Physical Activity Promotion on Campus: Using Empirical Evidence to Recommend Strategic Approaches to Target Female College Students

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Keywords: physical activity | college females | exercise & psychology | self-determination theory | university & college health services

Article:

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PHYSICAL ACTIVITY PROMOTION ON CAMPUS: USING EMPIRICAL EVIDENCE TO RECOMMEND STRATEGIC APPROACHES TO TARGET FEMALE COLLEGE STUDENTS

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Abstract

PROBLEM: A large number of American adults do not meet national physical activity (PA) guidelines for aerobic PA and muscle strengthening. Similarly, many American college students, specifically females do not engage in regular PA. Self Determination Theory can provide a basis for investigating motivational processes of PA. The purpose of this study was to examine relationships between exercise motivation regulation and physical activity behaviors among college females in order to make recommendations for future campus-based health promotion practices. METHODS: Participants (n = 470) completed a web-based survey including items from the Behavioral Regulation in Exercise Questionnaire various PA items. RESULTS: Multiple regression analyses indicate only Identified Regulation as a significant predictor of Moderate PA; both Identified and Intrinsic Regulation were significantly predictive of Vigorous PA; Identified Regulation was significantly predictive of strength training; and both Identified and Intrinsic Regulation were significantly predictive of Stretching. CONCLUSION: Findings demonstrate the need for further exploration of motivation regulation among college females. University campuses represent an ideal setting for promoting physical activity among large proportions of young adults, and evidence from this study and prevention science research should inform the development, implementation, and evaluation of uniquely female PA promotion efforts.

The Centers for Disease Control and Prevention (CDC) assert that many adult Americans do not meet the national guidelines for aerobic physical activity, and muscle-strengthening physical activity (National Center for Health Statistics, 2011). Likewise, a large number of American college students are not engaging in adequate amounts of PA (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Furthermore, findings from the American College Health Association-National College Health Assessment (ACHA-NCHA) indicate that 23.4% of college students reported no days of moderate-intensity cardiovascular or aerobic exercise of at least 30 minutes, and 38.4% reported zero days of vigorous-intensity physical activity of at least 20 minutes in the last 7 days (American College Health Association, 2013). A subgroup of college students at greatest risk for physical inactivity are college females; significantly more college females than males report no days of moderate-intensity aerobic exercise for at least 30 minutes per week and no days of vigorous-intensity aerobic exercise for at least 20 minutes per week (26.1% vs. 23.3%; 44.2% vs. 33.3%, respectively) (ACHA, 2013). The United States Department of Health and Human Services (2008) underscore that meeting PA guidelines decreases one's risk for a variety of chronic diseases. For those enrolled in college, the benefits of regular PA also include improved academic performance, academic behavior (e.g., time on task), as well as improved concentration and attentiveness in the classroom (CDC, 2011). Despite these documents benefits, lack of PA participation among college students continues to be a public health concern, especially considering that PA declines persist post-graduation (Kilpatrick & Bartholomew, 2005).

Self Determination Theory

Self Determination Theory (SDT) is ideally suited for understanding the cognitive, affective, and motivational processes of physical activity engagement and has been previously used to predict PA behaviors (Deci & Ryan, 1985; 1991; 2000). According to Deci and Ryan, motives for PA engagement are influenced by many factors. Motivation is conceived as three distinct states: (a) amotivation, (b) extrinsic motivation, and (c) intrinsic motivation (Deci & Ryan, 1985).

Amotivation is a form of motivation that is defined by the lack of intention to engage in PA behaviors that results from decreased competence to engage in PA or the lack of value placed on the potential outcomes (Deci & Ryan, 1985; 1991; 2000; Markland, 2014)). Extrinsic motivation is a second form of motivation that is characterized by the individual engaging in PA because of its association with a separable outcome (Deci & Ryan 1985). Extrinsically motivated behaviors are then further characterized by four types of regulation on a continuum from non-self-determined to self-determined: (a) external, (b) introjected, (c) identified, and (d) integrated. Externally regulated individuals participate in PA as a result of being told to do so by someone in authority. In this case, behavior is typically associated with compliance to external pressure rather than choice. Although individuals motivated by introjected regulation are more self-determined, they feel pressures to engage in PA because of feelings of guilt and shame, or to demonstrate one's self-worth. Individuals motivated by identified regulation participate in PA to achieve outcomes that are personally valued. The fourth and final type of extrinsic motivation is integrated regulation. Similarly to identified regulation, those who are motivated by integrated regulation value PA, but also view it as part of whom they are and subsequently engage in PA willingly. Intrinsic motivation is the third form of motivation

characterized by PA engagement for satisfaction during an activity rather than for a specific consequence (Deci & Ryan 1985).

