Journal of Sports Science 6 (2018) 268-275
doi: 10.17265/2332-7839/2018.05.002

Influence of Gender, Race and Generation on College Students' Exercise Motivation Levels: A Generational Comparison

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Abstract: The purpose of this study was to investigate exercise motivation of a Generation Z sample and to compare exercise motivation between Generation Z and Y. College students from Generation Z (N = 1,457) and Y (N = 2,199) completed the exercise motivation inventory. A two time-point cross sectional quasi-experimental design was implemented for this study. The strongest exercise motivators for Generation Z college students were strength/endurance, ill-health avoidance, and positive health. Generation Z participants scored statistically significantly higher across all subscales of the EMI-2 (exercise motivation inventory-2) when compared to Generation Y. Understanding generational differences in exercise motivation can help in tailoring effective physical activity interventions.

Key words: Physical activity, millennial, generation, cross-sectional.

1. Introduction

Obesity in the United States has drastically increased over the past 25 years, rising from 12% in 1991 to 36% in 2004 to 40% in 2014 [1]. Overweight and obese individuals can experience numerous negative health side effects. A sedentary lifestyle is one of the direct contributors to the obesity epidemic, which in turn can increase the likelihood of negative side effects. Many researchers have suggested the college years as a time where exercise engagement decreases and physical inactivity increases [2-4]. More specifically, 41% of students use a computer for 3 or more hours daily (not for school), while only 27% of current students are physically active for 60 minutes a day [1]. With this shift in technological reliance over the past decade, it is important to understand how generational differences may impact motivation to engage in physical activity in college. For example, physical activity levels have changed with different generation throughout the 20th century [3].

McCrindle and Wolfinger [5] suggest that generational studies can show some of the most self-evident divisions within our society. Variable differences such as behaviors, attitudes, values, and learning and communication styles can lead to future research in comparing individuals from different generations. Reeves and Oh [6] define generational difference theory as "the theory that people born within an approximately 20-year time period share a common set of characteristics based on the historical, technological advances, and other societal changes they have in common". Three characteristics describe differences in generations other than years of birth including: perceived membership, common beliefs and behaviors, and common location in history [7]. Six current generations that make up our society include: the Greatest Generation (1900-1925s), the

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Silent Generation (1925-1940s), the Baby Boomers 1940-1960s), Generation X (1970-1980s), Generation Y (1990-2000 also known as millennials) and Generation Z (2000-2010; aka post-millennials) [8]. The current college-aged student generation is known as Generation Z. Limited research has examined physical activity motivation and behavior of Generation Z, or compared physical activity levels between Generation Z and other generations.

Previous research indicates that only 20% of a Generation X sample engaged in regular moderate physical activity and only 38% engaged in regular vigorous physical activity [9]. Additionally, a cross-generational comparison revealed Baby Boomers were more physically active than Generation X [10]. A more recent survey found that less than 20% of Generation Z students achieved the recommended 30 minutes of moderate physical activity 5-6 days per week.

To better understand participation in physical activity, researchers often look at exercise motivation [11]. One scale that has been validated and used in many studies is the EMI-2 (exercise motivation inventory-2) [12]. The theoretical framework for the EMI-2 was based on causality orientation theory, which explains how humans seek to be autonomous, or have the ability to control and regulate their behaviors [13-14]. A recent generation analysis using the EMI-2 found that Generation Y (millennials) exercise for general health issues (positive health and ill-health avoidance), appearance, strength and endurance and weight management [4]. Moreover, there were significant differences in 3 of 14 exercise motivational subscales by age (affiliation, health pressures, and ill health avoidance) and 8 of the subscales by race [4]. When examined between gender, results revealed that males were motivated by intrinsic factors (strength, competition, and challenge) and females by extrinsic factors (i.e., weight management and appearance) [4]. When exercise professionals can understand what motivates one to exercise, plans and regimens can be established to help people participate in optimal exercise [1]. This can be vital in attaining the goal of enhancing physical activity levels and decreasing sedentary lifestyles.

Although previous studies have examined exercise motivation in a college population [15-18], little research has examined exercise motivation between generations [4]. In addition, there is little research found that has specifically compared exercise motivation between Generation Z and Generation Y (millennials). The purpose of this study was to investigate the differences in exercise motivation between race and gender within Generation Z college students. In addition, a secondary purpose was to compare exercise motivation levels between Generation Y (millennials) and Generation Z. With the findings, we hope to provide important programming implications with physical activity motivation among current college students across multiple demographics.

