

Health and Weight Beliefs and Behaviours of Pre-Service Teachers: Considerations and Implications for a Health Promotion Perspective in Teacher Education

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This project explored primary and secondary pre-service teachers' (i.e., bachelor of education [B.Ed.] students) beliefs about health behaviours as well as health and weight during their university education at a large research-intensive university in Alberta. Although many studies claim that there is a need for teacher education in the areas of health and weight, recommendations for what such curricula might include are lacking. The present study was conducted with 226 pre-service teachers. Data included participants' self-reported height, weight, body satisfaction, health promoting behaviours, implicit weight bias, and current weight loss and muscle gain attempts. Results suggest many pre-service teachers have concerns about their weight and shape, and exhibit weight bias. Teacher education focusing on body satisfaction, weight bias, exercise behaviour, and stress management may be beneficial for pre-service teachers to better prepare them to instruct about as well as model health attitudes and behaviors to their future students.

Ce projet a exploré les croyances de stagiaires au primaire et au secondaire (c.-à-d. des étudiants au Baccalauréat en Éducation) sur les comportements liés à la santé, la santé et le poids pendant leur parcours dans une grande université albertaine centrée sur la recherche. Si plusieurs études affirment que les enseignants doivent être formés dans le domaine de la santé et du poids, les recommandations quant à ce que pourrait inclure une telle formation sont inexistantes. L'étude, réalisée auprès de 226 stagiaires, a demandé aux participants de fournir des données relatives aux éléments suivants : taille, poids, satisfaction à l'égard de leur corps, comportements favorables à la santé, partialité implicite envers les gens présentant un excès de poids, perte de poids actuelle et tentatives d'augmenter la masse musculaire. Les résultats indiquent que plusieurs stagiaires sont préoccupés par leur poids et la forme de leur corps, et qu'ils montrent un préjugé face aux personnes avec de l'embonpoint. Une formation qui porterait sur la satisfaction à l'égard de son corps, la partialité envers les gens présentant un excès de poids, les comportements liés à l'exercice physique et la gestion du stress pourrait s'avérer bénéfique pour les stagiaires, qui seraient ainsi mieux préparer pour enseigner à leurs élèves des attitudes et des comportements liés à la santé, et pour en être de bons modèles.

Schools are crucial environments for health education and promotion (McCabe et al., 2007; Yager & O’Dea, 2005), and teachers play an important role in the health of their students (Dodd, Al-Nakeeb, Nevill, & Forshaw, 2010). Teachers can influence student health directly through curriculum (Deschesnes, Trudeau, & Kebe, 2010), or indirectly by the health behaviours and attitudes they model to their students (Dodd et al., 2010). Many teachers may be underprepared to promote student health (Russell-Mayhew, Ireland, & Peat, 2012; Speller et al., 2010) and when teachers’ beliefs about health are misinformed, and/or their personal health behaviours are poor, there is potential for difficulties (O’Dea & Abraham, 2001; Speller et al., 2010; Yager & O’Dea, 2005). For example, O’Dea and Abraham (2001) demonstrated that 85% of male and 87% of female home economics teachers would advise students who are overweight to lose weight by cutting calories. However, such an approach may lead to nutritional deficits, hinder natural growth and development (Yager & O’Dea, 2005), or increase the child’s risk for body dissatisfaction and/or disordered eating (Russell-Mayhew et al., 2012). Unfortunately, teachers from a variety of specializations (e.g., physical education, English, mathematics; Russell-Mayhew et al., 2012) may be at risk of sharing inaccurate or even harmful health information (O’Dea & Abraham, 2001; Speller et al., 2010) or modeling unhealthy behaviours (O’Dea & Abraham, 2001; Yager & O’Dea, 2005) with their students.

