

The Competition–Performance Relation: A Meta-Analytic Review and Test of the Opposing Processes Model of Competition and Performance

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What is the relation between competition and performance? The present research addresses this important multidisciplinary question by conducting a meta-analysis of existing empirical work and by proposing a new conceptual model—the opposing processes model of competition and performance. This model was tested by conducting an additional meta-analysis and 3 new empirical studies. The first meta-analysis revealed that there is no noteworthy relation between competition and performance. The second meta-analysis showed, in accord with the opposing processes model, that the absence of a direct effect is the result of inconsistent mediation via achievement goals: Competition prompts performance-approach goals which, in turn, facilitate performance; and competition also prompts performance-avoidance goals which, in turn, undermine performance. These same direct and mediational findings were also observed in the 3 new empirical studies (using 3 different conceptualizations of competition and attending to numerous control variables). Our findings provide both interpretational clarity regarding past research and conceptual guidance regarding future research on the competition–performance relation.

Keywords: rivalry, attainment, productivity, goal structure, reward structure

Competition is highly prevalent in human societies across the globe (Eibl-Eibesfeldt, 1989; D. W. Johnson & Johnson, 1989; McClelland, 1961; cf. Bonta, 1997). In their vocational and avocational activities alike, individuals compete with one another in myriad ways. The present research addresses a basic and important question regarding competition, namely: What is the relation between competition and performance?

Not surprisingly, theorists have long been interested in whether competition helps or hinders performance. Surprisingly, little consensus has been reached on this issue over the years. Many theorists, such as Scottish philosopher and economist Adam Smith (1776/1937), have contended that competition enhances motivation and is beneficial for performance, thereby broadly embracing the Roman poet Ovid's dictum, "A horse never runs so fast as when he has other horses to catch up and outpace" (Ovid, *The Art of Love: Book III*, p. 173; Abra, 1993; Festinger, 1954; Locke, 1968; McClelland, Atkinson, Clark, & Lowell, 1953; Michaels, 1977; Parker, 1998; Schumpeter, 1934; Sherif, 1978; Shields & Bredemier, 2009; Smith, 1776/1937; Spencer, 1860/1969). Many other theorists, however, such as English philosopher and political theorist Thomas Hobbes (1651/1994), have espoused the opposite view, arguing that competition undermines motivation and is det-

rimental to performance; these theorists would be more likely to concur with the Hungarian composer Bella Bartok's quip, "Competitions are for horses, not artists" (Covington, 1992; Deci & Ryan, 1985; Deutsch, 1949; Forsyth, 1999; Frank & Cook, 1995; Johnson & Johnson, 2003; Kohn, 1986; Maehr & Midgley, 1991; Mead, 1937; Montagu, 1952; Ulrich, 2008). Both of these contrasting positions on the competition–performance relation continue to be espoused within broad and diverse areas of the contemporary psychological literature, including educational psychology, industrial–organizational psychology, social–personality psychology, and sport and exercise psychology (for reviews, see Sambolec, Kerr, & Messé, 2007; Tauer & Harackiewicz, 2004; Tjosvold, Johnson, Johnson, & Sun, 2006).

The present work has four foci. First, we conduct a meta-analysis of the existing empirical work on the competition–performance relation. Second, we propose a motivationally based model of competition and performance that is consistent with the extant research and that accommodates both of the contrasting positions on the competition–performance relation. Third, we conduct an additional meta-analysis (using meta-analytic structural equation modeling) that tests the central tenets of the proposed model. Fourth, we present three new empirical studies designed to further test the proposed model.

Existing Research on the Competition–Performance Relation: A Meta-Analysis

Competition may be conceptualized in three distinct ways (Brown, Cron, & Slocum, 1998): As a characteristic of the person (*trait competitiveness*), as a characteristic of the perceived situation (*perceived environmental competitiveness*), and as a characteristic of the actual situation (*structural competition*). All of these conceptualizations focus on interpersonal competition—that is,

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competition between individuals. Competition may involve other aspects, such as intrapersonal competition (i.e., competition with oneself) and intergroup competition (i.e., competition between groups). We limit our focus to interpersonal competition herein, because this aspect of competition has received the vast majority of the conceptual and empirical attention, especially with regard to the competition–performance relation. Furthermore, the other aspects of competition are quite distinct from interpersonal competition, emphasizing different types and levels of psychological processes (Albert, 1977; Elliot, Murayama, & Pekrun, 2011; Mehta, Wuehrmann, & Josephs, 2009; Tajfel & Turner, 1979), and researchers have compellingly argued that the different aspects of competition should be studied separately (see Tauer & Harackiewicz, 2004). In the following, we define each of the three conceptualizations of competition and describe the state of the literature for each with regard to systematic empirical reviews.

Trait competitiveness represents a dispositional preference to compete with others in achievement situations (Spence & Helmreich, 1983). Research on competitiveness as a personality trait has several different conceptual roots (e.g., Helmreich & Spence, 1978; Jenkins, Zyzanski, & Rosenman, 1979; Ryckman, Hammer, Kaczor, & Gold, 1990), and trait competitiveness has been an important personality construct in several different subdisciplines of psychology, especially educational psychology (e.g., Wigfield & Guthrie, 1997) and industrial–organizational psychology (e.g., Fletcher, Major, & Davis, 2008). The existing research has typically used the competitiveness subscale of the Work and Family Orientation (WOFO) scale (Helmreich & Spence, 1978) to assess trait competitiveness in a brief, face valid manner (sample item: “I feel that winning is important in both work and games”). Although research on trait competitiveness and performance has been conducted for over 30 years, not a single systematic empirical review (i.e., meta-analysis) has been published.

Perceived environmental competitiveness represents an individual’s cognitive construal of the competitive nature of the achievement setting. Deutsch (1949) and others (e.g., Kristof, 1996) have argued that participants’ subjective perceptions of the competitiveness of the achievement environment are critical to understanding competition effects. Perceived environmental competitiveness has been considered a particularly important construct in educational settings (Astin, 1968; Maehr & Midgley, 1996). However, most of the studies that have been conducted in the education domain have focused on perceived environmental competitiveness as a group-level variable (i.e., classroom or school), rather than an individual-level variable (i.e., student; e.g., Fraser & Fisher, 1982; Moos, 1979; Walberg & Anderson, 1972). This type of design allows researchers to investigate group-level effects of competition (“Do competitive groups do better than noncompetitive groups?”) but cannot address the focal question herein, which is “Do individual’s perceptions of the competitiveness of the environment influence their individual outcomes?” (see Robinson, 1950). A systematic empirical review of the link between perceived environmental competitiveness and performance has yet to be conducted. One article that appears to be relevant to this question at first glance (Haertel, Walberg, & Haertel, 1981) is not pertinent upon closer investigation, as the only studies that were examined with regard to perceived environmental competitiveness focus on group-level effects and composite, omnibus outcome variables that include

motivation, self-concept, and attendance in addition to performance.

Structural competition represents an actual situation in which two or more people vie for a mutually exclusive achievement outcome (Johnson & Johnson, 1989).¹ Traditionally, research on competition and performance has conceptualized competition in this manner. Unlike the aforementioned research on trait competitiveness and perceived environmental competition, several systematic empirical reviews have been conducted over the years on structural competition and performance. However, most of these reviews have been constrained in one of several ways as a function of the precise research question under consideration. Qin, Johnson, and Johnson (1995) and Stanne, Johnson, & Johnson (1999) compared the influence of competitive structures to cooperative structures on performance. This comparison is clearly of theoretical and practical importance, but it does not address structural competition *per se*. To test whether structural competition *per se* is beneficial or deleterious for performance, it is necessary to compare competitive structures to neutral controls (sometimes labeled “individualistic structures”). In addition, some meta-analyses have restricted their focus to a specific type of performance (e.g., motor performance; Stanne et al., 1999) or a specific age group (e.g., 12–15 years; Roseth, Johnson, & Johnson, 2008). The only peer reviewed meta-analysis that compares the influence of competitive structures to neutral controls on all types of performance across age groups was conducted by Johnson, Murayama, Johnson, Nelson, and Skon (1981).² These researchers found no significant difference between competitive structures and neutral controls on performance attainment. Given that 30 years have passed since this research was published, an update of this important work is clearly overdue.

In sum, despite long-term and widespread interest in the competition–performance relation, systematic evaluation of the existing empirical yield has been lacking. This is particularly the case with regard to trait competitiveness and perceived environmental competitiveness, although an updating of meta-analytic work on structural competitiveness is also clearly needed. In the following, we provide a meta-analytic review that focuses on the relation between each of the three conceptualizations of competi-

¹ Perceived environmental competitiveness and structural competition are related with regard to their influence on performance; in both instances, it is one’s perception of the situation that (ultimately) guides behavior (Ames & Archer, 1988; Deutsch, 1949; Lewin, 1935). Nevertheless, distinguishing between these two conceptualizations of competition has practical value, because researchers have investigated them with very different methodologies (i.e., research on perceived environmental competitiveness uses self-report questionnaires, whereas research on structural competition relies on experimental manipulation).

² In a book chapter, Johnson and Johnson (1989) also reported meta-analytic data that compared the influence of competitive structures to neutral controls on all types of performance across age groups. The results showed a performance increment for competitive structures in initial analyses, but this finding became null when the analysis was restricted to high quality studies. It should also be noted that the Stanne et al. (1999) meta-analysis contains an error in Table 2; it is clear from the narrative text that “competition vs. individualistic” should read “cooperation vs. individualistic.” Stanne et al. (1999) did not include a comparison of competitive structures and neutral controls.

tion and performance. No restrictions are made with regard to type of performance or age group, and the structural competition analyses focus on competition per se (i.e., competitive structures vs. neutral controls).

Sample of Studies

The studies included in our meta-analysis were identified via a thorough search of the literature for studies written in English and published by April 2011 that investigated the relation between competition (trait competitiveness, perceived environmental competitiveness, or structural competition) and performance with human participants. First, we searched PsycINFO and ERIC using pairs of keywords, one representing competition and the other representing performance. The search terms representing competition included *competition*, *competitive*, *competitiveness*, *hypercompetition*, *hypercompetitive*, *reward structure*, *goal structure*, and *motivational climate*. The search terms representing performance included *performance*, *achievement*, *attainment*, *accomplishment*, and *productivity*. More than 7,000 references were retrieved. Second, we checked to ensure that all studies used in the prior published meta-analyses on structural competition and performance (e.g., Johnson et al., 1981; Roseth et al., 2008) were retrieved. Third, we searched for additional studies citing any of the major scales used to assess trait competitiveness or perceived environmental competitiveness (e.g., Midgley et al., 1998; Smither & Houston, 1992). Fourth, we searched for additional studies by major contributors to the literature on the competition–performance relation (e.g., David Johnson, Roger Johnson, Robert Helmreich). Finally, we searched the reference sections of all of the relevant retrieved studies for additional relevant studies. We reviewed the abstracts of these retrieved studies and eliminated those that were clearly not relevant to the competition–performance relation.

We then screened the resulting pool of studies on the following inclusion criteria. With regard to trait competitiveness and perceived environmental competitiveness, studies were included if (a) the study dealt specifically with the relation between self-reports of competitiveness (trait or perceived environmental) and performance and (b) the study contained sample sizes and at least one zero-order correlation for the variables of interest. Studies in which only path coefficients (from multiple regression or structural equation modeling) or partial correlations were reported without accompanying zero-order correlations were not included, because these values do not provide a comparative metric across studies (Lipsey & Wilson, 2001). With regard to structural competition, studies were included if (a) the study dealt specifically with the experimental effect of competition on performance, (b) the study compared a competition condition with a neutral control condition (as opposed to a cooperation condition), and (c) the study contained information to calculate an effect size for the dependent variable or variables (see the Calculating and Integrating Effect Sizes section, below).

For all three conceptualizations of competition, competition was operationally defined as normative comparison between individuals, and we included all studies in which this definitional aspect of competition was salient (e.g., the trait competitiveness measure included items focused on normative comparison, or the structural competition manipulation focused on interpersonal comparison).

Performance was operationally defined as a score obtained on a task, with measures including graded performance (e.g., exam scores, grade point averages), quality and quantity of job productivity (e.g., sales performance, professors' scholastic achievements), sport performance, quality of and accuracy on cognitive/motor/sensory tasks, time to obtain solutions to problems, level of cognitive reasoning and critical thinking, creativity, recall, and retention. Studies using only self-perceived performance measures were not included. As delineated earlier, the focus of the present research is on the relation between competition and performance at the individual level of analysis; as such, studies on intergroup competition or using groups rather than individuals as the focal unit of data analysis were not included. If a relevant study did not report information to compute an effect size and was published since 2000, we attempted to contact the author(s) to obtain the pertinent data.

In all, our search produced the following number of studies for meta-analytic review. For trait competitiveness, 56 articles were identified, yielding a final sample of 65 studies using 14,721 participants. For perceived environmental competitiveness, 33 articles were identified, yielding a final sample of 33 studies using 11,439 participants. For structural competition, 59 articles were identified, yielding a final sample of 81 studies using 5,887 participants. The studies included in the meta-analysis are listed in the Appendix.

Coding Study Characteristics

The variables coded in the meta-analysis for each conceptualization of competition were as follows: (a) outlier status (outlier or not); (b) gender composition (female dominant, if female ratio is more than 75%; male dominant, if male ratio is more than 75%; or mixed); (c) age group (nonadult [≤ 18] or adult; we also coded mean age for further analysis); (d) nationality (U.S. or non-U.S.); and (e) year of publication (1980s and before, 1990s, or 2000 and after). For trait competitiveness and perceived environmental competitiveness, the type of performance domain was coded (school, work, or sport), while for structural competition, the type of performance task was coded (cognitive or motor/perceptual/sensory).

Calculating and Integrating Effect Sizes

The studies on trait competitiveness and perceived environmental competitiveness provide correlation coefficients, whereas those on structural competition provide mean differences. Given this inconsistency, we used different computation methods (described below) to compute effect sizes for each type of data. All data analyses were conducted using Comprehensive Meta-Analysis (Version 2.2.; Borenstein, Hedges, Higgins, & Rothstein, 2008; for technical details, see Borenstein, Hedges, Higgins, & Rothstein, 2009).

Trait competitiveness and perceived environmental competitiveness. As recommended in the literature (Hedges & Vevea, 1998; see also Hafdahl & Williams, 2009), we converted all correlations to Fisher's z using the following formula:

$$z_j = \frac{1}{2} \times \log \left(\frac{1 + r_j}{1 - r_j} \right), \quad (1)$$

where r_j , and z_j denote the sample correlation and Fisher's z of study j , respectively. We computed v_j , the variance of z_j , as follows:

$$v_j = \frac{1}{n_j - 3}, \quad (2)$$

where n_j is the sample size of study j . A few studies used dichotomous dependent variables. In such cases we computed the standardized mean difference between the groups and used it as an estimate of z_j . All results are presented using correlation coefficients to facilitate ease of interpretation of the findings. Effect size estimates were reconverted to correlations by the inverse of the Fisher transformation.

Structural competition. Standardized mean differences between the experimental and control conditions were calculated. We computed effect sizes using Hedges and Olkin's (1985) unbiased estimator g_j , given by

$$g_j = \left(\frac{\bar{Y}_j^E - \bar{Y}_j^C}{S_j} \right) \times \left(1 - \frac{3}{4(n_j^E + n_j^C) - 9} \right), \quad (3)$$

where $\bar{Y}_j^E$, $\bar{Y}_j^C$, n_j^E , n_j^C are the experimental and control group sample means and sample sizes for the j th study, and S_j is the pooled standard deviation of the two groups. As can be seen, the effect sizes were calculated so that a positive effect size indicated a favorable outcome for the experimental (i.e., competition) group. We computed v_j , the variance of g_j , as follows:

$$v_j = \left[\frac{n_j^E + n_j^C}{n_j^E n_j^C} + \frac{1}{2(n_j^E + n_j^C)} \left(\frac{\bar{Y}_j^E - \bar{Y}_j^C}{S_j} \right)^2 \right] \left(1 - \frac{3}{4(n_j^E + n_j^C) - 9} \right)^2. \quad (4)$$

In the structural competition studies, not all investigations reported the information in Equations 3 and 4. When two groups were compared and only t values were reported, it is straightforward to transform the t values to effect sizes g (see Lipsey & Wilson, 2001). In some studies, a one-way analysis of variance with more than two groups or a factorial analysis of variance was conducted and only the means and sample sizes of each condition and omnibus F values were reported. In such cases, we used the available information to estimate the mean-square error of the analysis of variance, computed the square-root of this estimate, and then inserted this value for S_j . A few studies conducted analysis of covariance but did not report the correlation between the covariate and the outcome variable; a few other studies did not report the sample size of each condition but reported the overall sample size. In such cases, precise estimation of effect sizes is not possible, so we estimated the effect size by assuming that (a) the correlation between the covariate and the outcome variable was 0.5, or (b) the sample sizes were equal across the groups.

Integration of the effect sizes. For each conceptualization of competition, we adopted a random-effects framework to integrate the computed effect sizes (Hedges & Vevea, 1998). In this approach, the overall point estimate of the effect sizes is obtained by computing the weighted average of the effect sizes (i.e., z_j for trait competitiveness or perceived environmental competitiveness and g_j for structural competition) with the weight of j th study w_j given by

$$w_j = \frac{1}{v_j + \tau^2}, \quad (5)$$

where τ^2 is the between-studies variance (the variance of the effect size parameters across the population of studies), estimated by the method of moments method. The standard error of the averaged effect sizes V is estimated as follows:

$$V = \frac{1}{\sum_{i=1}^K w_i},$$

where K is the total number of studies. This value is used to construct a 95% confidence interval (CI) of the average effect size.

When a study included multiple effect sizes, the average effect size within the study was computed and used in the meta-analysis. This allowed us to avoid nonindependence of the data.

Meta-Analytic Results

Trait competitiveness. Table 1 reports the meta-analytic results for trait competitiveness. Overall, the average effect size is $r = .05$ (95% CI [.02, .08]). Although this effect is statistically significant (as indicated by the 95% CI that does not include 0), it is clearly of extremely small magnitude. Indeed, the .05 value falls considerably below a small effect size ($r = .10$; see Cohen, 1988).

