Well-being and leisure-time physical activity psychosocial factors predict physical activity among university students

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ABSTRACT

Drawing from literature supporting top-down (i.e., well-being impacting leisure) and bottom-up (i.e., leisure impacting well-being) models explaining the bi-directional relationship between leisure and well-being, this study examines the complex relationship of well-being, leisure constraints, and leisure negotiation factors in predicting leisure-time physical activity (LTPA) rates among university students. Six hundred sixty-one university students completed an online questionnaire assessing psychological well-being (PWB), LTPA constraints, LTPA negotiation strategies, and LTPA rates. A multiple regression analysis indicated bottom-up and top-down variables jointly predict LTPA. In regards to bottom-up psychological LTPA variables, LTPA was positively predicted by LTPA planning and prioritisation skills and negatively predicted by constraints to recreation facility spaces, lack of time, and utilising financial strategies. In regards to top-down well-being, influences on LTPA, LTPA rates were negatively predicted by personal growth and positively predicted by autonomy. We highlight how the study findings might inform intentional university health promotion policies and programming, leading to a culture of student well-being through LTPA.

A meta-analysis of empirical studies investigating the relationship between leisure engagement and subjective well-being (SWB) produced evidence for both bottom-up and top-down models of SWB (Kuykendall, Tay, & Ng, 2015). Bottom-up models of SWB suggest leisure experiences influence SWB via leisure satisfaction, while top-down models suggest that individuals who actively engaged in a diverse set of leisure activities that meet psychological needs may perceive leisure experiences more positively than individuals with low SWB (i.e., Diener, 1984). Because the bi-directional relationship between leisure and SWB has been empirically supported, this research seeks to simultaneously use bottom-up subjective leisure measures (i.e., leisure constraints; constraint negotiations) and top-down well-being measures (i.e., psychological well-being) to predict leisure-time physical activity (LTPA) rates among college students. This research has implications for university-based interventions seeking to improve LTPA engagement and well-being.

Leisure-time physical activity

Physical activity is recommended to improve cardiorespiratory and muscular fitness, bone health, and reduce the risk of non-communicable diseases and depression (World Health Organization [WHO], 2010). It is recommended that adults (i.e., 18–64 years old) participate in at least
150 minutes of moderate-intensity aerobic activity every week, along with muscle-strengthening activities on 2 or more days a week that work all major muscle groups (WHO, 2010). Leisure-time physical activity (LTPA) is cardiovascular and strength-based behaviour occurring within recreation, sport, or exercise (Craig et al., 2003). Unlike other forms of physical activity (i.e., occupation, home-based), LTPA is likely to induce the perceived freedom and intrinsic motivation necessary to meet the broad psychological needs that lead to increased SWB (Kuykendall et al., 2015; Newman, Tay, & Diener, 2014). LTPA has been positively linked to positive affect, life satisfaction, and psychological well-being (Bray & Kwan, 2006; Doerksen, Elavsky, Rebar, & Conroy, 2014; Wiese, Kuykendall, & Tay, 2018).

Given the established relationship between SWB and LTPA, higher education institutions have sought to create a campus culture supporting students’ well-being through LTPA (i.e., Fullerton, 2011). However, the majority of university students fail to be physically active and/or meet LTPA guidelines (Bray & Born, 2004; Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Thus, it is important to investigate the bottom-up and top-down variables affecting LTPA rates.

**Bottom-up subjective psychological variables affecting LTPA**

Bottom-up models of SWB propose that leisure engagement increases SWB through leisure satisfaction (Diener, 1984). It may be particularly important for SWB to be derived from leisure domains for individuals facing major identity and/or life transitions when leisure-time becomes more important or prevalent (Kuykendall et al., 2015). To maximise the bottom-up effects of leisure on SWB, decreasing psychological barriers to leisure is important. Kuykendall et al. (2015) suggested using subjective measures explaining the psychological elements of leisure experiences to understand the quality of leisure engagement and satisfaction. This study uses two common subjective measures: perceived leisure constraints and leisure constraint negotiations skills.

**LTPA perceived constraints**

Perceived LTPA constraints may be structural/contextual, intrapersonal, and/or interpersonal (e.g., Das & Evans, 2014). Structural/contextual constraints are factors external to the individual that limit LTPA participation, including limited time, finances, resources, transportation (Das & Evans, 2014; Downs, Van Hoomissen, Lafrenz, & Julka, 2014; LaCaille, Dauner, Krambeer, & Pedersen, 2011; Nelson, Lust, Story, & Ehlinger, 2008; Van Dyck, De Bourdeaudhuij, Deliens, & Deforce, 2015). Intrapersonal constraints are internal factors impacting LTPA, including a lack of knowledge, skill, motivation, energy, or prioritisation to be physically active (Das & Evans, 2014; Kulavic, Hultquist, & McLester, 2013; LaCaille et al., 2011). Interpersonal constraints are social factors diminishing LTPA participation, including a lack of peer support, or fear of injury, stigma, or general discomforts in recreational settings (Kulavic et al., 2013; Lopes, Gabbard, & Rodrigues, 2016; Vartanian & Shaprow, 2008).

