

Chapter 9

Differences in Participant Motivation Based on Category of Body Mass Index and Gender

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Abstract Motivation is defined as “the directions and intensity of one’s effort” and is a significant factor in the selection of exercise and sport. Participant motivation evaluates those factors that enhance or inhibit motivation to participate and is represented by factors as health orientation, weight concern/weight loss and personal goal achievement. The research aim was to evaluate the differences in nine participant motivation factors based on health risk categories of body mass index (BMI) using four BMI categories of underweight, normal, overweight and obese and related to athlete gender. The nine participant motivation factors utilized in the study were health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem. Male and female athletes competing at the 2009 World Masters Games, Sydney, Australia volunteered for the research (male; $n = 3687$; mean age = 53.72; SD = 10.05 and female; $n = 3488$; mean age = 49.39; SD = 9.15). Athletes

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completed an online survey using the Limesurveytm interactive survey system where they responded to a 56 item sport psychological instrument, the Motivations of Marathoners Scale. Results for male athletes significant differences ($p < .001$) were identified for BMI category with health orientation, weight concern, personal goal achievement, competition, affiliation, life meaning and self-esteem, although η^2 values were small (η^2 values .002–.020). For female athletes significant differences ($p < .001$) were identified for BMI category with health orientation, weight concern, personal goal achievement, competition, affiliation and self-esteem, although η^2 values were small (η^2 values .001–.017). No significant differences occurred for recognition, life meaning or psychological coping.

Keywords Masters sport • BMI • Participant motivation • Gender

9.1 Introduction

Motivation is defined as “the directions and intensity of one’s effort” and is a significant factor in the selection of exercise and sport. Participant motivation evaluates those factors that enhance or inhibit motivation to participate and is represented by factors as health orientation, weight concern/weight loss and personal goal achievement (Masters et al. 1993; Marcus and Forsyth 2009). These motivating factors are identified to influence the quantity of physical activity in people. Some research has been conducted on participant motivation factors displayed by 2009 World Masters Games (WMG) athletes based on issues of gender and comparisons between different international competition cohorts (Heazlewood et al. 2011, 2012, 2015).

9.1.1 Body Mass Index

Body mass index (BMI units in kg m^{-2}) or Quetelet index (American College of Sports Medicine 2010) and research indicates that obesity related health problems and health risks increase above a BMI value of 25. According to American College of Sports Medicine (2010) criteria scores athletes would be underweight (BMI < 18.5), normal (BMI = 18.5–24.9), overweight (BMI = 25.0–29.9) and obese (BMI > 30.0) scores. BMI scores of 25.0–29.9 increases disease risk for females and high risk for males and greater than 30 results in high risk for females and very high risk for males.

Research has indicated the following trends that link BMI with nutrition and physical activity behaviours across different populations. BMI was used to predict dietary risk and race in a study of university women (Anderson 2006) which indicated that at risk eating behaviours were somewhat linked to BMI. A study of the effects of effects of self-efficacy, body mass, and cardio respiratory fitness

on exercise motives in Chinese college students (Shen and Xu 2007) and discovered physical and psychological variables have both independent and specialized functions on exercise motives. Future motivational studies in exercise should focus attention to ecological approaches that account for physical, psychological, and social factors. Ecological approaches reflect the context of the behaviours such as sports competition. Sicilia et al. (2014) evaluated the relationship of exercise motivation and social physique anxiety in secondary education male and female adolescents and included BMI and gender as potential predictors of motivation and social physique anxiety.

Caperchione et al. (2008) evaluated mediating relationship between body mass index and the direct measures of the theory of planned behaviour on physical activity intention, and the findings indicated that the direct measure of attitude and perceived behavioural control mediated the relationship between BMI and physical activity intention. The current research problem is what influence BMI categories in predicting participant motivation factors as health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem in terms of these factors being important to masters athletes at international level competitions.

