variables, nor sex, significantly predicted perceived environmental competitiveness (all  $ps > .26$ ).

Regressing perceived environmental competitiveness on the Houston et al. (2002) trait competitiveness measure also revealed a significant positive relation between these variables,  $\beta = .24$ ,  $z = 4.75$ ,  $p < .001$ . This relation remained significant in regression analyses controlling (separately) for social desirability,  $\beta = .23$ ,  $z = 4.39$ ,  $p < .001$ , or general perceived competence,  $\beta = .24$ ,  $z = 4.30$ ,  $p < .001$ . Among these control variables, only social desirability was significantly (negatively) related to perceived environmental competitiveness,  $\beta = -.13$ ,  $z = -2.41$ ,  $p = .016$  (all other  $ps > .64$ ).

## Study 2

Study 2 sought to replicate and extend Study 1. First, we tested the predicted positive relation between trait competitiveness and perceived environmental competitiveness examined in Study 1, but this time in a job context rather than a classroom context. Second, we tested trait and perceived environmental competitiveness as separate and sequential predictors of performance-based goals. We predicted that both trait and perceived environmental competitiveness would positively predict independent variance in performance-approach and performance-avoidance goal pursuit and, furthermore, that trait competitiveness would positively predict perceived environmental competitiveness, which would then positively predict the two performance-based goals.

## Method

**Participants and procedure.** Four hundred and thirty-four individuals (219 male, 214 female, 1 missing value) completed the study on Amazon's Mechanical Turk (MTurk) for modest monetary compensation (.20 USD). An *a priori* power analysis revealed that 395 participants were needed to detect small-sized effects ( $f^2 = .02$ ) in a multiple linear regression

model with power of .80; we made sure to meet or exceed this target sample size before stopping data collection. The mean age of participants was 32.33 ( $SD = 9.89$ ); ethnicity was: 80% Caucasian, 5% African American, 9% Asian, 4% Hispanic, 2% unspecified. Participation was restricted to persons in the U.S. with fewer than 1,000 MTurk tasks completed and an approval rating of 95% or higher. Individuals needed to currently have a job to participate; participants were employed in their job for a mean of 5.88 years ( $SD = 6.15$ ).

Participants followed a web link through MTurk to access the study. They completed a trait competitiveness measure, a job-specific perceived environmental competitiveness measure, a job-specific achievement goal measure, and demographic information.

**Measures.** The same WOFO trait competitiveness measure used in Studies 1a and 1b was used in this study. The same perceived environmental competitiveness measure used in Studies 1a and 1b was used, but the focus was shifted to the job context (e.g., “In my job, it seems that people are competing with each other”). Achievement goals were assessed with Elliot and Murayama’s (2008) Achievement Goal Questionnaire-Revised (AGQ-R); the focus was on the job context. Specifically, performance-approach goals (e.g., “In my job, my goal is to perform better than the others”) and performance-avoidance goals (e.g., “In my job, my goal is to avoid performing poorly compared to others”) were assessed with three items each using a 1 (not at all true for me) to 5 (extremely true for me) scale. Participants’ responses were averaged to create the performance-approach and performance-avoidance goal variables. Means, standard deviations, reliabilities, and zero-order correlations are presented in Table 3.

## Results

We tested the hypothesized model (see Figure 1) using path analysis with observed variables. Model fit was not relevant, because the hypothesized model was fully saturated. In this and the subsequent study, correlated errors were specified for performance-approach and performance-avoidance goals, as recommended in multiple mediator models (Preacher &



Hayes, 2008; see Murayama & Elliot, 2012). As seen in the figure, the analysis revealed that trait competitiveness was a positive predictor of perceived environmental competitiveness ( $\beta = .28, z = 6.05, p < .001$ ), which in turn was a positive predictor of both performance-approach goals ( $\beta = .36, z = 8.70, p < .001$ ) and performance-avoidance goals ( $\beta = .23, z = 4.71, p < .001$ ). Trait competitiveness also remained a positive predictor of performance-approach goals ( $\beta = .34, z = 8.03, p < .001$ ) and performance-avoidance goals ( $\beta = .11, z = 2.29, p = .022$ ).

