

University of Wollongong

## Research Online

---

Faculty of Health and Behavioural Sciences -  
Papers (Archive)

Faculty of Science, Medicine and Health

---

2011

### Declining physical activity levels as an unintended consequence of abolishing mandatory campus service fees

Sandra C. Jones

*University of Wollongong*, [sandraj@uow.edu.au](mailto:sandraj@uow.edu.au)

Lance R. Barrie

*University of Wollongong*, [lanceb@uow.edu.au](mailto:lanceb@uow.edu.au)

Follow this and additional works at: <https://ro.uow.edu.au/hbspapers>



Part of the [Arts and Humanities Commons](#), [Life Sciences Commons](#), [Medicine and Health Sciences Commons](#), and the [Social and Behavioral Sciences Commons](#)

---

#### Recommended Citation

Jones, Sandra C. and Barrie, Lance R.: Declining physical activity levels as an unintended consequence of abolishing mandatory campus service fees 2011, 511-518.

<https://ro.uow.edu.au/hbspapers/2089>

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: [research-pubs@uow.edu.au](mailto:research-pubs@uow.edu.au)

---

## Declining physical activity levels as an unintended consequence of abolishing mandatory campus service fees

### Abstract

**Objective:** This study investigates the effect of the introduction of voluntary student unionism and subsequent increase in campus facility fees on engagement in physical activity on campus. **Participants:** Participants were 1,904 students from a large regional NSW (Australia) university across 3 time periods (926 in 2005, 504 in 2006, and 474 in 2007). **Methods:** Students completed a survey across the 3 time periods, responding to questions about physical activity levels, use of on-campus and off-campus facilities, and barriers to facility use. **Results:** Participation in physical activity at university facilities was low overall, and declined substantially between 2005 and 2007, with the proportion of students identifying cost as a barrier more than doubling over this time period. **Conclusions:** There is a need for policy makers to consider the unintended health impacts of such policy changes, particularly in relation to the impact on already insufficient levels of physical activity.

### Keywords

Declining, physical, activity, levels, unintended, consequence, abolishing, mandatory, campus, service, fees

### Disciplines

Arts and Humanities | Life Sciences | Medicine and Health Sciences | Social and Behavioral Sciences

### Publication Details

Jones, S. C. & Barrie, L. (2011). Declining physical activity levels as an unintended consequence of abolishing mandatory campus service fees. *Journal of American College Health*, 59 (6), 511-518.

# **Declining Physical Activity Levels as an Unintended Consequence of Abolishing Mandatory Campus Service Fees**

Sandra C. Jones, MBA, MPH, MAssEval, PhD; Lance Barrie, BSc, MPH  
Centre for Health Initiatives, University of Wollongong

## **Abstract**

**Objective:** This study investigates the effect of the introduction of voluntary student unionism and subsequent increase in campus facility fees on engagement in physical activity on campus. **Participants:** Participants were 1,904 students from a large regional NSW (Australia) university across 3 time periods (926 in 2005, 504 in 2006, and 474 in 2007). **Methods:** Students completed a survey across the 3 time periods, responding to questions about physical activity levels, use of on-campus and off-campus facilities, and barriers to facility use. **Results:** Participation in physical activity at university facilities was low overall, and declined substantially between 2005 and 2007, with the proportion of students identifying cost as a barrier more than doubling over this time period. **Conclusions:** There is a need for policy makers to consider the unintended health impacts of such policy changes, particularly in relation to the impact on already insufficient levels of physical activity.

Keywords barriers, college health, healthy public policy, physical activity, recreation centers, university/college students

Regular physical activity and good health go hand in hand, having numerous benefits such as reducing the risk of cardiovascular disease and its associated risk factors. Exercise has been shown to be beneficial in reducing overweight and obesity, lowering blood pressure, lowering

cholesterol levels, and reducing the risk of type 2 diabetes and some cancers.<sup>1</sup> Physical activity also helps to improve long- and short-term mental well-being through stress release and reduced levels of anxiety.<sup>2</sup>

The National Physical Activity Guidelines for Australians<sup>3</sup> recommend that adults participate in at least 30 minutes of moderate-intensity physical activity on most (preferably all) days of the week, in order to obtain health benefits. This is generally interpreted as 30 minutes on at least 5 days of the week, totaling 150 minutes of moderate activity per week.<sup>3</sup> The guidelines for children and adolescents recommend at least 60 minutes of moderate to vigorous physical activity every day.<sup>4</sup>

The 2004–2005 National Health Survey found that only 29.6% of Australian adults reported participating in moderate to high levels of physical activity, a slight decrease from 2001 (30.1%). Moreover, approximately 50% of adult Australians report weight-to-height ratios that indicate they are overweight or obese (ie, have a body mass index greater than 25), a figure that has been consistently rising since 1995 when only approximately 40% of Australian adults were categorized as overweight or obese.<sup>5</sup>

