Normative Values for the Profile of Mood States for Use with Athletic Samples

REVISION

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Running Head: POMS NORMS FOR ATHLETES

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Abstract

The Profile of Mood States (POMS) has been used extensively for the assessment of mood in the sport and exercise environments. The purpose of the study was to develop tables of normative values based on athletic samples. Participants (N = 2,086), comprising athletes at the international (n = 622), club (n = 628), and recreational (n = 836) levels, completed the POMS in one of three situations: pre-competition/exercise, post-competition/exercise, and away from the athletic environment. Differences between the athletic sample and existing norms were found for all mood subscales. Main effects of level of competition and situation were identified. The results support the proposition that the use of the original tables of normative values in sport and exercise environments is inappropriate.

Keywords: MOOD, POMS, NORMS, SPORT, EXERCISE

Normative Values for the Profile of Mood States for Use with Athletic Samples

Investigation of relationships between mood states and involvement in sport or exercise has proven a popular area of research during the past three decades. The Profile of Mood States (POMS) inventory, developed by McNair, Lorr and Droppleman (1971), has been used extensively for the assessment of mood in the sport and exercise environments, featuring in more than 200 published articles. The factor structure of the POMS, representing six dimensions of the mood construct -- Tension, Depression, Anger, Vigor, Fatigue, Confusion -- and the associated tables of normative values were derived from psychiatric outpatients and normal college students. McNair et al. (1971, p. 6) recommended that the POMS should be used primarily as a measure of mood states in psychiatric outpatients although they acknowledged that it could prove useful in other environments.

The application of the POMS in sport and exercise was pioneered by Morgan and his associates (Morgan & Johnson, 1978; Morgan & Pollock, 1977; Nagle, Morgan, Hellickson, Serfass, & Alexander, 1975). Morgan noted a tendency for those involved in sport or exercise to report scores for Vigor above the 50th percentile of the published norms (McNair et al., 1971) and to report scores for Tension, Depression, Anger, Fatigue, and Confusion below the 50th percentile. He referred to this pattern of scores as an iceberg profile and proposed that it reflected mental health (see Morgan, 1985). In hindsight, and given the now well documented benefits of regular physical activity to mental health (see Biddle, 1995), that the average athlete tends to show a more positive mood profile than the average psychiatric outpatient, or even the average college student, is unsurprising.

Researchers using the POMS as a measure of mood outside the environments investigated by McNair et al. (1971) have been faced with a choice of either using the original tables of normative data as a point of reference or generating their own norms. The vast majority of researchers have chosen the former option even though McNair et al. (1971, p. 19) specifically warned that the college norms, generated from students (N = 856) at a single university, should be “considered as very tentative.”

Normative scores for the POMS for a specific population were published by Tunis, Golbus, Copeland, Fine, Rosinsky, and Seely (1990). They transformed the reported mood scores of 705 pregnant women seeking prenatal diagnosis for advanced maternal age into standard scores, thereby providing norms for the assessment of comparable groups in future research. To date, researchers of mood in sport have relied exclusively upon the original normative data (see LeUnes, Hayward, & Daiss, 1988) leading several reviewers of this field (Renger, 1993; Rowley, Landers, Kyllo, & Etnier, 1995; Terry, 1995; Vanden Auweele, De Cuyper, Van Mele, & Rzewnicki, 1993) to call for the applicability of POMS to sport to be strengthened.

It should be emphasized that there is nothing inherent in the mood construct which restricts its relevance to populations within the clinical environment. Mood is a universal phenomenon the measurement of which can logically be achieved by the same method from one population to another, providing conditions such as similar linguistic capability and relevant response set are met. The same is not true, however, for tables of normative data which are intended to reflect what is representative of specific populations. Clearly, the sample group from which the standard scores are derived should offer an appropriate comparison to the individual scores of interest. It is an inherent limitation to apply a set of normative scores collected in one environment to another, patently different, environment. For example, McNair et al. (1971) produced normative scores for the POMS which differed significantly between psychiatric outpatients and normal college students on all mood subscales. Most researchers in the sport and exercise environment (including myself) have been guilty of accepting this limitation and it is rather surprising that POMS norms for sport have not been generated previously.