9.1.2 Research Aim

The research aim was to evaluate the differences in nine participant motivation factors based on health risk categories of body mass index (BMI), using four BMI categories of underweight, normal, overweight and obese (American College of Sports Medicine 2010) and related to athlete gender. To assess if BMI differentiated the level of importance and difference in nine participant motivation factors of health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem and enable the development of specific intervention programs based on the different dimensions of participant motivation interacting with gender to enhance participation in sport and physical activity by masters athletes.

9.2 Methods

9.2.1 Sample and Instruments

The study was approved by a university human research ethics committee. Male and female athletes competing at the 2009 World Masters Games, Sydney, Australia volunteered to participate in the research project (male; $n = 3687$; mean age = 53.72; SD = 10.05 and female; $n = 3488$; mean age = 49.39; SD = 9.15). Athletes completed an online survey using the Limesurveytm interactive survey

system where they responded to a 56 item sport psychological instrument, the Motivations of Marathoners Scale (MOMS) with a 7-point Likert scale response to each item. The range was 1 = least important to 7 = most important reason. The MOMS instrument focused on nine participant motivation factors related to health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem.

The MOMS instrument displays high internal consistency good test–retest reliability, factor validity, construct validity, convergent validity and discriminant validity (Masters et al. 1993; Ogles and Masters 2000). The nine factors represented the dependent variable set in the analysis. The four categories for body mass index (BMI units in kg m^{-2}), where weight is divided by height squared were based on American College of Sports Medicine (2010) criteria where underweight (<18.5), normal (18.5–24.9), overweight (25.0–29.9) and obese (>30.0) scores. The additional obesity class categories of I (30–34.9), II (35.0–39.9) and III (>40.0) were not applied. The BMI categories were the independent nominal level variables used in the ANOVA using SPSS Statistics version 22 software.

9.2.2 Statistical Analysis

The research design was a cross-sectional non experimental design using a cohort of athletes who competed at the 2009 World Masters Games, Sydney Australia. Cross tabulations were applied to assess the frequency distribution for the four BMI categories with gender. Mean and standard deviation for participant motivation factor scores by gender were calculated to assess trends. One-way ANOVAs were conducted on each of the nine factors by BMI factor using gender separately in the analyses. A two-way ANOVA with gender and BMI category had insufficient cell counts for an adequate solution and was not applied. The effect sizes η^2 or η^2 were calculated for the ANOVA solutions where .01 is considered small, .06 medium and .14 large (Cohen 1988). Post hoc tests included least significant difference (LSD), Scheffe and Tamhane's T^2 (unequal variance).

9.3 Results

Table 9.1 displaying the cross tabulations were applied to assess the frequency distribution for the four BMI categories with gender to understand the frequency distribution of the sample. There were significant different (Chi-square = 177.5, $df = 3$, $p < .001$).

Table 9.2 indicates the general differences in participant motivation factors of health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem for male and female athletes.

Table 9.1 Frequency distribution for gender with BMI category

WMG data	Classification			
	Underweight	Normal	Overweight	Obese
Male	11	1317	1399	430
Female	44	1656	879	347
Total	55	2973	2278	777

American College of Sports Medicine (2010) criteria for BMI Scores

Underweight (<18.5)

Normal (18.5–24.9)

Overweight (25.0–29.9)

Obese (>30.0)

Table 9.2 Mean and standard deviation for participant motivation factors and gender

Participant motivation factor	Gender	Mean	SD
Weight concern	Male	3.86	1.39
	Female	3.93	1.48
Competition	Male	4.06	1.45
	Female	3.57	1.45
Health orientation	Male	4.79	1.50
	Female	4.79	1.51
Goal achievement	Male	4.89	1.45
	Female	4.71	1.52
Recognition	Male	2.84	1.49
	Female	2.61	1.45
Affiliation	Male	4.37	1.42
	Female	4.84	1.40
Psychological coping	Male	2.74	1.45
	Female	2.79	1.50
Life meaning	Male	3.02	1.50
	Female	3.06	1.53
Self-esteem	Male	3.86	1.44
	Female	3.97	1.50