2. Materials and Methods

2.1 Study Design and Participants

A cross sectional quasi-experimental design utilizing two data points (spring 2017 and fall 2005/spring 2006) were utilized within this study. The university's Human Subjects Institutional Review Board approved the study prior to data collection. Methods for both data points were collected using similar methodology. Students were recruited from required physical activity courses at the same southeastern midsized university. A small bonus of a 2% increase to their final grade was offered to all students. Students were able to access the description of the studies, informed consent and the inventories via the online course learning management system. The first question of the survey verified the student's passive consent and willingness to participate. At the end of the survey, a confirmation page was displayed, in which the student was to turn into their physical activity instructor for extra credit. Participants in both data points completed the demographic questionnaire

and the exercise motivation inventory-2.

In spring of 2017, 2,910 Generation Z students were enrolled in the 96 physical activity courses and 1,457 students (892 women, 553 men) completed the survey. In the fall 2005 and spring 2006, 5,108 Generation Y students were enrolled in 200 sections of physical activity courses, 2,214 (1,118 women, 1,081 men) completed the survey. The description of the demographics can be found in Table 1.

2.2 Measures

The EMI-2 was used to measure participant's exercise motives, which includes 51 items and 14 subscales. The subscales can be categorized as either intrinsic or extrinsic factors and include the following areas affiliation, appearance, challenge, competition, enjoyment, health pressures, ill-health avoidance, nimbleness, positive health, revitalization, social recognition, strength and endurance, stress management, and weight management. Factorial validity and invariance were rigorously tested [12]. The discriminate validity showed consistency with the self-determination theory [19].

2.3 Data Analysis

The data collected in 2005/2006 used the Survey Monkey program and the 2017 data used the Qualtrics system, in both systems the data were exported to SPSS version 21.0 for analysis.

Variations in exercise motivation preferences among Generation Z college students were reported by means and standard deviations. The statistical tests that were utilized in this study were consistent with the Egli et al. 2011 study and included descriptive (frequencies, means) and inferential statistics (*t*-tests, analyses of variance [ANOVAs]). Demographics (gender and race) represented the independent variables, while the 14 subscales represented the dependent variables. Means were utilized to determine group ranking of exercise motivations. ANOVAs determined significant difference of motivation by age, gender, and race. For racial categories, a 1-way ANOVA with Tukey post hoc analysis using harmonic mean sample size determined significant differences between races. Alpha levels were set at $p < 0.05$, reported with 95% confidence intervals.

3. Results and Analysis

For the Generation Z college sample, the top three exercise motivators were positive health ($M = 5.18$; $SD = 0.75$), strength and endurance ($M = 5.07$; $SD = 0.81$) and ill-health avoidance ($M = 4.95$; $SD = 0.84$) (Table 2). The least important motivators were health pressures ($M = 3.93$; $SD = 1.22$), social recognition ($M = 4.01$; $SD = 1.24$), and competition ($M = 4.35$; $SD = 1.25$), all motivation subscales are listed in Table 2 by order of preference.

Tables 3 and 4 highlighted significant differences in exercise motivation subscales by gender and race. Significant gender differences were found for enjoyment ($p = 0.02$), challenge ($p \leq 0.00$), social recognition ($p \leq 0.00$), competition ($p \leq 0.00$), health

Table 1 Frequency and percentiles of demographic characteristics of study participants (Generation Z: *N* = 1,457; Generation Y: *N* = 2,214).

Variable	Generation Z		Generation Y	
Gender (*n* = 1,452)*	*n*	*%*	*n*	*%*
Female	892	61.2	1,181	50.8
Male	553	38.0	1,081	49.2
Race (*n* = 1,451)**				
White	911	62.5	1,527	69.4
Black	372	25.5	478	21.7
Other	168	11.5	194	8.8

* 5 participants did not respond to this question;

** 6 participants did not respond to this question.

Table 2 Descriptive statistics reported by means and standard deviations for exercise motivation subscales (EMI-2).

