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Review

A meta-analytic review of the approach-avoidance achievement goals and performance relationships in the sport psychology literature

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Abstract

Purpose: To summarize the approach-avoidance achievement goal and performance in the sport psychology literature.
Methods: A total of 17 published studies, two of which provided two samples, were located. Accepted meta-analytic procedures were used with Hedges *g* as the effect size metric. From the 17 studies, 73 effect sizes were calculated.
Results: Results based on a random effects model indicated that the performance goal contrast had the largest facilitative impact on performance followed by the mastery and performance approach goals. Both of the avoidance goals performance and mastery had small non-significant and detrimental effects on performance. The homogeneity statistics revealed significant heterogeneity for the approach and avoidance performance goals. Categorical moderator variables were examined for study sex composition (male, female, or mixed), mean age of sample (<18 years or ≥18 years), study setting (lab or naturalistic), and nature of performance variable (objective or subjective).
Conclusion: The performance goal contrast holds value for sport performance research. Contrary to approach-avoidance predictions, the mastery-approach goal and performance effect size was significant and of equal magnitude as the performance approach goal and performance effect size. Thus, future research should closely test the efficacy of both the mastery- and performance contrasts in impacting performance of sport tasks. Last, the significant effect sizes reported in this review are in stark contrast to contemporary meta-analytic findings in education. Differences in the approach-avoidance goals in sport and education relative to performance should be researched further.

Keywords: Mastery approach goals; Performance approach goals; Performance enhancement; Performance goal contrast

1. Introduction

Understanding predictors of sport performance, in a variety of contexts and under a variety of conditions, is undoubtedly a goal of sport psychology research. A number of sport psychology interventions such as goal setting[1] and constructs such mood states[2] have been extensively examined as to their impact on performance of a wide range of tasks in competitive sport and physical activity (PA) settings. In addition to these and many other sport psychology interventions and constructs, achievement motivation is a sport psychology topic of great interest. Performance may be seen as the "gold standard" outcome of achievement motivation research.[3] Performance certainly is widely accepted as the "gold standard" outcome in achievement centered within sport and PA contexts. The achievement goal approach[4] has for decades been a dominant motivational framework. This framework has accounted for hundreds of competitive sport, leisure time exercise, and physical education invesatigations.[5] For decades the dichotomous achievement goal approach has been the framework of choice. This framework is concerned with an individual's subjective interpretation of success corresponding to the task or mastery and ego or performance achievement goals. But, since Elliot and colleagues[6–9] proposed and introduced

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measures for approach-avoidance goal dimension to the dichotomous goal framework, a number of studies in sport psychology[10] have appeared let alone hundreds of studies in other broad domains such as education[11] and organizational psychology.[12]

Though only approximately 50 published approach-avoidance studies in sport and exercise psychology were reported by Stevenson,[10] a number of approach-avoidance articles have appeared in the sport and exercise psychology literature since her review such that in a variety of contexts with a wide array of antecedents and consequences surrounding Elliot's approach-avoidance goals.[13–16] One specific area that has gained attention within the approach-avoidance achievement goal literature is the relationship of Elliot and colleagues' approach-avoidance goals to performance of tasks that were clearly presented as an outcome of importance and performed in front of others (i.e., the researchers or within a group setting) in sport and physical education contexts.[3,17–32] Given the different types of measures combined with different settings (e.g., true golf score[17,27] to laboratory golf putting[22]) to the vast array of study participants (e.g., university students[22,25,26] to elite athletes[17,20,31]), no one consensus statement of the relationship exists between the approach-avoidance achievement goals exits. Thus, the purpose of the present quantitative investigation was to summarize the approach-avoidance achievement goal and performance literature within normally considered psychology of sport and PA settings. Based on the results, a secondary purpose was to provide recommendations for future research.