Next, we conducted additional analyses to investigate the robustness of this finding (see Table 1). First, we excluded studies that had statistically significant standardized residuals (i.e., potential outlier studies; see Hedges & Olkin, 1985). The average effect size remained very small with these studies omitted ($r = .03$; 95% CI [.02, .05]). We then examined whether the effect size was moderated by the study characteristics that we coded. Specifically, we computed the effect size separately for each of the following categories: gender composition, age group, nationality, year of publication, and type of performance domain. As indicated in Table 1, none of the study characteristics may be seen as strongly moderating the relation between trait competitiveness and performance. The average effect size remained small to nonexistent (ranging from $r = .00$ to .11) within each category. We also conducted a meta-regression analysis (Borenstein et al., 2008) using the random-effects model (method of moments) to further test the linear or quadratic effects of age in the relationship between trait competitiveness and performance. The results showed no significant effects ($ps > .61$).

Perceived environmental competitiveness. Table 2 reports the meta-analytic results for perceived environmental competitiveness. Overall, the average effect size is extremely small and not statistically significant ($r = -.01$; 95% CI [-.06, .04]). Thus, perceived environmental competitiveness has no discernible influence on performance, and even if the observed effect were significant, it would be considered very small relative to a small effect size of $r = .10$.

As with trait competitiveness, we next conducted additional analyses to investigate the robustness of this finding (see Table 2). First, we excluded potential outlier studies (on the basis of statistically significant standardized residuals). The average effect size did not change as a function of these omissions ($r = -.02$; 95% CI [-.07, .03]). We then examined whether the effect size was moderated by the study characteristics that we coded. Again, as with

Table 1
Meta-Analysis on Trait Competitiveness

Analysis	<i>k</i> (total <i>N</i>)	Mean weighted <i>r</i>	95% CI	τ^2
Overall effect size	65 (14,721)	.05	[.02, .08]	.01**
Overall effect sizes excluding outliers	52 (12,246)	.03	[.02, .05]	.00
Effect sized based on gender composition				
Female dominant (male ratio is < .25)	8 (1,255)	.09	[-.01, .20]	.01
Male dominant (male ratio is > .75)	13 (1,959)	.10	[.03, .17]	.01
Mixed (male ratio is between .25 and .75)	40 (10,956)	.02	[-.01, .06]	.01*
Effect sizes for different age groups				
Non-adults (18 years old or younger)	10 (4,064)	.00	[-.05, .05]	.00
Adults (older than 18 years)	55 (10,657)	.06	[.03, .10]	.01**
Effect sizes inside and outside the U.S.				
U.S.	51 (10,665)	.05	[.02, .09]	.01**
Non-U.S.	9 (3,511)	.07	[-.01, .14]	.01
Effect sizes based on year of publication				
1980s and before	13 (3,044)	.04	[-.01, .09]	.00
1990s	21 (4,851)	.08	[.02, .15]	.01
2000s and after	31 (6,826)	.04	[-.00, .08]	.01*
Effect sizes for type of performance domain				
School	28 (8,879)	.03	[-.01, .06]	.00
Work	23 (3,958)	.10	[.04, .16]	.01*
Sports	3 (382)	.11	[-.09, .30]	.02

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

trait competitiveness, we computed the effect sizes separately for each of the different categories, namely, gender composition, age group, nationality, year of publication, and type of performance domain. As indicated in Table 2, none of the study characteristics may be seen as strongly moderating the link between perceived environmental competitiveness and performance. The average effect size remained small to nonexistent (ranging from $r = -.10$ to $.11$) within each category. We also conducted a meta-regression analysis to further test the linear or quadratic

effects of age in the relationship between perceived environmental competitiveness and performance. The results showed no significant effects ($ps > .28$).

Structural competition. Table 3 reports the meta-analytic results for structural competition. Note that the effect size in this analysis is represented by g , a standardized mean difference. Overall, the average effect size is extremely small and not statistically significant ($g = .04$; 95% CI [-.08, .16]). Thus, structural competition has no discernible influence on performance, and even

Table 2
Meta-Analysis on Perceived Environmental Competitiveness

Analysis	<i>k</i> (total <i>N</i>)	Mean weighted <i>r</i>	95% CI	τ^2
Overall effect size	33 (11,439)	-.01	[-.06, .04]	.02**
Overall effect sizes excluding outliers	30 (10,646)	-.02	[-.07, .03]	.01**
Effect sized based on gender composition				
Female dominant (male ratio is < .25)	1 (508)	-.06	[-.23, .11]	n/a
Male dominant (male ratio is > .75)	1 (262)	-.10	[-.22, .02]	n/a
Mixed (male ratio is between .25 and .75)	27 (10,081)	-.01	[-.06, .05]	.02**
Effect sizes for age groups				
Non-adults (18 years old or younger)	23 (8,558)	-.04	[-.10, .02]	.02*
Adults (older than 18 years)	10 (2,881)	.05	[-.02, .13]	.01
Effect sizes inside and outside the U.S.				
U.S.	24 (9,271)	-.04	[-.10, .03]	.02**
Non-U.S.	9 (2,168)	.06	[-.02, .14]	.01
Effect sizes based on year of publication				
1980s and before	5 (1,469)	.07	[-.01, .15]	.00
1990s	9 (4,452)	-.07	[-.17, .03]	.02
2000s and after	19 (5,518)	-.00	[-.07, .07]	.02*
Effect sizes for type of performance domain				
School	20 (8,545)	-.06	[-.12, .01]	.02*
Work	6 (1,374)	.05	[-.07, .16]	.02
Sports	6 (1,225)	.11	[-.02, .23]	.02

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

Table 3
Meta-Analysis on Structural Competition

Analysis	<i>k</i> (total <i>N</i>)	Mean weighted <i>g</i>	95% CI	τ^2
Overall effect size	81 (5,887)	.04	[−.08, .16]	.22**
Overall effect sizes excluding outliers	69 (4,885)	.08	[−.02, .18]	.08**
Effect sized based on gender composition				
Female dominant (male ratio is < .25)	20 (844)	.03	[−.19, .25]	.10
Male dominant (male ratio is > .75)	20 (826)	−.01	[−.25, .22]	.16
Mixed (male ratio is between .25 and .75)	29 (2,391)	−.07	[−.32, .17]	.38*
Effect sizes for age groups				
Non-adults (18 years old or younger)	41 (2,930)	.00	[−.20, .20]	.34*
Adults (older than 18 years)	40 (2,957)	.09	[−.05, .22]	.12*
Effect sizes inside and outside the U.S.				
U.S.	61 (3,529)	.05	[−.07, .16]	.10**
Non-U.S.	20 (2,358)	.05	[−.25, .34]	.38*
Effect sizes based on year of publication				
1980s and before	52 (3,680)	.05	[−.13, .22]	.29**
1990s	17 (1,294)	−.01	[−.20, .19]	.09
2000s and after	12 (913)	.11	[−.14, .36]	.13
Effect sizes for type of performance task				
Motor/perceptual/sensory	33 (1,406)	−.10	[−.32, .11]	.27**
Cognitive	48 (4,481)	.13	[−.01, .27]	.17**

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

if the observed effect were significant, it would be considered very small (falling considerably below a small effect size of $g = .20$; see also Lipsey & Wilson, 2001). To establish comparability of the results across competition conceptualizations, we also transformed the effect size g into r (Hedges & Olkin, 1985) and integrated the results with a random effects model. This yielded a very small average effect size of $r = .02$ (95% CI [−.04, .08]).

As with trait competitiveness and perceived environmental competitiveness, we next conducted additional analyses to investigate the robustness of this finding (see Table 3). First, we excluded potential outlier studies (on the basis of statistically significant standardized residuals). The average effect size did not change as a function of these omissions ($g = .08$; 95% CI [−.02, .18]). We then examined whether the effect size was moderated by the study characteristics that we coded. Again, as with the preceding conceptualizations of competition, we computed the effect sizes separately for the categories gender composition, age group, nationality, and year of publication. We also investigated possible moderation by type of performance task. As indicated in Table 3, none of the study characteristics may be seen as strongly moderating the effect of structural competition on performance. The average effect size remained small to nonexistent (ranging from $g = -.10$ to $.13$) within each category. We also conducted a meta regression analysis to further test the linear or quadratic effects of age in the relationship between structural competition and performance. The results showed no significant effects ($ps > .63$).

Summary and integration. In sum, the meta-analytic results indicate that there is no discernible relation or, at very most, an extremely weak relation between competition and performance. Two of the three overall analyses exhibited a nonsignificant effect, and the one significant effect (for trait competitiveness) was so small as to be of trivial importance. This null or extremely small relation was also observed in the ancillary analyses omitting outlier studies, as well as the ancillary analyses focused on coded study characteristics.

In a final analysis, we combined all of the studies together, regardless of conceptualization of competition, to examine the omnibus competition–performance relation.

Specifically, we converted all of the g effect sizes into the r metric and applied a random effects model; care must be taken in interpreting the result from such an analysis, given the combining of different effect size metrics. The analysis ($k = 174$) revealed that the omnibus average effect size is extremely small and not statistically significant ($r = .03$; 95% CI [−.00, .06]). In short, the existing data lead to the conclusion that competition has no noteworthy relation with performance.

The Opposing Processes Model of Competition and Performance

As noted at the beginning of this article, there is a widespread belief among scholars that competition influences performance, with some theorists contending that the influence is positive and others contending that it is negative. Both sides of this argument are espoused vigorously, and this has been the case not just for decades but for centuries. In this context, our meta-analytic results are quite sobering, as they seem to suggest that neither side is correct; instead, they indicate that competition has no noteworthy relation with performance.

Although this finding may come as a surprise to some, it will likely resonate with others, such as those who have tried to review research on the competition–performance relation in narrative fashion. Surveying the literature in this way, one is struck by the preponderance of null results, coupled with occasional (often weak) findings in a positive or negative direction. Narrative reviewers have struggled with how to characterize the literature accordingly; for example, Chertkoff and Mesch (1997) stated the following: “Given the mixed research results, drawing conclusions about this literature has presented a difficult challenge” (p. 2; see also Hinsz, 2005; Lewis & Cooney, 1987). Our meta-analysis

provides an empirical basis for addressing this challenge, and our findings lead to the firm conclusion that there is no noteworthy relation between competition and performance.

Inconsistent Mediation

One possible response to our meta-analytic results is to declare that both sides of the argument regarding the competition–performance relation are wrong. An alternative response, however, is to recognize that our meta-analysis focuses on just one type of relation between competence and performance—the direct effect. It is possible to move beyond a focus on this direct effect to a consideration of the psychological processes evoked by competition that influence performance attainment. At present, there is a decided absence of theoretical and empirical work on mediational processes in this area of inquiry, and we believe that attending to such mediational processes will help illuminate the nature of the competition–performance relation. Indeed, we believe that a careful examination of mediation will reveal that both sides of the ongoing argument are not wrong, as the meta-analytic results might seem to suggest, but rather that both sides of the argument are actually right.

The lack of clarity to date regarding the direct effect between competition and performance is undoubtedly responsible for the absence of attention to mediational processes. The conventional wisdom on mediation in the psychological literature has long been that a direct effect between an independent and dependent variable must be documented before a mediational process can be considered (Baron & Kenny, 1986; Judd & Kenny, 1981; see also Hyman, 1955). In the past several years, however, this conventional wisdom has been refuted by methodologists who have identified a number of cases in which mediational analysis is valid in the absence of a direct effect (e.g., inconsistent mediation, distal mediation; Collins, Graham, & Flaherty, 1998; Kenny, Kashy, & Bolger, 1998; MacKinnon, Krull, & Lockwood, 2000; Shrout & Bolger, 2002). The emerging consensus in the literature is that the analysis of indirect effects can bear considerable fruit, regardless of the presence or absence of a direct effect (Judd & Kenny, 2010; MacKinnon, 2008; Preacher & Hayes, 2008b; Zhao, Lynch, & Chen, 2010).

In the present research, we argue that inconsistent mediation is operative in the competition–performance relation and that attending to this form of mediation will explain, both conceptually and empirically, the absence of a direct effect between competition and performance. Inconsistent mediation occurs “in multiple mediator models where mediated effects have different signs”; in such instances, “the overall relation . . . may actually be zero, yet there are two opposing mediational processes” (MacKinnon, Fairchild, & Fritz, 2007, p. 602). That is, in inconsistent mediation, a null direct effect masks the operation of two different mediational processes: one that has a positive influence on the dependent variable and another that has a negative influence on the dependent variable. Here we propose that competition evokes two distinct mediational processes, one that facilitates performance and one that undermines performance. Specifically, we posit performance-approach and performance-avoidance achievement goals as joint mediators of the competition–performance relation.

Performance-Approach and Performance-Avoidance Achievement Goals

In achievement settings, general appetitive or aversive concerns are evoked by dispositional tendencies and situational construals/affordances. These desires or fears are presumed to energize behavior but do not provide specific guidelines for how one may accomplish or address the desire or fear that has been activated (Elliot, 1999). Individuals commonly adopt more concrete aims or goals that help them guide and direct their behavior with regard to more specific competence-relevant possibilities (Elliot & Church, 1997). These achievement goals function as concrete tools that individuals use to strategically regulate their general desires and fears about success and failure. In prior work, we have conceptualized achievement goals as proximal predictors of achievement-relevant outcomes (Elliot & Church, 1997); here we take the additional step of casting them as mediator variables that explain the indirect influence of dispositional tendencies and situational construals/affordances on achievement-relevant outcomes.

Achievement goals vary with regard to two basic aspects of competence—definition and valence (Elliot & McGregor, 2001). Competence is defined by its standard of evaluation, and three standards may be identified: a task-based standard (how one is doing compared to what the task demands), a self-based standard (how one is doing compared to one’s own intrapersonal trajectory), and an other-based standard (how one is doing compared to others). Competence is valenced by its positive focus on success or its negative focus on failure. The two achievement goals most pertinent to the present research, performance-approach goals and performance-avoidance goals, are both grounded in an other-based standard and focus on a positive or negative normative possibility, respectively. That is, performance-approach goals represent trying to do well relative to others, and performance-avoidance goals represent trying to avoid doing poorly compared to others.

In the present research, we conceptualize performance-approach and performance-avoidance goals as mediator variables in an explanatory account of the competition–performance relation that we call the opposing processes model of competition and performance (see Figure 1b). Research indicates that competition activates social comparison processes and shifts attention to normative standards of evaluation (Ames & Ames, 1984; Mussweiler, 2003; Tesser, 1988). In addition, there are hints in the literature that competition is associated with both appetitive and aversive processes such as excitement and anxiety (Ames, Ames, & Felker, 1977; Fletcher & Nusbaum, 2008; Heggestad & Kanfer, 2000; Ross, Rausch, & Canada, 2003). Accordingly, we posit that competition positively predicts the adoption of both performance-approach and performance-avoidance goals (Paths 1 and 3 in Figure 1b). That is, individuals are posited to regulate their competitive concerns—whether evoked by dispositional tendencies, situational construals, or structural features of the achievement environment—by adopting and pursuing specific aims focused on outperforming or not being outperformed by their peers.

Performance-approach goals have been shown to be associated with challenge-based affect, cognition, and behavior (e.g., eagerness, task-absorption, persistence) that tend to facilitate performance, whereas performance-avoidance goals have been linked with threat-based affect, cognition, and behavior (e.g., worry, task distraction, self-handicapping) that tend to undermine performance

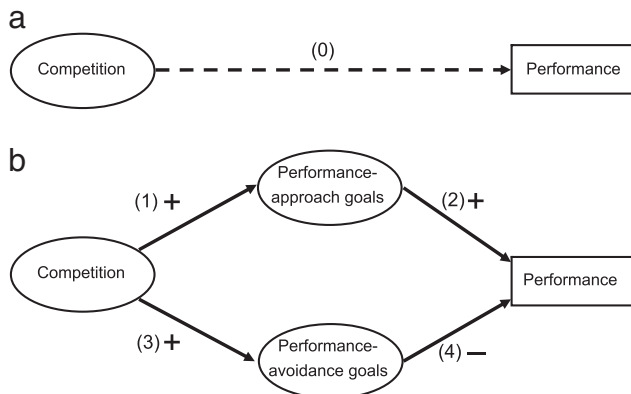


Figure 1. A schematic of our hypothesized model linking competition and performance. Competition does not have a direct effect on performance (a), but this is due to the positive indirect effect of performance-approach goals and the negative indirect effect of performance-avoidance goals (b; the opposing processes model of competition and performance). The dashed line represents a null (or weak) effect; the solid lines represent a positive (+) or negative (–) effect.

(Brodish & Devine, 2009; Darnon, Butera, Mugny, Quiamzade, & Hulleman, 2009; Elliot, McGregor, & Gable, 1999; Sideridis, 2005; Urdan & Midgley, 2001; Vallerand et al., 2007). As such, it is not surprising that a considerable amount of research has documented performance-approach goals as a positive predictor of performance outcomes and performance-avoidance goals as a negative predictor (for reviews, see Elliot, 2005; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Kaplan & Maehr, 2007). In accord with this research, in the proposed model we posit performance-approach and performance-avoidance goals as positive and negative predictors of performance, respectively (Paths 2 and 4 of Figure 1b). Furthermore, we posit that these two achievement goals jointly mediate the relation between competition and performance and that these joint processes explain the absence of a direct effect revealed in our meta-analytic review (Figure 1a). Thus, competition is viewed as facilitating performance to the extent that it prompts performance-approach goal pursuit and is viewed as undermining performance to the extent that it prompts performance-avoidance goal pursuit; the combination of these mutually opposing processes is posited to mask the fact that competition actually has an important impact on performance outcomes. Note that this model is not only consistent with the extant research revealing no overall, direct influence of competition on performance but also accommodates both of the contrasting positions on the competition–performance relation described at the outset of this article. In the following, we present an additional meta-analysis (using meta-analytic structural equation modeling) and three new empirical studies that are designed to test the opposing processes model of competition and performance.