Young adults, like their older counterparts, have generally been found to be insufficiently active, with over 40% of people aged 18 to 29 years not participating in adequate physical activity.<sup>6</sup> This represents a considerable decline from the activity levels of children and adolescents, with a recent survey in New South Wales ( $n = 5,407$ ), finding that three-quarters of students in years 6, 8, and 10 reported levels of physical activity that met the Department of Health and Ageing recommendations, with boys reporting more activity than girls.<sup>7</sup>

The few studies of the physical activity levels of university students suggest that this group is somewhat more active than their same-age peers, although there is still room for improvement. A review of 19 studies conducted between 1985 and 2001 concluded that, based on the American College of Sports Medicine guidelines for physical activity, less than half of university students in the United States and Canada engage in sufficient levels of physical activity to acquire health benefits.<sup>8</sup> This is slightly bettered by Australian students, with the same study finding that approximately 60% of Australian university students participate in adequate physical activity, higher than the proportions from all 27 other countries analyzed in the review. However, 40% is still a large and unacceptable proportion of Australian university students who are not sufficiently active.

Recent research has highlighted that the low levels of physical activity undertaken by university students, and the observed decline in participation from high school to university, is occurring in most developed nations.<sup>9, 10, 11</sup> A comparison of student self-reports of physical activity during the last 2 months of high school and the first 2 months at university found significant declines in both frequency and duration of vigorous physical activity; and that 50% of the students who had been vigorously active (ie,  $\geq 20$  minutes on 3 or more days per week) during the last year of high school had become insufficiently active during their first year of university.<sup>12</sup>

The university years play an important role in establishing lifestyle patterns, which may affect the remainder of the student's lives; and with the number of Australians with higher education qualifications increasing from 14% to 22% between 1998 and 2008,<sup>13</sup> and the number with 4 or more years of higher education nearly doubling in the United States over the past 3

decades, there clearly needs to be more emphasis placed on physical activity undertaken within the university environment.<sup>14</sup>

A study of physical activity levels on 4 Australian campuses found that the preferred activities of University students who were exercising adequately were racquet sports, swimming, aerobics, team sports, and weight training<sup>15</sup>—all activities that are currently available on most University campuses. It has been suggested that the university environment itself can be improved to encourage physical activity amongst university students, with suggestions including greater access to, and affordability of, facilities; and improving the design of university infrastructure, including the placement of recreational facilities and the aesthetic design of existing areas.<sup>16</sup> However, the association between the university environment and physical activity appears to be vastly understudied in health research and, as a result, relevant interventions are limited.

As mentioned above, there is consistent evidence of low levels of physical activity undertaken by university students, particularly in relation to the observed decline in physical activity participation from the higher levels during high school. Determining why these declines are occurring is a pressing question for health researchers, and several studies have been conducted to find possible explanations. A US study found that the major barriers to physical activity for university students were time constraints, exercise being viewed as “too hard,” and family members not encouraging exercise.<sup>17</sup> In addition, self-efficacy for coping with barriers to physical activity has been found to partially control the decline in physical activity in the pretransition to first-year university period.<sup>10</sup>

It is likely that individual factors such as those identified cannot solely explain these low levels of physical activity, and that policy has a significant influence also. The World Health Organization (WHO) Ottawa Charter (1986) recognized health as a fundamental social goal, and identified 5 health promotion action areas designed to address the social determinants of health. These action areas include the building of health public policy and the creation of supportive environments as a means of promoting “health for all.” The WHO Adelaide Recommendations on Healthy Public Policy (1988), defined healthy public policy as “policy that makes health choices possible or easier for citizens,” and affirms the role of public policy as the primary action that establishes an environment in which other health promotion actions are encouraged, and are possible. Healthy public policy is therefore the responsibility of all government sectors, and all sectors should be accountable for the health consequences of their policy decisions.

Historically, students at Australian universities have been required to become a member of their campus student organization. The fees for this membership were generally collected by the university administration and provided to the student union; with these funds typically used for the provision of campus-based activities such as sporting facilities, entertainment, social clubs, subsidized food, advocacy, and childcare services.<sup>18</sup> Students could elect not to join the “student union” but were then required to pay an equivalent amount to the university as a service fee.

