

# Emotional states, achievement goals, and performance in NCAA Division I swimmers

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## ABSTRACT

There is much interest in how emotions and achievement goals predict sports performance, yet little research has examined these topics in elite swimmers. This study involving NCAA Division 1 swimmers aimed to (a) present descriptive information on emotions and goals related to training and meets and (b) predict performance from emotions and 2 x 2 (performance-mastery x approach-avoidance) achievement goals. Over the course of five meets, 13 swimmers (4 men, 9 women) completed weekly ratings of bipolar emotional dimensions (e.g., sluggish-energetic) and achievement goals regarding their training. One day prior to meets, swimmers rated the same emotions and goals regarding the upcoming meet. Event performance was recorded in standardized FINA points. Swimmers (a) experienced neutral emotions (close to the midpoint of bipolar scales) regarding training and positive emotions about meets and (b) endorsed high levels of approach goals and moderate levels of avoidance goals. Correlational analyses revealed that positive emotions associated positively with approach goals and negatively with mastery-avoidance goals. Multilevel models predicting performance from emotions and goals showed sparse associations, with some evidence indicating that increases in energy and decreases in performance avoidance goals prior to a meet related to better performance. We discuss the implications of these findings.

**Keywords:** Physical activity psychology, Swimming, Emotions, Energy, 2 x 2 goals, FINA points, Coaching applications.

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## INTRODUCTION

There is great interest in studying how emotions and goals predict sports performance (e.g., Conroy & Hyde, 2011; Hanin, 2000). Despite swimming's high popularity among athletes and fans (National Sporting Goods Association, 2020), there is a limited body of research on emotional and goal predictors of elite swimming performance (Burton, 1988, 1989; Sorrentino & Sheppard, 1978). The current study involving NCAA Division I swimmers assessed emotion on several dimensions and assessed goals from the 2 (approach vs. avoidance) x 2 (performance vs. mastery) achievement goal framework (Elliot & Thrash, 2002) across several intercollegiate swim meets. We explored whether emotions and achievement goals predicted performance.

### ***Emotions and sports performance***

Research on emotion and sports performance has focused predominantly on anxiety, with meta-analyses across multiple sports showing that performance is predicted inconsistently and weakly by cognitive anxiety and somatic anxiety (Craft et al., 2003; Woodman & Hardy, 2003). For swimming in particular, one study (Burton, 1988) found a negative association between performance and cognitive anxiety, and a negative curvilinear relationship (i.e., best performance at moderate levels, worse at more extreme levels) between performance and somatic anxiety. An early meta-analysis (Beedie et al., 2000) and more recent, individual studies (Lane et al., 2010; Nicholls et al., 2012) have examined various emotions across many sports, with results generally showing that performance related positively to positive emotions and negatively to negative emotions. The current study assessed emotions on several bipolar dimensions (e.g., calm-tense, relaxed-energetic, pleasant-unpleasant) to cover a range of positive and negative emotions studied in relation to sports performance.

### ***Achievement goals and sports performance***

The 2 x 2 framework for achievement goals (Elliot & Church, 1997) is the dominant theoretical framework for studying goals in sports psychology research (Conroy & Hyde, 2011) and was employed in the current study. This framework distinguishes between two definitions of competence (mastery vs. performance) and two valences (approach vs. avoidance), resulting in four distinct goals: Mastery-approach (MAp; striving to improve absolute competence), Mastery-avoidance (MAv; striving not to have a decline in absolute competence), performance-approach (PAp; striving to improve performance relative to others), and performance-avoidance (PAv; striving not to have a decline in performance relative to others). Meta-analyses showed small-to-moderate, positive effect sizes for MAp and PAp goals on performance, and nonsignificant effect sizes for MAv and PAv goals (Lochbaum & Gottardy, 2015; Van Yperen et al., 2014). Although no studies have examined 2 x 2 goals in relation to swimming performance, some evidence indicates that lower swimming performance relates to motivation to avoid failure (Sorrentino & Sheppard, 1978) and focusing on race outcomes rather than personal performance (Burton, 1989).