Meta-Analytic Structural Equation Modeling

Meta-analysis is commonly used to synthesize prior empirical research on the relation between two variables (as in the meta-analysis reported above), but it is also possible to use meta-analysis to test a new theoretical model (N. Miller & Pollock,

1995). Herein we used meta-analytic structural equation modeling (MASEM; Cheung & Chan, 2005; Viswesvaran & Ones, 1995) to test the validity of the opposing processes model of competition and performance as represented in the extant data on the variables in the model: competition, performance-approach goals, performance-avoidance goals, and performance. In our MASEM analysis, we first meta-analyzed the correlations of all of the possible pairs of these variables (i.e., competition and performance-approach goals, competition and performance-avoidance goals, competition and performance, performance-approach goals and performance-avoidance goals, performance-approach goals and performance, performance-avoidance goals and performance) to compute a pooled correlation matrix. Then, we applied a structural equation model to the obtained pooled correlation matrix to test our model (Figure 1b). MASEM allows us to not only estimate path coefficients but also evaluate the fit of the model to the meta-analytic data. If all of the path coefficients in Figure 1b (Paths 1–4) were statistically significant and model fit were good, this would provide supportive evidence that the observed weak relation between competition and performance in the previous meta-analysis could be explained by inconsistent mediational processes involving performance-approach and performance-avoidance goals. Note that even if all of the path coefficients were statistically significant, model fit could be bad (Kline, 2005); this would indicate that the weak competition–performance relation is not well accounted for by the proposed inconsistent mediation (e.g., the magnitude of one indirect effect may be substantially larger than that of the other indirect effect, making the cancellation effect incomplete).

Sample of Studies

The studies included in this meta-analysis were identified via a thorough search of the literature for studies written in English and published by April 2011 that investigated the relations of at least two variables of interest in our model (i.e., competition, performance-approach goals, performance-avoidance goals, and performance) with human participants. Our previous meta-analysis already sampled the studies on the relation between competition and performance; accordingly, our literature search focused on the remaining five relations (i.e., competition and performance-approach goals, competition and performance-avoidance goals, performance-approach goals and performance-avoidance goals, performance-approach goals and performance, performance-avoidance goals and performance).

The study collection procedure was analogous to that used for our previous meta-analysis. First, we searched PsycINFO and ERIC using pairs of keywords, each of which represents the variables of interest in our model. As in the previous meta-analysis, the search terms representing competition included *competition*, *competitive*, *competitiveness*, *hypercompetition*, *hypercompetitive*, *reward structure*, *goal structure*, and *motivational climate*; likewise, the search terms representing performance included *performance*, *achievement*, *attainment*, *accomplishment*, and *productivity*. The search terms representing achievement goals were those used in Hulleman et al.'s (2010) recent meta-analysis on achievement goals and performance: *performance-approach*, *performance approach*, *performance-avoidance*, *performance avoidance*, *performance*, and *achievement goals*. Second, there is

no prior comprehensive meta-analysis on competition and performance-approach goals or competition and performance-avoidance goals, so all studies for these relations were retrieved anew. For the relations between performance-approach goals, performance-avoidance goals, and performance, we ensured that all published studies used in the most recent comprehensive meta-analysis on achievement goals and performance (Hulleman et al., 2010) were retrieved. Indeed, we were able to acquire the actual database from this meta-analysis to use as a foundation for our study collection;³ this database stopped at 2006, so we continued the study collection process to add all applicable studies published in 2007 and thereafter in accord with the search criteria delineated above. As noted above, the database for the competition and performance relation was the same as that used in our prior meta-analysis. Third, we searched for additional studies citing any of the major scales used to assess trait competitiveness, perceived environmental competitiveness, or achievement goals (e.g., Elliot & McGregor, 2001; Midgley et al., 1998; Smither & Houston, 1992). Fourth, we searched for additional studies by major contributors to the literatures on the relations under consideration (e.g., Andrew Elliot, Judith Harackiewicz, Robert Helmreich, David Johnson, Roger Johnson, Carol Midgley). Finally, we searched the reference sections of the relevant retrieved studies for additional relevant studies. We reviewed the abstracts of these retrieved studies and eliminated those that were clearly not relevant to the relations under consideration.

We then screened the resulting pool of studies on the following inclusion criteria. Studies were included if (a) the study dealt specifically with the relation between the variables of interest (competition, performance-approach goals, performance-avoidance goals, and performance), and (b) the study contained sample sizes and at least one zero-order correlation for the variables of interest at the individual level. There were a few studies that experimentally manipulated achievement goals with a neutral control condition; these studies were included after converting the *g* effect sizes into the *r* metric. The operational definitions of competition and performance were the same as those used in the previous meta-analysis. For performance-approach and performance-avoidance goals, we included all studies in which authors explicitly distinguished between these two types of goals (regardless of the labels used); studies that focused only on omnibus performance goals (i.e., studies not separating the approach and avoidance components of performance goals) were excluded. Following Hulleman et al. (2010), to retain a precise focus on studies of achievement goals defined as representations of desired or undesired end states (Austin & Vancouver, 1996; Elliot & Fryer, 2008; Harackiewicz & Sansone, 1991; Elliot & Kruglanski, 1996), we excluded studies in which goals were measured with statements of positive affect rather than goal-relevant language (e.g., “I feel successful when . . .”; Duda & Nicholls, 1992).

Our search produced the following number of studies for the MASEM. For the competition and performance-approach goal relation, 35 articles were identified, yielding a final sample of 36 studies using 17,669 participants. For the competition and performance-avoidance goal relation, 31 articles were identified, yielding a final sample of 32 studies using 14,794 participants. For the performance-approach goal and performance-avoidance goal relation, 233 articles were identified, yielding a final sample of 287 studies using 103,263 participants. For the performance-approach

goal and performance relation, 113 articles were identified, yielding a final sample of 136 studies using 42,749 participants. For the performance-avoidance goal and performance relation, 101 articles were identified, yielding a final sample of 123 studies using 36,622 participants. For the competition and performance relation, the sample is the same as that in the previous meta-analysis. In all, our MASEM has a total sample of 474 studies with 139,464 participants. In the current MASEM, we did not distinguish between the three conceptualizations of competition (i.e., trait competitiveness, perceived environmental competitiveness, and structural competition), because it is not possible to apply this distinction to the studies that assessed only performance-approach goals, performance-avoidance goals, and performance (or any two of these variables). The studies included in the MASEM are listed in the Appendix.

MASEM Procedure

MASEM is generally conducted in two steps. First, all correlations are meta-analyzed to compute a pooled correlation matrix. Second, structural equation modeling (SEM) is applied to this pooled correlation matrix to test a model. In conducting our MASEM analysis, we used a recently developed technique called two-stage structural equation modeling (Cheung & Chan, 2005). In this approach, the pooled correlation matrix is estimated by multivariate meta-analysis (see Gleser & Olkin, 2000) within the framework of SEM (Cheung, in press; see also Cheung, 2008). In this process, if a study does not have all relevant correlations, these nonexistent correlations are treated as missing data. Then, the obtained pooled correlation matrix is placed into an asymptotic distribution-free SEM to test the model, using an asymptotic covariance matrix of the pooled correlations as the weight matrix. This approach has a number of advantages over traditional MASEM methods (e.g., Viswesvaran & Ones, 1995). For example, because this approach simultaneously estimates pooled correlations with a full information maximum likelihood function, parameter estimates are much less biased than they are with traditional methods, especially when there are substantial missing correlations (see Enders, 2006). This is of particular importance in our context, given that there are only a few studies that included all of the variables of interest (none of which tested the proposed model). In addition, because an asymptotic covariance matrix of the pooled correlations is used as the weight matrix, we are able to estimate standard errors precisely. Traditional methods simply use the point estimate of the pooled correlation matrix and the sample size is determined by an arbitrary criterion (Cheung & Chan, 2005); as such, variations of the estimated correlations are ignored.

All data analyses were conducted using metaSEM (Cheung, 2011) and OpenMx (Boker et al., 2011) packages in R. A random effects model was used. When a study included multiple effect sizes, the average effect size within the study was computed and used in the meta-analysis.

MASEM Results

The pooled correlation matrix obtained from multivariate meta-analysis is reported in Table 4. Consistent with the previous

³ We thank Christopher Hulleman for allowing us access to the database.

Table 4
Multivariate Meta-Analysis Results on the Correlations Between Competition, Performance-Approach Goals, Performance-Avoidance Goals, and Performance

Variable	1	2	3	4
1. Competition	—			
2. Performance-approach goals	.41 [.36, .46]	—		
3. Performance-avoidance goals	.30 [.25, .35]	.41 [.38, .43]	—	
4. Performance	.03 [−.00, .06]	.10 [.08, .12]	−.12 [−.14, −.10]	—

Note. $k = 472$ ($N = 139,388$). Numbers in square brackets represent 95% confidence intervals.

(univariate) meta-analysis, the correlation between competition and performance is very weak and not statistically significant ($r = .03$; 95% CI [−.00, .06]). Note that the values are slightly different from the previous meta-analysis, because multivariate meta-analysis takes into account the covariation with the other correlations (see Gleser & Olkin, 2000). The other correlations are all statistically significant.

Of central importance, MASEM supported our hypothesized model (Figure 1b). As predicted, competition was positively associated with performance-approach goals ($\beta = .41$; 95% CI [.36, .47]) and performance-avoidance goals ($\beta = .29$; 95% CI [.24, .34]). In addition, performance-approach goals were positively associated with performance ($\beta = .15$; 95% CI [.12, .17]), whereas performance-avoidance goals were negatively associated with performance ($\beta = −.17$; 95% CI [−.19, −.15]). Importantly, the model provided a good fit to the data: $\chi^2(1) = 1.03$, $p = .31$, CFI = 1.00, TLI = 1.00, RMSEA = 0.000. This suggests that the weak relationship between competition and performance is explained by an inconsistent mediational process involving performance-approach and performance-avoidance goals.

Next, we used a (parametric) bootstrapping approach to test the significance of the indirect effects (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The analyses showed that both the positive indirect effect (competition → performance-approach goals → performance) and the negative indirect effect (competition → performance-avoidance goals → performance) were significant (estimates = .06 and −.05, respectively, $ps < .01$). Table 5 summarizes the obtained results.

Summary

The MASEM results indicated that competition is not directly related to performance but is indirectly related via achievement goals. Performance-approach and performance-avoidance goals were validated as mutually opposing mediators of the competition–performance relation, and it is these opposing processes that produced the weak direct relation between competition and performance observed in the previous meta-analysis.

New Empirical Studies

MASEM is a flexible and powerful data analytic tool, and our use of MASEM herein yielded clear support for the validity of our hypothesized opposing processes model of competition and performance. Our original meta-analytic results were included within the MASEM analysis; thus, the MASEM results effectively documented that the weak competition–performance relation observed in our original meta-analysis can be explained by the opposing processes model. However, the MASEM approach to testing our model is post hoc and indirect, and there are some inherent limitations to using this approach to test the specific research questions under consideration.

First, as noted earlier, it is not possible to distinguish between the three conceptualizations of competition (i.e., trait competitiveness, perceived environmental competitiveness, and structural competition) in our MASEM analysis, because this distinction cannot be applied to the many studies that assessed only perfor-

Table 5
Path Coefficients and Indirect Effects in MASEM and Studies 1–3

	Direct effect model (Figure 1a)	Opposing processes model of competition and performance (Figure 1b)					
		Effect via performance-approach goals			Effect via performance-avoidance goals		
	(0) Competition to performance	(1) Competition to Pap goals	(2) Pap goals to performance	Indirect effect	(3) Competition to Pav goals	(4) Pav goals to performance	Indirect effect
MASEM	0.03	0.41**	0.15**	0.06**	0.29**	−0.17**	−0.05**
Study 1	0.03	0.50**	0.42**	0.21**	0.33**	−0.46**	−0.15**
Study 2	0.09	0.35**	0.44**	0.15*	0.25**	−0.45**	−0.11**
Study 3	−0.13	0.39**	0.44*	0.17*	0.46**	−0.45*	−0.20*

Note. Numbers in parentheses correspond to those in Figure 1. MASEM = meta-analytic structural equation modeling; Pap = performance-approach; Pav = performance-avoidance.

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

mance-approach goals, performance-avoidance goals, and performance (or two of these variables). Second, some of the relations in the MASEM model may be seen as susceptible to confounding variables that could inflate the observed relation. For example, prior research has shown that perceptions of competence are positively associated with both performance-approach goals and performance (e.g., Elliot & Church, 1997; Marsh & Craven, 2006); as such, the observed link between performance-approach goals and performance in the MASEM analyses could be inflated or even spurious. MASEM focuses on simple zero-order correlations and cannot address this possibility. Third, in many, if not most, of the studies contributing to the MASEM analysis, the data were collected in a single session, which can also lead to covariate inflation. The temporal separation of construct assessments is recommended to address this problem (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Fourth, there is considerable variation in the achievement goal assessments included in our MASEM analysis, and some measures include content unrelated to the performance-approach and performance-avoidance goal constructs (e.g., self-presentation concerns, self-worth concerns; Elliot & Murayama, 2008; Elliot et al., 2011). Hulleman et al. (2010) have shown that these nuisance factors in achievement goal measures artificially depress relations between achievement goals and performance.

In light of these limitations, we deemed it important to supplement our MASEM findings with new empirical studies designed to put the opposing processes model to direct empirical test while also attending to the aforementioned issues. In the following, we present three such studies, each of which tested the model using a different conceptualization of competition—trait competitiveness (Study 1), perceived environmental competitiveness (Study 2), and structural competition (Study 3). In each of the studies, we included measures of perceived or prior competence and other possible confounding variables to examine the robustness of the focal relations. Furthermore, we designed Studies 1 and 2 to include considerable temporal separation between the competition, achievement goal, and performance assessments to minimize the likelihood of covariation inflation. Finally, we used recently developed achievement goal assessments that were explicitly designed to eliminate construct contamination. Supportive data from

these new studies would nicely complement our MASEM results, and the two sets of findings together would represent a particularly powerful validation of the opposing processes model of competition and performance. Table 6 lists the primary variables focused on in each of the three studies and provides descriptive statistics for these variables.

Study 1

In Study 1, we tested the hypothesized model in the context of a college classroom using trait competitiveness as the independent variable, exam performance as the dependent variable, and classroom achievement goals as mediator variables. We expected a null relation between trait competitiveness and exam performance but anticipated that this null effect would be explained by the opposing influences of performance-approach goals (positive) and performance-avoidance goals (negative). We examined the focal relations controlling for possible confounding variables to ensure that any observed findings were not mere artifacts of these other variables. Control variables included participants' general ability (SAT scores), perceived ability (general perceived competence and specific competence expectancies), and response bias (impression management and self-deceptive enhancement).

Method

Participants. A total of 301 (110 male, 191 female) students at a U.S. university participated in return for extra course credit. In this and all subsequent studies, participation was restricted to native English speakers. Participants were enrolled in an introductory-level psychology course where evaluation was based on a normative grading structure. The mean age of participants was 19.60; ethnicity was as follows: 216 Caucasian, 26 African American, 28 Asian, 17 Hispanic, and 14 unspecified.

Procedure. Participants reported their demographic information and their verbal SAT score in a large group session during the first week of the semester. Later that same week, they completed measures of trait competitiveness and general perceived competence in a take-home questionnaire packet. The following week, they completed a measure of response bias in another take-home

Table 6
Descriptive Statistics and Internal Consistencies of the Main Variables in Studies 1–3

Variable	<i>M</i>	<i>SD</i>	Observed range	Cronbach's α
Study 1				
Trait competitiveness	3.39	0.82	1.00–5.00	.77
Performance-approach goals	4.71	1.51	1.00–7.00	.93
Performance-avoidance goals	4.57	1.47	1.00–7.00	.89
Exam performance	77.4	13.0	31–100	
Study 2				
Perceived class competitiveness	2.59	1.05	1.00–5.00	.91
Performance-approach goals	3.72	1.08	1.00–5.00	.94
Performance-avoidance goals	3.40	1.20	1.00–5.00	.94
Exam performance	83.6	11.1	44–100	
Study 3				
Performance-approach goals	6.43	1.80	2.33–9.00	.92
Performance-avoidance goals	6.22	1.90	1.33–9.00	.86
Baseline anagram performance	5.16	2.96	0–15	
Postmanipulation anagram performance	6.02	3.14	0–14	

questionnaire packet. Participants reported their performance-approach and performance-avoidance goals for the class, as well as their competence expectancy for the class, in a large group session approximately 3 weeks later (1 week prior to their first exam). Exam performance data (possible range = 0–100) were acquired from the course instructor. For all assessments, participants were assured that their responses would remain confidential and would in no way influence their course grade.

Measures. Spence and Helmreich's (1983) five-item competitiveness measure from the WOFO scale was used to assess trait competitiveness (e.g., "I feel that winning is important in both work and games"). Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale ($\alpha = .77$). Elliot et al.'s (2011) achievement goal measure was used to assess participants' performance-approach goals (three items, e.g., "[My goal is] to do better than my classmates on the exams in this class") and performance-avoidance goals (three items, e.g., "[My goal is] to avoid doing worse than other students on the exams in this class"). Participants responded on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale ($\alpha = .93$ and $.89$, respectively).

Several measures were used to assess control variables (in addition to participants' verbal SAT score). Law, Elliot, and Murayama's (2012) four-item General Perceived Competence measure was used to assess broad perceptions of ability (e.g., "I do well at most things I try"). Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale ($\alpha = .82$). Elliot and Church's (1997) two-item measure was used to assess competence expectancies for the class (e.g., "I expect to do well in this class"). Participants responded on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale ($\alpha = .85$). Response bias was assessed with two 20-item subscales from Paulhus's (1991) Balanced Inventory of Desirable Responding. The subscales include impression management (IM) and self-deceptive enhancement (SDE). Participants responded on a 1 (*not true*) to 7 (*very true*) scale; half of the items for each subscale represent desirable statements (IM, e.g., "I always obey laws, even if I'm unlikely to get caught"; SDE, e.g., "I always know why I like things"), and half represent undesirable statements (IM, e.g., "When I was young I sometimes stole things"; SDE, e.g., "I have not always been honest with myself"). Participants received one point for each extreme response ($\alpha = .68$ and $.72$ for IM and SDE, respectively).

Results and Discussion

In this and all subsequent studies, the full information maximum likelihood method was used to avoid loss of information due to missing data (Enders, 2006; Schafer & Graham, 2002).

Trait competitiveness as a direct predictor of exam performance. First, we examined trait competitiveness as a direct predictor of exam performance (see Figure 1a). We used a latent variable model to prevent false negative (i.e., null) effects due to attenuation caused by measurement error (Bollen, 1989). Trait competitiveness was represented as a latent variable (with individual items as indicators), whereas exam performance was represented as an observed variable. As expected, trait competitiveness was not a significant predictor of exam performance ($\beta = .03$, $p = .63$).

