

Demographic and Personality Profile of 'High Active' and 'Low Active' Exercisers: A Discriminant Analysis

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Individuals who are health conscious and have tendency towards adopting and maintaining a healthy lifestyle are excellent segments for health-related offerings. This study attempts to examine group differences between 'high active' and 'low active' exercisers in demographic and personality characteristics. Cross-sectional data was collected via self-administered surveys from general adult sample. Significant group differences were found between the two exercise groups in age, occupation, and all personality factors investigated. 'High active' exercisers were found to be more conscientious and open to new experience (but scoring lower on neuroticism and emotional stability) compared with the 'low active' exercisers. The discriminant analysis reported conscientiousness to be the most important factor in discriminating between the two groups, followed by neuroticism. This study provides useful insights to marketers in segmenting markets, targeting promotions, and positioning products and services. Public policy agents and health professionals could use such information for health intervention and promotion efforts.

1. Introduction

In the marketing sense, healthy lifestyle behaviours are associated with a set of activities, interests, and opinions orientated toward the consumption of various goods and services (Kraft and Goodell, 1993). The demand for health-related products and services is largely being driven by market segments that have tendency towards adopting and / or maintaining healthy lifestyle (Divine and Lepisto, 2005). A good understanding of this customer segments that adopting healthy lifestyle behaviour is integral to capitalizing on new business opportunities for a number of health-related industries such as fitness clubs, health food and beverage, pharmaceutical, health care, insurance, and medical services. However, the lifestyle changes experiencing by Malaysians due to socio-economic development, urbanization and market globalization has led to the prevalence of obesity and "lifestyle" related illnesses like diabetes, heart attack, and cancers (Omar, 2002). The public health problems have caused a huge health care burden to the country and there is increasing concern over rapidly escalating health care costs (Ministry of Health, 2006). The government is concerned with the health issues that will affect the productivity and consequently, the nation economy in view of the importance of health as an asset in the development of human capital (Sim, 2006).

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Yap & Othman

Exercise is one of the key components leading to a healthy lifestyle (Bungum and Morrow, 2000). Regular physical activity and fitness contribute to overall health and fitness (Ooyub and Omar, 2002). Despite the facts that the positive physical and psychological benefits of exercise are well documented and well publicised, levels of physical inactivity are increasing worldwide (Bond and Batey, 2005). The health benefits of exercising as well as the prevalent sedentary lifestyle among Malaysians give a strong reason for the present study to look into the determinants of exercise participation.

The analysis of demographic and personality characteristics of exercisers could be useful to health care marketers in segmenting markets, targeting promotions, and positioning products and services. This study aims to examine the demographic and personality differences between 'high active' and 'low active' exercise groups as well as to categorise exercise group membership into these two groups based on selected personality factors. Based on the recommendation of Symons Downs, Graham, Yang, Bargainier and Vasil (2006), respondents who meet the exercise recommendations (i.e., 4 or more times per week) are classified as 'high active' exerciser; respondents who did not meet the recommendations (i.e., 3 or less times per week) are categorised as 'low active' exerciser. Health experts have agreed that this exercise group classification is appropriate and congruent with the international guidelines for physical activity (USDHHS, 2004).

2. Literature Review

Exercise Participation and Demographic Variables. A review of literature revealed that several demographic variables such as age, gender, education level, occupation, and income may have influence on exercise participation. For instance, in a study on physical activity and health outcome among sedentary women, Nies and Kershaw (2002) found age, income, and race to have significant effect on physical activity. Specifically, it was found that as age increased, overall physical activity level decreased; whereas income was related to physical activity performance positively. In an analysis of several types of healthy lifestyle behaviours including exercise, Divine and Lepisto (2005) found that individual who adopt a healthy lifestyle tend to be female, older, and more educated with higher income. According to Robinson and Rogers (1994), blue-collar occupation groups reported to be directly related to non-adherence to exercise program. Similarly, Marks and Lutgendorf (1999) reported higher income individual engaged in significantly higher levels of exercise and more educated seniors exercised more. Based on the literature discussed above, it is expected demographic differences exist between 'high active' and 'low active' exercise groups in terms of age, income, gender, education, and occupation. Hence, it is hypothesised that:

Yap & Othman

H1: There are differences between 'high active' and 'low active' exercise groups along age, income, gender, education, and occupation.