The stability of mood is a salient issue when generating a set of values designed to be representative of a particular population. Reported mood has been shown to be subject to significant diurnal variations (Hill & Hill, 1991; McNeil, Stones, Kozma, & Andres, 1994) the patterns of which may be attributable to individual differences (see Penner, Shiffman, Paty, & Fritzsche, 1994), psychiatric

disorder (see Cowdry, Gardner, O'Leary, Leibenluft, & Rubinow, 1991) or situational variability (see Mischel, 1990). It appears likely that the specific situational characteristics of the athletic environment will influence what can be considered to be a normal mood profile for athletes. Two variables of particular relevance for the sport psychology practitioner are the situation in which an athlete reports his/her mood and the level of competition at which an athlete competes. For example, mood states have been shown to fluctuate before and after competition (Terry, 1992, 1993) and away from the competition environment (Hall & Terry, 1995). In light of such variation it seems germane to investigate whether separate norms for different situations are appropriate.

Similarly, the typical mood of individuals involved in sport and exercise at the recreational level may differ from those involved at a club level of competition or an elite level. Previous comparisons of mood scores at different levels of participation have produced equivocal results. For example, Durtschi and Weiss (1986) found no difference between elite and non-elite marathoners, while Dyer and Crouch (1987) similarly found no difference between advanced and beginning runners. In contrast, significant differences in mood scores have been reported between marathoners and joggers (Wilson, Morley, & Bird, 1980) and between varsity and recreational swimmers (Riddick, 1984). Further, Goss (1994) reported greater mood disturbance among age-group (under 18 years of age) compared to varsity swimmers, although this difference may have been a function of age rather than level of competition. Given the equivocality of findings and the modest size of the samples used in most investigations, conclusions about the moderating influence of level of competition upon reported mood are difficult.

In summary, there appears to be a pressing need to develop athletic norms for the POMS and to investigate whether mood responses are associated with situational differences and level of competition. The purpose of this study therefore was to develop tables of normative values based on athletic samples to supplement those derived from samples of students, psychiatric outpatients, and pregnant women. In

accordance with the available evidence (see LeUnes et al., 1988; Terry, 1995; Vanden Auweele et al., 1993 for reviews) it was hypothesized that, compared to existing normative data, athletes would report higher scores of Vigor and lower scores of Tension, Depression, Anger, Fatigue, and Confusion.

Method

Participants

Participants were 2,086 volunteer athletes (1,244 men and 842 women) whose mean age was 28.6 years (SD = 12.4 years, range = 18 - 62 years). The sample comprised athletes at the international (n = 622), club (n = 628), and recreational (n = 836) levels. The international group was derived from 20 sports (see Table 1) in environments which included three Olympic Games (Albertville, Barcelona, and Lillehammer) and six World Championships. The club group derived from 20 sports, involving individuals who regularly (once per week or more) participated in competitive sport activities as members of an organized sports club. The recreational group derived from five activities but comprised mainly aerobic dance and weight training participants. None of the recreational group engaged in competitive sport activities. Participants were drawn from the following populations: International athletes recruited during the researcher's consultancy work as a sport psychologist with the national teams of Great Britain, student athletes at Brunel University, individuals using the Brunel Sport Psychology Services, club athletes from the west London Area, and recreational participants at various leisure facilities in south east England.

Measures

Mood states were assessed using the original version of the POMS (McNair et al., 1971). This is a 65-item inventory of six subscales: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor-Activity, Fatigue-Inertia, and Confusion-Bewilderment. Participants rated "How are you feeling right now" for each mood descriptor, e.g., "Friendly". Responses were provided on a 5-point scale anchored by 0 = "not at all" and 4 = "extremely". Validation studies have reported

internal consistency (alpha) coefficients for the POMS subscales ranging from .84 to .95 (see McNair et al., 1971). Test-retest reliability coefficients ranging from .65 to .74 are reported (McNair et al., 1971). The POMS usually takes between 5 to 7 min. to complete.