Prior research investigating exercise motivation found that intrinsic motivation and identified regulation were significantly correlated with future exercise, intention, intrinsic motivation was not a significant predictor of intentions, and introjected regulation (e.g., feelings of guilt) were significant positive predictors of future exercise intentions (Thøgersen-Ntoumani & Ntoumanis, 2006). Furthermore, Markland and Ingledew (2007) found that relative autonomy was positively related to exercise behavior. Additionally, higher intrinsic motivation predicted better aerobic fitness and introjected regulation predicted higher body fat composition in this sample (Sibley, Hancock, & Bergman, 2013). Lastly, findings suggest that integrated and identified regulations were significant predictors of exercise frequency for both males and females; integrated regulation was found to be a significant and positive predictor for males and females for duration of exercise and introjected regulation was found to be a positive predictor of exercise intensity for females only (Duncan, Hall, Wilson, & Jenny, 2010).

Whereas previous research provides some guidance for health promotion practitioners, few studies focused primarily on female college student populations. Consequently, evidence-based strategies targeting this unique population were not addressed. Exercise motivation, especially among females, is a complex phenomenon that deserves greater attention in order to establish effective practices that facilitate sustained behavior change (Ryan & Deci, 2007; Teixeria, Carraca, Markland, Silva, & Ryan, 2012). Thus, the purpose of this study was to examine potential relationships between exercise motivation regulation and physical activity behaviors among college females in order to make recommendations for future health promotion practices.

Methods

Recruitment & Data Collection

Following the approval of data collection procedures by an Institutional Review Board, 1422 students enrolled in a mandatory physical activity and wellness course at a southeastern university were invited to participate in this study during the Spring 2012 semester. Prospective participants were invited to complete an online survey that eliciting physical activity and self-determinism data. An email invitation informed prospective participants of the purpose of the research, requested their consent to participate, and provided a direct link to the survey that would remain accessible for two weeks.

Instrumentation

Following demographic questions, participants were presented with physical activity behavior questions assessing past 7-day moderate- and vigorous-intensity cardiovascular activity, strength training, and stretching. Participants were asked to report the number of days (0-7) in which they had participated in each type of physical activity during the past week (e.g., On how many of the past 7 days did you walk or bicycle for at least 30 minutes at a time? (Include walking or bicycling to or from class or work).

Afterward, participants were instructed to complete the BREQ-2; a 19 item questionnaire measuring five subscales of exercise motivation (Amotivation, External Regulation, Introjected Regulation, Identified Regulation, and Intrinsic Regulation) previously validated with a college aged population (D'Abundo, Sidman, Milroy, Orsini, & Fiala, 2012). The BREQ-2 has been used to explore relationships between exercise regulation and a variety of psychological constructs (Wilson & Rodgers, 204; Wilson, Rodgers, Fraser, & Murray, 2004; Gillison, Standage,

&Skevington, 2006; Markland & Ingledew, 2007; Edmunds, Ntoumanis, & Duda, 2008). Specified by instrument developers, results of the BREQ-2 can be reported as scores for each subscale or as the relative autonomy index (RAI), a single score derived from the subscales expressed in an index of the degree that respondents feel self-determined (Markland & Ingledew, 2007). All items use a five-point Likert scale (e.g., 0- Not true for me, 2- Sometimes true for me, 4-Very true for me). For this sample reliability coefficients for each BREQ-2 subscale are sufficient, tended to be higher for subscales related to greater self-determination and ranged from $\alpha = .78$ to $\alpha = .90$.