Exercise Participation and Personality Characteristics. The link between personality and health-related outcomes has long been an important aspect of personality research (Bogg, Voss, Wood and Roberts, 2007). Specifically, the role of personality has received increasing attention in exercise participation and the relationship between personality and health-related behaviours such as sports, exercise and/or physical activity has long been a focus of the studies on personality research (Courneya and Hellsten, 1998). Personality has been conceptualized from a variety of theoretical perspectives, but none of these definitions are universally accepted (John and Srivastava, 1999).

It was observed that some researchers included one or more lower level of personality variables such as self-esteem, self-motivation, and locus of control in examining exercise and physical activity. However, there is problem theoretically regarding these studies as noted by Bakker, Van Der Zee, Lewig and Dollard (2006, p.34) that "the inclusion of certain personality variables in a research design seems to have been dependent more often on the arbitrary choice of the researcher than on a theory of personality". Hence, a more integrated model of personality is needed to guide the study of exercise and personality.

The most popular model for studying personality traits is the Five-Factor Model of personality (FFM; Tupes and Christal, 1961). These five personality factors that have emerged from factor analyses are known as: neuroticism, extraversion, openness, agreeableness, and conscientiousness (McCrae and John, 1992). The FFM model was adopted as the underpinning theory for the present study as the FFM is adequate for understanding the relationship between personality and health-related behaviour (Marshall, Wortman, Vickers, Kusulas, and Hervig, 1994).

The traits frequently related with extraversion dimension are sociable, assertive, talkative, and active (Digman, 1990). Extraverts tend to be full of energy and enthusiasm, outgoing, and have a higher need for stimulation (John and Srivastava, 1999). Extraversion is associated with sociability and it reflects the participative nature of some health practices (Booth-Kewley and Vickers, 1994). A number of studies have previously shown healthy lifestyle adoption among individuals with wide social networks (Steptoe, Wardle, Vinck, Tuomisto, Holte and Wichstrøm, 1994). It is speculated that extraverts would be more attracted to exercise participation because exercise can satisfy the social and relatedness need (Ingledew, Markland and Sheppard, 2004). Based on Rhodes, Courneya and Bobick's (2001) assertion that high extraversion individuals not only likely to exercise more regularly, but also are more likely to adhere and maintain regular exercise, the following hypothesis is posited:

H2 (a): 'High active' exercisers tend to have higher score on extraversion compared to 'low active' exercisers.

Yap & Othman

People high on the conscientiousness scale tend to be reliable, thorough, responsible, organized, strong-willed, task-focused, achievement-oriented and persevering (Digman, 1990; McCrae and John, 1992). The conceptual definition of conscientiousness suggests that this personality factor may have influence on consumer health practices as stated by Steptoe, et al. (1994, p.340) that “people with consistently positive health practices tend to be responsible and conscientious, with a lack of impulsiveness and an orderly approach to life.” Therefore, the conscientiousness can be expected to be positively related to healthy-promoting behaviour (Marks and Lutgendorf, 1999). Presumably, this expectation applies to exercise participation, the following hypothesis is established.

H2 (b): ‘High active’ exercisers tend to have higher score on conscientiousness compared to ‘low active’ exercisers.

Neuroticism is associated with undesirable characteristics include being anxious, depressed, emotional, worried, moody, nervous, sad, tense, and insecure (John and Srivastava, 1999). Szabo (1992) reported that the habitually exercising subjects scored lower on neuroticism than the non-exercising subjects. Similarly, Potgieter and Venter (1995) found exercise program drop-outs to have significantly higher neuroticism scores than adherers. Therefore, it is expected that the predisposition to emotional instability associated with neuroticism serve to inhibit one’s exercise participation:

H2 (c): ‘High active’ exercisers tend to have lower score on neuroticism compared to ‘low active’ exercisers.

Literature regarding the links between openness, agreeableness and exercise participation has been limited (Marshall, et al., 1994). Courneya and Hellsten (1998) suggest future research to look further into the link between openness and exercise as the findings indicated that openness may be linked to exercise participation. Adams and Mowen (2005) found openness to be positively related to exercise and dieting behaviour whilst Schnurr, C. O. Vaillant and G. E. Vaillant (1990) reported agreeableness to be positively related to exercise behaviour. Based on the aforementioned literature, the following hypotheses are posed:

H2 (d): ‘High active’ exercisers tend to have higher score on openness compared to ‘low active’ exercisers.