1.1. Elliot's approach-avoidance achievement goals

Stemming from the dichotomous achievement goal framework[4] there are two orientations by which achievement motivation is influenced, task and ego, and thereby how personal competency is judged. Individuals endorsing a task or mastery orientation are primarily motivated by personal mastery or improvement. Thus, these individuals reflect a self-referenced standard of personal achievement to gauge their personal competency for a desired behavior. Conversely, an ego oriented person strives to win and is motivated to attain high normative standards of ability. Ego-oriented individuals judge success and failure on other-referenced standards and are motivationally "fragile" when they doubt their own competence.[33] While the dichotomous task and ego distinction relates to how competence is defined, the approach-avoidance dimension relates to how competence is valenced. This approach-avoidance dimension is the contribution of Elliot and colleagues.[7,8]

An approach valence indicates a behavior that is initiated by a positive or desirable event or possibility. In contrast, an avoidance valence indicates a behavior which is initiated by a negative or undesirable event or possibility.[7,8] Thus, approach goals focus on attaining competence, whereas avoidance goals focus on avoiding incompetence. Initially, Elliot and colleagues[6,8,9] proposed a trichotomous framework with the mastery, performance approach, and performance avoidance goals. These three goals were the focus of the hierarchical model of achievement motivation.[8] The trichotomous model was then expanded with bifurcation of the mastery goal into the mastery approach and mastery avoidance goals.[7,34–36] With this 2 × 2 achievement goal framework, competence based on the mastery-approach goal is defined by a focus on task-based attainment such as improving upon one's past personal record in a 100-m dash, whereas competence based on the mastery-avoidance goal is defined by a focus on avoiding a worsening of task-based attainment such avoiding not improving upon one's personal record in the 100-m dash. From the performance goal perspective, the performance-approach goal defines competence based on normative achievements such as the star running back on a football team focusing on rushing for more yards than the opponent's star running back, whereas the performance-avoidance goal defines competence based on avoiding displays of normative incompetence such as not rushing for more yards than the opponent's star running back.

1.2. Purpose and hypotheses

The aim of the present research was to clarify the approach-avoidance achievement goal and sport performance literature by conducting a meta-analytic review of Elliot defined approach-avoidance goals and performance studies to determine the impact of each goal as well as the performance goal contrast on performance. With regards to hypotheses, historically only the performance goals have been hypothesized to impact or be related to performance standards. But, recently Huang[11] in an extremely comprehensive meta-analysis of the dichotomous, trichotomous, and 2 × 2 achievement goal frameworks found that the mastery and performance approach goals were nearly equal in effect size magnitude and direction to the academic performance (means $r = 0.10$ and 0.13, respectively for the mastery and performance approach goals and academic achievement). Also of interest were the low albeit statistically significant magnitudes of these mean correlations as well as the nearly identical mean correlations with the avoidance goals and academic achievement (means $r = -0.11$ and -0.13 for the mastery and performance avoidance goals, respectively). Last, the notion that the performance goal contrast was a better predictor of performance has emerged in the sport psychology literature.[3,19,28] In addition, in the exercise psychology domain, Lochbaum and colleagues[37] demonstrated that both the performance and mastery goal contrasts were significantly different along a continuum of exercise participation stages in a theoretically coherent pattern with the positive contrast scores greater in the longer adhering exercise stages compared to the less adhering and non-exercising stages.

Hence, in generating hypotheses based on both the sport and education literature would suggest that all of the achievement goals would be related to sport performance with the mastery, mastery approach, and performance approach goals being facilitative and the two avoidance goals being

debilitative. It was also logically hypothesized based on the sport and one exercise psychology findings that the performance goal contrast would be positively related or facilitative to performance. Last, moderators were coded and examined. No formal hypotheses were forwarded as the moderators were exploratory in nature.

2. Materials and methods

2.1. Literature search and inclusion criteria

The literature search included that of electronic databases, review articles, search of references of articles found, and correspondence to authors that had published in the area. The electronic database search was conducted in EBSCO with the entire range of individual databases selected for inclusions (e.g., PsychINFO, PsychARTICLES, Sport-Discus, and ERIC). Variants of the following keywords were used in the search: trichotomous goals, 2 × 2 achievement goals, approach-avoidance achievement goals, sport, sport performance, performance approach, performance avoidance, mastery, mastery approach, mastery avoidance, and achievement motivation. Articles retained for the current meta-analysis met the following inclusion criteria: (a) published literature in the English language from January 1, 1996 (time prior to Elliot's goals) to September 1, 2013; (b) clear use of at least one type of Elliot's goals from his trichotomous or 2 × 2 framework measured[38] whether in a correlational or manipulated manner; (c) a measure of performance in the sport psychology and achievement motivation literature; (d) articles reporting sufficient quantitative statistical information for the calculation of an effect size; and (e) articles that failed to report sufficient information but an author provided via sufficient quantitative statistical information via email communication for the calculation of an effect size(s).