The mediational model. We then investigated the hypothesized opposing processes model in which performance-approach

and performance-avoidance goals serve as joint mediators of the indirect relation between trait competitiveness and exam performance (see Figure 1b). Trait competitiveness, performance-approach goals, and performance-avoidance goals were modeled as latent variables (with individual items as indicators), whereas exam performance was represented as an observed variable. In this and all subsequent studies, we allowed for correlated errors of the performance-approach and performance-avoidance goal variable, as recommended in multiple mediator models (Preacher & Hayes, 2008a).

As predicted, trait competitiveness was a positive predictor of both performance-approach goals ($\beta = .50$, $p < .01$) and performance-avoidance goals ($\beta = .33$, $p < .01$). In addition, performance-approach goals were a positive predictor of exam performance ($\beta = .42$, $p < .01$), whereas performance-avoidance goals were a negative predictor ($\beta = -.46$, $p < .01$). The model provided a good fit to the data: $\chi^2(50) = 114.23$, $p < .01$, CFI = .95, TLI = .93, RMSEA = .065, indicating that the weak direct effect can be explained by the opposing effects of performance-approach and performance-avoidance goals. We used a bootstrapping approach to test the significance of the indirect effects (MacKinnon et al., 2002). The analyses showed that both the positive indirect effect (trait competitiveness $\rightarrow$ performance-approach goals $\rightarrow$ exam performance) and the negative indirect effect (trait competitiveness $\rightarrow$ performance-avoidance goals $\rightarrow$ exam performance) were significant (standardized estimates = .21 and $-.15$, respectively, $ps < .01$). Table 5 summarizes the obtained results.

Control variable analyses. Next, we repeated each of the above analyses controlling for variables that could influence the focal relations. Specifically, we (independently) controlled for SAT score, general perceived competence, competence expectancies for the class, and IM and SDE response biases. As may be seen in Table 7, each of the nonsignificant (direct effect) and significant (indirect effect) findings from the primary analyses remained the same in these analyses.

In sum, the results indicate that trait competitiveness is not a direct predictor of exam performance but is an indirect predictor via achievement goals. Performance-approach and performance-avoidance goals were validated as mutually opposing mediators of the trait competitiveness-performance relation, and it is these opposing processes that produced the null direct relation between trait competitiveness and performance. The obtained results were not a function of participants' general ability (SAT score), perceived ability (general perceived competence and specific competence expectancies), or response bias (impression management and self-deceptive enhancement).

Study 2

Study 2 sought to conceptually replicate Study 1 using perceptions of class competitiveness, rather than trait competitiveness, as the independent variable. Again we examined the focal relations controlling for the possible confounding variables used in Study 1.

Method

Participants. A total of 240 (75 male, 165 female) students at a U.S. university participated in return for extra course credit.

Table 7

Path Coefficients and Indirect Effects With Controlling Variables in Studies 1 and 2

		Opposing processes model of competition and performance (Figure 1b)					
Direct effect model (Figure 1a)		Effect via performance-approach goals			Effect via performance-avoidance goals		
	(0) Competition to performance	(1) Competition to Pap goals	(2) Pap goals to performance	Indirect effect	(3) Competition to Pav goals	(4) Pav goals to performance	Indirect effect
Study 1	0.03/−0.02	0.50**/0.51**	0.42**/0.35**	0.21**/0.18**	0.33**/0.36**	−0.46**/−0.36**	−0.15**/−0.13**
	0.04/0.01	0.50**/0.48**	0.42**/0.35**	0.21**/0.17**	0.35**/0.33**	−0.46**/−0.41**	−0.17**/−0.14**
	0.05/0.05	0.50**/0.50**	0.42**/0.41**	0.21**/0.20**	0.32**/0.34**	−0.44**/−0.45**	−0.14**/−0.15**
Study 2	0.09/0.11	0.35**/0.34**	0.44**/0.45**	0.15**/0.15**	0.25**/0.24**	−0.45**/−0.44**	−0.11**/−0.10**
	0.08/0.06	0.35**/0.32**	0.43**/0.32**	0.15**/0.10*	0.25**/0.25**	−0.44**/−0.36**	−0.11**/−0.09*
	0.09/0.08	0.35**/0.36**	0.45**/0.50**	0.16**/0.18**	0.24**/0.24**	−0.46**/−0.52**	−0.11**/−0.12**

Note. Numbers in parentheses correspond to those in Figure 1. For each column and variable, the first value is from the initial analysis, the second value is from the analysis controlling for SAT score, the third value is from the analysis controlling for general perceived competence, the fourth value is from the analysis controlling for competence expectancies for the class, the fifth value is from the analysis controlling for impression management, and the sixth value is from the analysis controlling for self-deceptive enhancement. Pap = performance-approach; Pav = performance-avoidance.

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

Participants were enrolled in an introductory-level psychology course where evaluation was based on a normative grading structure. The mean age of participants was 19.15; ethnicity was as follows: 176 Caucasian, 10 African American, 32 Asian, 11 Hispanic, and 11 unspecified.

Procedure. As in Study 1, participants reported their demographic information and their verbal SAT score in a large group session at the beginning of the first week of the semester. At the end of the first week, they completed a measure of general perceived competence in a take-home questionnaire packet. During the second week of the semester, participants completed a perceived class competitiveness measure and a response bias measure in another take-home questionnaire packet. Participants reported their performance-approach and performance-avoidance goals for their midterm exam, as well as their competence expectancy for the exam, in a large group session approximately 2 months later (1 week prior to the exam). Exam performance data were acquired from the course professor (possible range = 0–100). For all assessments, participants were assured that their responses would remain confidential and would in no way influence their course grade.

Measures. To assess perceived class competitiveness, we created a five-item face valid measure for this study (e.g., “In this class, it seems that students are competing with each other”). Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale ($\alpha = .91$). Elliot and Murayama’s (2008) achievement goal measure was used to assess participants’ performance-approach goals (three items, e.g., “My goal is to perform better than the other students on the exam”) and performance-avoidance goals (three items, e.g., “My goal is to avoid performing poorly compared to others on the exam”). Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale ($\alpha = .94$ and $.84$, respectively).

For control variables, in addition to participants’ verbal SAT score, we assessed their general perceived competence ($\alpha = .82$) and response bias (IM and SDE; $\alpha = .67$ and $.70$) with the same measures used in Study 1. Competence expectancies were assessed

with the same measure used in Study 1 ($\alpha = .87$) but focused on the exam, not the class.

Results and Discussion

Perceived class competitiveness as a direct predictor of exam performance. Analogous to Study 1, we first examined perceived class competitiveness as a direct predictor of exam performance. We used a latent variable model; perceived class competitiveness was represented as a latent variable (with individual items as indicators), whereas exam performance was represented as an observed variable. As expected, perceived class competitiveness was not a significant predictor of exam performance ($\beta = .09$, $p = .15$).

The mediational model. We then investigated the hypothesized opposing processes model in which performance-approach and performance-avoidance goals serve as joint mediators of the indirect relation between perceived class competitiveness and exam performance. Perceived class competitiveness, as well as performance-approach and performance-avoidance goals, were modeled as latent variables with individual items as indicators, whereas exam performance was represented as an observed variable.

As predicted, perceived class competitiveness was a positive predictor of both performance-approach goals ($\beta = .35$, $p < .01$) and performance-avoidance goals ($\beta = .25$, $p < .01$). In addition, performance-approach goals were a positive predictor of exam performance ($\beta = .44$, $p < .01$), whereas performance-avoidance goals were a negative predictor ($\beta = -.45$, $p < .01$). Again, the model provided a good fit to the data: $\chi^2(50) = 110.95$, $p < .01$, CFI = .96, TLI = .95, RMSEA = .071, indicating that the weak direct effect can be explained by the opposing effects of performance-approach and performance-avoidance goals. Testing the significance of the indirect effects (as in Study 1) showed that both the positive indirect effect (perceived class competitiveness $\rightarrow$ performance-approach goals $\rightarrow$ exam performance) and the negative indirect effect (perceived class competitiveness $\rightarrow$ performance-avoidance goals $\rightarrow$ exam performance) were significant.

mance-avoidance goals $\rightarrow$ exam performance) were significant (standardized estimates = .15 and -.11, respectively, $ps < .01$). The results are summarized in Table 5.

Control variable analyses. Again, we repeated each of the above analyses controlling for variables that could influence the focal relations. Specifically, we (independently) controlled for SAT score, general perceived competence, competence expectancies for the exam, and IM and SDE response biases. As may be seen in Table 7, each of the nonsignificant (direct effect) and significant (indirect effect) findings from the primary analyses remained the same in these analyses.

In sum, the results indicate that perceived class competitiveness is not a direct predictor of exam performance but is an indirect predictor via achievement goals. Performance-approach and performance-avoidance goals were validated as mutually opposing mediators of the perceived class competitiveness-performance relation, and it is these opposing processes that produced the null direct relation. The obtained results were not a function of participants' general ability (SAT score), perceived ability (general perceived competence and specific competence expectancies), or response bias (impression management and self-deceptive enhancement).

Study 3

In Study 3, we sought to conceptually replicate Studies 1 and 2 using structural competition, rather than trait competitiveness or perceptions of competitiveness, as the independent variable, and anagram performance as the dependent variable. That is, we manipulated competition in the lab and examined the effect of this manipulation on anagram performance both directly and via task-specific performance-approach and performance-avoidance goals. We included a baseline performance measure to ensure that any observed relations with task performance would not be a mere artifact of preexisting differences in ability.

Method

Participants and experimental design. Fifty-six (14 male, 42 female) students at a U.S. university participated in return for extra course credit. The mean age of participants was 19.83, and ethnicity was as follows: 43 Caucasian, 11 Asian, 1 Hispanic, and 1 unspecified. Participants were randomly assigned to either a competition condition or a control condition.

Procedure and materials. The experiment was run with two participants at a time; the participants were placed in adjoining lab rooms but never saw or interacted with each other in any way. Once both participants arrived, the experimenter opened the doors to the individual lab rooms and stood between the rooms to provide instructions to the two participants simultaneously.

First, participants were instructed to complete the practice (baseline) anagram task for 5 min. Then, participants in the competition condition were informed that they would complete another version of the 5-min anagram task but that this time they would do so in competition with the person in the other room. They were asked to try their best in competing against the other person and were told that they would receive information regarding their score and whether they had won, lost, or tied after completion of the task. Participants in the control condition were simply informed that

they would complete another version of the 5-min anagram task. They were asked to try their best in solving the anagrams and were told that they would receive information regarding their score after completion of the task (see Tauer & Harackiewicz, 1999, for a similar manipulation). Immediately following the manipulation, participants reported their performance-approach and performance-avoidance goals for the upcoming anagram task using Elliot and Murayama's (2008) achievement goal measure on a 1 (*strongly disagree*) to 9 (*strongly agree*) scale ($\alpha_s = .92$ and $.86$, respectively). Then participants completed the (postmanipulation) anagram task.

We used anagrams for the experimental task, because previous research has shown that anagrams are sensitive to motivational manipulations (e.g., Elliot, Maier, Moller, Friedman, & Meinhardt, 2007; A. Miller & Hom, 1990). We developed two different sets of anagram tasks (one for baseline and one for postmanipulation), both of which involved solving 16 five-letter, single-solution anagrams over a 5-min period. The anagram sets were derived from a published list (Mayzner & Tresselt, 1966), and the anagram items were selected on the basis of average solution time to ensure that each set would represent a moderate level of difficulty.

Results and Discussion

Competition manipulation as a direct predictor of anagram performance. First, we examined the direct effect of the competition manipulation on postmanipulation anagram performance controlling for baseline anagram performance (to increase the statistical power to detect the direct effect). We used structural equation modeling; the competition manipulation (competition = +1, control = 0), baseline anagram performance, and postmanipulation anagram performance were all represented as observed variables. Baseline anagram performance was a positive predictor of postmanipulation anagram performance ($\beta = .61$, $p < .01$); as expected, the competition manipulation did not have a significant effect on postmanipulation anagram performance ($\beta = -.13$, $p = .32$).

The mediational model. We then investigated the hypothesized opposing processes model in which performance-approach and performance-avoidance goals serve as joint mediators of the indirect relation between the competition manipulation and postmanipulation anagram performance (controlling for baseline anagram performance). Given the modest sample size in the experiment, performance-approach and performance-avoidance goals, as well as the competition manipulation, baseline anagram performance, and postmanipulation anagram performance, were represented as observed variables.

As predicted, the competition manipulation had a positive influence on both performance-approach goals ($\beta = .39$, $p < .01$) and performance-avoidance goals ($\beta = .46$, $p < .01$). Baseline anagram performance was a positive predictor of postmanipulation anagram performance ($\beta = .58$, $p < .01$) and, more important, performance-approach goals were a positive predictor of postmanipulation anagram performance ($\beta = .44$, $p < .05$), whereas performance-avoidance goals were a negative predictor ($\beta = -.45$, $p < .05$). The model provided a good fit to the data: $\chi^2(1, N = 56) = 0.00$, $p = .95$, CFI = 1.00, TLI = 1.08, RMSEA = .00, indicating that the weak direct effect can be explained by the opposing effects of performance-approach and performance-

avoidance goals. Testing the significance of the indirect effects (as in the prior studies) showed that both the positive indirect effect (competition manipulation $\rightarrow$ performance-approach goals $\rightarrow$ anagram performance) and the negative indirect effect (competition manipulation $\rightarrow$ performance-avoidance goals $\rightarrow$ anagram performance) were significant (standardized estimates = .17 and -.20, respectively, $ps < .05$). The results are summarized in Table 5.

In sum, the results indicate that structural competition is not a direct predictor of anagram performance but is an indirect predictor via achievement goals. Performance-approach and performance-avoidance goals were validated as mutually opposing mediators of the structural competition–performance relation, and it is these opposing processes that produced the null direct relation. The obtained results were not a function of preexisting differences in ability.

Sex Effects in Studies 1–3

We conducted multigroup analyses for each study to test for possible sex differences in our data. Specifically, we used a log-likelihood ratio test to examine if the effects observed in the preceding analyses were invariant across males and females (Bollen, 1989). The analyses indicated that for Studies 1, 2, and 3 the path coefficients were not significantly different across sex for both the direct effect and mediational models ($ps > .10$). Each of the nonsignificant (direct effect) and significant (indirect effect) findings from the primary analyses remained the same in these analyses.

General Discussion

The relation between competition and performance is an important topic of inquiry, integral to conceptual and practical issues in many different psychological disciplines. Despite considerable research activity addressing this relation, little clarity or agreement has been reached to date, and polarizing debate is the norm in this literature. It is in this context that we carried out the present work, designed to systematically review prior empirical research and to propose and test a new model of the competition–performance relation.

Overview of Results

We commenced our research with a meta-analysis that focused on each of the three basic conceptualizations of competition—trait competitiveness, perceived environmental competitiveness, and structural competition. For trait competitiveness and perceived environmental competitiveness, the meta-analysis represents the first of its kind; for structural competition, it represents a much needed updating of the last comprehensive meta-analysis conducted 30 years ago. In two of the three instances (i.e., perceived environmental competitiveness and structural competition), the meta-analysis revealed a nonsignificant relation, and in the other (i.e., trait competitiveness), the significant relation was so small ($r = .05$) as to be of trivial importance. These results held across ancillary analyses focused on omitting outliers and attending to various study characteristics. An omnibus meta-analysis collapsing across the three conceptualizations also yielded a nonsignificant relation. Given the prevalence of competition in daily life and the

multitude of theorists positing the existence of a competition–performance relation (be it negative or positive), these results may seem disappointing, if not disconcerting. A straightforward interpretation of these results would lead to the conclusion that competition has no noteworthy influence on performance. We refute this straightforward interpretation herein, providing, in its stead, a conceptual model that explains the reason for the null relation.

Our model, the opposing processes model of competition and performance, posits that the observed null relation is actually the result of antagonistic appetitive and aversive processes that cancel each other out (Figure 1b). We conducted an additional meta-analysis to put this model to test, and the results yielded clear support for the model. The MASEM analysis revealed that opposing indirect effects involving performance-approach and performance-avoidance achievement goals explained the null competition–performance link observed in the original meta-analysis. Furthermore, we also conducted three new empirical studies to directly test our model and address the limitations inherent in the MASEM analysis. The results consistently yielded clear support for the opposing processes model. These studies revealed no effect for the direct relation between competition and performance (consistent with our initial meta-analytic results) but revealed inconsistent mediation via performance-approach and performance-avoidance achievement goals (consistent with our MASEM results). Importantly, our findings supported the proposed model for each of the three different conceptualizations of competition, across participants' sex and a variety of different control variables (general perceived competence, specific competence expectancies, impression management, self-deceptive enhancement, SAT score, and baseline performance), and with achievement goal assessments that exclude theoretically extraneous components. Taken together, the findings from our MASEM analysis and our three new studies provide extremely strong evidence for the validity of the opposing processes model of competition and performance.

Connection to Existing Theoretical Work

Given the conceptual and practical importance of the competition–performance relation and its relevance across multiple disciplines, it is not surprising that many scholars over the years have offered theories or approaches that either directly address or are clearly relevant to this topic. In the following, we give an overview of the most prominent of these theories and approaches, with an eye toward delineating how they explain the competition–performance relation and how their account is similar to or different from that offered by the opposing processes model.

Social facilitation theories. In a famous social-psychological experiment, Triplett (1898; see also Féré, 1887) demonstrated that children do better on a simple fishing reel task when they perform alongside another child. This research spawned a voluminous and still active literature on social facilitation (for reviews, see Aiello & Douthitt, 2001; Bond & Titus, 1983; Guerin, 1993). Although the initial experiment indicated that performance was enhanced in the presence of others, subsequent research showed that performance could be impaired in such instances as well; both performance enhancement and impairment in the presence of others now fall under the rubric of social facilitation. A basic premise of social facilitation research is that performance is enhanced on simple tasks but is impaired on complex tasks (Za-

jonc, 1965). Many explanations have been offered for this task difficulty moderation, none of which have risen to the level of consensus (Aiello & Douthitt, 2001).