Next we tested the indirect effect of trait competitiveness on each performance-based goal via perceived environmental competitiveness using a bootstrap procedure (on 5,000 samples). The indirect effect of trait competitiveness on performance-approach goals through perceived environmental competitiveness was significant,  $B = 0.14, 95\% \text{ CI } [0.08, 0.20]$ , as was the same indirect effect on performance-avoidance goals,  $B = 0.09, 95\% \text{ CI } [0.04, 0.15]$ .

Sex was significantly related to perceived environmental competitiveness,  $\beta = .09, z = -1.98, p = .048$ ; women ( $M = 2.93, SE = .07$ ) perceived less environmental competitiveness than men ( $M = 3.12, SE = .07$ ). Sex was also marginally significantly related to performance-approach goals,  $\beta = -.08, z = -1.86, p = .063$ , but not to performance-avoidance goals ( $p > .72$ ); women ( $M = 3.57, SE = .06$ ) tended to report more performance-approach goal pursuit than men ( $M = 3.42, SE = .06$ ).

### Study 3

Study 3 sought to replicate and extend Study 2. First, we tested trait and perceived environmental competitiveness as separate and sequential predictors of performance-approach and performance-avoidance goals, as in Study 2, but this time in a classroom context rather than a job context. Second, we included performance attainment as an outcome measure and tested the full indirect path from trait competitiveness to perceived environmental competitiveness to the two performance-based goals to performance attainment, with

performance-approach goals positively and performance-avoidance goals negatively predicting performance.

### **Method**

**Participants.** Four hundred and three (140 male, 260 female, 3 missing values) U.S. undergraduates in a psychology class in the U.S. completed the study for extra course credit. This sample size represents the maximum number of participants that could be recruited during the designated data collection period. The mean age of participants was 19.41 ( $SD = 1.36$ ); ethnicity was: 56% Caucasian, 7% African American, 25% Asian, 5% Hispanic, 7% unspecified.

Participants completed demographic information online during the first day of class, the trait competitiveness and perceived environmental competitiveness measures online during the second week of the semester, and a class-specific achievement goal measure online during the third week of the semester. The course exams were given on the sixth, twelfth, and sixteenth weeks of the semester; exam performance data were acquired from the course professor.

**Measures.** The same measures used in Study 1a for trait competitiveness and perceived environmental competitiveness were used in this study. Achievement goals were assessed with the AGQ-R used in Study 2, but the focus was shifted to the classroom context. Specifically, performance-approach goals (e.g., “My goal is to perform better than the other students”) and performance-avoidance goals (e.g., “My goal is to avoid performing poorly compared to others”) were assessed with three items each using a 1 (not at all true for me) to 7 (extremely true for me) scale. A measure of exam performance was created by summing the scores of each of three 100 point course exams; the exams were comprised of multiple choice, fill in the blank, and short answer questions. Means, standard deviations, reliabilities, and zero-order correlations are presented in Table 4.

## Results

We tested the hypothesized model (see Figure 2) using path analysis with observed variables. The model was a good fit to the data,  $\chi^2(2) = 3.87, p = .144, CFI = .994, TLI = .960, RMSEA = .048$ . As seen in Figure 2, the analysis revealed that trait competitiveness was a positive predictor of perceived environmental competitiveness ( $\beta = .26, z = 5.26, p < .001$ ), which in turn was a positive predictor of both performance-approach goals (marginal,  $\beta = .09, z = 1.91, p = .056$ ) and performance-avoidance goals ( $\beta = .18, z = 3.62, p = .001$ ). Trait competitiveness also remained a positive predictor of performance-approach goals ( $\beta = .48, z = 10.77, p < .001$ ) and performance-avoidance goals ( $\beta = .20, z = 3.87, p < .001$ ). The two performance-based goals were, in turn, predictors of exam performance: performance-approach goals were a positive predictor ( $\beta = .13, z = 2.04, p = .041$ ), whereas performance-avoidance goals were a negative predictor ( $\beta = -.13, z = -2.13, p = .033$ ).