Data Analysis

Prior to data analyses, male participants were excluded from the data set. Descriptive statistics were calculated to summarize demographic items and data elicited by physical activity items. Pearson's bivariate correlation coefficients were calculated to examine potential relationships among each of the five BREQ-2 factors and the four physical activity variables (days of moderate-intensity physical activity, days of vigorous-intensity physical activity, days of strength training, and days of stretching). Significant correlations ($p \leq .05$) indicated that further analysis using multiple regression was reasonable. Multiple regression was used to explore the predictive nature of the BREQ-2 constructs (amotivation, external regulation, introjected regulation, identified regulation and intrinsic regulation) on varying levels and types of physical activity (moderate-intensity PA, vigorous-intensity PA, strength training, and stretching). A single block entry method was used for each model and respective dependent variable. A significant t statistic ($p \leq .05$) indicated a potential predictive relationship between the independent variables (BREQ-2) and the dependent variable (PA). Afterward, the size of the coefficient (B) for each independent variable determined the relative strength of prediction. Correlation coefficients between exercise motivation regulations did not exceed .90, indicating that multicollinearity did not pose a problem (Hair, Anderson, Tatham, & Black, 1998).

Results

Participants

All students enrolled in a required basic studies physical activity and wellness course were invited to participate in data collection ($N = 1422$). Fifty-four percent ($n = 762$) consented to participate and completed the survey. Of those who completed the survey, 33% ($n = 470$) were female and included in data analyses. Participants identified themselves as 18-19 years-old (39.1%), White or Caucasian (88.3%), and a full-time (98.1%) non-student-athlete (91.9%). Additionally, the highest proportion of participants per category reported participating in 5 or 7 days of moderate-intensity PA (20.9% and 21.1% respectively), 2 days of vigorous PA (19.8%), zero days of strength training (32.1%), and 2 days of stretching (20.9%).

Table 1 presents correlation coefficients that describe the statistical relationships among the five motivation regulation constructs and the four PA variables. Results of correlation analyses indicate that Amotivation was significantly related negatively to vigorous PA, strength training, and stretching ($p < 0.01$). External Regulation was not significantly related to any of the independent variables. Introjected Regulation was significantly related positively to vigorous-intensity PA, strength training, and stretching ($p < 0.01$). Identified and Intrinsic Regulation were significantly related positively to all four dependent variables ($p < 0.01$).

To further explore significant findings

from correlational analyses, multiple regression analyses were used to investigate the predictive nature of each independent variable on the specific dependent variable while holding the other independent variables constant. Table 2 presents the results of the analysis for independent variables (BREQ-2 factors) predicting Moderate PA and Vigorous PA. Only Identified Regulation was significantly predictive of Moderate PA, and the model explained 5% (R^2= .054) of the total variance of Moderate PA behaviors. In other words, every unit increase of Identified Regulation predicts a .736 increase in days of Moderate PA, while holding all other types of motivation regulation constant. Both Identified and Intrinsic Regulation were significantly predictive of Vigorous PA, and the model explained 25% (R^2 = .25) of the total variance of vigorous-intensity PA behaviors. The best predictor of Vigorous PA as indicated by the larger B was Identified Regulation. This indicates that every unit increase of Identified Regulation predicts a 1.115 increase in days of Vigorous PA, while holding all other types of motivation regulation constant. Similarly, every unit increase of Intrinsic Regulation predicts a .216 increase in days of Vigorous PA.

Table 3 presents results of the multiple regression analysis for independent variables (BREQ-2 factors) predicting Strength Training. Identified Regulation was significantly predictive of strength training, and the model explained 22% (R^2 = .22) of the total variance of strength training behaviors. This indicated that every unit increase of Identified Regulation predicts a 1.066 increase in Strength Training, while holding all other types of motivation regulation constant.