Given the popularity of the achievement goal perspective across a number of disciplines, hundreds of studies were identified in the initial literature search though quickly the list was fewer than 20 with abstract screening. A total of 17 published studies were located as found in Table 1. Given more than one achievement goal exists, strict adherence to independence of the sample is not possible. For instance, if a study measured the 2 × 2 goals in sample via questionnaire, then each participant had a score for each goal and performance that results in four samples from one study. Thus, from the 17 published studies, 73 samples resulted. Four of the studies included data on either multiple samples[28,29] or split by sex.[22,25]

Data extraction procedures were handled by the first author who coded for (a) the sample characteristics of sex of sample (male, female, or mixed), mean age of the sample (<18 or ≥18), (b) the study's setting (laboratory or naturalistic); (c) the performance measure (objective or subjective); and (d) the achievement goal measured. By circumstances, there was great overlap amongst the studies with objective or subjective measures and mean age of the sample. Specifically, most of the objective studies were with samples with mean ages greater than 18 while the majority of samples with mean ages less than 18 where with subjective measures. The second author and a trained research assistant examined the first author's data extraction records as well as emails received from study authors that sent in requested information.

2.2. Effect size calculations

The Comprehensive Meta Analysis (CMA) Version 2 software developed by Borenstein et al.[39,40] was used to compute effect sizes. This program provides more than 100 options for data entry allowing great flexibility to overcome generally perceived insufficient information not provided in the literature. As previously indicated, each study could have provided more than one effect size due to the nature of measuring each goal and/or goal contrast within the same population. Separate analyses were set up for each goal measure. Based on Hedges and Olkin's[41] suggestion, Hedges' g was chosen as the measure of effect size as it provides a more conservative estimate with smaller number of effect sizes in a specific analysis ($k < 20$). Cohen's[42] criteria were used for interpretation of the summarized effect sizes as follows: ≤0.20 as small, 0.50 as medium, and ≥0.80 as large. Positive effect sizes should be interpreted as the achievement goal having a facilitative effect on performance, whereas a negative effect size should be interpreted as the achievement goal having a detrimental impact on performance.

Of the two primary models to determine statistical assumptions of error,[43] the random as opposed to fixed model was chosen. The fixed effects model assumes that all of the gathered studies share a common effect and differences are a result of within study error or sampling error.[43] The random effects model assumes both within study error and between-study variation.[43] Thus, the random effects model was chosen due to the variation in methodology of the gathered studies.

2.3. Heterogeneity of variance

The random effects model assumes that the true effect size will vary between studies; thus, moderate analysis is an important consideration. Two indicators (Q and I^2) were used to determine whether heterogeneity of variance existed for each goal and performance overall effect size calculation and are briefly explained. The Q test is a test of significance. This test is based on the critical values for a chi-square distribution. A significant Q value indicates that heterogeneity of variance exists across the individual effect sizes used to calculate the overall effect size. The Q value does not provide information on the magnitude of the individual effect size dispersion.[44] The I^2 statistic is the ratio of excess dispersion to total dispersion. As explained by Higgins et al.,[44] I^2 may be interpreted as the overlap of confidence intervals explaining the total variance attributed to the covariates. Higgins and Thompson[45] have provided a tentative classification of I^2 values to help interpret magnitude of the heterogeneity of variance: 25 (low), 50 (medium), and 75 (high). In addition, if heterogeneity was present, another purpose was to see if any of the coded moderator variables could account for the

Table 1
Study information, sample, performance measure, goal measure or manipulation, and effect size calculated per achievement goals or performance goal contrast for studies included in meta-analytic review.