H2 (e): ‘High active’ exercisers tend to have higher score on agreeableness compared to ‘low active’ exercisers.

3. Research Methodology

The survey instrument was a six-page questionnaire which has been translated from English to both Bahasa Malaysia and Mandarin using back-to-back translation method. The personality factors were measured using a 44-items Big Five Inventory (BFI)

Yap & Othman

developed by John, Donahue and Kentle (1991). Despite its brevity, the BFI is a psychometrically sound measure of the five personality factors that was developed through definitions of expert ratings of personality, and further verified by subsequent factor analyses (John and Srivastava, 1999). Each personality indicators were rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Exercise behaviour was assessed based on previous validated research instrument (Godin and Shephard, 1985). The phrasing of this item is – “How often do you participate in one or more exercise activities for 20 to 30 minutes per session during your leisure time in the last 3 months?” Respondents were asked to indicate their response on a 7-point response choice. Background information of the respondents such as gender, age, ethnicity, religion, marital status, level of education, income, and occupation were also included. The questionnaires were pre-tested using a sample size of 30 general adults (i.e., Faculty members, undergraduate and post-graduate students) to ensure clarity and ease of comprehension. Based on the feedback from the respondents as well as five experts in the area of Marketing, several corrections and modifications were made in terms of the wording, presentation and structure of the questionnaire. Respondents who had participated in the pre-tests were not included in the main study.

Sampling Procedure and Data Collection Method

Participants for the present study were general adult (18 to 65 years of age) recruited by student helpers through their informal contact. The target population of interest for the present study are subjects who are currently active in exercising. Respondents were considered qualified if they reported performing exercise activities at least once a week during leisure time for at least 20 to 30 minutes in duration each time for the last 3 months. To provide an adequate level of confidence in this study, a sample size of 600 respondents was targeted. Non-probability quota sampling method was adopted to ensure that various subgroups were included proportionately in the sample. Numerous studies (e.g., Grzywacz and Marks, 2001; Rimal, 2002; Brickell, Chatzisarantis and Pretty, 2006) have found significant gender differences in exercise participation. As Malaysia is a multicultural society, distinct ethnic groups might have experienced economic, social and culture differences, and these differences have certain level of influence on healthy lifestyle behaviour. Ethnicity has recently received some attention within the TPB framework (Nigg, Lippke and Maddock, 2008). Hence, gender and ethnic have been selected as a basis for quota sampling.

Based on the composition of the total population of Malaysia, the study set a 50-50 quota for gender, 50-30-20 quota for ethnic group (Malay, Chinese, and Indian). The Indian group was set higher at 20% compared to the national Census of 10% in order to capture an adequate number of Indian respondents. Data were collected from the subjects using personally administered questionnaires. A verbal consent was obtained from the participant prior to distributing the questionnaire. All participants were informed the study was on voluntary basis, and that information provided will be kept confidential. A small souvenir was offered to participants in order to encourage more participation. Exercise is an urban phenomenon; it is thus justifiable for the present study to be conducted in the Klang Valley areas since it is the largest urban centre in Malaysia.

4. Analysis of Results

Of 1,200 questionnaires sent out, 594 responses were returned for a response rate of 49.5%. Of these returns, only 512 complete questionnaires were usable for the data analyses. Generally, the number of respondents in terms of gender and race is consistent with the predetermined quota sampling. Due to the conscious effort to capture adequate number of Indian respondents, the final sample had a higher percentage of Indians compared to the national Census of 10%. A high proportion of the respondents were in the age range of 20 to 29. One possible explanation for the larger young sample may be due to the reason that young adults exercise more regularly and are less likely to be sedentary (Grzywacz and Marks, 2001; Piazza, Conrad and Wilbur, 2001). The finding pertaining to the higher proportion of the single respondents (60.9%) may be a reflection of the predominantly younger aged sample. Consistent with the race composition, it was found that the religion of the majority of the respondents were Islam (Islam = 50%, Buddhism/Taoism = 23.6%, Hinduism = 10.9%, Christianity = 13.5%, others = 2%). The higher proportion of respondents with university or professional degrees may be due to better employment opportunities available in the urban areas. While 34.6% of the respondents had an income in the range of RM1000 – RM2999, 23.5% of the respondents in the 'not applicable' category were mainly students, housewife, and retiree or unemployed. Lastly, when the occupation variable was examined, the majority of the respondents (41.2%) were in the 'executive/technician/production worker/clerical' category. *A Demographic Comparison: 'High Active' and 'Low Active' Exercise Groups.* The study reported that 35.7% of the respondents were categorised under the 'high active' group whilst 64.3% were in the 'low active' category. Chi-square tests of independence was used to examine the demographic differences between 'high active' exercise group and 'low active' exercise group. Among the demographic variables, significant differences were found between 'high active exercisers' and 'low active exercisers' in two demographic variables: age and occupation (see Table 1). This finding indicated that various age and occupation groups have different impacts on the two different exercise groups.