Although the initial impetus for social facilitation research was a desire to understand the competition–performance relation (see Triplett, 1898), researchers soon separated competition from social presence *per se* and explicitly focused on the latter (Allport, 1920). As such, social facilitation theories are not directly relevant to the opposing processes model. Nevertheless, a few observations may be offered in comparative fashion. First, we think the opposing processes model can be straightforwardly extended to apply to social facilitation effects and, more specifically, to account for task difficulty moderation. The presence of others should enhance competence valuation, the degree to which individuals care about doing well or poorly (Harackiewicz, Manderlink, & Sansone, 1984), thereby enhancing goal commitment (Elliot & McGregor, 2001). Facing a simple or well-learned task under such circumstances should promote challenge appraisals and a focus on success, which are known to foster performance-approach goals (McGregor & Elliot, 2002), whereas facing a complex or difficult task should prompt threat appraisals and a focus on failure, which are known to evoke performance-avoidance goals (Chalabaev, Major, Cury, & Sarrazin, 2009). Performance-approach and performance-avoidance goals, in turn, have beneficial and detrimental effects on performance, respectively (as documented in our MASEM analysis and new empirical studies; for a compatible account within the social facilitation literature focused on cardiovascular responses to stressors, see Blascovich, Mendes, Hunter, & Salomon, 1999).

Second, meta-analytic research has implicated approach and avoidance relevant personality constructs as moderators of social facilitation effects, independent of any influence of task difficulty. Specifically, Uziel (2007) has shown that social presence facilitates the performance of individuals with a “positive orientation” (i.e., extraverts and those high in self-esteem), but debilitates the performance of individuals with a “negative orientation” (i.e., those who are highly anxious and have low self-esteem); these patterns held across levels of task difficulty. Again, an extended opposing processes model can straightforwardly account for such findings. The positive dispositions in question have been shown to be strongly associated with performance-approach goals, whereas the negative dispositions have been shown to be strongly associated with performance-avoidance goals (Elliot & Thrash, 2002; Heimpel, Elliot, & Wood, 2006). It is likely that these dispositions prompt their corresponding goals in achievement situations, which, in turn, influence performance outcomes as specified in our MASEM analysis. To reiterate, the social facilitation literature does not focus on the competition–performance relation *per se*, but the opposing processes model seems easy to apply to the effects documented in this literature.

Social interdependence theory. From Deutsch’s (1949, 1962) original formulation to the present, social interdependence theory has played an important role in explaining the effects of competition and cooperation on various outcomes, including performance (Deutsch, 1949; Johnson & Johnson, 1989, 2005). In social interdependence theory, competition is defined as the existence of negative interdependence, where individuals perceive that they can obtain their objectives only if the other individuals with whom they are competitively linked fail to obtain their objectives.

Cooperation, on the other hand, is defined as the existence of positive interdependence, where individuals perceive that they can reach their objectives only if the other individuals with whom they are cooperatively linked also reach their objectives. A third category of interdependence, labeled individualistic, is said to exist when individuals perceive that they can reach their objectives regardless of whether others reach their objectives (Deutsch, 1962). In the main, competitive relations among individuals are posited to reduce effective behavior, increase negative emotional attachment to others, and undermine task performance (Johnson & Johnson, 1989, 2005).

Importantly, both conceptually and empirically, the primary focus of social interdependence theory is on cooperation among individuals and its beneficial effects on psychological functioning (including performance); competitive and individualistic relations between individuals get relatively little attention and are essentially used as comparisons for the central focus, cooperation (Johnson & Johnson, 2005). Meta-analytic research on performance outcomes clearly supports the central premise of social interdependence theory—that cooperative relations lead to more positive outcomes than competitive and individualistic relations (Johnson et al., 1981; Qin et al., 1995; Roseth et al., 2008; Stanne et al., 1999). However, a close reading of the published meta-analytic results reveals that the competitive versus individualistic contrast is null for performance outcomes, not favoring individualistic relations as one might anticipate on the basis of the theory. Researchers in this tradition have begun to allocate attention to the possibility (initially suggested as early as 1987 by Johnson and Johnson), that some types of competition may lead to positive performance outcomes (Stanne et al., 1999; Tjosvold et al., 2006). Specifically, competition may be beneficial when individuals are explicitly assured that everyone has a chance to win (i.e., constructive competition). Preliminary supportive data for this premise have been reported (Stanne et al., 1999; Tjosvold et al., 2006), but little research has been conducted to date.

Interdependence theory proposes that the way independence is structured determines how individuals interact with each other which, in turn, influences performance outcomes (Deutsch, 1962; Johnson, 2003). Thus, with regard to mediation, interpersonal rather than intrapersonal, constructs are the main focus. Occasional reference is made to achievement goals—mastery and performance goals—but only as approach-based “desired outcomes” (Roseth et al., 2008, p. 224). Furthermore, these goals are either construed as analogous to forms of interdependence (with cooperation and competition mapping onto mastery and performance goals, respectively; Roseth et al., 2008) or cast as broad motives that dictate the degree to which individuals compete in a constructive manner (Tjosvold et al., 2006). Thus, the foci of social interdependence theory and the opposing processes model are clearly very different. In contrast to social interdependence theory, the opposing processes model focuses on competition *per se*, posits that the overall effect of competition on performance is null, proposes two mutually canceling approach and avoidance processes that account for this null relation, and uses performance-approach and performance-avoidance goals as situation-specific mediators of competition effects. The two models do not contradict or conflict with one another, but rather have different emphases and may be viewed as complementary analyses of competition–performance relation. Social interdependence theory is broader in

focus and attends to cooperation as well as competition, while the opposing processes model delves more deeply into competition per se and delineates the intrapersonal processes through which competition has beneficial or detrimental effects.

Cognitive evaluation theory. Cognitive evaluation theory (Deci & Ryan, 1985) specifies how social and environmental factors, including competitive structures, help or hinder human motivation. From the perspective of this framework, competition typically engenders a controlling rather than an autonomy supportive environment, and this shifts the perceived locus of causality from internal to external, resulting in decreased intrinsic motivation (Deci & Ryan, 1985). A number of studies have provided data consistent with this perspective, although competitive outcome (i.e., win vs. lose) has been identified as a critical moderator variable (Deci, Betley, Kahle, Abrams, & Porac, 1981; Reeve & Deci, 1996; Vallerand & Reid, 1984; Vansteenkiste & Deci, 2003).

With regard to competition, this theory focuses primarily on intrinsic motivation and makes no explicit predictions regarding the competition-performance relation. Intrinsic motivation is presumed to be an important energizer of behavior that facilitates optimal functioning; intrinsic motivation and task performance are thought to be related in some instances but not others (Deci, Koestner, & Ryan, 1999; Deci & Ryan, 1985). Cognitive evaluation theory explains competition effects at the level of needs and motives, rather than goals. Competition is posited to undermine intrinsic motivation (in most instances) because it interferes with one's basic need to feel autonomous (Deci & Ryan, 1985).

Although the opposing processes model does not address the competition-intrinsic motivation relation, it seems straightforward to extend the model to account for this link. Research on the competition-intrinsic motivation relation has yielded somewhat inconsistent results, with some studies showing negative effects, but others showing null or even positive effects (see Reeve & Deci, 1996; Tauer & Harackiewicz, 2004); we suspect that a meta-analysis of the literature would reveal a small negative effect. Our MASEM analysis clearly showed that competition is a positive predictor of both performance-approach and performance-avoidance goals, so the first component of the extended model is already in place. Achievement goal research indicates that performance-avoidance goals are a clear negative predictor of intrinsic motivation, whereas performance-approach goals tend to be unrelated or show a positive relation (Elliot & Moller, 2003; Finney, Pieper, & Barron, 2004; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Lopez, 1999; Van Yperen, 2006). Thus, the nature of the direct competition-intrinsic motivation relation seen in the literature may be a function of the opposing influences of performance-approach and performance-avoidance goals, with the somewhat negative overall relation being a function of the somewhat stronger negative influence of performance-avoidance goals. Given that performance and intrinsic motivation are widely regarded as two of the most important outcomes in competition settings, we have already commenced meta-analytic work on the competition-intrinsic motivation relation to test these possibilities.

Motivational traits approach. Kanfer and Heggstad (1997; see also Kanfer & Ackerman, 2000) proposed a taxonomic framework of motivational traits and skills in an attempt to organize theory and research on work motivation. They identify two superordinate, integrative motivational traits—achievement and anxiety—as well as two lower level motivational skills—emotion

control and motivation control—as important variables in work motivation contexts. Achievement is conceptualized as an appetitive construct that encompasses competitive excellence and mastery, whereas anxiety is conceptualized as an aversive construct that encompasses fear of failure and test anxiety. Achievement and anxiety are posited to influence the development of emotional and motivational skills, with those high in achievement selecting themselves into challenging situations that facilitate skill development and those high in anxiety avoiding challenging situations, which leads to poor skill development (Kanfer & Heggstad, 1997). In general, motivational skills are posited to have a proximal influence on behavior and motivational traits are posited to have a distal influence on behavior; no specific predictions with regard to performance are proffered.

The opposing processes model shares some surface similarities with the motivational traits approach, in that both focus (in part) on trait competitiveness, both use the approach-avoidance distinction, and both posit two levels of constructs that have differential effects (proximal and distal) on behavior. Aside from these general commonalities, however, the two perspectives are very different. First, the purpose of the motivational traits approach is to provide an integrative taxonomy of individual differences in work motivation, whereas the purpose of the opposing processes model is to provide a motivational account of the competition-performance relation. Second, the motivational traits approach conceptualizes competition entirely in dispositional terms, whereas the opposing processes model incorporates other, nondispositional, aspects of competition as well. Third, the motivational traits approach does not incorporate a situation-specific goal construct, whereas such goals are at the centerpiece of the opposing processes model. Fourth, the motivational traits approach identifies constructs that may be involved in the competition-performance relation but does not delineate any specific hypothesis about this relation, whereas the opposing processes model both identifies the relevant constructs and proposes specific hypotheses about how they work in concert to predict and explain performance outcomes.

Goal-setting theory. Locke and Latham's (1990, 2002) goal setting theory is a well-established framework that focuses on the goal-performance relation. The basic premise of the theory is that commitment to specific, challenging goals enhances task performance (Locke & Latham, 1990). Although competition is not a central aspect of goal-setting theory, Locke and Latham (Locke, 1968; Locke & Latham, 1990) have offered a clear, specific prediction regarding the competition-performance relation. Specifically, they posit that competition is an incentive that facilitates performance attainment; competition is thought to foster positive goal-setting processes (e.g., enhanced goal commitment, adoption of more challenging goals) which, in turn, are beneficial for performance.

Goal-setting theory and the opposing processes model share a central premise, namely, that goals mediate the relation between competition and performance. In addition, in both approaches, the qualitative nature of goals is important in predicting performance outcomes. However, there are several important differences between the two frameworks. Unlike the opposing processes model, goal-setting theory construes competition in exclusively appetitive terms as a positive incentive that has a direct positive influence on performance (Hinsz, 2005). Also unlike the opposing processes model, goal-setting theory conceptualizes goals entirely in appet-

itive terms; no mention is made of the approach–avoidance distinction or the possibility that goals may focus on the avoidance of negative possibilities. A final difference between the two approaches concerns the performance–mastery distinction: the opposing processes model makes use of this distinction and focuses on performance-based goals *per se*; Lock and Latham (2002) have made reference to the performance–mastery distinction in some of their work, but not within the context of competition. Thus, although the opposing processes model and goal-setting theory share some important features, goal-setting theory is limited in the context of the competition–performance relation, in that it can account for neither the null direct effect found in our meta-analysis nor the undermining of performance via the performance–avoidance goal process.

Choking under pressure. Baumeister and Showers (1986) noted that individuals sometimes “choke under pressure,” defined as performing suboptimally under pressure conditions. They defined pressure as the presence of situational incentives or cues for optimal or superior performance, with competition identified as one important form of pressure situation. Competition, whether explicitly established or implicitly encouraged, is posited to increase the probability that choking will occur. Baumeister and Showers also identified three types of variables that increase the likelihood of choking under pressure: task complexity (more choking is predicted on difficult or complex tasks); efficacy expectancies (more choking is predicted when efficacy expectancies are low); and individual differences in anxiety (a high level leading to more choking), self-consciousness (a high level leading to more choking), and skill level (a low level leading to more choking).

The choking under pressure analysis of competition is compatible with the opposing processes model in that both approaches predict that competition can undermine performance attainment. Indeed, it is likely that performance–avoidance goals are at least one mediator of the choking under pressure effect (for relevant empirical research, see Brodish & Devine, 2009; Cury, Elliot, Da Fonseca, & Moller, 2006). However, there are clear and important differences between the two approaches. Unlike the opposing processes model, the emphasis in the choking under pressure analysis is primarily on the aversive implications of competition and its negative influence on performance. In this respect, it is essentially the avoidance-based analog of goal-setting theory, as detailed above. In addition, unlike the opposing processes model, the choking under pressure analysis does not make use of the goal construct in accounting for performance in competition settings. Thus, much like goal-setting theory, the choking under pressure analysis is limited with regard to the competition–performance relation, in that it can account for neither the null direct effect found in our meta-analysis nor the bolstering of performance via the performance–approach goal process.

In sum, there are several different theories and approaches available that address or are relevant to the competition–performance relation. What is perhaps most striking about our overview of these theories and approaches is how few of them focus directly and specifically on competition *per se*, much less on the competition–performance relation. In most, competition is one of several foci, and even the impressive, well-developed theories that seem dedicated to explicating competition effects at first glance prove on closer examination to be more focused on other phenomena (e.g., social presence for social facilitation the-

ory, cooperation for social interdependence theory). It is also important to note that none of the existing theories or approaches contradict or are incompatible with the opposing processes model in any way. In several instances, independent nonoverlapping ground is covered (e.g., cognitive evaluation theory). In others, contradiction may seem apparent (e.g., goal-setting theory’s stance that competition enhances performance or the prediction from the choking under pressure analysis that competition undermines performance), but in these instances the existing explanations are best seen as accurate but incomplete accounts that are entirely compatible with the specific components of the broader, more comprehensive opposing processes model. Indeed, the opposing processes model offers a more comprehensive and precise account of the competition–performance relation than any of the other existing theories and approaches.

Model Expansion

The present research demonstrates the validity and utility of the opposing processes model of competition and performance, and a logical next step is to consider how the model may be expanded and further developed in future research. One promising avenue would be to extend the model to incorporate different types of competition. At present, competition is considered in terms of its presence/absence or high/low amount, albeit with regard to three different conceptualizations (trait, perceived environment, environmental structure). It would be helpful to extend the model to consider the performance implications of different qualitative types of competition such as zero-sum, face to face, and intergroup (Deutsch, 1949; Stanne et al., 1999; Tauer & Harackiewicz, 2004). Another possibility would be to extend the model beyond competition to include cooperation, following the lead of social interdependence theory. It is likely that the positive influence of cooperation on performance outcomes, so clearly documented by Johnson and Johnson (1989, 2005) and their colleagues (Roseth et al., 2008; Stanne et al., 1999; Tjosvold et al., 2006), is mediated by mastery–approach goals. Unlike performance-based goals, which are rooted in social comparison, mastery–approach goals focus on attaining task-based or intrapersonal competence (Dweck, 1986; Nicholls, 1984). These goals have an inconsistent relation with performance, but theorists have hypothesized that they are beneficial for performance outcomes in several instances (Elliot, 2005; Midgley, Kaplan, & Middleton, 2001). We think cooperative contexts are one such instance, as the task–intrapersonal focus of mastery–approach goals seems highly compatible with the interdependent emphasis of these settings (Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2009; Tossman, Kaplan, & Assor, 2008).

Future work on the opposing processes model would also do well to adopt a more expansive focus with regard to performance outcomes, and outcomes more generally. In the present empirical investigations, we examined the influence of competition on two different performance variables—exam performance and anagram performance. Achievement tasks vary considerably in terms of the types of skills and abilities required (e.g., motor, perceptual, cognitive, etc.) and the domain in which the performance takes place (the classroom, the workplace, the ball field, etc.). Our meta-analytic data indicated that the competition–performance relation was the same (null or very weak) in each of these instances, suggesting that comparable mutually opposing processes were

operative accordingly. Nevertheless, subsequent work directly examining this issue would be welcomed. In addition, other outcomes beyond performance, such as intrinsic motivation (as discussed earlier), control beliefs, subjective well-being, and physical health are also worthy of empirical attention. To the extent that subsequent research yields supportive findings for outcomes beyond performance, the label of our model should be broadened accordingly to the opposing processes model of competition (*per se*).

Expansion is also possible with regard to the mediator variables in the model. We focused on achievement goals as mediators in the present research, because they have been shown to have tremendous explanatory and predictive utility in prior work on achievement motivation (Dweck, 1999; Elliot, 2005; Nicholls, 1989). Indeed, we view achievement goals as integral to a motivationally based conceptualization of competition and have difficulty envisioning a satisfactory account of competition and performance absent this construct. As such, when considering other mediational candidates, we view them as complements to rather than replacements for performance-approach and performance-avoidance goals. Regarding the link between competition and achievement goals, we think challenge and threat appraisals (or their corresponding cardiovascular activity; Blascovich & Mendes, 2000) are good candidates for inclusion, as they represent dynamic appetitive and aversive evaluations of the potential for gain or loss in the achievement context (Lazarus, 1991; see our earlier discussion on social facilitation) that have been linked to achievement goal pursuit in prior work (see Chalabaev et al., 2009; Elliot & Reis, 2003; McGregor & Elliot, 2002). To the extent that competition evokes challenge appraisals, the pursuit of performance-approach goals is likely, and to the extent that that competition evokes threat appraisals, the pursuit of performance-avoidance goals is likely. Regarding the link between achievement goals and performance, we think that task absorption and task distraction are good candidates for inclusion, as prior research has shown that these indicators of cognitive immersion carry important information about the quality and effectiveness of achievement goal pursuit (Cury, Elliot, Sarrazin, Da Fonseca, & Rufo, 2002; Harackiewicz & Sansone, 1991; Lee, Sheldon, & Turban, 2003). Task absorption likely mediates the positive influence of performance-approach goals on performance, whereas task distraction likely mediates the negative influence of performance-avoidance goals on performance. Examination of these relations in future research promises to yield a more detailed and complete understanding of the way in which performance-approach and performance-avoidance goals themselves operate as mediators of the competition–performance relation (and beyond).