The results indicated some paradoxical effects. For male athletes significant differences ($p < .001$) were identified for BMI category with health orientation, weight concern, personal goal achievement, competition, affiliation, life meaning and self-esteem, although η^2 values were small (η^2 values .002–.020). No significant differences occurred for recognition or psychological coping. The post hoc analyses (LSD, Scheffe and Tamhane’s T^2) indicated weight concern was identified as a moderate motivation factor for overweight and obese athletes, competition as a high motivator for underweight athletes, health orientation as moderate for normal BMI values, goal achievement as very high for underweight athletes, affiliation as moderate for obese athletes, life meaning low for most BMI categories and self-esteem marginally important for overweight athletes. The ANOVA

output for participant motivation factors, *F* ratio and significance for males are displayed in Table 9.3 using BMI category as independent variable.

For female athletes significant differences ($p < .001$) were identified for BMI category with health orientation, weight concern, personal goal achievement, competition, affiliation and self-esteem, although η^2 values were small (η^2 values .001–.017). No significant differences occurred for recognition, life meaning or psychological coping. Weight concern was identified as a moderate motivation factor for overweight and obese athletes, competition as a moderate motivator for normal BMI athletes, health orientation as moderate for normal BMI values, goal achievement as high for underweight athletes, affiliation as high for obese athletes and self-esteem marginally important for underweight and normal BMI athletes. The ANOVA output for participant motivation factors, *F* ratio and significance for males are displayed in Table 9.4 using BMI category as independent variable.

Tables 9.5 and 9.6 indicate the means and standard deviations for male and female athletes based on the four BMI categories: the independent variable and the nine participant motivation factors as the dependent variables in the nine one-way ANOVA analyses. To reiterate the total scale for each factor is a seven point Likert scale where 1 represents not an important reason to 7 a most important reason.

Table 9.3 ANOVA output for participant motivation factors, *F* ratio and significance for males using BMI as independent variable

Factor	<i>F</i> ratio	Significance
Weight concern	16.209	<.000
Competition	5.778	.001
Health orientation	16.047	<.000
Goal achievement	13.478	<.000
Recognition	1.480	.218
Affiliation	3.865	.009
Psychological coping	1.415	.236
Life meaning	5.853	.001
Self-esteem	6.107	<.000

Table 9.4 ANOVA output for participant motivation factors, *F* ratio and significance for females using BMI as independent variable

Factor	<i>F</i> ratio	Significance
Weight concern	6.894	<.000
Competition	4.142	.006
Health orientation	6.439	<.000
Goal achievement	13.293	<.000
Recognition	.194	.900
Affiliation	2.691	.045
Psychological coping	.464	.707
Life meaning	1.215	.303
Self-esteem	3.619	.013

Table 9.5 Means and standard deviations for the BMI category with each participant motivation factor for male athletes

BMI category		Weight concern	Competition	Health orientation	Goal achievement	Recognition	Affiliation	Psychological coping	Life meaning	Self-esteem
Underweight	Mean	2.96	5.09	4.00	6.18	2.31	4.07	2.68	2.89	3.54
	SD	1.36	1.12	2.27	.96	1.83	2.10	2.05	2.30	2.25
Normal	Mean	3.66	4.17	4.93	5.07	2.92	4.26	2.82	3.15	3.99
	SD	1.30	1.44	1.43	1.41	1.50	1.42	1.49	1.53	1.44
Overweight	Mean	4.06	4.00	4.83	4.81	2.81	4.42	2.71	2.99	3.82
	SD	1.401	1.47	1.49	1.46	1.40	1.41	1.42	1.46	1.42
Obese	Mean	3.89	3.88	4.30	4.58	2.79	4.52	2.67	2.76	3.62
	SD	1.48	1.38	1.62	1.47	1.47	1.42	1.43	1.46	1.46

Table 9.6 Means and standard deviations for the BMI category with each participant motivation factor for female athletes