Next, we tested the indirect effect of trait competitiveness on each performance-based goal via perceived environmental competitiveness using a bootstrap procedure (on 5,000 samples). The indirect effect of trait competitiveness on performance-approach goals through perceived environmental competitiveness was significant,  $B = 0.03, 95\% CI [0.00, 0.07]$ , as was the same indirect effect on performance-avoidance goals,  $B = 0.09, 95\% CI [0.03, 0.15]$ . Then, we tested the indirect effect of trait competitiveness and perceived environmental competitiveness on exam performance via the two achievement goals (i.e. the opposing processes model of competition). The results indicated that the indirect effect of trait competitiveness on exam performance was mediated by both performance-approach goals (positively),  $B = 2.97, 95\% CI [0.35, 5.81]$ , and performance-avoidance goals (negatively),  $B = -1.24, 95\% CI [-2.76, -0.28]$ . The results also indicated that the indirect effect of perceived environmental competitiveness on exam performance was mediated by both performance-approach goals (positively),  $B = 0.50, 95\% CI [0.01, 1.50]$ , and performance-avoidance goals

(negatively),  $B = -1.09$ , 95% CI [-2.59, -0.20]. Finally, we tested the path linking trait competitiveness to exam performance through perceived environmental competitiveness and the performance-based goals. The results indicated that this indirect effect was significant via performance-approach goals (positive),  $B = 0.14$ , 95% CI [0.00, 0.45] and performance-avoidance goals (negative),  $B = -0.30$ , 95% CI [-0.79, -0.07]<sup>3</sup>.

Sex was significantly related to performance-approach goals,  $\beta = -.20$ ,  $z = -4.61$ ,  $p < .001$ , but not to performance-avoidance goals ( $p > .10$ ); women ( $M = 5.49$ ,  $SE = .07$ ) reported more performance-approach goals than men ( $M = 4.98$ ,  $SE = .09$ ). Sex was also significantly related to exam performance,  $\beta = -.17$ ,  $z = -3.34$ ,  $p = .001$ ; women ( $M = 240.14$ ,  $SE = 2.54$ ) scored higher than men ( $M = 226.12$ ,  $SE = 3.45$ ). Sex was not related to perceived environmental competitiveness ( $p > .19$ ).

### **General Discussion**

Interpersonal competition can be conceptualized as a characteristic of the person (trait competitiveness) and as a characteristic of the subjective situation (perceived environmental competitiveness). These conceptualizations are usually studied separately, but in the present research we investigated them together. Three primary findings were observed. First, we observed a positive relation between trait competitiveness and perceived environmental competitiveness, both in the classroom and in the workplace, and both alone and while controlling for various third variable possibilities. Second, we observed that trait competitiveness and perceived environmental competitiveness were unique positive predictors of performance-approach and performance-avoidance goals, and that trait competitiveness exerted its influence on these performance-based goals in part via perceived environmental competitiveness; these findings were observed in both the classroom and the workplace. Third, we observed that trait and perceived environmental competitiveness had both separate and sequential influences on performance attainment in the classroom through

the opposing processes of performance-approach and performance-avoidance goal pursuit.

Given that trait competitiveness is a dispositional characteristic and, therefore, presumed to be consistent across time and situations, the most straightforward way to interpret the positive correlation between trait competitiveness and perceived environmental competitiveness is in terms of social projection. That is, highly competitive individuals are thought to view the achievement situations that they enter through the lens of their own competitive desires, and to construe more competitiveness in situations than the situations themselves actually warrant. This social projection is important, because it is likely to create a competitive ethos in the environment through evocative dynamic interactionism (Buss, 1987). For example, a highly competitive person may enter an achievement situation, construe it as highly competitive, and behave accordingly, which may lead others in that situation to respond with competitive behavior in reciprocal fashion. In this way, competitiveness projection can be self-fulfilling, in that it can create a competitive ethos in the classroom, workplace, or ballfield that would not otherwise be present.