Our model posits that competition evokes both performance-approach and performance-avoidance goal pursuit and that these appetitive and aversive processes have a mutually antagonistic influence on performance. The fact that our meta-analytic and new empirical results revealed a null effect suggests that these appetitive and aversive processes are usually of similar strength. This need not always be the case; in instances when one process is considerably stronger than the other, a positive or negative influence of competition on performance might be witnessed. That is, moderator variables undoubtedly exist that affect the relative weights of appetitive or aversive mediation effects. In fact, our previous overview of other relevant theoretical perspectives may

be consulted to derive promising moderator variable candidates, such as task difficulty, evaluative pressure, self-esteem, and self-consciousness. A systematic investigation of moderation would be welcomed in future research, as it is relevant to both theory and practice.

Broader Considerations and Contributions

Competition is a topic of widespread interest across scholarly disciplines and levels of analysis. Views on competition not only vary with regard to individual psychological processes, our focus herein but also with regard to educational and occupational structures, economic and political systems, and broad metatheoretical assumptions about human nature and the purpose of life. Given this intellectual context, we think it is important to highlight that our analysis of competition and performance is meant to be descriptive and explanatory, not prescriptive. By documenting that competition, when accompanied by performance-approach goals, facilitates performance outcomes, we are not advocating for competitive traits or structures or for the use of normatively focused forms of self-regulation. Likewise, by documenting that competition, when accompanied by performance-avoidance goals, undermines performance outcomes, we are not advocating against competitive traits or structures or against the use of normatively focused forms of self-regulation. On the basis of the present conceptual and empirical research, it is possible to state in emphatic terms that competition can be both beneficial for and detrimental to performance. However, formulating a position on the relative merits or demerits of competition for individuals, organizations, and societies is a complex and variegated task well beyond the present scope.

The opposing processes model fits nicely into the rich tradition of hierarchical models in achievement motivation literature that integrate both general motivational orientations and more specific forms of self-regulation, such as strategies, tactics, and goals (Cattell, 1957; Elliot, 1997; Emmons, 1989; Lewin, 1935; Little, 1989; McClelland, 1951; McDougal, 1908; Murray, 1938; Nuttin, 1984; Rotter, 1954; Sheldon, 2004). In the opposing processes model, performance-approach and performance-avoidance goals represent specific forms of self-regulation, and competition (in its various forms) is presumed to prompt a general motivational concern about normative competence that is then regulated by the two goals. A noteworthy strength of this and other hierarchically based models is that they, unlike many motivation frameworks, are able to account for both the energization (*i.e.*, initial instigation) and direction of behavior.

In addition to contributing to the competition literature, and the achievement motivation literature more generally, the present research also provides a much needed illustration of the importance of attending to inconsistent mediation in social science research (MacKinnon, 2008). Despite a clear declaration by contemporary methodologists that mediation can be present in the absence of a direct effect (Kenny et al., 1998; MacKinnon et al., 2000), empirical work exhibiting this type of pattern remains rare, suggesting a continuing reticence to embrace this perspective. This is unfortunate, as inconsistent mediational processes are likely quite commonplace (Zhao et al., 2010); if so, failing to explore such processes can only retard theoretical and empirical progress. Accordingly, we hope that the present documentation of a highly

robust (replicated several different ways), conceptually sensible form of inconsistent mediation will help coax potentially reticent researchers to move past the now outdated convention of waiting for establishment of a direct effect before examining mediation.

Conclusion

Summary statements about the benefits and ills of competition are often quite strident, and this seems true regardless of whether they come from the person on the street, the pundit or politician on television, or the scholar in academia. The take-home message from the present research is that at the level of individual psychological processes, competition appears to be neither entirely beneficial nor entirely detrimental to performance. Rather, our work indicates that the competition–performance relation varies as a function of the type of achievement goals pursued. Accordingly, our research highlights the need for a nuanced, integrative approach to this important area of inquiry.

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Appendix

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COMMENT

Competition and Performance: More Facts, More Understanding? Comment on Murayama and Elliot (2012)

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Murayama and Elliot (2012) made a significant contribution to the literature on competition by presenting the results of 2 meta-analyses and 3 primary studies on the relation between competition and performance. Murayama and Elliot established that in general, there is no relationship between competition and performance. They then made the case that the lack of relationship is due to 2 opposing processes (performance-approach and performance-avoidance goals) that cancel each other out. The meta-analyses made a significant contribution to the literature on competition but had problems with the way in which the types of competition were defined and the clarity of the control condition. Their opposing processes model suffers from the relatively high relationship between performance-approach and performance-avoidance goals, their failure to include likelihood of success or failure in their model, and the lack of specification of the process through which competition prompts one type of goal or the other. Their results do highlight the need for further research on competition focusing on the combination of personality traits and situational variables.

Keywords: competition, cooperation, performance

Murayama and Elliot (2012) have made a significant contribution to the literature on competition by presenting the results of two meta-analyses and three primary studies on the relation between competition and performance. The first meta-analysis included 177 studies and approximately 32,000 participants and found no significant relation between competition and performance. The second meta-analysis reexamined the results from the first, now including 473 studies and over 140,000 participants and using meta-analytic structural equation modeling (MASEM; Cheung & Chan, 2005; Viswesvaran & Ones, 1995) to test whether performance-approach and performance-avoidance achievement goals represent inconsistent mediators of the competition–performance relation. MASEM results supported their prediction and, more generally, the opposing processes model of competition and performance. Finally, as if two meta-analyses were not enough, Murayama and Elliot also presented three primary empirical studies testing the opposing processes model across three different ways of operationalizing competition. Any part of this research program may have been published independently, and we applaud Murayama and Elliot's efforts to publish one article that is greater than the sum

of its individual parts. There are, however, a number of problems raised by their procedures and conclusions that may result in decreasing our understanding of competition and its relationship with performance. The first set of problems involves their meta-analyses, mainly their conclusions about the relationship between competition and performance, their definition of competition, and the ambiguous nature of the control condition. The second set of problems involves using their opposing processes model to explain the lack of relationship between competition and performance. This includes the disadvantages of an individual approach to competition and the interdependence between performance-approach and performance-avoidance goal orientations.

The Relationship Between Competition and Performance

Murayama and Elliot (2012) essentially found no relationship between competition and performance (correlation of 0.05 for the trait competition studies, -0.01 for the perceived competition studies, and 0.03 for the structured competition studies). These findings are both consistent with some previous meta-analyses but different from others. Reporting similar results, D. W. Johnson, Maruyama, Johnson, Nelson, and Skon (1981) found that, compared to individualistic conditions, the effect size of competition on performance for structural competition studies was 0.03 with 48 studies included in the analysis, and Roseth, Johnson, and Johnson (2008; focusing on early adolescents' academic achievement) found an effect size of 0.20 (ns) with 29 studies included in the analysis. Reporting dissimilar results, D. W. Johnson and Johnson (1989) found an effect size of 0.30 ($p < .05$) with 38 studies, and

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Stanne, Johnson, and Johnson (1999) found an effect size of 0.36 ($p < .05$) with 28 studies. In short, the null findings reported in the present meta-analysis are consistent with two previous meta-analyses, but inconsistent with two others. Perhaps the difference in results of the current meta-analysis and the Johnson and Johnson meta-analysis is due to the fact that only 21 of the 38 studies in Johnson and Johnson are found in the references of the current meta-analysis. While this meta-analysis may provide the definitive view of the relationship between trait competition and perceived competition and productivity, the inconsistency with the results for structural competition in this meta-analysis and two of the previous meta-analyses needs more study. It may be that for structural competition, competition results in higher achievement than do individualistic efforts.

Defining Three Types of Competition

While the results of the overall analysis are quite important, the way in which Murayama and Elliot (2012) defined types of competition is less helpful. Trait competition was defined as “a dispositional preference to compete with others in achievement situations” (p. 1036) and was operationalized by self-rating scales aimed at measuring the respondent’s competitiveness. Perceived competition was defined as “the cognitive construal of the competitive nature of the achievement setting” (Murayama & Elliot, 2012, p. 1036) and was operationalized by the response to questions or scales aimed at measuring the respondent’s perception of the degree to which competition was present in the situation. Structural competition was defined as “an actual situation in which two or more people vie for a mutually exclusive achievement outcome” (Murayama & Elliot, 2012, p. 1036) and was operationalized by the experimental structuring of competition into the situation. Thus, there are studies that used self-reference scales to measure a characteristic of the person (trait), respondent ratings of the perceived situation (perceived), and experimenter manipulations of competition as the independent variable (structural). The common element in the definitions is that competition involves comparing one’s progress with the progress of competitors to determine who is winning and who is losing (i.e., an other-based standard of performance). That is, all definitions of competition included normative social comparison.

There are problems with these definitions. First, what is actually used to group the studies is the operational definitions, not the conceptual definitions. This is appropriate because the dozens of researchers conducting each type of study probably used a number of different conceptual definitions while using essentially the same operational definition. Thus, the conceptual definitions given in the current article are examples of the ones the researchers used, but not a definitive definition. The focus is on the operational definitions.

Second, any one conceptual definition may be operationalized in all three ways. Deutsch’s (1949b, 1962) definition of competition, for example, has been operationalized as a situational structure (Deutsch, 1949a), as an attitude or trait scale (D. W. Johnson & Norem-Hebeisen, 1979), and as a perception of the situation (D. W. Johnson & Johnson, 1983). Different definitions of competition, derived from different theories, can have the same operational definition of competition (i.e., use the same trait scale, perception question, or experimental manipulation). Thus, when

Murayama and Elliot (2012) analyzed three ways of operationalizing competition, they were not really making conclusions about three types of competition. Rather, they were making conclusions as to the results of operationalizing competition in three different ways. The finding that it does not really matter how competition is operationalized, that the results are basically the same, may be a valuable contribution to the literature.

Third, the three ways of operationalizing competition are not really independent. Two are self-report measures of how competitive the respondent is and how competitive the situation is. The latter could be a projection reflecting the competitiveness of the respondent. Many times, when researchers are not sure respondents will tell the truth, they use indirect measures of a person’s traits (i.e., instead of asking how competitive the respondent is, they ask how competitive the situation or other people are). From the field theory perspective (Deutsch, 1962), furthermore, all three measures are perception variables. Deutsch (and Lewin) would argue that it is not what the experimenter intends that defines a situation as competitive, it is what the participant perceives. This is why there are manipulation checks in experiments. Just because the experimenter structures competition does not mean that respondents will behave competitively, so, at the end of the experiment, respondents are often asked to rate the competitiveness of the situation to ensure that in fact they correctly perceived the experimenter’s intentions in structuring the independent variable. Thus, all three types of competition could be viewed as being the same (i.e., perceived competition).

Fourth, Murayama and Elliot’s (2012) footnote about the practical utility of distinguishing among operational measures is correct, as they help to clarify the impact of operationalization on the results. What remains unclear, however, is what it means psychologically for competition to be “a characteristic of” (Murayama & Elliot, 2012, p. 1035) a person, perceived situation, or actual situation. Each type of operationalization does not seem to relate to specific psychological processes (other than normative social comparison), antecedents, or consequents (other than performance).

What should *not* be concluded from the authors’ article is that there are three conceptual types of competition. The fact that conceptual and operational definitions both have to be present in a well-defined concept does not mean that operational definitions are the basis on which conceptual definitions are built. Rather, conceptual definitions should be derived from theory, and operational definitions should follow with clear rules of correspondence. The cart (operational definition) usually does not go before the horse (conceptual definition).

Finally, while there is no theoretical structure tying all three ways of structuring competition together, it should be noted that the common element in all definitions is social comparison. At the end of the competition, performances are ranked to determine a winner and loser. It would be a mistake, however, to assume that all social comparison is competitive. All competition does involve social comparison, but not all social comparison involves competition.

The problem is not social comparison in and of itself. There is also social comparison in cooperative situations. Social comparison is inherent in the definition of the nature of competition. In cooperation, social comparison occurs as part of promotive interaction, where group members observe each other to see who needs help and assistance, who needs what resources to be successful,

what task and relationship skills do the other group members have and not have, who needs encouragement, and so forth. Such social comparisons do not promote competition among participants; rather, they enhance the quality of the cooperation taking place. Even in individualistic situations, if participants can see each other or monitor each other's work, social comparison tends to take place. Murayama and Elliot (2012) seemed to assume that social comparison is inherently competitive, but that is true only under certain conditions.

Is the Control Condition Neutral?

Murayama and Elliot (2012) took the position that only a comparison with individualistic efforts reveals the relationship between competition and performance. Competition involves comparing one's performance with the performance of others. Murayama and Elliot considered individualistic efforts to be neutral while cooperative efforts are not. In our opinion, it is the other way around—cooperation provides the neutral comparison while individualistic efforts provide an ambiguous and unclear source of comparison. Both competitive and individualistic efforts are self-centered, for example, while cooperation is both self- and other-centered. Competition involves oppositional interaction in which participants try to obstruct the performance of others, individualistic efforts involve no connection to others, and cooperation involves promotive interaction in which participants try to enhance others' performance. Comparing the two types of interaction, competitive and cooperative, may provide a better view of competition than comparing oppositional interaction with no interaction at all because in both oppositional and promotive interaction participants are linked to each other. Furthermore, if competition is defined by its standard of evaluation, namely, the normative comparison between individuals, then it remains unclear what standard of evaluation defines individualistic conditions other than trying to ignore other people. In actual classrooms, it may be impossible to ignore the behavior of classmates, and students may make normative comparisons even though they are not supposed to (D. W. Johnson & Johnson, 1989). Thus, it may be a problem that Murayama and Elliot did not define clearly the nature of the individualistic condition (other than it is not cooperative).

Throughout the history of research on social interdependence, defining individualistic efforts has been difficult. Allport (1920) noted, for example, that when individuals coacted on means-independent tasks (i.e., individualistic tasks), 80% reported feelings of competition. Although criterion-referenced procedures are now common in physical education skills and fitness testing (Hopple, 1995), such evaluation methods are still carried out in a public context that allows participants to monitor both their own and others' performance, thereby allowing for social comparison, which in many cases may change their perception of the situation from individualistic to competitive. Many teachers who tried to implement individualistic learning in the early 1970s found that students would compete with their classmates regardless of how the tasks were structured (D. W. Johnson & Johnson, 1975/1999). Thus, it may be difficult to find a neutral comparison with competition because, in many of the studies, it may be that perceived strong competition was being compared with perceived weak competition, especially when social comparison was possible. Whatever the case, the nature of the control condition in these

meta-analyses remains unclear and may be another source of variability between the present meta-analytic findings and previous meta-analyses.

Individual Versus Relational Views of Competition

There are two major ways in which competition may be understood. One is as an inherent property that resides in the person, such as traits, dispositions, values, attitudes, or genes, all of which are assumed to have a physical, neurophysiological representation of some kind. As an internal property, competitiveness is assumed to be basically static, remaining consistent across situations and time. From this perspective, psychologists typically search for laws that govern the competitiveness inside a single individual. In the authors' meta-analyses, trait competitiveness, perceived competition, and perceived structural competition may all be seen as operationalizations of a stable, enduring personality predisposition.

Explaining behavior solely or primarily in terms of inherent properties of the person reflects the Aristotelian mode of thought. Aristotle focused on the salient object and its attributes. Aristotle explained that a stone falling through the air is due to the stone having the property of "gravity." The reason that wood floats in water is that it has the property of "levity." The focus was exclusively on the object, with no attention paid to outside influences. From this point of view, a person competes because he or she has the property of "competitiveness." Psychologists who focus on individual differences seek laws governing how individual-difference variables predict behavior. A contribution of this meta-analysis is that it was primarily conducted from the individual-differences approach, providing a contrasting view of the literature from previous meta-analyses conducted from a relational perspective.

A second way to understand competition is by viewing it as a relational variable. From the relational approach, competition is something that exists between two or more persons. As an interaction pattern among participants, competition is assumed to be revealed only over time as the participants act and react to each other's actions (i.e., it is dynamic rather than static), but does not have a direct material representation. Like physical forces such as gravity and electricity, the existence of competition can only be discerned by observing its effects on the behavior of participants. Thus, psychologists who focus on relational variables seek laws governing the patterns of interaction among individuals.

This approach has its roots in Galilean physics. Galileo realized that it was not properties of the earth that determined its orbit around the sun, or properties of the sun, but the interrelationships among the sun and all the planets that determined the earth's orbit. Physicists recognize that the properties of individual objects are "definable and observable only through their interaction with other systems" (Bohr, 1934, p. 37). Subatomic particles, for example, cannot be observed directly with current technology, but they can be identified and studied by observing their interconnections with each other and other particles (Capra, 1982). In quantum theory, furthermore, a physicist never ends up with "things"; the physicist always deals with interconnections. Taking Galilean thought as a model, Kurt Lewin (1935) and others focused psychological theory on relational variables, not individual variables.

One of Lewin's students, Morton Deutsch, specifically applied the relational approach to competition. Social interdependence theory states that goals may be positively interdependent (i.e., a

person can achieve his or her goal if and only if the other participants achieve their goals) or negatively interdependent (i.e., a person can achieve his or her goals if and only if the other participants fail to achieve their goals; Deutsch, 1949b, 1962). The absence of goal interdependence results in individualistic efforts (i.e., a person can achieve his or her goal regardless of whether others achieve their goals). The basic premise of the theory is that each type of goal interdependence leads to different patterns of interaction among participants, which in turn lead to different outcomes.

Negative goal interdependence (i.e., competition) results in oppositional interaction, which leads to the outcomes (e.g., whether one wins or loses; Deutsch, 1949b, 1962). Oppositional interaction occurs as individuals discourage and obstruct each other's efforts to achieve the goal. In competition, participants focus both on winning and on preventing anyone else from winning. In interacting with fellow competitors, therefore, competitors tend to strive to block others' success, engage in no or misleading communication, refuse to give each other help and assistance, refuse to exchange or share needed resources, distrust competitors, refuse to be influenced by competitors, use tactics of threat and coercion in influencing others, and generally have negative attitudes toward competitors (Deutsch, 1949b, 1962; D. W. Johnson & Johnson, 1989, 2005). This interaction pattern tends to result in a fairly low level of performance. Even the winners may underperform; in competition, a contestant does not have to perform at the highest level possible for him or her, the contestant only has to outperform the other contestants. If a person can win while exerting little effort, then he or she will probably exert little effort. Deutsch's social interdependence theory assumes that it is not what is within a person that defines competition, but that competition is defined by the nature of the interaction among the individuals involved in the situation. Many of the previous reviews of competitive versus individualistic efforts on performance have been conducted from the framework of competition being a relational variable (e.g., D. W. Johnson & Johnson, 1989, 2005; D. W. Johnson et al., 1981; Roseth et al., 2008; Stanne et al., 1999).