The original unipolar POMS was used in preference to the more recent bipolar version (POMS-BI; Lorr & McNair, 1988) for two reasons. First, the unipolar version remains the more commonly selected version of POMS by contemporary researchers of sport and exercise in preference to the POMS-BI. Therefore, norms based on the unipolar version will have relevance to a larger number of researchers. Second, there is tentative evidence that the POMS-BI is a less sensitive measure of mood state than the unipolar POMS (see Terry, 1995). However, while the present research developed athletic norms for the unipolar POMS there is a need to also develop athletic norms for the POMS-BI and the many shortened versions of POMS (e.g., Grove & Prapavessis, 1992; Shacham, 1983; Terry, Keohane, & Lane, 1996).

Procedure

Data were collected over a five year period (1990 - 1995) by the author or trained research assistants. Participants completed POMS in one of three situations: pre-competition/exercise, post-competition/exercise, or away from the athletic environment. Pre-competition/exercise data collection points included eve of competition, 1 hr., 40 min., and 10 min. Distortion in reported mood has been demonstrated where athletes perceive that mood profiles may influence team selection (Miller & Edgington, 1985). Therefore, where applicable, pre-competition data were collected after team selection had been announced. Post-competition/exercise data data collection points included 10 min., 40 min., 1 hr., and 4 hr. Away from the athletic environment, data were collected in classroom settings or during one-on-one interviews, not within 48 hrs. of competition/exercise. A culturally-appropriate alternative word list (c.f., Albrecht & Ewing, 1989) was available during completion of the POMS. This alternative word list is available upon request from the author. All participants were treated in accordance with the

"Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 1992).

Results

Raw Score Distributions

Table 2 contains descriptive statistics of raw scores for the six POMS subscales. Means and standard deviations are provided for the athletic sample overall and grouped by level of competition and situation. Frequency distributions for the sample overall showed the distribution of scores for Tension, Depression, Anger, Fatigue, and Confusion to be skewed in the direction of low scores whereas scores for Vigor were distributed symmetrically.

Participants reported the full range of possible scores for Vigor (0-32) and Fatigue (0-28). For Tension (possible range: 0-36, range used: 0-34), Depression (possible range: 0-60, range used: 0-52), Anger (possible range: 0-48, range used: 0-42), and Confusion (possible range: 0-28, range used: 0-27) none of the participants reported scores at the very top end of the scales. The ranges of scores reported are comparable with those reported by Tunis et al. (1990) in a previous development of population-specific norms for the POMS.

Conversion to Standard Scores

Raw scores were subjected to T-score transformations using the following formula:

$$T = 50 + 10 \frac{(n - m)}{s}$$

where n = raw score; m = mean; s = standard deviation. This transformation converts raw scores to scores on a standard scale with a mean of 50 and a standard deviation of 10. Normative scores for the overall sample are contained in Table 3. These data are presented, as for the original POMS (McNair et al., 1971), in a format which may be used to plot profiles and to convert raw scores to standard scores.

Gender Comparisons

A gender comparison by McNair et al. (1971) found that less than 1% of the variance in mood scores of college students was associated with gender, resulting in a combined table of normative data for male and female students. Previous gender comparisons of mood scores in sport and exercise environments (Craighead, Privette, Vallianos, & Byrkit, 1986; Fuchs & Zaichowsky, 1983; Goss, 1994, Stratton, 1996) have shown minimal or no differences between males and females. In the present study, no significant differences in mood scores were found between male and female participants. Therefore, data for males and females were collapsed into one group for all further analyses.

Comparisons with Existing Norms

Single factor Multivariate Analysis of Variance (MANOVA) showed significant overall differences between scores for the athletic sample and existing norms for college students (Wilks's lambda = 0.33, $p < .001$). Univariate tests showed significant differences between the athletic sample and existing norms (McNair et al., 1971) on all mood subscales (see Table 4). When plotted against college norms (see Figure 1), mean scores for athletes showed, as hypothesized, a pronounced "iceberg" profile in line with Morgan's mental health model (Morgan, 1985), indicating that such a profile is the norm rather than the exception for athletes.