In March 2005, the Australian Federal Government introduced legislation into parliament banning compulsory student unionism for students at universities and colleges. In the words of the Senate Committee: “At the core of the policy is a determination to uphold the right of self determination. In this context, that means that students should not be obliged to pay for

services which they will not choose to use, nor join organisations which are unlikely to represent their interests.”<sup>19</sup> Opponents of voluntary student unionism argued that the decline of student organizations would result in a loss of important financial and social services for students and would reduce the ability of students to provide a collective voice in academic and political issues. This legislation—the *Higher Education Support Amendment (Abolition of Compulsory Up-front Student Union Fees) Bill 2005* (but commonly referred to as “voluntary student unionism” or VSU)—was passed in the Senate, banning the collection of such fees from July 1, 2006.

It had previously been posited that the introduction of VSU would impact on prices and availability of facilities, since this subsidization would no longer occur. Reviews conducted in 2007 found that VSU reduced annual funding from AU\$179 million to AU\$13 million, resulting in over 400 sport, advocacy, and other services (eg, childcare) closing down or contracting.<sup>20</sup> This is likely to further contribute to the decline in physical activity levels of students, as research has shown that having a supportive environment for activity (eg, having accessible facilities and more opportunities for activity) is associated with higher levels of physical activity.<sup>21, 22</sup>

We know that there is a notable decline in physical activity in the transition period between high school and the commencement of university. However, there is a need to examine the levels of participation in physical activity amongst university students, what modifiable barriers can be addressed in the future, and—in this Australian context—whether VSU may further decrease the already low levels of physical activity.

We were unable to identify any studies that directly assessed the role of college policies (or government policies that impact on colleges) in increasing or decreasing physical activity. However, we believe that our study provides some initial evidence that government policies and laws have the potential to impact on a wide range of health-related behaviors and that such impacts should be carefully considered prior to their introduction. Although it is beyond the scope of this paper to review in detail, we note that there is extensive evidence of the role of policy on promoting physical activity in the preschool and primary school environment.<sup>23</sup>,  
24 , 25

There is a small, but consistent, body of literature on the role of college policies and government regulations in improving the health outcomes of students, much of which has been published in this journal. In the main, these studies have investigated substance use behaviors (smoking and drinking). For example, there is evidence that awareness of college alcohol policies is associated with lower incidence of binge drinking<sup>26</sup>; that students residing in states with stronger legal restrictions on underage and excessive drinking are less likely to binge drink.<sup>27</sup>,<sup>28</sup> Each of these studies have recommended the development of additional policies and/or increasing awareness of existing policies to reduce engagement in health-damaging behaviors.

As stated earlier, increasing numbers of US adults are undertaking university studies, and there is evidence that lifestyle patterns established in the university years have a significant impact on health behaviors and outcomes in later life. For example, a study that followed over 20,000 male Harvard alumni for 23 to 27 years found that the incidence of depression was lower among those who had been physically active.<sup>29</sup> Thus, policies put into place by university administrators have the potential to not only improve (or reduce) the physical and

emotional well-being of college students and reduce attrition, they also have a role in influencing lifetime health behaviors and health outcomes.

The aims of the current study were to measure the level of physical activity university students are undertaking both on and off campus and to assess where students prefer to exercise; to examine perceived barriers to physical activity; and to measure the impact of the introduction of VSU on the physical activity levels of university students.

## METHODS

The University of Wollongong (UOW) is located 80 km south of Sydney, New South Wales (east coast of Australia), with Wollongong being the eighth largest city in Australia. The UOW student population in 2007 was 23,171, which was predominantly made up of undergraduate students ( $n = 14,741$ ). The majority of students are under the age of 25 years ( $n = 15,692$ ) and these figures are similar to previous years (2005–2007).

The University Recreation and Aquatic Centre (URAC) is an on-campus fitness facility that includes an aquatic center, an air-conditioned health club, lunchtime sports, and also various sporting clubs attached to the university. Before the VSU was introduced, enrolled UOW students automatically became URAC members, which entitled students to use the facilities and join the gym at a discounted rate (approximately 50%). After the introduction of the VSU, the guidelines changed significantly and students now have to pay AU\$110.00 to become a URAC member (and therefore receive discounted rates for URAC facilities) and gym membership prices have almost doubled.

This project utilized a convenience sample of university students ( $n = 1,904$ ), recruited on the main campus of the UOW. Trained research assistants administered the surveys at various locations throughout the university campus. Participants were offered the opportunity to enter a competition to win a gift voucher that could be used at major department and specialist stores nationally, with competition entry forms collected and stored separately to survey forms. The study protocol was approved by the university's Human Research Ethics Committee.

Participants were asked to complete a survey about their current levels of physical activity, and engagement with physical activity–related groups and use of resources on campus and off campus. Measures within the survey were used to determine each participant's level of physical activity and perceived barriers to engaging in physical activity. Face validity was determined by a process of recruiting 4 academics and 8 students to review the survey, with each working through the survey items in a one-on-one session with one of the authors. A “think-aloud” method was used, with participants working through the questionnaire and clarifying any confusion regarding question wording or response options. Minor modifications were made to the questionnaire following the completion of the first 6 interviews, and no further issues or concerns or clarifications were raised by the remaining 6 participants.