Study	Sample[a]	Performance measure	Goal measure	Goal	ES (Hedges *g*)
Bois et al.[17] (2009)	41 male professional golfers competing in the first stage of the French professional tour (age: 28.80 ± 5.75)	Combined round scores for 2 days of 18-hole golf (correlation signed reversed to account for lower score in golf actually being the better score)	AGQ-S, French version	MAv	−0.34
				PAp	0.81
				PAv	−0.55
Chalabaev et al.[18] (2008)	51 French female competitive soccer players (age: 20.30 ± 5.90)	Timed soccer-dribbling task (correlation sign reversed so a better time is a higher score) − time 1 performance	AGQ-S, French version	PAp	0.10
				PAv	0.16
				PGC	0.12
Elliot et al.[3] (2006)	51 female and 50 male French physical education students (age: 11.63 ± 0.66)	Timed basketball dribbling task (correlation sign reversed so better time is a higher score)	Experimental manipulation of trichotomous goals with contrast correlation provided	PGC	0.41
Gao et al.[19] (2013)	115 boys and 161 girls, American middle school students (age: 13.34 ± 0.96)	PACER	AGQ-S with modified wording to reflex PACER test	MAp	0.32
				MAv	−0.37
				PAp	0.41
				PAv	−0.08
Halvari and Kjormo[20] (1999)	136 Norwegian Olympic level athletes (sex breakdown and mean age not reported)	Performance scored on actual achievements from National Championship of Norway to Olympic Games	SCAT with physiological items omitted to create a PAv scale	PAv	−0.44
Hulleman et al.[21] (2008)	155 American males attending football camps entering 8th−12th grade (*M* age not reported; 0.8% in 8th grade; 14.3% in 9th grade; 24.4% in 10th grade; 26.9% in 11th grade; 33.6% in 12th grade)	Subjective coach rating of player performance in camp	Adapted items[52] and AGQ-2	MAp	0.04
				PAp	0.19
Kavussanu et al.[22] (2009)	39 male undergraduate students from a British university (mean age not reported)	Putting task − radial error	Experimental manipulation of 2 × 2 achievement goals, within group difference ES reported	MAp	0.19
				PAp	0.12
				PAv	0.20
Kavussanu et al.[22] (2009)	63 female undergraduate students from a British university (mean age not reported)	Putting task − radial error	Experimental manipulation of 2 × 2 achievement goals, within group difference ES reported	MAp	0.19
				PAp	0.30
				PAv	0.18
Li[23] (2010)	447 female and 198 male high school athletes reporting participating in a variety of sports in Taiwan, China (age: 16.6 ± 1.0)	Subjective performer self-rated performance since beginning season compared to players of similar age	AGQ-S translated into Chinese[53]	MAp	0.23
				MAv	−0.14
				PAp	0.14
				PAv	−0.20
Li et al.[24] (2011)	164 high school handball athletes from top eight teams in 2009 National Senior and Junior High School Championships in Taiwan, China (age: 15.7 ± 1.3)	Subjective coach rated performance after an important championship event	AGQ-S translated into Chinese (Li et al.[53])	MAp	0.16
				MAv	−0.07
				PAp	−0.06
				PAv	−0.19
Lochbaum et al.[25] (2009)	155 male undergraduate students from an American university (mean age not reported)	PACER	Elliot and McGregor's[54] questionnaire worded for strenuous exercise participation	MAp	0.28
				MAv	−0.04
				PAp	0.25
				PAv	0.02
Lochbaum et al.[25] (2009)	131 female undergraduate students from an American university (mean age not reported)	PACER	Elliot and McGregor's[54] questionnaire worded for strenuous exercise participation	MAp	0.17
				MAv	−0.05
				PAp	−0.12
				PAv	0.01
Ntoumanis et al.[26] (2009)	138 first-year undergraduate students attending the University of Birmingham (age: 19.3 ± 1.3)	Scored dart-throwing task	Experimental manipulation of 2 × 2 achievement goals	MAp	0.22
				MAv	0.15
				PAp	0.27
				PAv	0.19

(*continued on next page*)

Table 1 (*continued*)