Standardized differences (effect sizes) were calculated to further assess the magnitude of differences between the present values and college norms. Effect sizes are calculated by dividing the difference in mean values (normally) by the pooled standard deviation (see Thomas & Nelson, 1996). Due to the non-availability of the original McNair et al. (1971) dataset, effect sizes were calculated using the standard deviation for the present sample only. The mean effect size was 0.78 (Tension = 0.86, Depression = 1.17, Anger = 0.47, Vigor = 0.26, Fatigue = 0.68, Confusion = 1.26) indicating that the difference between normative mood profiles for athlete and college samples is large overall, relatively small for reported Vigor, moderate for Anger, large for Fatigue and Tension, and very large for Depression and Confusion (Thomas & Nelson, 1996).

It should be emphasized that the college norms used for this comparison were those generated from a mixed-gender sample of students (using a "one week" response set) who in turn reported greater mental health than psychiatric outpatients (see McNair et al., 1971, pp. 16-20). Reported mood scores for a small sample (N = 113) of college students using a "right now" response set (see Pillard, Atkinson, & Fisher, 1967) were similar to those for the present sample with the exception of the Vigor subscale where athletes (M = 17.35) reported much higher values than students (M = 12.80)#

Moderating Factors

Levels of Competition: Within the athletic sample, mood scores for different levels of competition (elite, club, recreational) and different situations (pre-competition/exercise, post-competition/exercise, away from the athletic environment) were compared using single factor MANOVAs. Some participants were excluded from the group comparisons for situation either because the precise data collection point was unknown or because the data collection point could not be readily classified under one of the three situational headings (e.g., data collected midway between one competition and another). The multivariate analyses, summarized in Table 5, showed significant main effects of level of competition (Wilks's lambda = 0.81, $p < .001$) and situation (Wilks's lambda = 0.79, $p < .001$). The interaction effect was not investigated as there were insufficient data for club athletes in the post-competition situation.

Univariate Analysis of Variance and Scheffé post hoc tests showed that athletes at club level reported lower scores of Vigor and higher scores of Tension, Depression, Anger, Fatigue, and Confusion than the other two groups. It appears, therefore, that participation at international or recreational level is associated with greater mental health (Morgan, 1985) than participation at club level. Further, international athletes reported significantly lower scores of Fatigue and Confusion than recreational participants but significantly higher scores of Depression and Anger. To help interpret the magnitude of the between-group differences, effect sizes

were calculated. Effect sizes ranged from 0.06 (Tension scores for international and recreational groups) to 0.94 (Anger scores for club and recreational groups) with a mean of 0.45, indicating that group differences associated with level of competition were moderate overall (Thomas & Nelson, 1996). Differences between the international and recreational groups were small to moderate (mean effect size = 0.20, range = 0.06 to 0.43) whereas differences between international and club athletes (mean effect size = 0.56, range = 0.44 to 0.77) and between club and recreational athletes (mean effect size = 0.58, range = 0.31 to 0.94) were moderate to large.

Situational Differences: Univariate analyses of differences by situation showed a more positive mean mood profile for athletes at the post-competition/exercise stage than the other two situations. Post-competition/exercise scores were significantly lower for Tension, Depression, Anger, and Confusion than those at the pre-competition/exercise stage or away from the competition environment. Also, significantly higher Vigor scores were recorded at the post competition/exercise stage than before or away from competition/exercise. Fatigue scores away from the competition/exercise environment were significantly higher than in the other situations. Effect sizes ranged from 0.09 (Depression scores pre-competition/exercise and away from competition/exercise) to 1.03 (Tension scores pre- and post-competition/exercise). The mean effect size of 0.52 indicated that group differences associated with the competition or exercise situation were moderate overall (Thomas & Nelson, 1996). Differences from pre- to post-competition/exercise ranged from small (Fatigue = 0.15, Vigor = 0.38) to large (Confusion = .72, Depression = 0.77, Anger = .90, Tension = 1.03) with a mean effect size of 0.66. Differences between the post-competition/exercise situation and away from competition/exercise ranged from moderate (Vigor = 0.50, Fatigue = 0.58) to large (Depression = 0.70, Anger = .72, Confusion = .88, Tension = 96) with a mean effect size of 0.72. Differences between the pre-competition/exercise situation and away from competition/exercise were small (Depression = 0.09, Vigor = 0.12,