Trait competitiveness is a particular type of trait – a *motivational* trait representing the general appetitive desire for competence relative to others. As such, our work fits nicely within the nascent, but intriguing body of work on *motivation projection*. This work has focused primarily on the projection of situation-specific goals (Ahn, Oettingen, & Gollwitzer, 2015; Berthold, Mummendey, Kessler, Luecke, & Schubert, 2012; Kawada et al., 2004; Maner et al., 2005). However, Woltin and Yzerbyt (2015) recently documented the projection of general motivational orientations, namely promotion and prevention regulatory foci. Our work suggests that this projection of general motivational orientations extends beyond dispositional regulatory foci to dispositional competitiveness.

Another key finding in our research is that trait and perceived environmental competitiveness are separate positive predictors of performance-approach and performance-

avoidance goals. Research on the antecedents of achievement goals has tended to emphasize *either* person-based (Baranik et al., 2010; Elliot & Church, 1997; Tanaka & Yamuchi, 2001) *or* environmentally-based (Ames, 1992; Maehr & Midgley, 1996; Meece, Anderman, & Anderman, 2006) factors. The present results nicely illustrate that achievement goal pursuit is a *joint* function of both the person and the (perceived) situation (see also Elliot, 1999), and that both need consideration for a full account of achievement goal pursuit. Furthermore, our results not only show the *separate* predictive utility of trait and perceived environmental competitiveness, but also suggest their *sequential* predictive utility – perceived environmental competitiveness partially explained the indirect relation between trait competitiveness and each of the performance-based goals. Importantly, the relation between trait competitiveness and each performance-based goal remained significant with perceived environmental competitiveness accounted for, indicating that other variables are operative in this relation as well. Likely candidates include challenge and threat construals or responses (Elliot & Reis, 2003; Jamieson, in press) and emotions such as eagerness and anxiety (Carver & Scheier, in press; Elliot & McGregor, 1999); challenge and eagerness would likely account for the link to performance-approach goals, whereas threat and anxiety would likely account for the link to performance-avoidance goals.

The final key finding in our research is that the separate and sequential predictive utility of trait and perceived environmental competitiveness influences downstream performance attainment through performance-based goal pursuit. This aspect of our findings nicely links participants' self-reports of competitiveness and goal pursuit to an objective indicator of achievement in an actual achievement setting. It also enriches the recently proffered opposing processes model of competition (Murayama & Elliot, 2012) by showing that the indirect influence of both trait and perceived environmental competitiveness runs through performance-approach and performance-avoidance goals, which are positive and negative

predictors of performance, respectively.

A critical “take away” message from this (enriched) opposing processes model is that competition, whether it be operationalized as trait competitiveness or perceived environmental competitiveness, can have positive implications for performance if performance-approach goals are pursued, but can have negative implications for performance if performance-avoidance goals are pursued. As such, a critical question for subsequent research is to identify moderators of the link between (trait and perceived environmental) competitiveness and each form of goal pursuit. Perceived competence is one promising candidate. It seems likely that for those high in trait or perceived environmental competitiveness, high perceived competence would prompt the pursuit of performance-approach goals, and low perceived competence would prompt the pursuit of performance-avoidance goals. Beliefs about failure is another promising candidate. It seems likely that for those high in trait or perceived environmental competitiveness, a belief that failure is simply an indicator of what one needs to work on would prompt the pursuit performance-approach goals, and a belief that failure is an immutable indicator of incompetence would prompt the pursuit of performance-avoidance goals. These moderator questions are of both theoretical and practical importance, placing them high on the research agenda.