Study	Sample[a]	Performance measure	Goal measure	Goal	ES (Hedges *g*)
Schantz and Conroy[27] (2009)	25 male and female collegiate golfers attending an American university (age: 19.6 ± 1.2)	18-hole mean centered golf round score	AGQ-S averaged for all 18 holes	MAp	0
				MAv	−0.46
				PAp	−0.27
				PAv	−0.16
Stoeber and Crombie[28] (2010)	103 male and 58 female athletes competing in 2008 Outdoor Athletic Championships of the British Universities Sports Association (age: 20.7 ± 2.3)	Absolute performance converted to International Association Athletics Federation points	AGQ-S	MAp	0.32
				MAv	−0.02
				PAp	0.35
				PAv	−0.02
				PGC	0.39
Stoeber and Crombie[28] (2010)	103 male and 58 female athletes competing in 2008 Outdoor Athletic Championships of the British Universities Sports Association (age: 20.7 ± 2.3)	Qualification success (a dichotomous measure of performance)	AGQ-S	MAp	0.23
				MAv	−0.06
				PAp	0.37
				PAv	−0.02
				PGC	0.40
Stoeber et al.[29] (2009) − Study 1	98 male and 28 female participants competing in a Half-Ironman distance triathlon of which 112 had complete data (age: 36.5 ± 7.6)	Timed Half-Ironman distance triathlon performance	AGQ-S	MAp	0.29
				MAv	0.11
				PAp	0.37
				PAv	−0.13
Stoeber et al.[29] (2009) − Study 2	281 males and 58 females participating in two Olympic distance triathlons of which 335 had complete data (age: 37.2 ± 7.9)	Timed Olympic distance triathlon performance	AGQ-S	MAp	0.17
				MAv	0
				PAp	0.37
				PAv	−0.17
Turner et al.[30] (2012) − Study 2	21 competitive female netball players from British university varsity or club teams (age: 21.09 ± 3.54)	48 netball shots from four different specific positions (12 shots per spot)	AGQ-S	MAp	0.48
				MAv	0.04
				PAp	0.58
				PAv	0.56
Turner et al.[31] (2013)	42 elite English male national and country level cricketers (age:16.45 ± 1.38)	National academy batting test consisting of 30 deliveries from a pace bowling machine set at 80 mph	AGQ-S	MAp	−0.12
				MAv	−0.02
				PAp	0.73
				PAv	−0.28
Vallerand et al.[32] (2008)	45 female and 22 male Canadian competitive water-polo and synchronized swimming athletes (age: 16.10 ± 3.98)	Subjective coach rating of swimming performance over season	Elliot and Church's[55] questionnaire worded for sport	Mas	0.02
				PAp	−0.23
				PAv	−0.33

Abbreviations: AGQ-S = Achievement Goal Questionnaire-Sport; PAp = performance approach goal; PAv = performance avoidance goal; MAp = mastery approach goal; MAv = mastery avoidance goal; PGC = performance goal contrast; Mas = mastery goal from the trichotomous framework; PACER = progessive aerobic cardiovascular endurance run; SCAT = sport competition anxiety test; ES = effect size.

[a] Ages are presented as mean ± SD values (years).

heterogeneity. This was done by computing the Q between (Q_B) value that is calculated by subtracting the individual Q values referred to as Q within (Q_W) values for each moderator subcategory from Q total (Q_T) value for the overall effect size. For instance, the Q_B for the age moderator was for the performance approach goal by subtracting the two subcategory Q_W values for age (i.e., <18 and age ≥18) categories from the Q_T for the performance approach goal. To determine significant of the Q_B value, an online chi-square value calculator for the specific degrees of freedom (number of moderator categories − 1) was used.

3. Results

3.1. Description of performance and approach-avoidance measures

Table 1 contains the studies as well as their features and effect size(s) generated. Most certainly, there was a variety of performance measures taken across the 17 studies. The performance measures crossed a number of sports such as golf, cricket, soccer, American football, dart throwing, racing, netball, swimming, water polo, and a number of unreported Olympic sports with Olympic and national level athletes as the study participants. In addition, the progressive aerobic cardiovascular endurance run (PACER) test was used in a physical education setting as well as in a university fitness class. Thus, the vast array of performance measures and thereby environments in just 17 studies speaks to the richness of the body of literature. Given the focus of this meta-analysis was on Elliot's approach-avoidance goals, all of the studies except for Halvari and Kjormo[20] used an established questionnaire or manipulation procedures for the experimental studies. The most often used measure was the Achievement Goal Questionnaire-Sport (AGQ-S) or some modification of this scale as well as the scale being translated into French[17,18] and Chinese.[23,24]

3.2. Overall effect sizes results

As found in Table 2, the performance goal contrast had a moderate-to-large positive impact on performance ($g = 0.74$, $Z = 6.52$) followed by the small-to-moderate positive impact of the mastery ($g = 0.38$, $Z = 9.38$) and performance ($g = 0.38$, $Z = 4.60$) approach goal. The fail safe Ns for the mastery ($N = 303$) and performance ($N = 374$) approach goals were quite large relative to the number of collected studies. Hence, these fail safe Ns provide a great deal of confidence in the relationship of these goals to sport related performance. The fail safe N for the performance contrast was also large ($N = 50$) compared to the number of effect sizes found ($k = 4$). Both of the avoidance goals (performance $g = -0.15$, $Z = -1.91$; mastery $g = -0.11$, $Z = -1.77$) had small negative effects on performance. Based on standard interpretation of the 95% confidence intervals (CI), neither of the effect sizes for the two avoidance goals was significantly different from zero as the CI contained zero. As such, both Z scores were non-significant. It is worthy to note that the performance avoidance goal was very close to being significantly different than zero ($g = -0.15$, $Z = -1.91$).