One of the problems for attempting to investigate the impact of a person variable on performance is being able to measure the strength of the person variable. For Lewin and his students, a troublesome and stubborn problem in understanding the causes of behavior was identifying the strength of personality traits in influencing behavior. Lewin believed that each person had a unique and idiosyncratic reaction to situations based on the interaction between the person's personality and the perceived environmental factors in the situation, and he wanted to develop a framework within which an accurate description of individual cases within a framework of general laws could be established (Lewin, 1946). He and his students and colleagues found, however, that the contribution of any one individual difference to behavior was difficult to measure. It still is. One reason is that for Lewin, the person and the environment could not be separated because they were both part of one total psychological field. Another reason is that each person has numerous traits and dispositions, all of which interact with each other, and separating out the influence of any one may be almost impossible. This is akin to attributing biological outcomes to one gene when, in truth, genes work in combination with each other as well as with the environment (Shonkoff & Phillips, 2000). Knowing that a person has one gene is not very informative

because it does not tell you how the gene interacts with all the other genes in the person's body, nor does it tell you what environmental factors may be related to genetic expression. This does not diminish the importance of a single gene, it just recognizes the limited role of any one gene among multiple interactions with other genes. The same may be said about a person's traits. While it may be important to know that a person tends to have performance-approach goals, it does not reveal how this trait interacts with all the person's other traits in influencing the person's behavior nor how environmental/situational factors influence its expression (Ross & Nisbett, 2011). Because of this and other difficulties in understanding the interaction between the person and the environment, some of Lewin's students and colleagues began to focus more and more on situational factors. The general conclusion of some of Lewin's followers has been that it is much easier to influence a person's behavior by controlling situational variables than it is by understanding or controlling a person's traits. What Lewin would really want, however, is that research on competition focus on the combination of personality traits and situational variables.

One of the advantages of the relational approach to competition is that it focuses attention on the interpersonal interaction and the situational influences on the interaction. In competition, what actions a person takes and the emotions a person feels are determined by the actions and emotions of the other competitors. If a rival gets too far ahead to catch, for example, one may decrease one's effort regardless of how competitive one feels. When one is far ahead, one will tend to slow down again to save oneself for the next race. Only exert enough effort to win is a cardinal rule in competitions, and how much effort one has to exert depends almost entirely on the efforts and actions of the other competitors. Correspondingly, the situational conditions may determine how hard one tries to win. If it is pouring down rain, if it is unusually hot or cold, one might increase or decrease one's effort. The relational approach to competition, by focusing on the nature of the interaction among participants and the situational factors influencing that interaction, allows for a more complex analysis of the process of competition.

While the individual and relational approaches to understanding behavior are often contrasted, theorists and researchers do not have to choose between them. Both approaches can be pursued at the same time. Kurt Lewin put it in a formula: Behavior is a function of the person and the environment ($B = f(P, E)$). Lewin believed in the mutual dependence on each other of dispositional variables (i.e., the person) and the person's psychological representation of the environment (i.e., situation). He also believed that people often overemphasized personal variables and underestimated the power of the social context on enhancing or constraining behavior. Much of his research was aimed at demonstrating the impact of situational variables such as leadership style and method of decision making on individuals' behavior.

Future research on achievement goals should examine Person $\times$ Situation interactions, or how individuals with different goal orientations respond to different environmental goal structures. From our perspective, a three-level achievement goal framework is needed, one in which personal goal orientations (e.g., mastery-approach, mastery-avoidance, performance-approach, performance-avoidance) are embedded within group-level social interdependencies (e.g., cooperative, competitive, individualistic), which, in turn, are embedded

within contextual goal structures, or goal-related messages in the environment (e.g., mastery-approach, mastery-avoidance, performance-approach, performance-avoidance). Little is known about whether these three levels reinforce, buffer, or interact in a way that exacerbates or attenuates performance outcomes (though see Lau & Nie, 2008; Wolters, 2004). Little is also known about the directionality of multilevel effects over time (though see Linnenbrink, 2005; Newman, 1998). For example, it may be that social interdependence and contextual goal structures influence performance by way of personal goal orientations (e.g., social interdependence/contextual goal structure $\rightarrow$ personal goal orientation $\rightarrow$ performance outcomes), or personal goal orientations may influence performance by way of social interdependence and contextual goal structures (e.g., personal goal orientation $\rightarrow$ social interdependence/contextual goal structure $\rightarrow$ performance outcomes). Whatever the case, our point is that only by taking a relational approach and focusing on Person $\times$ Situation dynamics will we understand the processes by which competition elicits different performance goals and affects performance.

In the second part of the article, Murayama and Elliot (2012) deemphasized the distinctions between trait, perceived, and situational competition and focused on the meditational effect of a person's performance-approach and performance-avoidance goals on the competition-performance relation.

Nature of Performance-Approach and Performance-Avoidance Goals

The second part of the article began with the distinction between performance-approach and performance-avoidance goals. Murayama and Elliot (2012) proposed that competition springs from either performance-approach or performance-avoidance goals in each participant. These goals generally energize behavior but do not provide specific guidelines for how the goals may be accomplished. Performance-approach goals are seen as having a positive effect on performance, and performance-avoidance goals are seen as having a negative effect on performance. There are shortcomings in Murayama and Elliot's conceptualization of these goals.

First, it is not clear that performance-approach and performance-avoidance goals are actually two separate things. There is a sizable correlation between the two variables (0.41 in the MASEM), and the two types of goals have been found to be correlated in other studies advocating a multiple goals perspective (e.g., Barron & Harackiewicz, 2001; Pintrich, 2000; Wolters, 2004). Viewed as orthogonal variables, a person could be high or low on one or the other or on both. In other words, competition may result in generating either performance-approach or performance-avoidance goals, both performance-approach and performance-avoidance goals, or neither performance-approach nor performance-avoidance goals. Murayama and Elliot's (2012) model does not take the last two possibilities into account. It should be noted that if performance-approach and performance-avoidance goals are orthogonal and a person may be low in both, Murayama and Elliot need to explain what happens when competition generates neither.

Second, even if the goals are distinct, there may be more to competitive goals than merely seeking to win or seeking to avoid losing. Murayama and Elliot (2012) left out the subjective probability of success and failure. The framework of performance-approach and performance-avoidance goals has a long history in

psychology. In the late 1930s and the early 1940s, Kurt Lewin and his students developed *resultant valence theory* to explain how goals with positive valence (e.g., performance-approach goals) and goals with negative valence (e.g., performance-avoidance goals) influence motivation and performance (Escalona, 1940; Festinger, 1942; Lewin, Dembo, Festinger, & Sears, 1944). They theorized that in setting goals, a person must take into account four factors: (a) the importance of achieving the goal (i.e., valence of success), (b) the importance of avoiding failure (i.e., valence of failure), (c) the likelihood that one can achieve the goal (i.e., expectancy of success), and (d) the likelihood that one will fail (i.e., expectancy of failure). Thus, historically, performance-approach goals consisted of two parts, the perceived importance of the goal and the perceived likelihood that one can succeed in achieving the goal. Performance-avoidance goals consisted of the perceived importance of avoiding failure and the perceived likelihood that one will fail if one tries to achieve the goal. Recent research has confirmed the importance of the likelihood of success in mediating the impact of performance goals on productivity (Darnon, Butera, Mugny, & Hulleman, 2009).

While the importance of achieving the goal is often emphasized, the likelihood that one can be successful in achieving the goal has powerful effects on effort and performance. Marrow (1938a, 1938b) found that when participants were encouraged to believe they could achieve the goal and urged on to strive to do so (thereby increasing their perceived likelihood of being successful), they were more likely to want to continue to try to achieve the goal after their efforts were interrupted. On the other hand, participants who expected to fail and whose efforts were interrupted saw the goal as less attractive and had less interest in continuing to try to achieve it (Cartwright, 1942). Participants who were failing to achieve a goal and whose efforts were interrupted quickly forgot about the goal and moved on to other tasks (Rosenzweig, 1943). These results are important, as in many goal-oriented situations (such as school classrooms), 90% or more of the students in a competition may expect to lose and, therefore, their motivation to engage in the learning activities may be minimal or nonexistent. In the current model, only the positive and negative valences exist in competitive situations; the likelihood of success and failure is ignored. The model is incomplete.

Third, there is some ambiguity about the definition of performance-approach and performance-avoidance goals. At times, it seems that Murayama and Elliot (2012) viewed them as traits that are stable, enduring qualities that exist across situations and through time. At other times, it seems that Murayama and Elliot were referring to cognitive representations that are influenced by situational factors. In either case, the two types of goals are seen as separate individual characteristics. In Lewin's theory, on the other hand, every person simultaneously has both positive and negative valences attached to the goal, and the balance between the two creates a quasi-stationary equilibrium that determines the person's behavior. That is, once a person adopts a goal, a state of tension (i.e., a specific intention to achieve the goal) is created that consists of all the forces driving the person toward achieving the goal (e.g., desire to learn, desire to succeed) and all the forces hindering or blocking the person from achieving the goal (e.g., anxiety, fear of failure). A dynamic equilibrium exists between the approach and avoidance forces that determines the level of motivation and the nature of the behavior. The level of motivation and the behavior

are in constant flux, increasing or decreasing with each action the person takes and with each experience the person has. When a person gets tired, for example, motivation to climb a mountain may decline. When a person is leading a race, motivation to win may increase. Each moment, things happen that may change the equilibrium level and thereby increase or decrease motivation. The person is motivated to achieve the goal until the tension is discharged by (a) achieving the goal, (b) achieving a goal that can substitute for the original goal, (c) having another goal become more salient, or (d) giving up the intention or desire to achieve the goal. If the goal is achieved, another goal may be set of slightly greater difficulty (i.e., the level of aspiration is increased). Lewin viewed the approach and avoidance influences as being in balance, whereas Murayama and Elliot in their article separated them and viewed the person as being characterized by one or the other.

Fourth, there is an issue with Murayama and Elliot's (2012) assumptions about causation. Murayama and Elliot argued that performance-approach goals enhance performance and performance-avoidance goals decrease performance. We are not sure. Taking a domain-specific viewpoint (e.g., Alexander, Murphy, & Kulikowich, 1998), there is a rationale for performance-avoidance goals producing higher achievement than performance-approach goals on physical activities. While fear of failure may interfere with cognitive processing and completion of cognitive tasks, fear may enhance physical reactions because it tends to bypass cognitive processes and go straight to the muscles. In a fencing match, for example, a person may block the opponent's thrust before the person is cognitively aware the thrust is taking place. When there are simple, overlearned, physical tasks to complete, therefore, physical reactions based on the "fight or flight" response (e.g., adrenalin, hormonal changes, single focus of attention) may result in performance-avoidance goals facilitating performance to a greater extent than do performance-approach goals. Zajonc's (1965) work on social facilitation is especially indicative of this argument. The possibility that increases in some motor performance may be related to performance-avoidance goals may underlie the larger effect-size estimates reported by Stanne et al. (1999), as this meta-analysis focused on motor tasks. R. T. Johnson and Johnson (1979), however, found that on very simple cognitive tasks, competition did not promote higher achievement than did cooperation. Thus, the increases in performance related to performance-avoidance goals may be limited to motor, not cognitive, tasks.

Shortcomings of the Opposing Processes Model

Murayama and Elliot (2012) presented the interesting proposition that the absence of a relationship between competition and performance is due to the previous researchers not differentiating between two opposing processes that cancel each other out. Murayama and Elliot identified performance-approach and performance-avoidance goals as mediators that, when taken into account, show that there is a relationship between competition and performance despite the appearance of the overall data. They stated that in the literature as a whole, the two types of performance goals tend to cancel each other out. There are a number of shortcomings in their argument.

First, the opposing processes model of competition basically establishes a "whether this or that" proposition. The opposing

processes model tests whether competition is associated with performance-approach or performance-avoidance goals and establishes that the answer is both. The mediating role of approach and avoidance goals is helpful to the extent that it explains inconsistent findings regarding the relation between competition and performance. What was not discussed, however, is why competition is related to those goals, and how it may generate approach goals in one person, avoidance goals in another person, both approach and avoidance goals in a third person, and neither approach nor avoidance goals in a fourth person. The article added little clarity about the causal factor underlying the way in which competition results in one or the other type of goal. To the contrary, averaging across trait, perception, and structural competition suggests that competition represents a latent variable, variously determined by individual traits, perceptions, and environmental factors. The opposing processes model needs more specificity as to what causes an individual to adopt performance-approach or performance-avoidance goals.

Second, the opposing processes model does not clarify the processes through which competition results in outcomes. While Murayama and Elliot (2012) presented evidence that performance-approach goals tend to be characterized by positive emotional states and will lead to increased cognitive performance, and performance-avoidance goals will tend to be characterized by negative emotional states and will lead to decreased cognitive performance, Murayama and Elliot did not describe the processes through which such results take place. Regardless of one's performance goals, competition still involves obstructing others' success, distrusting competitors, providing misleading communications, dealing with conflicts as win-lose situations, and so forth (Deutsch, 1962; D. W. Johnson & Johnson, 1989). Absent evidence to the contrary, simply knowing whether people are motivated to win or to avoid losing does not necessarily change the dynamics of competitive interaction.

Third, the opposing processes model assumes that within the populations included in the research studies, the effort exerted by the participants who have performance-approach goals will approximately equal the lack of effort exerted by the participants who have performance-avoidance goals. The equal positive and negative performance levels of the two groups are assumed to cancel each other out. This assumption is dubious. In most competitions, far more people withdraw physically or psychologically (because they know they have no chance to win) than engage at full effort. Many people tend to withdraw from competition; only the few who have a chance to win tend to be motivated. Typically, the power of negativity (i.e., fear of losing) is greater than the power of positivity (i.e., excitement about winning; Vaish, Grossman, & Woodward, 2008), and more people see themselves as having little or no chance of winning than see themselves as contenders. As Lewin would say, when the subjective probability of success is low, there is no motivation to engage in the activity. Thus, in most situations, one would expect a high percentage of people to withdraw from competition, with only those few who could realistically win having performance-approach goals.

Fourth, while Murayama and Elliot (2012) did not discuss any possibility of conflict between approach and avoidance goals, Lewin (1935) identified three patterns of conflict: approach-approach, avoidance-avoidance, and approach-avoidance. Approach-avoidance conflict occurs when an individual holds the positively valenced goal of successfully performing better than others while also holding the negatively valenced goal of avoiding performing poorly com-

pared to others. Lewin proposed that approach-avoidance conflict represents a stable equilibrium because approaching a goal increases the strength of avoidance concerns and moving away from a goal increases the strength of approach concerns. Motivationally, therefore, individuals are stuck, brought back to the original equilibrium whether they move toward or away from the goal. Since Murayama and Elliot saw the two types of goals as being separate and apart from each other, the possibility of ambivalence should have been considered.

Constructive Competition

Murayama and Elliot (2012) in their meta-analyses made the case that competition will be constructive when participants have performance-approach goals. While this may be true, it does not provide much guidance to practitioners (such as teachers) on how to induce such goals. In our writings on social interdependence, we made the case that there were conditions under which each goal structure (i.e., cooperative, competitive, individualistic) was appropriate and productive (D. W. Johnson, 1970; D. W. Johnson & Johnson, 1974, 1975/1999, 1978; D. W. Johnson, Johnson, & Holubec, 1998; Stanne et al., 1999). The conditions for constructive competition were most completely spelled out in D. W. Johnson and Johnson (1978) and further elaborated on in D. W. Johnson and Johnson (1975/1999) and Stanne et al. (1999). The conditions are as follows: Winning is relatively unimportant; all participants have a reasonable chance of winning; the rules, procedures, and criteria for winning are clear and specific; and participants are able to monitor each other's progress and engage in social comparison. There are situational conditions that make competition constructive. It is less clear as to whether there are personality characteristics that do so, although predispositions to play fair, obey the rules, not cheat, win and lose with grace and good nature, and so forth certainly influence the constructiveness of competition. No matter the extent to which a person is dominated by performance-approach or performance-avoidance goals, however, if the stakes are too high, the person may be tempted to cheat; if the likelihood of winning is seen as too low, the person may lose motivation to participate; and so forth. The current presentation of the opposing processes model of competition, while it has beneficial aspects, does not clarify the nature of competition, the process by which it takes place, or the conditions under which it will be constructive.

Methodology

We compliment Murayama and Elliot on their use of sophisticated methodology. They not only used meta-analytic procedures to summarize a vast and seemingly unruly literature but also presented impressive evidence that the available literature can be better explained by including mediating variables. They used MASEM analysis to test some of their model's predictions, and then two survey studies and one experimental study to test the proposed model in a way that controls for the limitations of the MASEM analysis. Thus, in one article, Murayama and Elliot (2012) moved from empirical observations by way of meta-analysis to theory development and testing by way of MASEM and additional evidence by way of primary research. This is an ex-

traordinary example of programmatic work in the hypothetic-deductive model.

Conclusions

Murayama and Elliot (2012) established that in general, there is no relationship between competition and performance, despite how it is operationalized. While their meta-analyses are impressive, representing a great deal of work, we have noted that operational definitions are not the same as conceptual definitions and that Murayama and Elliot's work reflects more of the former than the latter. We have also noted that the control condition was somewhat ambiguous. Finally, we have noted that Murayama and Elliot primarily approached competition as an individual variable, while looking at it as a relational variable may be more fruitful. Murayama and Elliot then made the case that the lack of relationship between competition and performance is due to two opposing processes (performance-approach and performance-avoidance goals) that cancel each other out. That is, sometimes competition leads to performance-approach goals that increase performance, and sometimes competition leads to performance-avoidance goals that decrease performance. We have noted that the two types of goals are not really independent, that Murayama and Elliot left out the important aspect of perceived likelihood of success or failure, and that the ways in which a person develops one or the other type of goal is not clear. The opposing processes model does not clarify the processes through which each type of goal affects performance. Future research is needed that links these findings to conceptual frameworks explicating which individuals, what types of situations, and what kinds of Person $\times$ Situation interactions follow the opposing processes model. There is no doubt, however, that competition is pervasive and an important aspect of human life. Many people every day are involved in mandatory competitions in educational and career settings whether they want to be or not. Given the prevalence of competition and the often nonvoluntary participation, there is a need to understand how to make competition constructive. Their recommendation that constructive competition is based on performance-approach goals is contrasted with the relational view that specifies the situational conditions necessary to make competition constructive. Finally, Murayama and Elliot conducted an exemplary program of research that adds considerably to our knowledge about competition.