The survey was conducted on the university campus in 3 time periods: October 2005 (before the introduction of VSU), October 2006 (shortly after the introduction of VSU), and October 2007 (just over a year after the introduction of VSU). The survey was conducted at the same time each year to ensure that the results were not affected by seasonal variations in physical activity.

Survey questions included physical activity over the previous 7 days; membership of URAC; attendance at URAC facilities (weight, swimming pool, fitness classes); membership of university sport teams and activity-based groups; barriers to physical activity at on-campus facilities; membership of off-campus gyms, fitness centers, or pools; membership of nonuniversity sporting teams and activity-based groups; and barriers to physical activity at off-campus facilities. The questionnaire also contained a series of demographic questions, including gender, age, and student status.

We considered both the research questions and how each variable was measured when analyzing the data to ensure the research aims for the project were met. The majority of questions in the survey were categorical variables and consequently basic descriptive statistics were used to assess demographic data. Pearson's chi-square test for independence was used to explore the relationship between demographic variables and types of activity undertaken both on and off campus and also to determine significant differences between the type of physical activity undertaken (fitness class, recreation activity, organized sport, etc) for both males and females between 2005 and 2007. When measuring barriers to physical activity across the 3 survey points, descriptive statistics were again used. Additionally a z test for 2 proportions was used to determine significant differences between the independent samples (2005 and 2007).

## **RESULTS**

In total, 1,904 students completed this survey across the 3 time periods (926 in 2005, 504 in 2006, and 474 in 2007). This represents almost 13% of the 14,798 domestic undergraduate students that were enrolled at UOW in 2007 (this figure includes students on 2 other

campuses). As the survey was anonymous, we are unable to determine how many (if any) students completed the survey at multiple time points. A profile of the respondents in each of the 3 years is provided in Table 1.

**Table 1: Demographic characteristics of survey respondents**

	2005	2006	2007	Total
<b>Gender</b>				
Male	43.8%	44.8%	42.9%	43.8%
Female	56.2%	55.2%	57.1%	56.2%
<b>Age</b>				
≤ 21	61.1%	72.4%	67.9%	66.0%
22-25	25.6%	22.8%	23.7%	24.4%
26+	13.2%	4.6%	7.9%	9.6%
<b>Marital status</b>				
Single	80.3%	78.6%	75.7%	78.7%
Married	5.7%	3.0%	3.0%	4.4%
De-facto	10.8%	15.1%	18.1%	13.8%
Other	3.2%	3.3%	3.2%	3.2%
<b>Employment status</b>				
Unemployed	26%	24.6%	23.6%	25.2%
Casual	47.6%	52.0%	53.8%	50.6%
Part Time	17.7%	17.7%	16.7%	17.5%
Full Time	5.4%	4.0%	4.9%	4.9%
No Answer	3.2%	1.8%	1.1%	1.7%

Perhaps surprisingly, participation in off-campus facilities (pool, basketball courts, gymnasium, etc), classes, clubs, and courses was significantly higher than for university facilities. No more than 30% of respondents in each year reported using university facilities, classes, or clubs within the previous week, and less than 8% reported attending a university gym course in the *month* before survey completion. Participation at off-campus facilities was not quite as low, with slightly more than half of respondents in all 3 surveys using off-campus facilities in the *week* prior to survey completion.

Contingency table analysis (using the Pearson chi-square test) revealed differences between males and females for a number of questions. Interestingly, males were more likely to take an exercise class at university ( $\chi^2 = 37.372, p < .001$ ), and females had higher participation rates in recreational clubs and sports on university campus ( $\chi^2 = 24.402, p < .001$ ). In regards to using off-campus facilities, 39.6% of males reported using an off-campus gym compared to 50.9% of females, which is significant at the 5% level ( $\chi^2 = 26.753, p < .001$ ). Again, males were more likely to attend an off-campus exercise class ( $\chi^2 = 13.346, p < .001$ ), and females were reported higher activity levels involving a sports or recreation club off campus ( $\chi^2 = 35.059, p < .001$ ). There were no significant differences in reported activity levels for on- or/and off-campus facilities by student status (ie, full time/part time/not studying).