3.3. Moderator analyses

The review of the homogeneity statistics found in Table 2 revealed significant heterogeneity distributions for the performance approach ($Q_T = 66.24$, $p < 0.001$) and avoidance goals ($Q_T = 57.46$, $p < 0.001$). A large level of between-study variation existed for the performance approach goal ($I^2 = 72.83$) and a medium level for the performance avoidance goal ($I^2 = 68.67$). Non-significant heterogeneity distribution resulted for both of the mastery goals and performance contrast. Thus, moderator analyses were not conducted.

For the performance approach goal (Table 3), significant variation existed between the coded moderator variables for the sample mean age ($Q_B = 12.58$, $p < 0.001$), objectivity and subjectivity of the performance measure ($Q_B = 15.88$, $p < 0.001$) and study sex composition ($Q_B = 18.02$, $p < 0.001$). Specifically, for participants that were on average 18 or older, the effect size was moderate ($g = 0.47$) compared to the small effect for participants on average under 18 ($g = 0.20$). For the objectivity/subjectivity moderator variable, the effect sizes were very different with the subjective measures ($g = 0.08$) being very small compared to the moderate ($g = 0.48$) effect size for the objective performance measures. For the sex composition of the studies, males ($g = 0.46$) and mixed ($g = 0.44$) samples were moderate in effect size compared to the small effect size for females ($g = 0.22$).

For the performance avoidance goal, significant differences existed for all of the moderator categories: mean sample age

Table 2
Random effects model results for the performance-approach, performance-avoidance, mastery-approach, mastery-avoidance goals, and performance goal contrast.

Variable	Effect size statistics					Null test	Heterogeneity statistics		Publication bias
	k	N	g	SE	95%CI	Z	Q_T	I^2	Fail safe N
PAp	19	2717	0.38	0.08	0.22, 0.54	4.60**	66.24**	72.83	374
PAv	19	2563	−0.15	0.08	−0.30, 0	−1.91	57.46**	68.67	52
MAp	17	2541	0.38	0.04	0.30, 0.46	9.38**	16.63	3.85	303
MAv	14	2291	−0.11	0.06	−0.22, 0.01	−1.77	22.34	41.83	11
PGC	4	474	0.74	0.11	0.52, 0.97	6.52**	3.83	21.74	50

Abbreviations: PAp = performance approach goal; PAv = performance avoidance goal; MAp = mastery approach goal; MAv = mastery avoidance goal; PGC = performance goal contrast; k = number of effect sizes; N = total number of participants; g = effect size (Hedges g); SE = standard error; CI = confidence intervals; Z = test of the null hypothesis; $Q_T = Q$ total; I^2 = total variance explained by moderators. *$p < 0.05$, **$p < 0.001$.

Table 3
Moderator variable results for the performance approach and avoidance goals.

Variable/study features	Effect size statistics				Null test	Heterogeneity statistics	
	k	*g*	SE	95%CI	*Z*	Q_B	I^2
Performance approach goal							
Mean age (year)						12.58**	
<18	6	0.20	0.12	−0.03, 0.44	1.70		72.60
≥18	13	0.47	0.10	0.27, 0.67	4.66**		68.33
Performance measure						15.88**	
Subjective	4	0.08	0.16	−0.23, 0.38	0.48		78.15
Objective	15	0.48	0.09	0.31, 0.65	5.44**		61.78
Sex						18.02**	
Female	4	0.22	0.23	−0.23, 0.67	0.95		65.95
Male	5	0.46	0.09	0.28, 0.64	4.91**		0
Mixed	9	0.44	0.11	0.22, 0.66	3.91*		78.24
Setting						0.78	
Lab	3	0.49	0.12	0.25, 0.72	4.04**		0
Naturalistic	16	0.36	0.09	0.18, 0.54	3.82*		76.71
Performance avoidance goal							
Mean age (year)						26.82**	
>18	5	−0.33	0.09	−0.51, −0.15	−3.62**		43.16
≥18	13	0	0.08	−0.16, 0.16	0.02		48.15
Performance measure						13.93**	
Subjective	3	−0.42	0.07	−0.56, −0.28	−6.08**		0
Objective	16	−0.08	0.09	−0.24, 0.09	−0.87		64.76
Sex						15.40**	
Female	4	0.19	0.13	−0.06, 0.43	1.51		0
Male	4	−0.06	0.17	−0.40, 0.28	−0.36		41.06
Mixed	10	−0.25	0.10	−0.45, −0.06	−2.57*		74.21
Setting						19.30**	
Lab	3	0.36	0.14	0.09, 0.63	2.66*		0
Naturalistic	16	−0.23	0.07	−0.38, −0.09	−3.21*		60.69