Confusion = .12, Tension = 0.14, Anger = .20) to moderate (Fatigue = 0.41) with a mean effect size of 0.18.

Group norms can be generated from the descriptive statistics found in Table 2 or are available by contacting the author.

Discussion

The present study developed tables of normative scores for the POMS inventory derived from athletic samples. Comparison with existing norms showed that athletes report more positive moods than students, who in turn report more positive moods than psychiatric outpatients. Such differences emphasize the desirability of population-specific normative values. Group comparisons have shown significant variations in reported mood associated with the athletic situation and level of competition. In light of the paucity of directly relevant previous research, a degree of speculation is required to account for these differences.

The finding that mood was more positive following competition/exercise has several explanations. It is feasible that the prospect of competition is associated with a slight mood disturbance which dissipates by the time competition is over, although it appears less tenable that mood disturbance would occur prior to recreational exercise. Further, mood away from the athletic environment may be less positive than mood following activity due to a small but significant withdrawal effect. Alternatively, the reported differences may be explained by the mood-enhancing properties of physical activity rather than the mood disturbing qualities of forthcoming competition or inactivity. The well-documented psychological benefits of physical activity (see Berger, Owen, & Man, 1993; Biddle, 1995) suggest that the "mood enhancement" hypothesis may have more support than the "mood disturbance" hypothesis.

The reason why club athletes should report more negative moods than either international athletes or recreational participants is equally elusive and also warrants further investigation. Riddick (1984) similarly found recreational swimmers to report more positive mood profiles than swimmers in varsity teams, a difference he

explained in terms of the additional physical training demands endured by the competitive group. A tentative explanation for differences in reported mood associated with level of competition is that the moderate level of physical activity experienced by recreational participants produces mood enhancement whereas the additional physical demands at the competitive club level reduces mood enhancement or causes mood disturbance. Long term habituation to increased physical demands, such as that experienced by international athletes, and the attendant improvements in physical capacity, somehow revives the mood enhancing properties of physical activity. This explanation assumes a linear increase in volume of physical activity from recreational to competitive club to international participants and it is acknowledged that this assumption may be erroneous. It is also acknowledged that some athletes, far from experiencing mood enhancement through increased physical activity, instead succumb to overtraining syndrome which is associated with acute mood disturbance (see Budgett, 1990; Morgan, Brown, Raglin, O'Connor, & Hellickson, 1987).

The between-group differences emphasize that typical mood responses are moderated by the characteristics of the situation and the competitive level of the individual. These variables should be considered by researchers investigating mood-performance relationships. It is proposed that the tables of normative data developed in the present study represent an improved point of reference for those using mood profiles in sport and exercise environments, although researchers are encouraged to generate normative data for their specific populations of interest. Given the statistically significant and, in some cases, large group differences, researchers who use the POMS in sport or exercise environments are advised to refer to group norms which are most relevant to the level of competition and situation of their population of interest.

While the size of the sample used in the present study can be considered a strength, the limitations of the participant group should be noted. First, the relative lack of demographic information makes it difficult to judge the representativeness of

the sample. Second, the recreational group of participants were older than the other two groups and comprised proportionately more females. Third, the unequal cell sizes (for instance, recreational participants were over-represented in the post-competition/exercise situation) may mean differences attributed to situation are actually an artifact of differences attributable to level of competition. Therefore, the inter-group comparisons may have less generalizability than the normative scores for the sample overall.