### ***Overview of the current study***

In an experience sampling design, swimmers rated emotions and goals repeatedly over time and competed in five meets. One set of emotion/goal ratings focused on training (completed each Sunday during the season), and another set of ratings focused on competitive meets (completed the day prior to each meet). Because little research has been done on emotions and goals in swimmers, basic descriptive information on these variables was of interest. Descriptive statistics may give insight into (a) the typical emotional and goal profiles of swimmers during a competitive season, (b) the degree of variation in emotions and goals, and (c) covariations among variables. Obtaining ratings of emotions and goals together allowed for examining unique effects (statistically controlling for shared variance) on performance, which is potentially important because emotional and goal states are correlated in sporting contexts (Kavussanu et al., 2014). Based on previous

findings, we expected that performance would associate positively with positive poles of emotion variables as well as MAp and PAp goals. Research on MAv and PAv goals was inconclusive, so we did not make predictions regarding those goals.

## METHOD

### **Participants and procedure**

Participants were 13 (4 men, 9 women) swimmers of the NCAA Division I [Anonymized] University Swimming and Diving team. Ages ranged from 18 to 21. Self-reported ethnicities included “White” ( $n = 11$ ), “Multiracial” ( $n = 1$ ), and “Some other race” ( $n = 1$ ). Swimmers were recruited by the second author (anonymized), who was a member of the swim team. Each swimmer generated a unique code name to anonymize data. Over five meets, swimmers completed multiple ratings of their emotions and achievement goals on two paper-and-pencil surveys: (a) a weekly survey given each Sunday, and (b) a meetly survey given each day prior to a meet. Performance times for individual events at four dual meets and one mid-season invitational were recorded. All procedures were approved by the [University] IRB.

### **Measures**

#### *Emotional states*

On the weekly survey, swimmers responded to questions about their emotions regarding the “previous week of training” on 7-point, bipolar scales: e.g., “How (e.g., sluggish-energetic) did you feel over the previous week?” Emotional dimensions were sluggish-energetic, tense-calm, gloomy-cheerful, unsure-confident, defeated-dominant, and unpleasant-pleasant. These dimensions are reflected in prominent taxonomies of emotions (Russell, 1980; Thayer, 1978), with the exception of “defeated-dominant,” which was recommended by the second author because it was common parlance among the participants. On the meetly survey, swimmers rated the same dimensions with respect to the next day’s meet: e.g., “How sluggish-energetic do you feel when you think about the upcoming meet?”

#### *Achievement goals*

On the weekly survey, swimmers rated their achievement goals on a shortened version of the Achievement Goals Questionnaire for Sport (AGQ-S, Conroy et al., 2003) regarding the upcoming week of training (“Please respond to each of the following items in terms of how accurate it is for you with respect to the next week of training.”) on a 7-point scale (1 = not at all accurate, 7 = completely accurate). The original version includes three items for each type of goal: PAp (e.g., “It is important for me to perform better than others in my group”), PAv (e.g., “I just want to avoid performing worse than others in my group”), MAp (“I want to perform as well as it is possible for me to perform”), and MAv (“I’m concerned that I may not perform as well as I can”). To reduce participant burden, we dropped items with the lowest loading on each factor in the scale development article (Conroy et al., 2003). On the meetly survey, swimmers rated their achievement goals with respect to the upcoming meet (“Please respond to each of the following items in terms of how accurate it is for you with respect to your next meet”) on one item per goal from the AGQ-S (the example items listed for the weekly questionnaire).

#### *Event performance*

The team’s HY-TEK Meet Manager system recorded event times. Times were converted to FINA (International Swimming Federation) points on a scale from 1 to 1,100 to allow comparison of performances across events (e.g., 100m freestyle, 200m fly). Prior to the season, swimmers’ personal best times for each event were recorded and converted to FINA points.

## RESULTS

### Descriptive statistics

We used the base commands and the *psych* package (Revelle, 2022) in R (R Core Team, 2023) to compute descriptive statistics aggregated per swimmer (Table 1). The response rate was good for weekly questionnaires (around 90%) and fair for meetly questionnaires (around 60%). The typical swimmer (a) felt neutral (close to the midpoint of bipolar scales) about weekly training and slightly positive about the upcoming meet, and (b) showed high levels of approach goals and moderate levels of avoidance goals. Emotions and goals showed high levels of within-person variation with the exception of approach goals (especially weekly PAp and meetly MAp). The proportion of variance attributable to within-person variation was high except for performance goals. The typical swimmer competed in just over 11 events (average of just over 2 per meet). As would be expected, best previous performance was high relative to typical event performance. Most variation in performance was at the within-person level relative to the between-person level.

Table 1. Descriptive statistics.