Several other promising avenues for future research may also be identified. First, we focused on the form of trait competitiveness most commonly studied in the literature – individual differences in the desire for interpersonal normative competence. Other forms of trait competitiveness may also be considered in conjunction with perceived environmental competitiveness, such as intraindividual competitiveness (Jury, Smeding, & Darnon, 2015), hypercompetitiveness (Ryckman, Hammer, Kaczor, & Gold, 1990), constructive competitiveness (Tjosvold, Johnson, & Johnson, Sun, 2003), and even related constructs such as social dominance orientation (Sidanius & Pratto, 2001). Furthermore, given research

showing that people tend to underestimate their use of social comparison information (Van Yperen & Leander, 2014), it would be interesting to examine whether people also tend to underestimate their level of these types of dispositional competitive tendencies. Second, we conceptualized and operationalized perceived environmental competitiveness in terms of both perceptions of other individuals (whether they are competitive or not) and perceptions of the structure of the achievement situation (whether it is designed to foster competition or not). It would be interesting to assess these components of perceived environmental competitiveness individually to see if they have the same or different links to trait competitiveness on the one hand and goal pursuit on the other. In addition, it would be valuable to investigate the extent to which people's perceptions of the competitive environments they encounter are grounded in actual (consensually reported) competitiveness, as well as their (projected) dispositional tendencies. Third, in classic research, McClelland and colleagues (McClelland, 1961; McClelland & Winter, 1969) extended the study of individual level psychological processes regarding achievement motivation to the country level (see also Cheung & Chan, 2012; Van de Vliert, Kluwer, & Lynn, 2000). It may be informative to emulate this innovative approach in future work, to see if the "self-other" correlation, the "separate and sequential" influences, and the "opposing processes" findings of the present research extend to the country level.

Limitations of our research may be identified and used as an impetus and guide for subsequent empirical work. One limitation is that our studies are correlational in nature, thereby precluding definitive causal and directional conclusions. Although we believe that social projection is the most straightforward way to interpret the observed positive correlation between trait and perceived environmental competitiveness, other processes such as self-stereotyping (Ames, 2004; Kruger, 2007) may be implicated as well. For example, one may observe another person being highly competitive in an achievement situation, may desire to be like that person, and may therefore rate oneself as high in trait competitiveness, thereby



contributing to the observed positive correlation. Such inferential processes would need to take place repeatedly over time and situations to eventuate in a true shift in dispositional competitiveness, and even in this instance trait and perceived environmental competitiveness would undoubtedly mutually influence each other (i.e. the perception would influence the trait, which in turn would influence the perception). Longitudinal research over an extended time period is needed to investigate this possibility of reciprocal causality. Another limitation of our research is that our studies were conducted in the U.S., so generality of the findings to other countries is unknown. Likewise, although our studies focused on two different types of achievement domains – the classroom and the workplace – the extent to which our findings would be the same or different in other achievement domains (e.g., the ballfield, hobbies) is not clear. Accordingly, subsequent research would do well to examine the generalizability of our findings to other countries and domains.

In conclusion, by studying trait and perceived environmental competitiveness together, we believe that we have acquired a deeper and broader understanding of competition and its implications in achievement contexts. Our work can be seen as emerging from and consistent with the rich Lewinian context of person x situation analyses of behavior (Lewin, 1935), with the person variable being a self-attributed dispositional characteristic and the situation variable being a perception of the social environment. We documented, in a way that Lewin would certainly have appreciated, both the interrelation between and the independent influence of a person variable and a situation variable (Lewin, 1946). Further deepening the Lewinian roots, we examined these person and situation relations with regard to achievement motivation, a content area central to Lewin's conceptual interest (Lewin, Dembo, Festinger, & Sears, 1944). Competitiveness is basic to human psychology and ubiquitous in contemporary society, and it is important to take into consideration the interplay of person- and situation-based factors in theoretical and empirical work on competitive striving.

## Footnotes

1. The following articles are relevant to this point about published data from larger projects: *Study 1a* (Elliot, Murayama, Kobeisy, & Lichtenfeld, 2015, Study 1), *Study 1b* (Elliot et al., 2015, Study 2; Weidman, Tracy, & Elliot, 2016, Study 2a), and *Study 3* (Elliot, Al-Dhobaiban, Murayama et al., 2016, Study 2b; Gocłowska et al., 2016, Study 2; Korn & Elliot, 2016, Study 3; Weidman et al., 2016, Study 2b).