Reddon, Marceau, and Holden (1985) emphasized the importance of using norms of direct relevance to the population of interest after identifying significant differences between their sample of 361 college students and the norms proposed to represent such a population (McNair et al., 1971). Cooper and McConville (1990) went further in suggesting that individuals differed sufficiently in their mood variability to render as flawed the whole logic of using norms for the POMS (see also Penner, Shiffman, Paty, & Fritzsche, 1994). Whilst the superiority of using an individualized database of previous profiles to interpret the present mood of a particular athlete is not disputed, the benefit of a pool of normative scores which is as relevant as possible to the participants of interest is proposed. Given that previously the only available set of norms was one that has been shown to be clearly unrepresentative of athletic populations, perhaps the most valuable contribution of the present data is the standardized profile sheet generated from a large mixed-sport sample of athletic participants at different levels of competitions and in a variety of situations (Table 3). This provides improved normative data as a point of reference for researchers and professionals using the POMS inventory in sport and exercise environments.

If the present results are used to inform the interpretation of the POMS profile of an athlete, it is pertinent to consider whether to compare the individual to the athletic norms overall or to one of the subgroup norms. Clearly some individuals could belong to more than one subgroup (e.g., an international athlete prior to competition). It would have been possible to generate norms for such combinations

from the present data although it was decided against this strategy on the grounds that the consequent reduction in group size would have diminished the representativeness of the respective samples. It is recommended that the normative values for the athletic sample as a whole are the most representative but that the circumstances of an individual might be such that the subgroup norms offer a more relevant point of comparison. It should be reiterated that the present norms are based on a "How are you feeling right now" response set and may not be applicable if any other rating periods are used. McNair et al. (1971, p. 20) found that a "How have you been feeling during the past week including today" response set was associated with higher scores on all subscales. The tendency for affect scores to increase as the rating period grew was also reported by Watson, Clark, and Tellegen (1988). It is logical that over a one week period a broader range of emotions may be reported, thereby increasing subscale scores, whereas the immediacy of the "right now" protocol may influence participants to report fewer emotions.

In summary, the present study has developed tables of normative values for the POMS which may benefit researchers of mood in sport and exercise environments. The situational characteristics in which mood is assessed and the competition level of the participant appear to moderate reported mood scores. Future research might develop tables of normative values for other specific populations.

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Table 1

Athletic Populations Represented in the Sample (N = 2,086)

International (n = 622)	Club (n = 628)	Recreational (n = 836)
Alpine Skiing	Badminton	Aerobics
Badminton	Basketball	Alpine Skiing
Bobsled	Boxing	Golf
Canoeing	Canoeing	Jogging

Cricket	Cricket	Weight Training
Fencing	Cycling	
Golf	Field Hockey	
Hang Gliding	Figure Skating	
Horse Racing	Golf	
Judo	Gymnastics	
Karate	Ice Hockey	
Modern Pentathlon	Karate	
Netball	Netball	
Rowing	Rowing	
Rugby Union	Rugby League	
Squash	Rugby Union	
Swimming	Soccer	
Tennis	Track and Field	

Track and Field Triathlon

Triathlon Volleyball

Table 2

Descriptive Statistics for Raw Scores of the Profile of Mood States

Among an Athletic Sample Grouped by Level of Competition and Situation

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Group	Ten		Dep		Ang		Vig		Fat		Con	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Whole sample (N = 2,086)	6.99	(6.29)	5.16	(7.52)	6.29	(7.24)	17.35	(6.64)	6.61	(5.82)	5.36	(4.45)
Level 1 (n = 622)	5.66	(4.97)	4.38	(6.43)	6.24	(7.02)	18.51	(7.24)	5.37	(5.51)	4.00	(3.79)