In terms of age, subjects in the '30 to 39' age group tended to exercise less frequently than those subjects who were either younger (i.e., below 20) or older (i.e., above 40 years old). A possible explanation for such finding was that subjects in the age group of '30 to 39' may begin to have family role and / or other work commitments, leaving them having less time for exercise activities. This finding converges with previous studies in which Piazza, Conrad and Wilbur (2001) and Grzywacz and Marks (2001) who found age to be related to exercise frequency. When occupation was examined, the majority of the subjects who do not exercise as regularly tended to belong to the occupation group of 'Executive / Technician / Production Worker / Clerical'. It was found that 'Student / Housewife' tended to exercise more regularly compared to other occupational groups. One possible reason for the 'Student / Housewife' group to exercise more frequently could be that this group of subjects tended to have more time for exercise activities compared to other working groups. This is consistent with the finding of Robinson and Rogers (1994) which found occupation groups to be related to exercise adherence.

Yap & Othman

Table 1
High Active and Low Active Exercisers: A Demographic Comparison

Characteristics	'Low Active' Exercisers (N=329)		'High Active' Exercisers (N=183)	
	Frequency	Percentage	Frequency	Percentage
Gender ($\chi^2 = 2.458$, p-value = 0.140)				
Male	156	47.4	100	54.6
Female	173	52.6	83	45.4
Age ($\chi^2 = 35.776$, p-value = 0.0001)				
Below 20	11	3.3	19	10.4
20 - 29	167	50.8	95	51.9
30 - 39	105	31.9	23	12.6
40 - 49	31	9.4	30	16.4
Above 50	15	4.6	16	8.7
Race ($\chi^2 = 0.143$, p-value = 0.931)				
Malay	164	49.8	89	48.6
Chinese	99	30.1	58	31.7
Indian	66	20.1	36	19.7
Religion ($\chi^2 = 0.518$, p-value = 0.915)				
Islam	167	50.8	89	48.6
Buddhism/Taoism	78	23.7	43	23.5
Hinduism	37	11.2	19	10.4
Christianity	42	12.8	27	14.8
Marital Status ($\chi^2 = 0.129$, p-value = 0.938)				
Single	199	60.5	113	61.7
Married without children	26	7.9	13	7.1
Married with children	97	29.5	55	30.1
Education ($\chi^2 = 4.523$, p-value = 0.104)				
SPM/SPVM/MCE/O-Level and below	74	22.5	55	30.1
STPM/HSC/A-Level to College Diploma	103	31.3	45	24.6
University/Professional Degree	152	46.2	83	45.3
Income ($\chi^2 = 5.58$, p-value = 0.134)				
Below RM1000	30	9.1	15	8.2
RM1000 - RM2999	119	36.2	58	31.7
RM3000 - RM4999	80	24.3	28	15.3
RM5000 & above	35	10.6	27	14.8
Occupation ($\chi^2 = 10.199$, p-value = 0.037)				
Professional/Managerial Position	34	10.3	23	12.6
Middle Level Manager	37	11.2	19	10.4
Executive / Technician / Production Worker / Clerical	150	45.6	61	33.3
Own Business	23	7.0	16	8.7
Student / Housewife	78	23.7	63	34.4

Note: due to missing data, the total number of both categories might not be consistent

Rimal (2002) found several key socio-economic variables such as income and education to influence individual health behaviour. More specifically, Nies and Kershaw

Yap & Othman

(2002) found income to have significant association with physical activity while Grzywacz and Marks (2001) found socioeconomic status to have association with exercise participation. As for education level, Marks and Lutgendorf (1999) reported more educated people tended to exercise more frequently. Blanchard, Kupperman, Sparling, Nehld, Rhodes, Courneya et al. (2008) found ethnicity to be related to physical activity. However, contradicting with these previous studies, no significant association was found between income, education, ethnicity and exercise participation. Surprisingly, this study found no significant gender difference between 'high active' and 'low active' exercisers. This too contradicts the finding of Divine and Lepisto (2005).