	Weekly				Meetly			
	Average <i>n</i> per swimmer	<i>M</i>	WP SD	1-ICC1	Average <i>n</i> per swimmer	<i>M</i>	WP SD	1-ICC1
<b>Emotion</b>								
Sluggish-energetic	4.6	3.73	1.27	.80	3.0	4.62	1.10	.80
Tense-calm	4.6	3.73	1.48	.91	3.1	4.40	1.07	.92
Gloomy-cheerful	4.6	4.21	1.11	.83	3.0	5.01	1.00	.91
Unsure-confident	4.6	4.09	1.18	.74	3.1	4.64	1.11	.65
Defeated-dominant	4.6	3.96	1.13	.70	3.1	4.84	0.93	.77
Unpleasant-pleasant	4.6	4.24	1.13	.91	3.1	4.95	0.95	.80
<b>Goal</b>								
PAp	4.6	6.67	0.27	.17	3.1	5.42	0.58	.32
PAv	4.6	4.55	0.95	.22	3.1	3.82	0.86	.26
MAp	4.6	5.18	0.58	.56	3.1	6.87	0.20	.97
MAv	4.6	4.04	0.67	.81	3.1	4.49	1.08	.85
<b>Performance</b>								
Event	--	--	--	--	11.6	724.00	51.38	.71
Best	--	--	--	--	11.4	794.02	60.85	.74

Note. Emotions and goals were measured on 7-point scales (1 to 7). The possible range for performance variables was 1-1,100 points. *M* = average item mean for the typical participant, WP SD = pooled within-person standard deviation. The ICC1 was subtracted from 1 to show the proportion of total variance attributable to within-person variance.

### Associations among emotions and achievement goals

We used the *statsBy* command in the *psych* package to compute pooled within-person correlations between emotions and goals (Table 2). Emotion variables correlated positively with each other on both questionnaires (excepting the correlation between tense-calm and unpleasant-pleasant on the meetly questionnaire), indicating that, for the typical swimmer, increases in positivity on one emotional dimension associated with increases in positivity on all other dimensions (because emotional dimensions were bipolar, these results also mean that increases in negativity on one dimension associated with increases in negativity on all other dimensions). Correlations among goals at the weekly level showed that PAv associated positively with PAp and MAv, whereas no goal dimensions correlated reliably at the meetly level. Correlations between emotions and goals showed that increases in positive emotions generally related positively to MAp at the meetly level

and negatively to MAV at the weekly and meetly levels. Increases in energy and dominance related positively to PAp at the meetly level.

Table 2. Pooled within-person correlations.

Variable number	1	2	3	4	5	6	7	8	9	10
<b>Emotions</b>										
Sluggish-energetic	--	.23	.74	.67	.67	.72	.36	-.03	.46	-.17
Tense-calm	.40	--	.21	.29	.29	.08	.10	.04	.14	-.11
Gloomy-cheerful	.70	.57	--	.67	.73	.78	.09	-.14	.43	-.39
Unsure-confident	.66	.46	.76	--	.56	.62	.20	.03	.37	-.44
Defeated-dominant	.61	.46	.73	.67	--	.59	.31	-.08	.23	-.34
Unpleasant-pleasant	.64	.52	.78	.74	.69	--	.01	-.13	.27	-.21
<b>Goals</b>										
PAp	.07	.11	.06	.09	.00	.07	--	.24	.23	.00
PAv	.00	.07	.05	.03	.09	-.03	.26	--	.22	.04
MAp	.19	-.05	.06	-.03	.22	.00	-.04	.02	--	-.22
MAv	-.24	.14	-.28	-.35	-.27	-.33	.13	.38	-.02	--

Note. Correlations below the diagonal are among weekly variables ( $r_s > |.25|$  have  $p$ -values  $< .05$ ); correlations above the diagonal are among meetly variables ( $r_s > |.30|$  have  $p$ -values  $< .05$ ).

### Multilevel models predicting performance

Our data had a multilevel structure, with emotions, goals, and performance variables (Level 1) nested within swimmers (Level 2). We computed restricted maximum likelihood (REML) multilevel models (MLMs) using the package lme4 (Bates et al., 2015). The REML estimator produces accurate estimates in two-level models with relatively small samples (Hox & McNeish, 2020; McNeish & Stapleton, 2016), including our sample size of 13 level 2 units (swimmers) with an average of just over 11 level 1 units (meets). We used random intercept models, allowing the outcome variable (event performance) to differ across swimmers. Slopes relating predictors (emotions, goals, and best performance) to event performance were fixed across swimmers. Predictors were person-mean centred, facilitating interpretation of coefficients as deviations from a person's average level.