**LTPA constraint negotiation skills**

Constraint negotiation skills can help individuals overcome LTPA constraints and experience satisfying LTPA, thereby leading to SWB. Negotiation strategies such as boosting intentions for LTPA participation, prioritising and planning for LTPA, and improving LTPA conditions all predict higher levels of LTPA (Barz et al., 2016). Seeking social support for LTPA, including peer and/or parent involvement and encouragement, finding people with similar interests, and asking for help, has also been positively linked to LTPA involvement (Farren, Zhang, Martin, & Thomas, 2017). Cognitive reframing, such as ignoring what others think or avoiding bothersome individuals, has also been established as a negotiation skill (Stanis, Schneider, & Anderson, 2009). Finally, financial negotiation strategies, such as saving/budgeting for LTPA, have been associated with increased LTPA (Stanis et al., 2009). LTPA
constraints and negotiation skills may impact leisure engagement and leisure satisfaction thereby affecting the levels of SWB derived from leisure.

**Top-down well-being variables affecting LTPA**

Investigating top-down models of SWB, Kuykendall et al. (2015) found evidence that SWB can affect the engagement and enjoyment of LTPA. For example, Trainor, Delfabbro, Anderson, and Winefield (2010) found that only adolescents who are psychologically healthy tend to engage in structured leisure activities, concluding that ‘preexisting psychological dispositions and health may determine the nature of leisure participation’ (p. 180). Students attending university are typically between the ages of 18–25. Because of the developmental stage they occupy and related normative identity tasks, they may experience instability, uncertainty, and rumination which may impact their levels of well-being (Schwartz et al., 2011). As such, current levels of well-being among university students may relate to LTPA engagement.

The purpose of the present study is to determine the extent to which well-being, leisure-time physical activity (LTPA) constraints, and LTPA negotiation factors predict LTPA rates among university students. Few studies have explored how top-down well-being and bottom-up LTPA constraints and negotiations factors jointly predict LTPA participation. This approach may add nuance to our understanding of the complex relationship between leisure and SWB, which has important implications for professionals serving students’ health needs (e.g., healthy and counseling services, student affairs).

**Methods**

**Participants and procedure**

Following study approval from the Institutional Review Board, a Qualtrics questionnaire was distributed using a modified Dillman method to a stratified random sample of 2,750 of 15,398 students enrolled at a mid-size northeastern United States university in the Spring 2016 (Dillman, Smyth, & Christian, 2009). The sample was stratified equally by class year, including graduate students. Survey completion averaged 15 minutes.

**Measures**

The survey was designed using validated questionnaires measuring well-being, LTPA constraints and negotiations, and LTPA participation.

**Well-being**

Well-being was assessed using three, three-item scales from the Scales of Psychological Well-Being (PWB: Ryff & Keyes, 1995), including autonomy (α = .651), personal growth (α = .705), and self-acceptance (α = .705). Items were measured on six-point Likert scales (i.e., strongly disagree–strongly agree).

**LTPA constraints and negotiation skills**

LTPA constraint and negotiation measures (Hubbard & Mannell, 2001) were adapted to the university student population. Constraint items were measured on five-point Likert scales (strongly disagree to strongly agree). Using exploratory factor analysis with a varimax rotation, the 30 LTPA constraints items factored into five domains: fear of physical/psychological safety, lack of skill/confidence, lack of information and friends, poor access to a recreation facility, and lack of time (α = .627-.852). Negotiation items were measured on five-point Likert scales (never to always). Using exploratory factor analysis with a varimax rotation, the 18 LTPA negotiation items
factored into four domains: planning for and prioritisation of physical activity, social support, psychological reframing, and financial strategies ($\alpha = .717-.794$).

**LTPA rates**

LTPA was measured using the short form version of the International Physical Activity Questionnaire (IPAQ; Craig et al., 2003). Participants reported daily walking, moderate-intensity, and vigorous-intensity physical activity participation during leisure time across one week. A metabolic equivalent score (MET-minutes) was calculated to account for the unique energy requirements of the three LTPA intensities (e.g., walking, moderate, vigorous) across the week.