Corrected Item-total Correlations. While item-total correlation refers to a correlation of an item with the composite score of all the items forming the same scale; corrected item-total correlation (CITC) does not include the score of the particular item in question when calculating the composite score, hence it is labelled as 'corrected' item-total correlations (Lu, Lai and Cheng, 2007). Many items for personality factors did not meet the cut-off value of 0.50 and hence indicated candidates for deletion (Hair, Black, Babin, Anderson and Tatham, 2006). The CITC scores for extraversion indicators were relatively low. Two indicators with the value of 0.411 and 0.419 were eliminated from subsequent analysis. For agreeableness, only one indicator exceeded slightly the cut-off value of 0.50. Hence, decision was made to drop the whole agreeableness factor from further analysis. Indeed, agreeableness has been found to be a relatively weak factor compared to other four personality factors (Conner and Abraham, 2001). The CITC scores for conscientiousness indicators are among the highest which ranged from 0.613 to 0.845 except for two items which were eliminated from further analysis. Similarly, two neuroticism items were dropped as the CITC score were too low. Subsequently, merely four openness items were retained for further analysis.

Exploratory Factor Analyses. The dimensions of the scale were examined by factor analysing the items using the principal components analysis with Varimax rotation method (Malhotra, 2004). Minimum eigen values of 1.0 helped determine the number of factors or dimensions for each scale. The items for a factor were retained only when the absolute size of their factor loading is above 0.5 (Hair et al., 2006). The rotated factor matrix in Table 2 shows that four factors can be identified to explain the underlying characteristics of personality. Together, these four factors accounted for approximately 59% of the variance in responses. Unexpectedly, all items for both conscientiousness dimension (7 items) and extraversion dimension (6 items) were loaded on Factor 1, explaining 34.5% of the total variance. Hair, et al. (2006) argued that model adequacy assessment should take into account both empirical and theoretical justifications. Empirically, the present factor analysis finding suggested that the conscientiousness and extraversion indicators should be combined to represent one single personality factor. However, this does not seem to make theoretical sense as both conscientiousness and extraversion are conceptually very different factors (John and Srivastava, 1999). As the factor loadings of the extraversion items were consistently and relatively lower than conscientiousness dimension, the extraversion items were removed from the subsequent analyses. The openness items had fair loadings (ranging from 0.674 to 0.803) on the intended construct, accounting for 10.5% of the total

Yap & Othman

variance. The factor analysis outcome suggested that all the six neuroticism items loaded on two different factors. Factor 3 included three items related to the original neuroticism concept with factor loadings ranging from 0.578 to 0.783, accounting for 7.1% of the total variance; whilst the three items (i.e., 'relax', 'not easily upset', and 'calm') loaded on Factor 4 can be viewed as another dimension labelled as emotional stability. This emotional stability factor consisted of three items ranging from 0.557 to 0.779, explaining 6.7% of the total variance.