2. When not accounting for sex, some results are a bit different in Study 3. The link between perceived environmental competitiveness and performance-approach goal endorsement was not significant,  $\beta = .07$ ,  $z = 1.58$ ,  $p = .12$ . Regarding indirect effects, that linking trait competitiveness to performance-approach goals by perceived environmental competitiveness was not significant,  $B = 0.03$ , 95% CI [-0.00, 0.07]. In addition, the indirect effect linking perceived environmental competitiveness to performance through performance-approach goals,  $B = 0.52$ , 95% CI [-0.09, 1.56], and that linking trait competitiveness to performance through perceived environmental competitiveness and performance-approach goals,  $B = 0.15$ , 95% CI [-0.01, 0.46] were not significant.

3. In addition to the main analyses conducted with achievement goal focused on the class as a whole, we conducted ancillary analyses with exam-specific achievement goals. These exam goals were measured at three different times (before each exam) and were averaged to compute a single measure.

As in the main analyses, we tested the hypothesized model using path analysis with observed variables. The model was a good fit to the data,  $\chi^2(2) = 3.86$ ,  $p = .145$ , CFI = .996, TLI = .969, RMSEA = .048. As in the main analyses, trait competitiveness was a positive predictor of perceived environmental competitiveness ( $\beta = .26$ ,  $z = 5.32$ ,  $p < .001$ ), which in turn was a positive predictor of both performance-approach goals (marginal,  $\beta = .08$ ,  $z = 1.74$ ,  $p = .081$ ) and performance-avoidance goals ( $\beta = .11$ ,  $z = 2.15$ ,  $p = .031$ ). Trait competitiveness

also remained a positive predictor of performance-approach goals ( $\beta = .42, z = 9.07, p < .001$ ) and performance-avoidance goals ( $\beta = .21, z = 4.13, p < .001$ ). The two performance-based goals were, in turn, predictors of exam performance: performance-approach goals were a positive predictor ( $\beta = .25, z = 3.67, p < .001$ ), whereas performance-avoidance goals were a negative predictor ( $\beta = -.24, z = -3.46, p < .001$ ).

Next, we tested the indirect effects using a bootstrap procedure (on 5,000 samples). The indirect effect of trait competitiveness through perceived environmental competitiveness was not significant for performance-approach goals,  $B = 0.03, 95\% \text{ CI } [-0.00, 0.06]$ , and was significant for performance-avoidance goals,  $B = 0.05, 95\% \text{ CI } [0.00, 0.10]$ . The indirect effect of trait competitiveness on exam performance was mediated by both performance-approach goals (positively),  $B = 5.30, 95\% \text{ CI } [2.54, 8.42]$ , and performance-avoidance goals (negatively),  $B = -2.47, 95\% \text{ CI } [-4.76, -0.97]$ . The indirect effect of perceived environmental competitiveness on exam performance was mediated by both performance-approach goals (positively),  $B = 0.96, 95\% \text{ CI } [.01, 2.48]$ , and performance-avoidance goals (negatively),  $B = -1.22, 95\% \text{ CI } [-2.87, -0.22]$ . Finally, the path linking trait competitiveness to exam performance through perceived environmental competitiveness and performance-based goals was significant via performance-approach goals (positive),  $B = 0.27, 95\% \text{ CI } [0.01, 0.75]$  and performance-avoidance goals (negative),  $B = -0.34, 95\% \text{ CI } [-0.88, -0.06]$ .