Level 2 (n = 628)	9.62 (7.19)	8.67 (9.49)	9.91 (8.05)	15.64 (5.84)	8.16 (5.94)	7.38 (4.96)
Level 3 (n = 836)	6.00 (5.84)	3.11 (5.39)	3.60 (5.34)	17.78 (6.49)	6.37 (5.71)	4.84 (3.94)
Situation 1 (n = 752)	8.75 (7.13)	6.90 (8.69)	8.29 (7.92)	16.65 (6.20)	6.52 (5.88)	6.22 (4.78)
Situation 2 (n = 386)	3.33 (3.39)	2.02 (3.98)	2.63 (4.62)	19.04 (6.22)	5.70 (5.22)	3.35 (3.17)
Situation 3 (n = 436)	7.85 (6.03)	6.15 (7.86)	6.82 (7.05)	15.88 (6.36)	8.96 (6.08)	6.77 (4.61)

Note. Ten = Tension, Dep = Depression, Ang = Anger, Vig = Vigor, Fat = Fatigue, Con = Confusion; Level 1 = International, Level 2 = Club, Level 3 = Recreational;

Situation 1 = Pre-competition/exercise, Situation 2 = Post-competition/exercise,

Situation 3 = Away from the athletic environment.

Table 3

Normative Scores for the Profile of Mood States Derived from an Athletic Sample (N = 2,086)

T-score	Ten	Dep	Ang	Vig	Fat	Con
90+	32-36	35-60	35-48			23-28
89						
88	31	34	34			
87	30	33	33		28	22
86		32	32			
85	29				27	21
84		31	31			
83	28	30	30		26	20
82	27	29			25	
81			29			19
80	26	28	28		24	
79	25	27	27			
78		26			23	18
77	24		26			
76		25	25		22	17
75	23	24			21	
74	22	23	24			16
73			23		20	
72	21	22	22	32		15

71	20	21		31	19	
70		20	21		18	
69	19		20	30		14
68	18	19	19	29	17	
67		18				13
66	17	17	18	28	16	
65			17	27		12
64	16	16			15	
63	15	15	16	26	14	11
62		14	15	25		
61	14		14		13	
60	13	13		24		10
59		12	13		12	
58	12	11	12	23	11	9
57				22		
56	11	10	11		10	8
55	10	9	10	21		
54		8	9	20	9	7
53	9					
52	8	7	8	19	8	
51		6	7	18	7	6
50	7	5	6			
49				17	6	5
48	6	4	5	16		
47	5	3	4		5	4
46		2		15	4	
45	4		3	14		3
44	3	1	2		3	
43		0	1	13		

42	2		12	2	2
41		0			
40	1		11	1	
1					
39	0		10	0	
38					0
37			9		
36			8		
35					
34			7		
33			6		
32					
31			5		
30			4		
29					
28			3		
27			2		
26					
25			1		
24			0		

Table 4

Comparison of POMS Scores for the Present Sample and Existing Norms for College Students (McNair et al., 1971) and Pregnant Women (Tunis et al., 1990)

Source	Wilks	df	Factor	Univariate Fa
Athletes v College Students	0.33**	6,2080	Ten	2166.9**
			Dep	2879.1**
			Ang	462.9**
			Vig	145.8**
			Fat	931.0**
			Con	3239.8**
Athletes v Pregnant Women	0.31**	6,2080	Ten	687.5**
			Dep	15.0**
			Ang	6.0*
			Vig	1162.2**
			Fat	2671.2**
			Con	43.8**

Note. Ten = Tension, Dep = Depression, Ang = Anger, Vig = Vigor, Fat = Fatigue, Con = Confusion

adf=1,2085

* p < .05, **p < .001

Table 5

MANOVA of the Profile of Mood States Scores

Among an Athletic Sample (N = 2,086)

Source	Wilks	df	Factor	Univariate Fa
Level of competition	0.81**	12,4156	Ten	85.7**
			Dep	113.8**
			Ang	156.5**
			Vig	33.0**
			Fat	38.4**
			Con	110.2**
Situation	0.79**	12,3128	Ten	104.8**
			Dep	55.4**
			Ang	83.9**
			Vig	28.7**
			Fat	37.6**

Con	73.3**

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Note. Ten = Tension, Dep = Depression, Ang = Anger, Vig = Vigor, Fat = Fatigue, Con = Confusion

adf = 2,2083 for level of competition, df = 2,1569 for situation

**p < .001

List of Figures