Participation in physical activity at university facilities—measured in terms of number of weekly visits, exercise classes, and participation in university sporting or recreational clubs—appears to have declined between 2005 and 2007 (Table 2). The percentage of respondents who reported using the university gym facilities in the last week decreased by 23.7%, from 30.0% in 2005 to 22.9% in 2007 ( $\chi^2 = 8.120, p = .017$ ); and the percentage who reported

taking a university exercise class in the last week decreased by 37.1%, from 12.4% in 2005 to 7.9% in 2007 ( $\chi^2 = 9.717, p = .008$ ). These results can be compared to the proportion of participants using off-campus facilities, which remained relatively stable between 2005 and 2007 (53.4% in 2005; 57.3% in 2006, and 52.0% in 2007;  $\chi^2 = 5.082, p = .669$ ).

**Table 2: Use of on-campus and off-campus exercise facilities**

	(%)		
	2005	2006	2007
Used campus facilities last week at all*	30.0	29.2	22.9
Taken campus exercise class last week at all*	12.4	8.3	7.9
Participated in campus sporting or recreational club last week at all	16.2	11.9	16.4
Attended campus gym course last month at all	7.9	7.7	6.4
Used off campus facilities last week at all	53.4	57.3	52.0
Taken off campus exercise class last week at all	18.7	19.6	17.8
Participated in off campus sporting or recreational club last week at all	29.7	33.8	37.3
Attended off campus course last month at all	18.9	13.7	18.3

\* Significant at the .05 level

Respondents were asked to identify whether a series of factors were a barrier for them personally to participating in physical activity/using facilities both on campus and off campus

(Table 3). For both on-campus and off-campus physical activity, time, study commitments, and cost were identified as barriers by more than a quarter of respondents, and distance by one-fifth. There was considerable consistency in the barriers identified in each of the 3 survey years. However, there was one major significant difference between 2005 and 2007: identification of cost as a barrier to using university sporting and gym facilities increased from 22.2% of respondents in 2005 to 52.0% of respondents in 2007 ( $z = 11.101, p < .001$ ). Notably, although identification of cost as a barrier to use of off-campus facilities also increased, the increase was much smaller (from 36.1% in 2005 to 41.0% in 2007,  $z = 1.746, p < .081$ ). There was also a corresponding decrease in the proportion of respondents who stated that there were no barriers to them using gym and sporting facilities at the university, from 15.7% in 2005 to 9.3% in 2007 ( $z = 3.224, p = .001$ ).

**Table 3: Percentage of respondents citing barriers to using the gym and sporting facilities on and off campus**

Barrier	on campus				off campus			
	2005	2006	2007	Overall	2005	2006	2007	Overall
Time	47.5	52.2	46.9	48.1	43.4	44.0	42.3	42.9
Study Commitments	29.4	28.4	30.8	29.5	26.2	26.4	28.5	27.0
Cost*	22.2	22.2	52.0	29.6	35.7	33.5	41.0	36.6
Distance	21.1	24.6	24.3	22.7	21.8	14.5	18.2	18.9
No Interest	7.4	7.1	6.6	6.1	7.6	4.6	7.0	6.4

Prefer Other Venue	3.6	5.0	1.8	3.6	2.2	1.8	0.4	0.9
Inadequate Facilities	2.5	1.2	1.1	1.6	4.0	3.4	1.9	3.3
Other Barriers	3.5	2.8	5.1	3.7	2.0	0.4	4.4	2.2
<i>No Barrier*</i>	15.7	14.9	9.3	13.9	20.0	26.4	20.9	21.9

\*Significant at the .05 level (on campus only)

A comparison of reported barriers to on-campus physical activity between those who had and those who had not used university facilities in the past week shows that the primary differences were in perceptions of insufficient time, with approximately half of nonparticipants reporting time as a barrier compared to less than one-third of participants; and distance, which is likely to be a factor of the distance respondents travel to attend university (with those living closer to campus more able to access on-campus facilities). Other, although smaller, differences were in those reporting no interest or preferring another venue (higher among nonparticipants); and higher rates of agreement that inadequate facilities and parking problems are a barrier among those who had used the facilities in the past week. It is interesting to note that the dramatic increase in perception of cost as a barrier between 2005 and 2007 was evident for both those who had used the facilities (16.6% to 52.8%) and those who had not (24.7% to 51.8%).

In 2007 (only) respondents were also asked whether they were currently a member of the university's recreation and aquatic center, whether they had been previously; and those who had discontinued membership were asked the reasons for their decision. In 2007, 101 (21.4%) of the respondents were members of URAC, and of the 370 people who were not currently members, 89 (24.8%) had previously been a member. In response to the question

about why they did not renew their membership at URAC, cost was identified by the majority of respondents (60.7%, 54) as being the main reason; this was followed by study and time commitments (11.2%, 10), with no other barrier selected by more than 5 respondents. We note that in 2007, the cost of membership for university students rose to AU\$490 (from AU\$285 in 2006).