Sex was significantly related to performance-approach goals,  $\beta = -.17, z = -3.74, p < .001$ , and performance-avoidance goals,  $\beta = -.11, z = -2.27, p = .023$ ; women ( $M_{\text{PAP}} = 5.47, SE_{\text{PAP}} = .07; M_{\text{PAV}} = 5.09, SE_{\text{PAV}} = .09$ ) reported more performance-approach and performance-avoidance goals than men ( $M_{\text{PAP}} = 5.07, SE_{\text{PAP}} = .09; M_{\text{PAV}} = 4.77, SE_{\text{PAV}} = .12$ ). Sex was also significantly related to exam performance,  $\beta = -.17, z = -3.45, p = .001$ ; women ( $M = 240.23, SE = 2.51$ ) scored higher than men ( $M = 225.73, SE = 3.39$ ). Sex was not related to perceived environmental competitiveness ( $p > .19$ ).

When not accounting for sex, indirect effects, that linking trait competitiveness to performance-avoidance goals by perceived environmental competitiveness was not significant,  $B = 0.05$ , 95% CI [-0.00, 0.09]. In addition, the indirect effect linking perceived environmental competitiveness to exam performance through performance-approach goals,  $B = 0.90$ , 95% CI [-.27, 2.30] and that linking trait competitiveness to exam performance through perceived environmental competitiveness and performance-approach goals,  $B = 0.25$ , 95% CI [-0.06, 0.70] were not significant.

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Table 1

*Means, standard deviations, reliabilities, and zero-order correlations for Study 1a*

	$\alpha$	$M$	$SD$	1	2	3	4
1. Trait competitiveness	.81	3.56	.85	1			
2. Perceived environmental competitiveness	.86	2.82	.90	.28***	1		
3. Self-deceptive enhancement	.74	4.46	3.14	.02	-.16**	1	
4. Self-evaluative bias	.53	4.68	.88	.24***	.01	.31***	1
5. GPA	—	3.28	.54	-.00	-.06	-.13*	-.10*
6. Sex	—	—	—	.15**	.05	.12*	.20***

*Note:* GPA: Grade Point Average. Sex is coded -1 for female and +1 for male. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$



Table 2

*Means, standard deviations, reliabilities, and zero-order correlations for Study 1b*

	$\alpha$	$M$	$SD$	1	2	3	4
1. Trait competitiveness (WOFO)	.82	3.60	.83	1			
2. Perceived environmental competitiveness	.89	2.28	.97	.34***	1		
3. Trait competitiveness (RCI)	.92	3.33	.86	.71***	.24**	1	
5. Social desirability	.75	15.92	5.14	-.27**	-.15**	-.11*	1
5. General perceived competence	.85	3.49	.64	.19***	.10 <sup>t</sup>	.29***	.26**
6. Sex	—	—	—	.09	.03	.17**	.05

*Note:* Sex is coded - 1 for female and + 1 for male. WOFO = Work and Family Orientation; RCI = Relative Competitiveness Index. <sup>t</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 3

*Means, standard deviations, reliability, and zero-order correlations for Study 2*

	$\alpha$	$M$	$SD$	1	2	3	4
1. Trait competitiveness	.79	3.69	0.78	1			
2. Perceived environmental competitiveness	.89	3.03	1.06	.29***	1		
3. Performance-approach goals	.86	3.49	1.05	.43***	.45***	1	
4. Performance-avoidance goals	.91	3.90	1.13	.17**	.26***	.49***	1
5. Sex	—	—	—	.09 <sup>t</sup>	.11*	-.01	.02

*Note:* Sex is coded - 1 for female and + 1 for male. <sup>t</sup> $p < .10$ , \*  $p < .05$ , \*\*\*  $p < .001$

Table 4

*Means, standard deviations, reliabilities, and zero-order correlations for Study 3*

	$\alpha$	$M$	$SD$	1	2	3	4
1. Trait competitiveness	.83	3.51	.83	1			
2. Perceived environmental competitiveness	.87	2.37	.88	.27***	1		
3. Performance-approach goals	.86	5.31	1.23	.49***	.20**	1	
4. Performance-avoidance goals	.89	4.82	1.55	.24***	.23**	.56***	1
5. Exam performance	.85	234.85	40.88	.05	-.09 <sup>t</sup>	.08	-.05
6. Sex	—	—	—	.08	.09 <sup>t</sup>	-.16**	-.05