Table 2
Rotated Factor Matrix for Personality Statements

Items	Factors			
	F1	F2	F3	F4
E1: is talkative	.776	.198	.008	-.042
E3: is full of energy	.717	.308	-.074	.052
E4: generates a lot of enthusiasm	.719	.306	-.016	-.047
E5: tends to be quiet	.721	.078	-.068	.004
E7: is sometimes shy, inhibited	.587	.021	-.077	-.178
E8: is outgoing, sociable	.702	.272	-.046	.047
C1: Does a thorough job	.869	.102	.124	.054
C3: Is a reliable worker	.859	.137	.105	.059
C4: Tends to be disorganised	.858	.026	.074	.107
C5: Tends to be lazy	.598	.083	.060	.118
C6: Perseveres until the task is finished	.880	.067	.132	.051
C7: Does things efficiently	.867	.046	.144	.061
C8: Makes plans and follows through with them	.835	.001	.094	.095
N1: Is depressed, blue	-.017	-.012	.578	.147
N2: Is relaxed, handles stress well	.117	-.094	.070	.677
N4: Worries a lot	.020	-.066	.783	-.097
N5: Is emotionally stable, not easily upset	-.049	.001	.025	.779
N7: Remains calm in tense situations	.094	.010	.403	.557
N8: Gets nervous easily	.141	.007	.644	.166
O1: Is original, comes up with new ideas	.183	.693	-.035	-.041
O2: Is curious about many different things	.185	.674	-.083	-.011
O5: Is inventive	.086	.684	.036	-.083
O8: Is sophisticated in art, music, or literature	.101	.803	.008	.040
Eigen Values	8.436	2.289	1.677	1.116
Total Variance Explained (%)	34.487	10.492	7.138	6.657
Cumulative Variance Explained (%)	34.487	44.979	52.116	58.773
Composite reliability	0.938	0.807	0.710	0.714

Consequently, conscientiousness, openness, neuroticism, and emotional stability factors were included in the subsequent analyses. This is not uncommon in the personality and health research. In the exercise domain, Courneya, Bobick and Schinke (1999) included only extraversion, conscientiousness, and neuroticism in examining the relationship between personality and exercise behaviour. The factor analysis identified four factors associated with personality characteristics, with conscientiousness emerging first and accounted for the largest proportion of variances, followed by openness. Overall, the present findings indicated measurement problems associated with the agreeableness and extraversion dimension in this sample.

Yap & Othman

The component items of each factor derived in the factor analyses were subject to reliability test (Hair et al., 2006). By convention, an acceptable level of composite reliability coefficient to retain an item in a scale is at least 0.70 (Nunnally, 1978). The reliability measures for the four personality factors (see Table 2) were exceeded the recommended cut-off value, indicating satisfactory reliability for the measures adopted. Subsequently, summated mean scores of multiple indicators were created for these personality factors for the use in further analyses.

Comparing Personality Factors: 'High Active' and 'Low Active' Exercise Group. Independent sample t-tests were used to compare mean scores for personality factors between 'high active' and 'low active' exercise groups. Table 3 presents the results of the mean comparisons between the two groups. The differences in group means were statistically significant in all the personality factors compared. In summary, the t-test analysis concluded that 'high active' exercisers tended to be more conscientious and more open to new experiences (but scoring lower on neuroticism and emotional stability dimension) compared to the 'low active' exercisers.

Table 3
Comparing the Mean Scores of Personality Factors

Personality Factors	Mean (Std. Dev.) ^a		F-value	Significance ^b
	'High Active'	'Low Active'		
Conscientiousness	6.10 (0.397)	4.70 (0.980)	102.122	0.0001
Openness	5.17 (0.810)	4.71 (0.962)	4.712	0.0001
Neuroticism	1.99 (0.456)	3.00 (0.936)	71.109	0.0001
Emotional Stability	2.13 (0.495)	3.02 (0.919)	35.375	0.0001

Note: ^a Higher scores represent greater agreement with the attributes; ^b Level of significance using t-tests

While the significant test of the mean differences of the personality factors provides a preliminary insight into the differences between the two groups, the use of independent sample t-test was not able to determine the relative importance of each factor that best discriminate between 'high active' and 'low active' exercise groups (Hair et al., 2006). Therefore, discriminant analysis was needed to provide an exploration into the discriminating power of the factors. Discriminant analysis has been a popularly used statistical tool for examining differences among distinct groups (see Ramayah, Md. Taib and Koay (2006) and Ghazali and Nor Othman (2004) for example). Table 4 presents the discriminant analysis of the two exercise groups. It was found that the group who exercise regularly was significantly different from the group who does not exercise as regular in terms of all personality factors studied. Specifically, the 'high active' exercisers tended to score higher on conscientiousness and openness (but had lower score on neuroticism) compared to the 'low active' exercise group. Hence, Hypotheses (b), (c), and (d) posited were supported.