### **COMMENT**

This study found low participation in physical activity among university student respondents across all 3 survey years. This is consistent with previous Australian research; for example, a study of 4 Australian university campuses found that 47% of men and 32% of women were insufficiently active based on the national guidelines,<sup>15</sup> and another that 30.0% of students in a regional university in Western Australia were not participating in regular physical activity.<sup>30</sup>

Comparing barriers to use of on- and off-campus facilities, it is interesting to note that time was more frequently identified as a perceived barrier to on-campus than off-campus physical activity. This could be indicative of students' time-tables being structured in a way that exercising on campus is not practical (such as insufficient breaks between classes) or of perceived need to obtain maximum "value" from study time whilst on campus. The known association between physical activity levels and self-efficacy for coping with barriers to physical activity<sup>10</sup> suggests that future interventions could target students' self-efficacy for coping with barriers, ideally in combination with strategies to address the reality of these barriers, to help reduce the decline in physical activity that occurs during the transition to university life.

In 2005, 35% of respondents identified cost as a barrier to off-campus physical activity, compared to just 22.3% on campus, suggesting that pre-VSU prices were affordable for the majority of students. It is important to note that whilst VSU was introduced midway through 2006, students were still required to pay their *compulsory annual* university student union fees in February 2006, which meant that they were automatically members of the UOW gym (URAC) in the second half of 2006 (which included the 2006 survey period). However, some disincentives to utilize the URAC facilities during the time of the second survey existed, such as an increase in URAC prices in January 2006 by between 10% and 20% for most services, and a 50%–100% increase in the costs of hiring of playing fields, which were an attempt to prepare for the introduction of VSU in mid-2006. In 2007, when the full impact of VSU was evident, the reporting of cost as a barrier to use of on-campus facilities spiked dramatically, and the proportion of respondents using university facilities declined by almost one-third.

Previous research has clearly demonstrated that people trade off between immediate and delayed outcomes and that for many this results in a preference for smaller short-term outcomes over larger long-term outcomes, often at the expense of their long-term health.<sup>31, 32</sup>

<sup>33</sup> University students already experience a large number of barriers to exercise, and increasing the cost of exercise facilities serves as an important additional barrier. Thus, one unintended effect of removing compulsory student union fees (an immediate outcome) may be to reduce the levels of exercise and thus the physical and psychological benefits of engaging in physical activity (a longer-term outcome).

It is important to note that the government's position in introducing the VSU legislation was that it would benefit individuals (university students) by preventing them from being forced to pay for services they do not use.<sup>19</sup> That is, the rationale for the policy was “an ideological

objection to activity of any kind which responds to...the public good at the expense of ...individual rights.”<sup>34 (p106)</sup> However, our study finds that the introduction of VSU—the removal of compulsory fees, which subsidize campus facilities and social services—impacted not only on the “common good” of the university population as a whole but also the “individual good.” Interestingly, we note that the potential for this to occur was not addressed in the government reports that reviewed the arguments for and against this legislation,<sup>19, 34</sup> other than an oblique mention in the 2003 report, which opposed the legislation: “this was as much an attack on student appetites for food and drink as for political rights; and an attack on their entertainment choices and their health, fitness and need for counselling and essay-writing skills.”<sup>34 (p106)</sup>

## **Limitations**

The primary limitation of the current study is that we did not collect data on overall physical activity levels (ie, minutes of physical activity per week). The focus of the study was on the use of on-campus (and off-campus) facilities, and thus the questions addressed frequency of use of facilities. This oversight did not become evident until 2 years into the study—when comparing the data from the first 2 surveys (2005 and 2006). Future research should collect data on physical activity more generally, if we are to conclude as to the impact on overall physical activity levels rather than just physical activity in exercise facilities.

Another limitation is that we did not measure changes in the cost of off-campus facilities, or collect data from people who were not university students, so we cannot definitively state that reductions in use of facilities extended beyond campus facilities. However, it is likely that

increases in costs at external facilities would have been consistent with changes in consumer price index/inflation, not the doubling of costs that occurred for campus facilities.

The generalizability of the findings may be somewhat limited, as the data were collected on the campus of 1 regional university and there may be regional differences in the impact of VSU on use of facilities, particularly those related to socioeconomic status and disposable income. Further, the results cannot be directly applied to campuses and facilities in other countries, although the implications of cost increases on students' use of facilities may be of relevance to other countries and to other policy changes.