Table 1 Correlation Coefficients

		Moderate PA	Vigorous PA	Strength Training	Stretching
Amotivation	Pearson Correlation	-.061	-.140**	-.139**	-.146**
	Sig. (2-tailed)	.090	.000	.000	.000
	N	762	762	762	762
External Regulation	Pearson Correlation	-.013	-.041	-.064	-.047
	Sig. (2-tailed)	.717	.256	.078	.199
	N	762	762	762	762
Introjected Regulation	Pearson Correlation	.055	.223**	.217**	.137**
	Sig. (2-tailed)	.130	.000	.000	.000
	N	762	762	762	762
Identified Regulation	Pearson Correlation	.223**	.493**	.467**	.421**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	762	762	762	762
Intrinsic Regulation	Pearson Correlation	.168**	.401**	.359**	.354**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	762	762	762	762

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 Regression Analysis for Independent Variables Predicting Moderate PA (n = 470)

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.	95.0% Confidence Interval for B	
B	Std. Error	Beta			Lower Bound	Upper Bound	
(Constant)	1.954	.331		5.902	.000	1.304	2.603
Amotivation	.104	.147	.030	.708	.479	-.185	.393
External Regulation	.057	.127	.019	.445	.656	-.193	.306
Introjected Regulation	-.162	.097	-.072	-1.660	.097	-.353	.030
Identified Regulation	.736	.164	.262	4.494	.000	.415	1.058
Intrinsic Regulation	.023	.129	.009	.180	.857	-.230	.277

Note. $R^2 = .054$

Regression Analysis for Independent Variables Predicting Vigorous PA (n = 470)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta		Lower Bound	Upper Bound	
(Constant)	-.482	.264		-1.827	.068	-1.000	.036
Amotivation	.202	.117	.066	1.721	.086	-.028	.432
External Regulation	-.057	.101	-.022	-.561	.575	-.256	.142
Introjected Regulation	.011	.078	.005	.141	.888	-.142	.164
Identified Regulation	1.115	.131	.443	8.535	.000	.859	1.371
Intrinsic Regulation	.216	.103	.097	2.097	.036	.014	.418

Note. $R^2 = .25$

Table 3 Regression Analysis for Independent Variables Predicting Strength Training (n = 470)

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.882	.255		-3.460	.001	-1.382	-.382
Amotivation	.195	.113	.067	1.722	.086	-.027	.417
External Regulation	-.151	.098	-.061	-1.544	.123	-.343	.041
Introjected Regulation	.047	.075	.025	.630	.529	-.100	.195
Identified Regulation	1.066	.126	.447	8.451	.000	.818	1.313
Intrinsic Regulation	.086	.099	.041	.864	.388	-.109	.281

Note. $R^2 = .22$

Table 4 presents results of the multiple regression analysis for independent variables (BREQ-2 factors) predicting Stretching behavior. Both Identified and Intrinsic Regulation were significantly predictive of Stretching, and the model explained 19% (R^2 = .19) of the total variance of stretching behaviors. The best predictor of Stretching behavior as indicated by the larger B was Identified Regulation. In other words, every unit increase of Identified Regulation predicts a 1.012 increase in Stretching behavior, while holding all other types of motivation regulation constant. Similarly, every unit increase of Intrinsic Regulation predicts a .223 increase in Stretching behavior.

Discussion

The purpose of this study was to examine potential relationships between exercise motivation regulation and physical activity behaviors among college females in order to make recommendations for future health promotion practices. Findings from correlational analyses are consistent with SDT, as well as other studies that have explored behavioral regulation and exercise regulation in females (Markland, 2009; Sabiston, et al., 2010). In this study, more self-determined forms of motivation regulation are positively and more strongly related with the physical activity behaviors, and amotivation is negatively correlated with all physical activity behaviors except for moderate-intensity physical activity. In other words, findings in this study support the notion that higher levels of self-determination, as measured by the BREQ-2, are associated with higher levels of physical activity engagement among college females (Edmunds et al., 2008; Wilson et al., 2004).

Despite patterns of autonomous motivations of exercise regulation among females in this study, introjected regulation, a more extrinsic form of motivation based on guilt and shame, was significantly positively related to Vigorous PA, Strength Training, and Stretching ($p < 0.01$). The relationship of introjected regulation to exercise regulation in females has been previously cited. Despite reporting intrinsic motivations for exercise such as enjoyment, adolescent females also reported guilt as a motivating factor for exercise. [13] Edmunds at al., (2008) reported increases in introjected regulation in both a control and SDT intervention exercise group. Researchers noted a possible explanation may be that social pressure about appearance becomes more pronounced over a 10-week class. Furthermore, Thøgersen-Ntoumani and Ntoumanis (2006) found introjected regulation, or