**Data inspection and analysis**

Cases containing incomplete data for each of the scales within the survey were removed. Outliers were addressed according to responses on the IPAQ, which measured LTPA. To account for individuals who overestimated their LTPA levels (Downs et al., 2014), cases with LTPA levels greater than three standard deviations above the mean were removed. A multiple regression analysis was conducted using well-being, LTPA constraints, and LTPA negotiation strategies to predict LTPA rates.

**Results**

**Demographics and descriptives**

Of the 2,750 students who received a survey email, 661 students fully or partially participated in the study, for a response rate of 24.0%. Data cleaning and removal of outliers resulted in a sample of $n = 423$. The sample was mostly female (63%) with an average age of 22.9 years ($SD = 5.7$). Responses were distributed across undergraduate first year, second year, or third year (22.5%, 22.9%, 19.1%, respectively). There was a notable decrease in respondents from the senior class (14.4%), Masters (12.8%) and Ph.D. respondents (7.3%). Table 1 displays the sample demographics and Table 2 shows the means and standard deviations for all study variables.

**Regression results**

The top-down and bottom-up predictors explained 23.5% of the variance in LTPA ($R^2 = .24, F(6, 409) = 20.9, p < .001$; Table 3). In regards to bottom-up psychological LTPA variables, LTPA was
positively predicted by LTPA Negotiation: Planning and Prioritisation Skills ($\beta = 0.33, p < .001$) and negatively predicted by LTPA Constraint: Poor Access to Recreation Facility ($\beta = -0.15, p = .001$), LTPA Constraint: Lack of Time ($\beta = -0.12, p = .006$), and LTPA Negotiation: Financial Strategies ($\beta = -0.09, p = .049$). In regards to top-down well-being, influences on LTPA, LTPA rates were negatively predicted by personal growth ($\beta = -0.19, p < .001$) and positively predicted by autonomy ($\beta = 0.15, p = .024$).

### Discussion and implications

This study sought to understand the extent to which top-down well-being factors, and bottom-up LTPA constraints and negotiation strategies were related to LTPA rates among university students. We highlight how the study findings might support LTPA on college campuses through intentional health promotion policies and programming, leading to a culture of student well-being through LTPA.

**Bottom-up subjective psychological variables affecting leisure**

Planning and prioritisation for LTPA was the strongest, significant factor in positively predicting LTPA rates. Planning and prioritisation strategies included recognising the value and importance of

<table>
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<th>Table 2. Descriptive statistics.</th>
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\(^a\)1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, 5 = strongly agree

\(^b\)1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

\(^c\)1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, 6 = strongly agree

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<tr>
<th>Table 3. Final regression model for Leisure Time Physical Activity (LTPA) rates.</th>
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<tr>
<td><strong>Model</strong></td>
<td><strong>$R^2$</strong></td>
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<td>LTPA</td>
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***$p < .001$; Only significant variables were used in this model.**
LTPA, getting up early to be active, changing one’s LTPA location, and being active when the recreation centre is less busy. University professionals should foster skillsets related to planning for and prioritisation of LTPA as part of students’ daily routines. Many university-based physical-activity interventions include planning skills, novel and challenging activities, social support, and group cohesion (Boyle, Mattern, Lassiter, & Ritzler, 2011; Brown, Bray, Beatty, & Kwan, 2014). These design elements are likely to support flow-like experiences, create autonomous states, and create communities of support that align with the psychological areas that lead to well-being through LTPA (Newman et al., 2014). Students may also benefit from a non-required academic course that provides education and resources on proper LTPA (Das & Evans, 2014; Evans, Hartman, & Anderson, 2013). Unlike many health-based academic courses, these courses focus on building LTPA skills while also holding students accountable for LTPA participation. Students are able to practice planning and prioritisation skills by enrolling in the course (Hartman, Evans, & Anderson, 2017), which may translate to lifelong LTPA negotiation skills.

The results of this study confirm previous findings that access to recreational facilities in terms of operating hours, welcoming staff, and available programming are an influential factor in LTPA (e.g., Van Dyck et al., 2015). To address these constraints, students may benefit from time-use diaries, staffing and programming introductions, and facility tours to reduce perceived structural/contextual constraints. Many universities have been decentralising recreation services by providing physical activity opportunities where students spend the most time, such as residence halls (Brown et al., 2014). By adding satellite fitness facilities, weight rooms, outdoor fitness trails, and green space proximate to where students study and live, universities can reduce barriers to LTPA that are present when using the central campus recreation centre.