## **Conclusions**

Although the present study did not assess psychological or scholastic outcomes, prior research demonstrates the negative impacts of declines in physical activity on both mental health and academic performance. There is evidence that stress, depression, and anxiety are associated with college student grades and attrition,<sup>35, 36</sup> and a strong body of evidence that a lack of physical activity is associated with higher levels of anxiety and stress.<sup>37</sup> The association between physical activity and academic performance has been most comprehensively studied among school-aged children, and studies have consistently shown that both fitness levels and participation per se are associated with increased academic achievement.<sup>38, 39, 40</sup> In an article in this journal, a study conducted in a large private US university found that strength training was associated with higher grade point averages among first-year students.<sup>41</sup>

The transition to university is a key trigger for further reducing already low levels of physical activity. This is despite many university campuses having the facilities needed for the

preferred activities of this demographic. There is a range of barriers to physical activity, notably perceptions of lack of time and excessive study commitments, which could be addressed by interventions to increase self-efficacy along with environmental or policy changes to address the reality of these barriers. For example, class timetables could be structured in such a way as to allow for a longer break between morning and afternoon classes; a 90-minute rather than a 60-minute break would allow sufficient time to attend an exercise class and still eat lunch. Similarly, campus facilities could be modified to provide more opportunities for free physical activity, such as the development and maintenance of walking paths and running tracks.

The results of this study suggest that since the introduction of VSU, the cost of university exercise facilities has become a greater barrier to participation. Given the already low rates of participation in regular physical activity, there is a need for government departments, universities, and policy makers to consider the health impacts of such policy changes.

### **References**

1. Australian Institute of Health and Welfare; 2006 [cited 2009 Apr 24]. Australia's Health 2006. Available from: <http://www.aihw.gov.au/publications/index.cfm/title/10585>
2. Dunn A, Trivedi M, O'Neal H. Physical activity dose-response effects on outcomes of depression and anxiety. *Med Sci Sports Exerc.* 2001;33:587–97.
3. DHAC (Commonwealth Government Department of Health and Aged Care) 1999, National physical activity guidelines for Australians, Canberra: DHAC.

4. Australian Government Department of Health and Ageing (DoHA) 2004, Get out and get active, Australia's physical activity recommendations for 12–18 year olds, Canberra: DoHA.
5. Australian Bureau of Statistics; 2008 [cited 2009 Apr 24]. Australian Census Data. Available from: <http://www.abs.gov.au/websitedbs/d3310114.nsf/home/Census+data>.
6. Australian Institute of Health and Welfare; 2006 [cited 2009 Apr 24]. Australia's Health 2006. Available from: <http://www.aihw.gov.au/publications/index.cfm/title/10321>
7. Booth M, Okely AD, Denney-Wilson E, Yang B, Hardy L, Dobbins T. 2006, NSW schools physical activity and nutrition survey (SPANS) 2004, Sydney: NSW Health.
8. Irwin J. Prevalence of University Students Sufficient Physical Activity: A Systematic Review. *Percept Motor Skill*. 2004;98(3), 927-943.
9. Kilpatrick M, Herbet E, Bartholomew J. College Students' Motivation for Physical Activity: Differentiating Men's and Women's Motives for Sport Participation and Exercise. *J Am Coll Health*. 2005;54(2):87.
10. Bray S. Self Efficacy for Coping With Barriers Helps Students Stay Physically Active. *Res Q Exercise Sport*. 2007;78(2):61.
11. Sinclair K, Hamlin M, Steel D. Physical Activity Levels of First-Year New Zealand University Students: A Pilot Study. *Youth Studies Australia*. 2005;24(1):38-42.
12. Bray S, Born H. Transition to University and Vigorous Physical Activity: Implication for Health and Psychological Well-Being. *J Am Coll Health*. 2004;52(4):181-188.
13. Australian Bureau of Statistics; 2008 [cited 2009 Apr 24]. Education and Work: Australia. Available from: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/6227.0>.
14. Reed J, Wilson D. Awareness of Use of a University recreational Trail. *J Am Coll Health*. 2006;54(4):227-230.

15. Leslie, E, Owen N, Salmon J, Bauman A, Sallis J, Kai Lo S. Insufficiently active Australia College Students: perceived personal, social and environmental influences. *Res Q Exercise Sport*. 1999;28:20-27.
16. Reed J. Perceptions of the Availability of Recreational Physical Activity Facilities on a University Campus. *J Am Coll Health*. 2007;55(4):189-194.
17. Grubbs J, Carter L. The relationship of perceived benefits and barriers to reported exercise behaviours in college undergraduates, *Fam Community Health*. 2002;25(2):76-84.
18. Australia Broadcast Corporation; 2005 [cited 2009 Apr 24]. Federal Government bans compulsory student unionism. Available from:  
[http://www.abc.net.au/worldtoday/indexes/2005/twt\\_20050316.htm](http://www.abc.net.au/worldtoday/indexes/2005/twt_20050316.htm).
19. Senate Employment, Workplace Relations and Education Legislation Committee. 2005. *Provisions of the Higher Education Support Amendment (Abolition of Compulsory Up-front Union Fees) Bill 2005*, Canberra, , Australia: Senate Printing Unit, Department of the Senate, Parliament House.
20. Department of Education, Employment and Workplace Relations. 2008. *The Impact of Voluntary Student Unionism on Services, Amenities and Representation for Australian University Students: Discussion Paper*, Canberra, , Australia: Department of Education, Employment and Workplace Relations.
21. Humpel N, Owen N, Leslie E. Environmental factors associated with adults' participation in physical activity: A Review. *Am J Prev Med*. 2002;22:188-199.
22. Sallis JF, Johnson MF, Calfas KJ, Caparosa S, Nichols J. Assessing perceived physical environment variables that may influence physical activity. *Res Q Exercise Sport*. 1997;68:345-351.
23. Wechsler, H, Devereaux, R S, Davis, M and Collins, J. 2000. Using the school environment to promote physical activity and healthy eating. *Prev Med*, 31: S121–S137.