	Source of variation	*M*	*SD*
1.	Positive health	5.18	0.75
2.	Strength and endurance	5.07	0.81
3.	Ill-health avoidance	4.95	0.84
4.	Stress management	4.90	0.85
5.	Nimbleness	4.85	0.88
6.	Weight management	4.81	0.99
7.	Appearance	4.80	0.85
8.	Enjoyment	4.78	1.02
9.	Revitalization	4.75	0.90
10.	Challenge	4.72	0.94
11.	Affiliation	4.36	1.15
12.	Competition	4.35	1.25
13.	Social recognition	4.01	1.24
14.	Health pressures	3.93	1.22

Table 3 Report of significant differences by demographic variables (gender and race) and exercise motivation as outlined by independent *t* tests with mean scores reported (*N* = 1,457).

Source of variance	Gender	*M*	*SD*	*t-value*	*Significance*
Stress management	Male	4.88	0.84	-0.62	0.54
	Female	4.91	0.85		
Revitalization	Male	4.80	0.87	1.41	0.16
	Female	4.73	0.92		
Enjoyment	Male	4.86	0.93	2.28	0.02*
	Female	4.73	1.08		
Challenge	Male	4.82	0.88	3.07	0.00*
	Female	4.66	0.98		
Social recognition	Male	4.37	1.10	8.77	0.00*
	Female	3.79	1.27		
Affiliation	Male	4.67	0.96	8.04	0.00*
	Female	4.18	1.21		
Competition	Male	4.78	1.01	10.57	0.00*
	Female	4.09	1.32		
Health pressures	Male	4.12	1.21	4.62	0.00*
	Female	3.81	1.22		
Positive health	Male	5.09	0.78	-3.30	0.00*
	Female	5.23	0.74		
Weight management	Male	4.64	0.99	-5.16	0.00*
	Female	4.92	0.97		
Appearance	Male	4.82	0.86	0.46	0.64
	Female	4.80	0.84		
Strength and endurance	Male	5.08	0.80	0.46	0.65
	Female	5.06	0.82		
Nimbleness	Male	4.87	0.85	0.82	0.41
	Female	4.83	0.90		
Ill-health avoidance	Male	4.91	0.86	-1.28	0.20
	Female	4.97	0.83		

* Significance at alpha level 0.05.

Table 4 Report of significant differences by race and exercise motivation as determined by ANOVAs with mean scores reported (*N* = 1,457).

	Mean score				
Source of variation	White	Black	Other	*F value*	*Significance*
Stress management	4.93[a]	4.80[a]	4.96	3.67	0.03*
Revitalization	4.77	4.68	4.85	2.52	0.08*
Enjoyment	4.80	4.72	4.84	1.11	0.33
Challenge	4.73	4.67	4.77	0.78	0.46
Social recognition	4.10[a]	3.79[a]	4.04	8.38	0.00*
Affiliation	4.41	4.26	4.37	2.13	0.12
Competition	4.39	4.27	4.35	1.20	0.30
Health pressures	3.90	4.01	3.91	0.96	0.38
Positive health	5.17	5.17	5.24	0.68	0.51
Weight management	4.87[a]	4.66[a]	4.84	5.99	0.00*
Appearance	4.84[a]	4.71[a]	4.82	3.04	0.05*
Strength and endurance	5.07	5.04	5.15	1.08	0.34
Nimbleness	4.82[a]	4.84	5.01[a]	3.42	0.03*
Ill-health avoidance	4.93	4.98	4.98	0.70	0.49

Note: Post hoc analysis difference using Tukey;

[a] superscript indicates variables that are significantly different;

* Significance at alpha level 0.05.

Table 5 Report of significant differences by Generation (Y and Z) and exercise motivation as outlined by independent *t* tests with mean scores reported.