Table 4 Regression Analysis for Independent Variables Predicting Stretching (n = 470)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.428	.282		-1.516	.130	-.982	.126
Amotivation	.080	.125	.026	.641	.522	-.166	.327
External Regulation	.033	.108	.012	.304	.761	-.180	.245
Introjected Regulation	-.141	.083	-.069	-1.700	.090	-.305	.022
Identified Regulation	1.012	.140	.392	7.241	.000	.737	1.286
Intrinsic Regulation	.223	.110	.098	2.023	.043	.007	.439

Note. R^2= .19

internal pressure, or feelings of guilt, were significant positive predictors of future exercise intentions.

Understandably, introjected regulation plays a role in exercise regulation in females, especially relating to societal pressures associated with appearance for women. However, what is interesting is that one may assume that feelings of autonomy involving intrinsic motivation may counter introjected regulation, especially over time, with increased experience and skills in exercise. Research does not seem to support that logic, and in fact, introjected regulation and intrinsic regulation coexist, even in SDT-designed exercise interventions (Edmunds et al., 2008). Kiltpatrick et al., (2005) findings that females' motivation for exercise was linked to more extrinsic factors such as appearance or weight management may also help explain our findings. This information is especially important to practitioners designing exercise programs for females. It may not be enough to design SDT-based, autonomous experiences, but attention must also be paid to countering introjected regulation motivations like feelings of guilt or motivations based on modifying appearance and/or weight.

Although findings from correlational analyses support the notion that greater self-determination is associated with greater physical activity engagement, the authors also sought to clarify the predictive nature of motivation regulation on physical activity engagement through regression analysis. Identified and Intrinsic Regulation are the best predictors of physical activity behaviors, compared to other types of motivation regulation. Wilson and Rodgers (2004) reported similar results, reporting identified regulation as the strongest predictor of behavioral intention to exercise. In addition, findings from this study corroborate findings presented by Wilson et al., (2004), as identified and intrinsic motivations predictive of behavioral intentions, self-reported exercise behavior, and effort and importance specific to the context of exercise in both males and females. Finally, Duncan et al., (2010) found that identified regulation was a significant predictor of exercise frequency for both males and female.

The results in this study indicated that identified regulation significantly predicted strength training and stretching. Therefore, the importance of the identified form of exercise regulation warrants further discussion. With previous researchers stating the important motivators of appearance and weight among females (Kilpatrick et al., 2005; Pauline, 2013) it may be that females do not believe strength training and stretching are important to weight and appearance. Therefore, females may benefit from education regarding the value of participating in a balanced physical activity program that includes all three components of physical activity.

Limitations

Limitations related to self-report data apply to this study; however, strategies were used to reduce the likelihood of eliciting socially desirable responses. Survey items did not elicit sensitive information, and participants were informed that their responses would be kept confidential.

Additionally, even though email invitations were sent to all students enrolled in the physical activity and wellness course, participation in data collection procedures was optional for everyone. This self-selection may have resulted in a larger number of participants who were more likely to be externally motivated to complete the survey; i.e., more likely to comply with external requests. Furthermore, those who self-select to participate in research studies are also likely to have an interest in the subject matter. Additionally, self-selection may have led to the collection of data from those who participate in more physical activity than the average female college student.

Finally, students were invited to participate in data collection procedures two weeks after the start of the semester, by which time they had already begun participating in a required physical activity labs. Ultimately this may have reduced the likelihood of eliciting data from sedentary students. Despite these limitations, the present study makes an important contribution to the literature on exercise motivation and American college females.

Conclusions

Prior research indicates that college females are not meeting the recommended guidelines for physical activity (ACHA, 2013). The findings of this study demonstrate the need for further exploration of motivation regulation among college females. Future research could include a variety of quasi-experimental designs, such as multiple time series and longitudinal data collection procedures. Additionally, future research exploring motivation regulation for a variety of popular physical activities (e.g., Yoga, Pilates, etc.) among a more diversified sample of college females is recommended.

University campuses represent an ideal setting for promoting physical activity among large proportions of young adults, and evidence from health promotion and prevention science research should direct development, implementation, and evaluation of physical activity promotion efforts to facilitate lifelong behaviors.

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