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REPLY

Further Clarifying the Competition–Performance Relation: Reply to D. W. Johnson et al. (2012)

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In their commentary, D. W. Johnson, Johnson, and Roseth (2012) provided some laudatory statements about our article, but they also expressed a number of concerns. The concerns focus on the following issues: types and definitions of competition, our choice of control group, the nature of performance-approach and performance-avoidance goals, the comprehensiveness of the opposing processes model, and performance-approach goals and constructive competition. We respond to each of these issues in turn and conclude with a statement regarding working to build an integrative model of the competition–performance relation (and beyond).

Keywords: competition, performance, achievement goals, performance-approach, performance-avoidance

We thank D. W. Johnson, Johnson, and Roseth (2012) for providing their thoughts on our meta-analyses and our opposing processes model of competition and performance (Murayama & Elliot, 2012). We appreciate the laudatory statements that they offered; the concerns that they express enable us to provide further information and detail on our views of competition and the opposing processes model. In the following, we respond to five main issues discussed by D. W. Johnson et al.

Types and Definitions of Competition

Our model focuses on three different types of competition: Trait competitiveness, perceived environmental competitiveness, and structural competition. We conceptualize, operationalize, and analyze these three types separately, but D. W. Johnson et al. (2012) contended that “all three types of competition could be viewed as being the same” (p. 1072). We agree that there are interrelations among these different types of competition. For example, it is likely that highly competitive individuals will perceive nearly any environment as involving a competitive component and will be particularly responsive to structures emphasizing competition. However, these interrelations by no means make the three types of competition isomorphic, either conceptually or operationally. Distinguishing between dispositional and environmental influences on behavior is fundamental to scientific psychology (Lewin, Dembo, Festinger, & Sears, 1944), and the perceived environment is often

portrayed as the nexus between the two, also exerting a unique influence (Bandura, 1986; Wen, Hawkey, & Cacioppo, 2006). It is difficult for us to understand why D. W. Johnson et al. would argue for eliminating these essential distinctions in the context of studying competition.

In a related vein, D. W. Johnson et al. (2012) stated that all three types of competition on which we focused in our meta-analyses are based on an individual difference approach, and they suggested that this approach is less fruitful than what they called a “relational approach” (p. 1073). In the individual differences approach, competition is defined as a stable, enduring, disposition, whereas in the relational approach, competition is defined in terms of patterns of interactions among individuals. More specifically, in the relational view, competition is defined as negative interdependence—a person can achieve his or her goals if and only if other participants fail to achieve their goals (Deutsch, 1949; D. W. Johnson & Johnson, 1989)—and it is argued that this type of competition tends to produce a low level of performance. We are puzzled as to why D. W. Johnson et al. sought to portray our meta-analysis on structural competition, in particular, as adopting an individual difference approach. As with several other meta-analyses of structural competition (D. W. Johnson & Johnson, 1989; D. W. Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Roseth, Johnson, & Johnson, 2008; Stanne, Johnson, & Johnson, 1999), we examine studies in which a competitive situation is experimentally manipulated; participants’ dispositional competitiveness is not considered in the studies in this meta-analysis.

Finally, D. W. Johnson et al. (2012) noted that social comparison is a core feature of our definition of competition and questioned whether we believe that all social comparison is competitive. We do not think that all social comparison is competitive; some social comparison may merely reflect information gathering or may be engaged in for purposes other than competition (Régner, Escribe, & Dupeyrat, 2007; Wheeler & Suls, 2005; Wood, 1989). However, we do think that in the vast majority of instances in

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everyday life, in which normative comparison is salient, an accompanying desire or concern regarding one's relative standing and its implications is also present. Normative comparison is inherent in each of our three conceptualizations of competition on which we focused in our article, and indeed, we believe it is inherent in any and all types and taxonomies of competition in the literature (Brown, Cron, & Slocum, 1998; Deutsch, 1949; D. W. Johnson & Johnson, 1989; Tauer & Harackiewicz, 2004). Thus, our position regarding social comparison is entirely concordant with that of D. W. Johnson et al., in that we view all competition as involving social comparison but not all social comparison as involving competition.

Choice of Control Condition

In our meta-analysis focused on structural competition, we opted to compare competition conditions with neutral (sometimes labeled individualistic) conditions, rather than cooperation conditions, to determine the effect of competition on performance. The authors critique this choice of control condition, arguing that competition and cooperation conditions are more similar to each other than competition and neutral conditions, that individuals in a neutral condition are likely to be competitive, and that the neutral condition is not clearly defined.

In selecting neutral conditions as our control condition, we followed the basic logic of scientific experimentation that one condition receives the focal treatment and the neutral comparison condition receives no treatment. This enables an inference to be made regarding the influence that competitive structures have on people relative to their baseline. Cooperation conditions, like competition conditions, represent manipulations that shift individuals away from their baseline. As such, when comparing competition and cooperation conditions with each other, it is impossible to know if an observed effect is due to the competition manipulation, the cooperation manipulation, or both (additively or multiplicatively). We agree with D. W. Johnson et al.'s (2012) point that competition and cooperation conditions share similarities (e.g., both are inherently relational) that make comparing them sensible, and we fully concur that meta-analyses of competition versus cooperation yield important information. We simply think that neutral controls are needed for both competition conditions and cooperation conditions, to anchor them to baseline behavior and determine the directionality of any observed effects.

We fully concur with D. W. Johnson et al. (2012) regarding the prevalence of the competition in daily life (Eibl-Eibesfeldt, 1989; McClelland, 1961; cf. Brophy, 2005) and agree that neutral conditions are not devoid of individuals with competitive desires and tendencies. Of course, this is true of cooperation conditions as well. Cooperation manipulations can diminish competitive striving to some extent, but as D. W. Johnson et al. themselves noted, individuals often continue to gravitate toward competitive standards and strivings, even when they are actively discouraged (D. W. Johnson & Johnson, 1989; Levine, 1983). Neutral conditions are considered to be "neutral" in the sense that they make no attempt to shift individuals from their standard mode of behavior; they are not thought to be "neutral" in the sense of assuming that individuals are *tabula rasa* or that all share the same psychological state. Cooperation conditions are very different in this regard, as they intentionally seek to shift individuals away from baseline

functioning. In short, we believe that neutral conditions represent the best control condition for analyses of structural competition, because they allow comparison of a treatment group with a no-treatment group. However, we also believe that contrasting competition and cooperation conditions (and cooperation and neutral conditions) is of considerable value. Indeed, we think the opposing processes model is applicable to cooperation and could help to explain why it has been shown to have positive effects on performance in many investigations (e.g., it may reduce performance-avoidance goals or evoke mastery-approach goals that benefit performance in some instances; Midgley, Kaplan, & Middleton, 2001; Vallerand et al., 2007).

Nature of Performance-Approach and Performance-Avoidance Goals

D. W. Johnson et al. (2012) stated that there are shortcomings in our conceptualizations of performance-approach and performance-avoidance goals and offer four accompanying critiques. We address each in turn.

First, D. W. Johnson et al. (2012) questioned whether performance-approach and performance-avoidance goals are separable, given the sizable positive correlation between them. Conceptually, this positive correlation is to be expected, because these constructs share a common core component, namely, they both define competence using a normative standard of evaluation (Elliot & McGregor, 2001; Elliot & Murayama, 2008). Empirically, a great deal of research in the achievement goal literature has clearly documented that these goals load separately in factor analysis, may be manipulated independently, and exert different (often opposite) influences on psychological processes and outcomes (Elliot, 1999; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Murayama, Elliot, & Yamagata, 2011; Murayama, Zhou, & Nesbit, 2009). The magnitude of the relation between these two goals varies in theoretically sensible ways and as a function of various methodological factors (Law, Elliot, & Murayama, 2012; Linnenbrink-Garcia, Middleton, Ciani, Easter, O'Keefe, & Zusho, *in press*). On a modal basis, the two goals exhibit a moderate to strong positive relation, but they can be weakly related or even unrelated in some instances (Law et al., 2012). In short, performance-approach and performance goals are not presumed to be orthogonal but instead are viewed as related but separate constructs.

The modal positive relation between performance-approach and performance-avoidance goals is actually an essential part of our opposing processes model, as we posit that competition evokes both goals, often simultaneously. D. W. Johnson et al. (2012) seem to have missed this point throughout their commentary. For example, they stated that our model does not take into account the case when competition generates both performance-approach and performance-avoidance goals (p. 1075). In addition, they contended that our position is different from that of Lewin et al. (1944) in not addressing the coactivation of approach and avoidance valenced goals (pp. 1076 and 1077). On the contrary, our model posits that competition can and commonly does prompt the joint pursuit of performance-approach and performance-avoidance goals. We should add that we do not view these goals as energizers of behavior that do not provide specific guidelines (as D. W. Johnson et al., 2012, stated on p. 1075); rather, conversely, we

view these goals as directors of behavior that are energized by competitive desires and perceptions (Church, Elliot, & Gable, 2001; Elliot, 2006).

Second, D. W. Johnson et al. (2012) expressed concern that our conceptualization of achievement goals does not include the subjective probability of success or failure. This construct of perceived or expected competence has been integral to achievement goal models from the inception of the literature (Dweck, 1986; Nicholls, 1984) and remains so today. Perceived competence is not considered part of the goal *per se* in contemporary views of achievement goals but, rather, is viewed as an antecedent (Diseth, 2011; Elliot & Church, 1997; Spray & Wartburton, 2011; Tanaka, Takehara, & Yamauchi, 2006) or moderator (Brusso, Orvis, Bauer, & Takleab, 2012; Kumar & Jagacinski, 2011; cf. Kaplan & Maehr, 2007; Senko, Hulleman, & Harackiewicz, 2011) of approach and avoidance goal adoption or as a mediator of achievement goal effects (Darnon, Butera, Mugny, Quizdale, & Hulleman, 2009; Gao, Lockbaum, & Podlog, 2011; Senko & Harackiewicz, 2005a; Tanaka et al., 2006; Van Yperen & Rekema, 2008). In our empirical studies, we controlled for perceived competence in order to make the strongest possible case for causal inference; future empirical work on the opposing processes model would do well to investigate the role of perceived competence as an antecedent, moderator, and mediator variable.

Third, D. W. Johnson et al. (2012) stated that there is ambiguity in our achievement goal conceptualization regarding whether goals are influenced by situational factors or are enduring characteristics. Achievement goals theorists have long viewed achievement goals as both temporary states pursued in specific situations and rather enduring tendencies that exhibit stability over time and situations (Fryer & Elliot, 2007; Harwood, Hardy, & Swain, 2000; Senko & Harackiewicz, 2005b). The existing research shows that the achievement goal construct has explanatory and predictive utility in both manifestations, and either would be applicable to the opposing processes model (e.g., trait competitiveness likely promotes general tendencies regarding performance-based goal adoption and structural competitiveness is presumed to prompt situation-specific performance-approach and performance-avoidance strivings).

Fourth, D. W. Johnson et al. (2012) noted the possibility that performance-avoidance goals might enhance performance in some instances. We concur that performance-avoidance goals may be beneficial in some instances (e.g., when protecting a lead will lead to victory) for some types of tasks (e.g., brute strength tasks or tasks inherently focused on not making errors) and in the short run (see Elliot, Shell, Henry, & Maier, 2005). However, a large body of empirical work indicates that these goals are, in the main, deleterious for performance outcomes (for reviews, see Elliot & Moller, 2003; Huang, 2012; Hulleman et al., 2010; Richardson, Abraham, & Bond, 2012). Thus, performance-avoidance goals *can* have a positive influence on performance, but this is the exception rather than the modal case.

Comprehensiveness of the Opposing Processes Model

D. W. Johnson et al. (2012) suggested that our model is incomplete by pointing to four issues that they consider shortcomings of our model. We address each in turn.

First, our model posits that competition leads to performance-approach goals, performance-avoidance goals, or both goals simultaneously, and D. W. Johnson et al. (2012) stated that our model needs more specificity regarding the factors that lead to the adoption of one goal or the other. We agree that it is important to identify such moderating factors, and indeed, our initial submission incorporated both conceptual and empirical work addressing this moderator variable issue. In the revision process, we omitted this material in the interest of establishing the foundational aspects of the opposing processes model in the initial article, prior to moving on to an elaboration of the model in subsequent work (see Zanna & Fazio, 1982, on the distinction between “first generation” and “second generation” research questions). On a related note, the D. W. Johnson et al. called for attention to Person $\times$ Situation interactions (another form of moderation) in research on achievement and motivation in general. Here, again, we concur and note that our opposing processes model can easily incorporate *either* of the aforementioned types of moderation.

Second, D. W. Johnson et al. (2012) stated that our model does not take into consideration the processes through which achievement goals influence performance outcomes. We did not focus on these meditational processes in our article for the same reason that we did not focus on moderation—we wanted to establish the essentials of the model before attending to additional specifics within the model. There are numerous studies explicating the processes through which performance-based goals influence performance (Corker & Donnellan, 2012; Dickhäuser, Buch, & Dickhäuser, 2011; Elliot & McGregor, 1999; P. D. Johnson, Shull, & Wallace, 2011; McGregor & Elliot, 2002; Sideridis, 2005;); these processes may be easily integrated into our opposing processes model.

Third, D. W. Johnson et al. (2012) stated,

Within the populations included in the research studies, the effort exerted by the participants who have performance-approach goals will approximately equal the lack of effort exerted by the participants who have performance-avoidance goals. The equal positive and negative performance levels of the two groups are assumed to cancel each other out. This assumption is dubious. (p. 1076)

Actually, our model does not assume that there are two groups of participants, one with high performance-approach goals, and the other with high performance-avoidance goals. Rather, our model posits that competition can lead individuals to adopt performance-approach and performance-avoidance goals simultaneously. Importantly, it also allows for the possibility that the situational emphasis can lead to more prominent performance-approach goal pursuit (or more prominent performance-avoidance goal pursuit), with positive (or negative) implications for performance accordingly.

Fourth, D. W. Johnson et al. (2012) stated, “Since Murayama and Elliot see the two types of goals as being separate and apart from each other, the possibility of ambivalence should have been considered” (p. 1077). Once again, our model fully allows for the simultaneous adoption of performance-approach and performance-avoidance goals.

Performance-Approach Goals and Constructive Competition

D. W. Johnson, Johnson, and colleagues (Stanne et al., 1999; Tjosvold, Johnson, Johnson, & Sun, 2003, 2006) have begun to elucidate factors that increase the likelihood that competition will be constructive. We applaud this valuable work and fully concur with the premises laid out within it. Referring to this work, D. W. Johnson et al. (2012) suggested that we advocate for performance-approach goals as a component of constructive competition and ask how this may be implemented by practitioners. The beneficial or detrimental nature of performance-approach goals is a much debated topic in the achievement goal literature (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Kaplan & Midgley, 2007; Midgley et al., 2001), and we simply mention a few basic points herein. We do believe that performance-approach goals are more adaptive forms of self-regulation than performance-avoidance goals in nearly all instances, and we do not advocate for the active suppression or eradication of performance-approach goals in the classroom, on the ball field, or in the workplace. However, we also acknowledge that performance-approach goal pursuit carries with it some dangers (Anseel, Van Yperen, Janssen, & Duyck, 2011; Darnon et al., 2009; Janssen & Van der Veet, 2011; Murayama & Elliot, 2011) and that it is optimal to, at minimum, pursue these goals in conjunction with mastery-approach goals (Barron & Harackiewicz, 2001; Pintrich, 2000). Critically, especially in educational settings and especially for children and young adults, we think it best to allow these goals to emerge of their own accord, rather than instantiate them directly or via feedback structures (Elliot & Moller, 2003; Murayama & Elliot, 2009). Thus, our answer to the question of whether performance-approach goals should be considered part of constructive competition is a qualified yes, with the nature of the qualifications being an active and ongoing topic among achievement goal researchers.

Conclusion

In conclusion, we thank D. W. Johnson et al. (2012) for their comments and hope that the responses we have provided clarify the issues they raised. Our opposing processes model is not meant to compete with existing models of competition, such as the social interdependence model; the different frameworks can be mutually informative and can cross-fertilize each other as researchers work together to acquire a greater understanding of the competition-performance relation (and beyond).

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Call for Nominations

The Publications and Communications (P&C) Board of the American Psychological Association has opened nominations for the editorships of **Behavioral Neuroscience**, **Journal of Applied Psychology**, **Journal of Educational Psychology**, **Journal of Personality and Social Psychology: Interpersonal Relations and Group Processes**, **Psychological Bulletin**, and **Psychology of Addictive Behaviors** for the years 2015–2020. Mark S. Blumberg, PhD, Steve W. J. Kozlowski, PhD, Arthur Graesser, PhD, Jeffery A. Simpson, PhD, Stephen P. Hinshaw, PhD, and Stephen A. Maisto, PhD, ABPP, respectively, are the incumbent editors.

Candidates should be members of APA and should be available to start receiving manuscripts in early 2014 to prepare for issues published in 2015. Please note that the P&C Board encourages participation by members of underrepresented groups in the publication process and would particularly welcome such nominees. Self-nominations are also encouraged.

Search chairs have been appointed as follows:

- **Behavioral Neuroscience**, John Disterhoft, PhD
- **Journal of Applied Psychology**, Neal Schmitt, PhD
- **Journal of Educational Psychology**, Neal Schmitt, PhD, and Jennifer Crocker, PhD
- **Journal of Personality and Social Psychology: Interpersonal Relations and Group Processes**, David Dunning, PhD
- **Psychological Bulletin**, Norman Abeles, PhD
- **Psychology of Addictive Behaviors**, Jennifer Crocker, PhD, and Lillian Comas-Diaz, PhD

Candidates should be nominated by accessing APA's EditorQuest site on the Web. Using your Web browser, go to <http://editorquest.apa.org>. On the Home menu on the left, find "Guests." Next, click on the link "Submit a Nomination," enter your nominee's information, and click "Submit."

Prepared statements of one page or less in support of a nominee can also be submitted by e-mail to Sarah Wiederkehr, P&C Board Search Liaison, at swiederkehr@apa.org.

Deadline for accepting nominations is January 11, 2013, when reviews will begin.