Yap & Othman

Table 4
Discriminant Analysis of the Two Exercise Groups

Independent Variables	Unstandardized Discriminant Function Coefficients	Standardized Discriminant Function Coefficients	Univariate F Ratio	Pooled Within-groups Correlation
Conscientiousness	1.255	1.030	341.296**	0.980
Neuroticism	-0.180	-0.144	189.023**	-0.730
Emotional Stability	0.313	0.249	149.130**	-0.648
Openness	0.179	0.163	29.134**	0.286

Note: Eigenvalue = 0.696; Canonical Correlation = 0.641; Wilk's Lambda = 0.589**; Chi-square = 268.49; Group Centroid (Low Active) = -0.621; Group Centroid (High Active) = 1.117

** p<.01

As shown in Table 4, there was only one discriminant function with the eigenvalue of 0.696 produced for the two exercise groups. The square of canonical correlation (i.e., 0.641) indicates that 41.1% of the variance in the dependent variable was accounted for by this model (Malhotra 2004). Conscientiousness was reported as the most important factor in discriminating between the 'high active' and 'low active' exercise groups, followed by neuroticism, with the F-value recorded at 341.296 and 189.023, respectively. The present finding corroborates with the previous research that has demonstrated conscientiousness to have greater effect on exercise participation compared with agreeableness and openness factor (Courneya and Hellsten, 1998; Bogg and Roberts, 2004).

Lastly, the classification results of the discriminant analysis are briefly discussed here (see Table 5). Approximately 75.7% of the respondent in 'low active' group was correctly classified, while 95.6% of 'high active' exercisers were correctly classified. Overall, the classified matrix showed that 82.8% of the analysis samples were correctly classified based on the discriminant function, implying approximately 83% accuracy of the discriminate function in classifying the exercise groups between the 'high active' and 'low active' exercise groups. Further, as shown in Table 6, the predictive accuracy of the model for the cross validation sample was 81.4%.

Table 5
Classification Results for Cases Selected in the Analysis

Actual Group	Number of Cases	Predicted Group Membership	
		'Low Active'	'High Active'
'Low Active'	329	249 (75.7%)	80 (24.3%)
'High Active'	183	8 (4.4%)	175 (95.6%)

Note: 82.8% of the original grouped cases were correctly classified.

Yap & Othman

Table 6
Classification Results for Cross Validation (Leave One Out Classification)

Actual Group	Number of Cases	Predicted Group Membership	
		'Low Active'	'High Active'
'Low Active'	329	243 (73.9%)	86 (26.1%)
'High Active'	183	9 (4.9%)	174 (95.1%)

Note: 81.4% of the cross-validated grouped cases were correctly classified.

5. Implications Of The Study

This paper is one of the first few attempts to analyse the personality and demographic profile of individual exercisers in Malaysia. The study found that 'high active' and 'low active' exercisers are indeed different in a number of aspects. Demographically, it was reported that age and occupation have significant association with exercise participation. However, the two groups, 'high active' and 'low active' exercisers, do not differ significantly in other demographic characteristics, namely gender, race, religion, marital status, education, and income level. In terms of personality characteristics, the study found significant differences between the two exercise groups along conscientiousness, openness, neuroticism, and emotional stability dimension. 'High active' exercisers tended to be more conscientious and more open to new experience (but scoring lower on neuroticism and emotional stability) as compared with 'low active' exercise group.

The choices made by individual concerning exercise and fitness activities are a form of consumer behaviour. In the marketing perspective, consumers adopting a healthy lifestyle can be viewed as a specific market segment. Understanding demographic and personality profile of the two exercise groups is important. Armed with this knowledge, marketers can segment the market according to these characteristics. This market segment could be targeted by determining the purchasing behavioural characteristics, shopping and media habits of individuals who have favourable attitude towards adopting healthy lifestyle. Based on such information, health care marketers are in a much better position for market planning and development of current or new offerings, and development of appropriate communication strategies. For instance, food manufacturers and retailers could also use such information to determine the appropriateness of product, distribution, and promotional strategies that target at these segments.