**Top-down well-being variables affecting leisure**

LTPA rates were also predicted by two well-being factors: personal growth and autonomy. LTPA was negatively predicted by the personal growth factor, meaning students who reported high levels of personal growth (i.e., well-being) had lower levels of LTPA participation. Personal growth is defined as placing importance on engaging in new experiences to support a continuous process of learning and changing (Ryff & Keyes, 1995). Perhaps those who reported high personal growth have a diversity of leisure activities that meet their personal growth and developmental needs beyond LTPA (Kuykendall et al., 2015). Marketing the opportunities for new experiences and learning through LTPA participation and contexts may be prudent for engaging students with high personal growth. Conversely, many students reporting low personal growth may be spending leisure time being physically active while avoiding other potentially developmental activities the university environment affords (e.g., Kuh, Hu, & Vesper, 2000). Interventions should emphasise the developmental trade-offs (e.g., health, academic, social, well-being outcomes) that may occur from spending excessive amounts of time participating in LTPA, over-exercising, or isolating oneself in LTPA environments. Encouraging leisure repertoires with a diverse range of leisure activities may be more effective in meeting students’ psychological needs.

Second, the autonomy factor positively predicted LTPA. Students who have confidence in their values and live according to them despite external pressures report higher levels of LTPA. Autonomy is also a psychological need that must be satisfied to obtain high levels of well-being (Deci & Ryan, 2000; Gagné, 2003). Universities foster autonomy by providing students with a wide-variety of academic degree programs, in- and out-of-class activities, and housing options. Likewise, universities can make it easier for students to choose physical activity options that align with their own interests and values by ensuring that students have access to a wide-variety of LTPA choices (e.g. formal vs. informal, individual vs. group, facility-based vs. nature-based, scheduled vs. unscheduled).
Implications for well-being research

These findings suggest that top-down well-being measures (i.e., PWB) and bottom-up subjective leisure variables (i.e., constraints, negotiation skills) collectively predict LTPA rates. LTPA rates were positively predicted by bottom-up LTPA prioritisation and planning negotiation skills and top-down autonomy. Students reporting high autonomy possess a general sense of confidence and make decisions based on self-imposed values, which may translate to planning for and prioritising LTPA despite other transition-based obligations, stressors, and temptations during university. Perhaps this is an example of where bottom-up LTPA negotiation skills are a manifestation of larger top-down global dispositions or skillsets. Future research should investigate whether fostered skillsets and behaviours can be transferable from a specific domain (i.e., leisure) to others (i.e., academic domains), and vice-versa. Further, longitudinal studies may provide further insight into causal or cyclical relationships among bottom-up and top-down variables related to LTPA.

Limitations

This study used a measure of psychological well-being that, while strongly correlated with and a predictor of SWB (i.e., Burns & Machin, 2010), is more oriented towards eudaimonic well-being as opposed to the hedonic nature of SWB. We also chose not to evaluate the extent to which the study findings differ by demographic differences (i.e., gender, class year). This study only predicted leisure engagement via duration and intensity of LTPA (i.e., LTPA MET minutes), but did not consider the extent to which students find LTPA satisfying. Patterns of well-being, leisure constraints, and leisure negotiation strategies other than ones found in this study may predict LTPA satisfaction. Future research should seek to understand how interventions may be designed for optimal LTPA engagement and satisfaction among students across the spectrum of well-being (i.e., positive affect, negative affect). Finally, the negative relationship between financial negotiation strategies and LTPA rates found in this study had a low beta-weight, and therefore its explanation for LTPA rates should not be overstated.

We also recognise that the cross-sectional survey design method used in this study limits the understanding of how top-down and bottom-up variables affect LTPA over time. Other methodological approaches, such as qualitative, mixed-method, and longitudinal designs, might better capture the complexity of relationship between leisure and well-being. Finally, this study was based in the American university context, and as such the findings may be specific to American-based universities and students.

Conclusion

The study findings suggest the need for creating intervention programming to address both top-down and bottom-up factors affecting LTPA. Universities are places of learning and growth. This should not be limited to academic and professional endeavours but rather focus on holistic student development, including the attainment of lifelong physical activity and well-being. To do so, university professionals must make conscious and intentional investments to create a university culture of well-being through LTPA.

Disclosure statement

No potential conflict of interest was reported by the authors.
Notes on contributors

Cindy L. Hartman is an Assistant Professor in the Department of Recreation Management and Policy at the University of New Hampshire. Her research focuses on the interplay of leisure and lifespan development, with a special focus on the emerging adulthood life. She collaborates on research exploring leisure participation and its relationship with identity development, work, and relationships in order to understand health and well-being outcomes.

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Stacey L. Hall, Ph.D currently serves as the Executive Director of Student Engagement and Development at the University of New Hampshire. Dr. Hall is a Past President of NIRSA:Leaders in Collegiate Recreation and has over twenty-five years of experience in collegiate recreation and student affairs.

References