Source of variance	Generation	*N*	*M*	*SD*	*t-value*	*Significance*
Stress management	Z	1,443	4.90	0.85	-47.46	0.00*
	Y	2,181	3.30	1.08		
Revitalization	Z	1,437	4.75	0.90	-42.62	0.00*
	Y	2,188	3.26	1.12		
Enjoyment	Z	1,439	4.78	1.02	-40.31	0.00*
	Y	2,174	3.21	1.23		
Challenge	Z	1,437	4.72	0.94	-44.83	0.00*
	Y	2,161	3.05	1.18		
Social recognition	Z	1,435	4.01	1.24	-37.57	0.00*
	Y	2,174	2.37	1.32		
Affiliation	Z	1,440	4.36	1.15	-42.38	0.00*
	Y	2,177	2.59	1.28		
Competition	Z	1,439	4.35	1.25	-32.56	0.00*
	Y	2,171	2.79	1.51		
Health pressures	Z	1,438	3.93	1.22	-45.41	0.00*
	Y	2,186	1.95	1.33		
Positive health	Z	1,440	5.18	0.75	-41.63	0.00*
	Y	2,190	3.86	1.03		
Weight management	Z	1,440	4.81	0.99	-35.71	0.00*
	Y	2,179	3.34	1.34		
Appearance	Z	1,428	4.80	0.85	-41.04	0.00*
	Y	2,174	3.41	1.08		
Strength and endurance	Z	1,436	5.07	0.81	-41.32	0.00*
	Y	2,181	3.70	1.07		
Nimbleness	Z	1,439	4.85	0.88	-42.22	0.00*
	Y	2,184	3.31	1.18		
Ill-health avoidance	Z	1,442	4.95	0.84	-43.35	0.00*
	Y	2,180	3.42	1.15		

* Significance at alpha level 0.05.

pressures ($p \leq 0.00$), positive health ($p \leq 0.00$), and weight management ($p \leq 0.00$) (Table 3). Significant race differences were found for various subscales of the EMI-2 (Table 4). When compared to blacks, whites were significantly more likely to exercise for stress management ($p = 0.03$), social recognition ($p \leq 0.00$), weight management ($p \leq 0.00$), and for appearance reasons ($p = 0.05$). However, whites were significantly less likely to exercise for nimbleness when compared to the "other" category ($p = 0.03$).

As outlined below (Table 5), Generation Z participants scored statistically significantly higher across all subscales of the EMI-2 when compared to Generation Y ($p \leq 0.00$). The top exercise motivator for both Generation Y and Z was positive health. The least important exercise motivator for both Generation Y and Z was health pressures as well.

4. Discussion

The purpose of the present study was to understand the exercise motivators of a Generation Z college sample. The secondary purpose was to compare exercise motivation between Generation Z Generation Y college samples.

The top three exercise motivators for the current Generation Z college students were positive health, strength and endurance and ill-health avoidance. These findings are similar to a recent article that found the same top three motivators in traditional and non-traditional college students [20]. Positive health was also highly ranked in terms of exercise motivation with recent social media interventions targeting physical activity in Generation Z college females [21]. Furthermore, Boomers were also found to rank health and fitness factors as their top reason to exercise [22]. Health and fitness factors such as positive health, strength and endurance and ill-health avoidance may be at the forefront of exercise motivation due to the positive health links that have been established in research and highlighted in popular culture [23].

In the current study, the least important motivators were health pressures, social recognition, and competition. This finding is in line with research that found social pressure to lose weight is actually decreasing [24]. This can offer a reason as to why health pressure and social recognition were ranked low and that being overweight is more socially acceptable, thus diminishing the social influence of physical activity [25].

Significant gender differences were found for enjoyment, challenge, social recognition, competition, health pressures, positive health, and weight management, which is consistent with previous research [26-27]. In the current study, men ranked enjoyment, challenge, social recognition, affiliation, competition, and health pressure higher than women. Conversely, women in this study ranked positive health and weight management higher than male counterparts. Men tend to be more competitive in nature compared to women and women are typically more body image conscience, which can lead to greater concern for weight management [28-31]. It appears that the gender differences in exercise motivation are still consistent with previous research. Physical activity professionals should be mindful when programming for specific populations. The factors that motivate males and females to exercise are different, and awareness of emphasis on these differences could be helpful in increasing exercise adherence.

Significant differences were found between races for various subscales of the EMI-2 (Table 4). When compared to black students, students who identified as white were significantly more likely to exercise for stress management, social recognition, weight management, and for appearance reasons. However, white students were significantly less likely to exercise for nimbleness when compared to the "other" category. Van Niekerk [31] also noted a racial difference between exercise motivation among university students, with white participants perceiving both physical and mental health to be stronger reasons

to exercise than the black participants. Cultural influences may impact differences racial groups' motivation for exercise and further investigation is warranted.