Among the demographic variables studied, this study found that only age and occupation significantly discriminating whether an individual is going to be highly active or less active in exercise participation. Specifically, subjects in the '30 to 39' age group tended to be less active compared with both the younger and older subjects. This finding may be attributed to the fact that subjects in this age group (i.e., '30 to 39') have family and / or work commitments, leaving them lesser time for exercise activities. When occupation was examined, it was found that 'Student / Housewife' tended to more active compared to other occupational groups, implying that students and housewives may

Yap & Othman

have more time for exercise activities compared to other occupational groups. In fact, time constraint has been stated as the main problem for not (or less active in) exercising among Malaysians (Mohd Nordin, Shamsuddin, Jamaludin, Zulkafli 2003).

Manufacturers or vendors who supply health-related products and services that appeal to the healthy lifestyle segment need to consider the differences between these sub-segments in order to make better decisions on how best to utilise marketing budgets for advertising, personal selling efforts, and other promotional activities. The health and fitness market in Malaysia is becoming more competitive. Marketers need to embrace innovative marketing strategies and findings ways to differentiate themselves in the competitive market. Good understanding of relevant target market characteristics is crucial for subsequent positioning strategies planning that could help to distinguish their brand and services from competitors' ones. For example, to overcome the time pressure problem among potential customers, health club and various fitness program operators should pay attention to ensure easy accessibility and convenience for their service delivery. Several tactics such as having longer operating hours, easy and free parking and placing the fitness centre at strategic location could be considered.

The present study reported significant personality differences between 'high active' and 'low active' exercise groups. Generally, 'high active' exercisers scored higher on conscientiousness and openness but tended to score lower on neuroticism and emotional stability. This has important implications for advertisers and marketers targeting at this segment especially for their marketing communication efforts. Appropriate advertising messages and media selection could be planned to make their advertisement more appealing to segment that carry such personality profile. Beside, the findings also have implication for sport marketing. Individuals are likely to participate in sport or events that reflect their personality. Hence, sport event organisers must ensure the sport activities fit the personality types of their target market and vice versa in order to make marketing appealing.

In classifying the group membership, among all factors included in the discriminant analysis, conscientiousness emerged to be the most important factor in discriminating between 'high active' and 'low active' exercise groups. Generally, the personality factor – openness – appears to be substantially neglected in health research (Marshall et al., 1994). The current finding that regular and more active exercisers tended to be more open to new experiences would certainly add value to provide important insights into the potential role of openness in health related behaviour.

Increasing concern over rapidly increasing health care expenditures in Malaysia is evident in the media. The pressure of escalating costs of public health care has been a major concern for people and the government. The government is actively promoting public healthy lifestyle behaviour as it is crucial in reducing both health risks and medical costs. The findings of this study regarding demographic and personality profile of exercise groups are also useful for public policy officials and health professionals in health promotion efforts. They may use such information to intervene effectively the growing incidence of obesity and other illnesses such as diabetes, heart attack that

Yap & Othman

relate to physical inactivity and unhealthy diet according to the characteristics of exercise groups.

Several limitations should be considered when interpreting the results of this study. First, although subjects were assured of anonymity and confidentiality, potential social desirability associated with self-report measures may have artificially inflated the observed relationship. One caveat, noted in the measurement section, is the personality scale used to measure the five personality factors. The present study found reliability and validity problem associated particularly with the agreeableness and extraversion factor. This may due to the different cultural setting of the present sample. The study could have been benefited more if agreeableness and extraversion were included with reliable and valid measure. Lastly, as the participation in the study was voluntary, subjects may be more health conscious and tend to be better educated and knowledgeable. Although careful consideration has been given in the quota set, the generalisability of the findings to a wider population should be done with caution.

As the present study focuses on the frequency of exercise, future research ought to include the intensity of exercise as well as considering more objective measures such as fitness class attendance or activity monitoring. Further refinements and validation of the personality scales is necessary by adapting the scale to local cultural settings. Further, a more specific examination into the individual facets of each factor such as the use of NEO-FFI (Costa and McCrae, 1985) as personality inventory may produce greater insights for the association between personality and exercise participation. Other possible research idea may be the inclusion of more narrowly defined personality factors such as locus of control, self-motivation, and self-esteem. Since there might be difference in terms of social and behavioural aspects between rural and urban dweller, future research should also replicate the study to other states in Malaysia. Lastly, the attempt to investigate other consumer healthy lifestyle behaviours such as healthy eating, tobacco-free lifestyle, substance use, health preventive practices, and weight control is needed to explore more comprehensive aspect of healthy lifestyle.

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