BMI category		Weight concern	Competition	Health orientation	Goal achievement	Recognition	Affiliation	Psychological coping	Life meaning	Self-esteem
Underweight	Mean	3.19	3.71	4.61	5.17	2.77	4.59	2.74	3.05	4.12
	SD	1.20	1.56	1.50	1.38	1.63	1.54	1.55	1.79	1.54
Normal	Mean	3.87	3.64	4.91	4.86	2.61	4.80	2.80	3.09	4.05
	SD	1.41	1.44	1.44	1.41	1.43	1.42	1.47	1.51	1.47
Overweight	Mean	4.09	3.48	4.71	4.54	2.60	4.86	2.73	2.98	3.85
	SD	1.53	1.46	1.54	1.51	1.45	1.37	1.47	1.49	1.47
Obese	Mean	3.94	3.36	4.51	4.35	2.59	5.04	2.83	2.94	3.83
	SD	1.58	1.40	1.63	1.57	1.48	1.29	1.59	1.55	1.56

Table 9.7 Male and female comparison for BMI category with participant motivation factor

Factor	Male	Female
Weight concern	Moderate motivator for overweight and obese athletes	Moderate motivator for overweight and obese athletes
Competition	High motivator for underweight athletes	Moderate for normal BMI athletes
Health orientation	Moderate for normal BMI values	Moderate for normal BMI values
Goal achievement	Very high for underweight athletes	High for underweight athletes
Recognition	ns	ns
Affiliation	Moderate for obese athletes	High for obese athletes
Psychological coping	ns	ns
Life meaning	Low for most BMI categories	ns
Self-esteem	Marginally important for overweight athletes	Marginally important for underweight and normal BMI values

Table 9.7 indicates the male and female comparisons for BMI category with participant motivation factor based on post hoc tests. It can be observed that weight concern, health orientation, goal achievement, affiliation show similar trends across both genders in terms of BMI category and level of motivation.

The same situation is relevant to recognition and psychological coping which were not related to BMI category for both genders. In terms of completion is serves at a high motivator for underweight males and a moderate motivator for normal BMI females, whereas self-esteem is marginally important for overweight males and underweight and normal BMI females.

These results indicate some complexity in terms of specific responses for the nine participant factors of health orientation, weight concern, personal goal achievement, competition, recognition, affiliation, psychological coping, life meaning and self-esteem.

9.4 Discussion

Although effect sizes were categorized as small, however, statistically significant differences were observed for both genders for BMI categories with the nine participant motivation. Both genders displayed health orientation, weight concern, personal goal achievement, competition, affiliation and self-esteem as sources of difference interacting with four BMI categories from marginal, moderate to large importance. In males, competition was a high motivator and goal achievement was a very high motivator for underweight athletes. In females goal achievement was high for underweight athletes and affiliation as high for obese athletes. It is important to highlight that participant motivation in terms of recognition or

psychological coping in males and recognition, life meaning or psychological coping in females were not differentiated by BMI category. The findings indicate that complex interactions occur between gender and the four BMI categories and the nine participant motivation factors evaluated in this study.

As a consequence of these findings marketing and encouraging athlete participation at international level masters competitions to different genders and interacting with the different BMI categories and linked to participant motivation profiles based on BMI will require more complex sport psychological marketing strategies as follows:

1. Strategies relevant to both genders should focus on weight concern issues for overweight and obese athletes, health orientation for normal BMI athletes, goal achievement for underweight athletes and affiliation for obese athletes.
2. In the context of gender specific strategies focus on competition for underweight males and for normal BMI females, life meaning for most BMI categories in males with no distinction for females and self-esteem for overweight males and underweight and normal BMI females.
3. Life meaning and psychological coping were not differentiated by BMI categories and were not identified as important factors for motivating both genders at this level of competition.

9.5 Conclusion

These findings based on a large cohort of male and female athletes competing at the 2009 World Masters Games suggest that BMI categories interaction with gender and influence participation motivation responses that subsequently influence participation in international masters sport competitions.

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