Abbreviations: k = number of effect sizes; g = effect size (Hedges g); SE = standard error; CI = confidence intervals; Z = test of the null hypothesis; Q_B = Q between; I^2 = total variance explained by moderators. *$p < 0.05$, **$p < 0.001$.

($Q_B = 26.82$, $p < 0.001$), objectivity/subjectivity of the performance measure ($Q_B = 13.93$, $p < 0.001$), study sex composition ($Q_B = 15.40$, $p < 0.001$), and study setting ($Q_B = 19.30$, $p < 0.001$). Specifically, for mean sample age, participants that were on average 18 or older, the effect size was 0 compared to the small-to-moderate effect for participants on average under 18 years of age ($g = -0.33$). For the objectivity/subjectivity of the performance measures, the effect sizes were very similar with the subjective measure ($g = -0.42$) being greater in magnitude than the objective measure ($g = -0.08$). For study sex composition, females ($g = 0.19$) and mixed ($g = -0.25$) samples were in opposite direction small in magnitude suggesting that the performance avoidance goal is beneficial for female performance while detrimental in a sample of both sexes. The male effect size was quite small at −0.06. Last, the performance avoidance goal differed significantly based on the setting with the lab setting being motivationally beneficial ($g = 0.36$) and the naturalistic setting being detrimental to performance ($g = -0.23$) with the effect sizes in the small-to-moderate range.

4. Discussion

The purpose of this investigation was to use meta-analytic techniques to summarize the approach-avoidance goals and performance literature in the domains of sport psychology. The first finding worthy of discussion concerns the moderate in magnitude master approach goal and performance relationship. Within the sport psychology literature, the mastery goal for decades has been most aligned with desirable motivated outcomes such as increased effort and persistence,[46] positive affect,[47] and intrinsic motivation.[48] Likewise within Elliot's frameworks, the mastery and mastery approach goals have been consistently related to PA levels,[37] the desirable physical education and competitive sport participation outcomes such as intrinsic motivation[49] and enjoyment.[50]

The moderate in magnitude relationship with performance for the mastery goal is an especially important finding in light of the heterogeneity test being insignificant. It appears, regardless of a number of potential moderators, that simply engaging in the mastery approach based thought patterns such as trying to demonstrate competence by beating one's personal standard of performance is an effective manner in which to improve on a task in an achievement setting. It is encouraging that performance may be improved by focusing on demonstrating competence by self-referenced standards. The only foreseen downside of a mastery approach goal pursuit could be the extreme examples of an athlete holding a world record or winning a golf major championship or any such record of achievement that is very difficult to achieve in future competitions of the same standard. Why this result is more encouraging than the small mastery goal and academic

performance relationships reported by Huang[11] is unknown. When comparing the Huang's result to the present meta-analysis, estimated conversation of the report mean *r*'s to Hedges *g* still suggested the facilitative relationship of the mastery approach goal with performance in the sport psychology literature is two times greater than in the education literature. Last, Lochbaum and colleagues[37] reported that the mastery goal differed as hypothesize across a number of exercise stages. Thus, though not sport performance, consistent exercise is a performance measure of sorts and one that appears to be of great difficulty world wide to achieve. Taken together, the mastery approach goal appears to be beneficial to performance and should be a focus of future research.

Unlike the mastery goal finding, significant heterogeneity emerged for both the performance approach and avoidance goals; thus, complicating the relationships of both goals to sport performance. When examining the gender makeup of the samples, both performance goals were equally facilitative for performance for the females though small in meaningfulness. Both of these results do support findings from Lochbaum and colleagues[37] in that the performance avoidance goal was a characteristic of females that self-reported exercising consistently for more than 5 years while also endorsing the performance approach goal. The notion of females motivated to not appear incompetent could be rooted in social constructions[7] but certainly the notion that endorsing this goal would be facilitative has not been formally forwarded in the sport psychology literature. It does not appear from the educational literature that either goal impacts female academic performance[11] in a meaningful way. It would be of interest to research experimentally as to whether females endorsing the performance avoidance goal would indeed improve their sport performance and whether this improvement would last over time.