24. Pate, R R, Pfeiffer, K A, Trost, S G, Ziegler, P and Dowda, M. 2004. Physical activity among children attending preschools. *Pediatrics*, 114: 1258–1263.
25. McGraw, S A, Sellers, D, Stone, E, Resnicow, K A, Kuester, S, Fridinger, F and Wechsler, H. 2000. Measuring implementation of school programs and policies to promote healthy eating and physical activity among youth. *Prev Med*, 31: S86–S97.
26. Rhodes, W A, Singleton, E, McMillan, T B and Perrino, C S. 2005. Does knowledge of college drinking policy influence student binge drinking?. *J Am Coll Health.*, 54: 45–49.
27. Wechsler, H, Lee, J E, Nelson, T F and Kuo, M. 2002. Underage college students' drinking behavior, access to alcohol, and the influence of deterrence policies: findings from the Harvard School of Public Health College Alcohol Study. *J Am Coll Health.*, 50: 223–236.
28. Wechsler, H, Lee, J E, Nelson, T F and Lee, H. 2003. Drinking and driving among college students: the influence of alcohol-control policies. *Am J Prev Med.*, 25: 212–218.
29. Paffenbarger, R S, Lee, I-M and Leung, R. 2010. Physical activity and personal characteristics associated with depression and suicide in American college men. *Acta Psychiatr Scand*, 89: 16–22.
30. Stone G, Strikwerda-Brown J, Gregg C. Physical activity levels, sporting, recreational and cultural preferences of students and staff at a regional university. *Australia Healthy Lifestyles Journal*. 2002;49(3-4):39-43.
31. O'Donoghue, T and Rabin, M. 2000. The economics of immediate gratification. *J Behav Decis Making*, 13: 233–250.
32. Keeler, T E, Marciniak, M and Hu, T-W. 1999. Rational addiction and smoking cessation: an empirical study. *J Socio-Econ*, 28: 633–643.
33. Fuchs, V. 1982. "Time preference and health: an exploratory study". In *Economic Aspects of Health*, Edited by: Fuchs, V. 93–120. Chicago, IL: University of Chicago Press.

34. Employment, Workplace Relations and Education References Committee. 2003. *Hacking Australia's Future: Threats to Institutional Autonomy, Academic Freedom and Student Choice in Australian Higher Education*, Canberra, , Australia: Senate Printing Unit, Department of the Senate, Parliament House.
35. Pritchard, M E and Wilson, G S. 2003. Using emotional and social factors to predict student success. *J Coll Student Dev*, 44: 18–28.
36. Fazio, N M and Palm, L J. 1998. Attributional style, depression, and grade point average of college students. *Psychol Rep*, 83: 159–162.
37. Centers for Disease Control and Prevention (CDC). 2002. *Physical Activity and Good Nutrition: Essential Elements to Prevent Chronic Diseases and Obesity*, Atlanta, GA: CDC.
38. Symons, C W, Cinelli, B, James, T C and Groff, P. 1997. Bridging student health risks and academic achievement through comprehensive school health programs. *J Sch Health*, 67: 220–227.
39. Chonitz, V R, Slining, M M, McGowan, R J, Mitchell, S E, Dawson, G F and Hacker, K A. 2009. Is there a relationship between physical fitness and academic achievement? Positive results from public school children in the northeastern United States. *J Sch Health.*, 79: 30–37.
40. Sigfusdottir, I D, Kristjansson, A L and Allegrante, J P. 2007. Health behaviour and academic achievement in Icelandic school children. *Health Educ Res*, 22: 70–80.
41. Trockel, M T, Barnes, M D and Egget, D L. 2000. Health-related variables and academic performance among first-year college students: implications for sleep and other behaviors. *J Am Coll Health.*, 49: 125–131.