We conducted a set of three MLMs for weekly and meetly variables separately (six MLMs in all): one MLM predicting event performance from emotions simultaneously, a second from goals simultaneously, and a third from emotions and goals simultaneously. Every event performance time was matched with weekly and meetly emotion and goal ratings (e.g., if a swimmer completed two events in one meet, we matched individual weekly and meetly predictor ratings to both performance times). We entered best performance as predictor in all models to statistically control for swimming ability in a particular race. Unstandardized  $b$  coefficients indicate the amount of change in FINA points for each 1-point increase in each predictor.

No weekly emotions or goals predicted event performance, indicating that within-person variations in performance were not a function of emotions about the prior week of training nor goals for training during the meet week. For meetly variables, sluggish-energetic related positively to event performance, indicating that within-person increases in performance related to increases in energy about the meet during the day prior to competition. PAv goals related negatively to event performance in the MLM controlling for other goals but were unrelated to event performance in the MLM controlling for goals and emotions. Best performance related positively to event performance in all models.

Table 3. Results from simultaneous multilevel models predicting performance.

Weekly Models						
Model	1		2		3	
Predictors	<i>b</i>	<i>p</i>	<i>b</i>	<i>p</i>	<i>b</i>	<i>p</i>
Sluggish-energetic	-1.22	.85			0.13	.98
Tense-calm	5.02	.26			6.36	.21
Gloomy-cheerful	-3.54	.73			-13.12	.29
Unsure-confident	-12.20	.28			-11.78	.34
Defeated-dominant	9.08	.21			10.91	.14
Unpleasant-pleasant	-1.69	.82			-2.19	.77
PAp			-7.76	.43	-17.08	.14
PAv			9.28	.31	14.70	.15
MAp			-10.27	.49	-10.63	.52
MAv			-5.63	.35	-7.30	.30
Best performance	0.58	< .001	0.59	< .001	0.61	< .001
Meety Models						
Model	1		2		3	
Predictors	<i>b</i>	<i>p</i>	<i>b</i>	<i>p</i>	<i>b</i>	<i>p</i>
Sluggish-energetic	14.0	.04	--	--	16.60	.04
Tense-calm	-5.40	.25	--	--	-5.80	.23
Gloomy-cheerful	-8.20	.34	--	--	-8.30	.39
Unsure-confident	-5.00	.52	--	--	-2.90	.76
Defeated-dominant	-4.00	.67	--	--	-4.70	.68
Unpleasant-pleasant	4.50	.64	--	--	-1.00	.93
PAp	--	--	-0.67	.93	-2.40	.80
PAv	--	--	-13.23	.04	-8.80	.20
MAp	--	--	-3.28	.86	-11.90	.61
MAv	--	--	-0.38	.93	-3.90	.42
Best performance	0.50	< .001	0.43	< .001	.46	< .001

Note. Model 1s entered all emotions and Best Performance simultaneously; Model 2s entered all goals and Best Performance simultaneously; Model 3s entered all variables simultaneously.

## DISCUSSION AND CONCLUSIONS

This study yielded novel descriptive and correlational data regarding Division I swimmers' emotions and goals over the course of a competitive season. These results may be useful for swimmers and coaches, as we discuss in the Emotions and Motivation During a Competitive Season section below.

Regarding performance, results were mostly inconsistent with our hypothesis that positive emotions would relate to swimming performance, as only energy about the next day's meet positively predicted performance. Results also did not support our hypothesis that approach goals would positively predict performance, as only increases in PAv goals about the next day's meet negatively predicted performance uniquely from other goals. One potential reason that we did not uncover more associations with performance is because we had limited power to detect small effects. We were able to detect several moderate to large effect sizes in within-person correlations between goals and affect.



We believe that the findings for performance, though sparse, may have important practical implications. Increases in individual (and thus team) performance may be related to increases in feeling energetic as opposed to sluggish, as well as to decreases in PAV goals, about the next day's meet. These findings complement research showing that more negative emotional and motivational states related negatively to swimming performance (Burton, 1988, 1989; Sorrentino & Sheppard, 1978). Thus, elite swimmers may benefit from finding ways to be in a more energetic emotional state and less performance-avoidant frame of mind. Swimming coaches may also consider encouraging thinking and goal-setting strategies aligned with these emotional and motivational states.