The other two interesting moderation findings concerned the setting for the performance avoidance goal and the sample mean age as well as objectivity/subjectivity of the performance measure for both performance goals. The opposing effects of the performance avoidance goal on sport performance based on the study's setting are of surprise and interest. Reasons as to why the performance avoidance goal would be beneficial to performance in a laboratory setting when compared detrimental in a naturalistic setting is only speculative. It certainly could be that in naturalistic settings the ability to gauge incompetence is more apparent in large group settings such as competing in a triathlon[29] as opposed to laboratory based dart task[26] in isolation. Research has demonstrated that though avoidance motivation has a number of positive influences on human behavior, it does drain resources.[51] Thus, in the context of sport, it is most likely much more demanding to take in information to judge competency and then to regulate behaviors to avoid demonstrating incompetence in large group settings than in isolation in a laboratory.

Last, for moderation results, the mean sample age and objectivity/subjectivity of the performance measure moderated the performance approach and sport performance relationship were tied closely together with the overlap of studies holding the same characteristics on these two moderators. It appears with the 18 and older participants when performance was measured objectively that the performance approach goal was moderately related to sport performance. This was not a result for the younger participants with a subjective performance measure. For the performance avoidance goal the results clearly demonstrated that this goal is detrimental to performance for mean samples under the age of 18 with a subjective performance measure. The interesting result is that the performance avoidance goal had no effect on objective performance with samples equal to or greater than 18 years of age. It is certainly very difficult based on achievement goal theory, past research, and even speculation as to why these results emerged. Future research examining these variables experimentally would be the best avenue whether participant age and measure type (i.e., objective/subjective) are interacting or simply required in combination to replicate the results of this meta-analysis.

The main limitation of the present this meta-analysis was the limited number of studies found in some of the moderator categories as well as the limited research with the performance goal contrast. It also could be potentially viewed as a limitation that such a broad range of performance measures were included. Though this limitation certain for the mastery approach goal is not warranted given the non-significant test of heterogeneity finding. Given the findings, broader implications to approach-avoidance achievement goal theory are warranted. One very important implication is that the mastery approach goal should be conceptualized in the sport psychology literature as a performance enhancing strategy. This moderate in meaningful relationship should be examined as to why it is facilitative. It could be that by focusing competency judgments improves other performance enhancing strategies such as positive self-talk or facilitative performance enhancing states such as maintaining desired activation levels. Thus, a great research agenda in sport would examine manipulation of the mastery approach goal and measurement of sport psychology performance enhancement variables while in an achievement context.

The other finding with a broader implication to approach-avoidance achievement goal theory is that of the facilitative and very meaningful impact of the performance goal contrast on performance. This finding is certainly intriguing for the future refinement of achievement goal theory in that it is the absolute difference between the two performance goals not the level of one goal that is of importance. For instance, an athlete with a difference score of 1 whether highly endorsing either performance goals (e.g., 7 on the performance approach goal minus 6 on the performance avoidance goal) or a low endorsement of either goals (e.g., 2 on the performance approach goal minus 1 on the performance avoidance goal) on a typical 1−7 rating scale would have the same beneficial impact on performance. Research manipulating level of endorsement would be very beneficial to advancing the approach-avoidance achievement goal literature. If truly de-emphasis of the performance goals with the caveat that the performance approach goal must be more endorsed than the performance avoidance goal, then certainly that would create conditions that might greatly benefit performance with the mastery approach goal being manipulated as the performer's

competency based focus. Last, the differential findings for the performance avoidance goal concerning participant gender and performance environment are worthy of future research and could have much broader implications to the future of approach-avoidance achievement goal theory.

5. Conclusion

This meta-analytic summary provided important and at times unexplainable findings in a rich body of literature on a very important outcome: performance. Though variables in sport psychology such as enjoyment and intrinsic motivation have been extensively examined because they are valued outcomes, sport performance is also a highly valued outcome. Approach-avoidance goals are related to sport performance. Continued examination of these goals is highly recommended as a fruitful area of research with broad implications for the refinement of approach-avoidance achievement goal research.

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