Lastly, exercise motivators were compared between Generation Y and Z in this current study. The present study collected data from a Generation Z sample mirroring the methods of a previously collected and published Generation Y sample in 2006 [4]. Generation Z participants scored statistically significantly higher across all subscales of the EMI-2 when compared to Generation Y. At the present time, no other studies have compared physical activity motives between these two generations. As previously noted, the heightened awareness of the health benefits of physical activity in popular culture and research may have influenced the observed trend [23]. The top exercise motivator for both Generation Y and Z was positive health. The least important exercise motivator for both Generation Y and Z was health pressures. Although positive health was ranked the highest among both generations, health pressures was ranked the lowest, and for college students where general health status is fairly high, this is logical. Students do not have the added pressure of addressing current health issues such as chronic diseases, they are motivated to avoid and maintain positive health status.

There are several limitations to this study, including sampling, instrumentation, confounding factors, and social constructs. The participants in this study were from a southeastern university and might not be representative other geographical regions. The study also used self-reported measures of motivation and responses are subject to bias. Additionally, this study did not take into account socioeconomic status as differences might exist between classes. Future studies might want to use a critical approach and test for baseline differences in socioeconomic status and race to account for this confounding factor. Finally, this study did not examine the correlations between physical activity behavior and exercise motivation. It is important to understand exercise motivation to further understand exercise initiation and adherence. Future research could examine generational differences in physical activity behavior.

5. Conclusion

Overall, the top three exercise motivators for the current Generation Y and Z college students were positive health, strength and endurance and ill-health avoidance. The goal for university wellness personnel is to increase physical activity which can aid in addressing the increasing obesity rates. Understanding motivation to exercise may be the key to augmenting and promoting physical activity. Gender and race are associated with different factors of exercise motives and understanding these motives can help in implementing specific exercise programming within the health education and promotion arena. These findings are particularly relevant to campus wellness services, when designing physical activity intervention and promotional programming.

References

[1] American College Health Association-National College Health Assessment II (ACHA-NCHA). 2017. "Obesity Rates & Trends. Obesity Rates & Trends: The State of Obesity." *Fall 2016 Reference Group Executive Summary.* Hanover, MD: American College Health Association. Accessed June 24, 2017. http://stateofobesity.org/rates/.

[2] Anderson, D. A., Shapiro, J. R., and Lundgren, J. D. 2003. "The Freshman Year of College as a Critical Period for Weight Gain: An Initial Evaluation." *Eating Behaviors* 4 (4): 363-7.

[3] Conklin, M. T., Lambert, C. U., and Cranage, D. A. 2005. "Nutrition Information at Point of Selection Could Benefit College Students." *Topics in Clinical Nutrition* 20 (2): 90-6.

[4] Egli, T., Bland, H. W., Melton, B. F., and Czech, D. R. 2011. "Influence of Age, Sex, and Race on College Students' Exercise Motivation of Physical Activity." *Journal of American College Health* 59 (5): 399-406.

[5] McCrindle, M., and Wolfinger, E. 2009. *The ABC of XYZ: Understanding the Global Generations*. The ABC of XYZ.

[6] Reeves, T. C., and Oh, E. 2008. "Generational Differences." *Handbook of Research on Educational*

Communications and Technology 3: 295-303.

[7] Howe, N., and Strauss, W. 2009. *Millennials Rising: The Next Great Generation*. Vintage.

[8] Biber, D. D., Czech, D. R., Harris, B., and Melton, B. 2013. "Attraction to Physical Activity of Generation Z: A Mixed Methodological Approach." *Open Journal of Preventive Medicine* 3 (3): 310-9.

[9] Keene, D. K., and Handrich, R. R. 2011. "Generation X Members Are Active, Balanced and Happy: Seriously." *Jury Expert* 23: 29.

[10] Martin, L. G., Freedman, V. A., Schoeni, R. F., and Andreski, P. M. 2009. "Health and Functioning Among Baby Boomers Approaching 60." *Journals of Gerontology: Series B* 64 (3): 369-77.

[11] Seo, D. C., Nehl, E., Agley, J., and Ma, S. M. 2007. "Relations between Physical Activity and Behavioral and Perceptual Correlates among Midwestern College Students." *Journal of American College Health* 56 (2): 187-97.

[12] Ingledew, D. K., and Markland, D. 2008. "The Role of Motives in Exercise Participation." *Psychology and Health* 23 (7): 807-28.