*Note:* Sex is coded -1 for female and + 1 for male. <sup>t</sup>  $p < .10$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

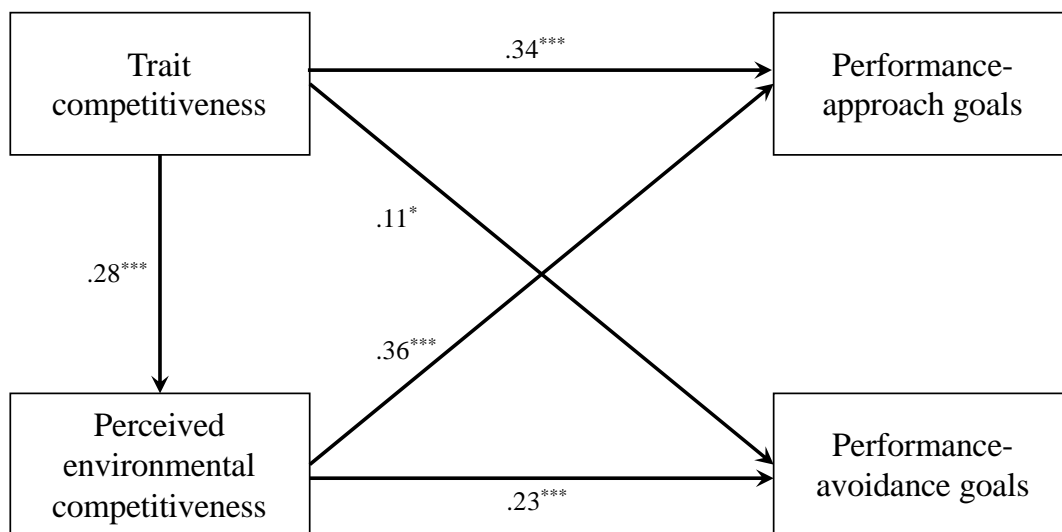


Figure 1. Path model for Study 2. \*  $p < .05$ , \*\*\*  $p < .001$ . Sex effects are excluded for presentation clarity.

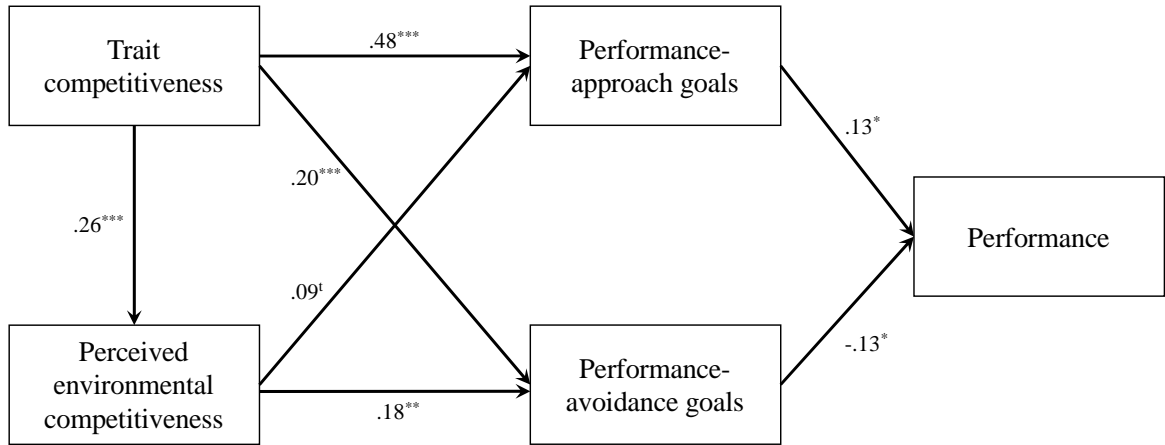


Figure 2. Path model for Study 3. <sup>t</sup>  $p = .056$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Sex effects are excluded for presentation clarity.