### ***Emotions and motivation during a competitive season***

Due to the limited amount of research in elite swimmers examining emotions and achievement goals, descriptive data and correlations were also of interest. On average, swimmers felt mostly neutral (close to the midpoint of bipolar scales) about weekly training and relatively positive about meets. There was substantial within-person variation in all emotions, and variations toward positivity were correlated across all emotional dimensions. Thus, swimmers' emotional experience included various highs and lows over the season, with general increases in positivity around meets. It may benefit coaches/swimmers to know that this is how swimmers feel in general over the course of a season. Coaches/swimmers need not be alarmed by slight variations in positivity and negativity, as they are likely not a sign of abnormality. Coaches might want to anticipate and capitalize on the increased positivity leading up to meets. This could be an opportunity to engage with swimmers when they feel most positive, potentially increasing energy, which might result in benefits to performance as discussed previously.

For achievement goals, across the weekly and meetly measures, swimmers generally showed high levels of PAp and MAp goals (with low levels of within-person variation). Therefore, swimmers were nearly always highly motivated to do better than others and increase performance relative to themselves, which may be expected amongst swimmers at an elite and highly competitive level. Coaches may want to reinforce these normative goals and be on the lookout for swimmers who do not have high levels of these goals, as that could indicate that motivation is lacking. Swimmers may benefit from self-monitoring approach goals and seek help if approach motivation is low. Swimmers showed moderate levels of PAV and MAV goals, as well as substantial within-person variation and positive correlations at the weekly level among these goals. These findings indicate that swimmers were moderately concerned about doing worse than others and that their competence would decrease, and these concerns tended to go together across weeks of training. Thus, concerns about doing poorly may emerge at different points during the season, but such concerns do not seem to be as salient as increasing performance levels. Coaches may expect that concerns about doing poorly may emerge at different points during the season and thus may want to devise strategies for helping swimmers to realign with more positive goals if they trend toward more avoidant goals. Swimmers also need not be alarmed or distressed by avoidance goals but work with their coaches to determine the reasons for avoidance motivation and collaborate on strategies to decrease these kinds of goals.

Turning to correlations between goals and emotions, PAp and MAp goals related positively to multiple positive emotions at the meetly level, indicating that swimmers felt better about their upcoming meet when their motivation to do better than others and increase their competence was higher. Weekly and meetly MAV goals related negatively to positive emotions, indicating that swimmers generally felt worse when they were more concerned about their own competence decreasing. These findings are in line with a broad collection of research showing that approach goals tend to relate to positive emotions and that avoidance goals tend to relate to negative emotions (Goetz et al., 2016) and add to the limited work looking at relations among achievement goals and emotions in athletes (e.g., Kavussanu et al., 2014). Coaches may use this information

to potentially generate more positive emotions in swimmers. Coaches might want to educate swimmers about the emotional benefits of PAp and MAp goals, as well as the emotional deficits of MAV goals. Further, coaches could help swimmers to articulate of PAp and MAp goals rather than MAV goals.

Regarding limitations, we reiterate that our findings are limited by our small sample size; however, as this study was exploratory in nature and examined under-researched topics, the data represent a promising starting point for larger-scale studies on emotions, achievement goals, and performance in elite swimmers. A second limitation is our use of single items to assess constructs and removing items from the AGQ-S (Conroy et al., 2003), both done for the sake of reducing participant burden in a sample that was likely to be extremely busy. These features may have decreased the reliability and narrowed the scope of our measures, and therefore future studies may attempt to use more comprehensive when doing so would not be onerous to participants. Third, the study is limited by the timeframes we chose for assessment (weekly, the day before each meet); findings may have differed if we conducted assessments at different times (e.g., the day of the meet, minutes before the meet) or with different frequencies (e.g., multiple times per week or per day). Fourth, self-reports have well-known limitations that apply to our self-ratings of emotions and goals, and thus alternative assessment strategies (e.g., behavioural, physiological) are encouraged in future work. Finally, it is worth noting that we cannot make strong conclusions about causality from correlational data, and experimental studies manipulating emotions and achievement goals would be needed to do so.

## AUTHOR CONTRIBUTIONS

Conceptualization: Joshua Wilt and Shelby Johnson. Methodology: Joshua Wilt and Shelby Johnson. Software: Joshua Wilt. Validation: Joshua Wilt. Formal analysis: Joshua Wilt. Investigation: Joshua Wilt and Shelby Johnson. Resources: Joshua Wilt and Shelby Johnson. Data curation: Joshua Wilt. Writing –original draft preparation: Joshua Wilt. Writing – review and editing: Joshua Wilt and Shelby Johnson.

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## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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