[13] Deci, E. L., and Ryan, R. M. 1985. "The General Causality Orientations Scale: Self-Determination in Personality." *Journal of Research in Personality* 19 (2): 109-34.

[14] Deci, E. L., and Ryan, R. M. 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum.

[15] Kimbrough, S., Rose, M., Vallee, J., and Nelan, J. R. 2005. "Use of a Shortened EMI-2 in Assessment of Exercise Motivation of Participating College Group Exercise." *Research Quarterly for Exercise and Sport* 76 (1): A101.

[16] Maltby, J., and Day, L. 2001. "The Relationship between Exercise Motives and Psychological Well-Being." *The Journal of Psychology* 135 (6): 651-60.

[17] Smith, B. L., Handley, P., and Eldredge, D. A. 1998. "Sex Differences in Exercise Motivation and Body-Image Satisfaction among College Students." *Perceptual and Motor Skills* 86 (2): 723-32.

[18] Vartanian, L. R., and Shaprow, J. G. 2008. "Effects of Weight Stigma on Exercise Motivation and Behavior: A Preliminary Investigation among College-Aged Females." *Journal of Health Psychology* 13 (1): 131-8.

[19] Ingledew, D. K., Markland, D., and Medley, A. R. 1998. "Exercise Motives and Stages of Change." *Journal of Health Psychology* 3 (4): 477-89.

[20] Kulavic, K., Hultquist, C. N., and McLester, J. R. 2013. "A Comparison of Motivational Factors and Barriers to Physical Activity among Traditional Versus Nontraditional College Students." *Journal of American College Health* 61 (2): 60-6.

[21] Al-Eisa, E., Al-Rushud, A., Alghadir, A., Anwer, S., Al-Harbi, B., Al-Sughaier, N., Al-Yoseef, N., Al-Otaibi, R., and Al-Muhaysin, H. A. 2016. "Effect of Motivation by 'Instagram' on Adherence to Physical Activity among Female College Students." *BioMed Research International.* http://dx.doi.org/10.1155/2016/1546013.

[22] Dacey, M., Baltzell, A., and Zaichkowsky, L. 2008. "Older Adults' Intrinsic and Extrinsic Motivation Toward Physical Activity." *American Journal of Health Behavior* 32 (6): 570-82.

[23] Centers for Disease Control and Prevention (CDC). 2017. "Physical Activity and Health." Retrieved from https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm.

[24] Leahey, T. M., LaRose, J. G., Fava, J. L., and Wing, R. R. 2011. "Social Influences Are Associated with BMI and Weight Loss Intentions in Young Adults." *Obesity* 19 (6): 1157-62.

[25] Molanorouzi, K., Khoo, S., and Morris, T. 2015. "Motives for Adult Participation in Physical Activity: Type of Activity, Age, and Gender." *BMC Public Health* 15 (1): 66.

[26] Elliot, D. L., Goldberg, L., Kuehl, K. S., Moe, E. L., Breger, R. K., and Pickering, M. A. 2007. "The PHLAME (Promoting Healthy Lifestyles: Alternative Models' Effects) Firefighter Study: Outcomes of Two Models of Behavior Change." *Journal of Occupational and Environmental Medicine* 49 (2): 204-13.

[27] González-Cutre, D., Sicilia, Á., and Águila, C. 2011. "Interplay of Different Contextual Motivations and Their Implications for Exercise Motivation." *Journal of Sports Science & Medicine* 10 (2): 274.

[28] Courtenay, W. H. 2000. "Constructions of Masculinity and Their Influence on Men's Well-Being: A Theory of Gender and Health." *Social Science & Medicine* 50 (10): 1385-401.

[29] Keating, X. D., Guan, J., Piñero, J. C., and Bridges, D. M. 2005. "A Meta-Analysis of College Students' Physical Activity Behaviors." *Journal of American College Health* 54 (2): 116-26.

[30] Kilpatrick, M., Hebert, E., and Bartholomew, J. 2005. "College Students' Motivation for Physical Activity: Differentiating Men's and Women's Motives for Sport Participation and Exercise." *Journal of American College Health* 54 (2): 87-94.

[31] Van Niekerk, R. L. 2010. "Understanding the Barriers to and Reasons for Physical Exercise among University Students: Psycho-Social Perspectives of Sports." *African Journal for Physical Health Education, Recreation and Dance* 16 (Special issue 1): 172-81.