A lack of teacher preparedness for student health promotion may be due to a curricular deficit in Canadian teacher education programs (Fahlman, Hall, & Gutuskey, 2013; Yager & O’Dea, 2005). Few Canadian universities require mandatory course work in health education as part of their teacher preparation programs (Veugelers & Schwartz, 2010), yet many teachers find themselves in schools with health promotion initiatives (e.g., the Alberta Comprehensive School Health program, 2005; Joint Consortium for School Health, 2013; Veugelers & Schwartz, 2010) where part of their role is to teach and model health promoting behaviours (Veugelers & Schwartz, 2010; Yager & O’Dea, 2005). This mismatch between teachers’ health education knowledge and teaching expectations leaves teachers to find alternative sources of health information when designing their lesson plans or in order to answer student questions. One of the easiest and most frequently used sources of such health information are teachers’ personal beliefs about health and body weight (Welch & Wright, 2011; Yager & O’Dea, 2005). Researchers have demonstrated that such beliefs influence teachers’ approaches to health education (Bostock, Kitt, & Kitt, 2011; Yager & O’Dea, 2005).

Teachers’ beliefs about health (Bostock et al., 2011; Russell-Mayhew et al., 2012; Speller et al., 2010), weight (Yager & O’Dea, 2005), and physical activity (Webster, Monsma, & Erwin, 2010; Welch & Wright, 2011) influence what (Deschesnes et al., 2010; Russell-Mayhew et al., 2012), and how (Speller et al., 2010; Webster et al., 2010; Welch & Wright, 2011), students learn regarding such topics. The issue with teachers drawing from their personal health and weight knowledge is that many primary and secondary education teachers, and particularly those who specialize in physical and health education, struggle with their own health and weight (O’Dea & Abraham, 2001; Russell-Mayhew et al., 2012): teachers are not immune to the larger societal discourses about health and weight. Yager and O’Dea (2005) compared the self-reported dieting and exercise behaviour, disordered eating, and body image and satisfaction of undergraduate physical and health education majors and non-health education majors (i.e., pre-service teachers). Both groups of pre-service teachers reported struggles with their body image and satisfaction in addition to incidences of disordered eating and exercise behaviour, but scores for the health and physical education majors were poorer in all categories than the non-health and

physical education majors. For instance, Yager and O’Dea reported that the prevalence of eating disorders in the health and physical education teachers was higher for males (12.5%) and females (7.7%) than non-health and physical education males (0%) and females (6%). Thus, teachers directly responsible for health and physical education may have the greatest risk for negative beliefs and behaviours.

Russell-Mayhew et al. (2012) inquired into 14 secondary pre-service teachers’ beliefs and behaviours around weight-related issues in a mixed methods design. While participants self-reported body satisfaction on the Body Satisfaction Scale (BSS [Slade, Dewey, Newton, Brodie, & Kiemie, 1990]) was relatively high ($M = 22.4$, $SD = 3.6$ out of 30), 78.6% of the sample were trying to lose weight despite the majority of these participants being within a normal weight range. In qualitative interviews, many of the pre-service teacher participants conveyed oversimplified beliefs about weight, which authors cautioned might lead to oversimplified health messages or weight bias (i.e., prejudice based on one’s body weight, typically for individuals living in large bodies [Puhl, Luedicke, & Grilo, 2014]) in future teaching practices.

Teachers who exhibit weight bias towards their students may have lowered expectations for, and poorer relationships with, students who live in large bodies (Fontana, Furtado, Marston, Mazzardo, & Gallagher, 2013; Peterson, Puhl, & Luedicke, 2012). In a study by Fontana et al. (2013), pre- and in-service physical education teachers’ explicit (i.e., an individual’s verbalized or reported prejudice) and implicit weight biases (i.e., unspoken or unconscious prejudice) were assessed. No explicit weight bias was found as measured by the Anti-Fat Attitudes Questionnaire (AFA [Crandell et al., 1994]). However, when participants completed the automatic, timed, Implicit Association Test (IAT [Greenwald, McGhee, & Schwartz, 1998]), scores indicated strong anti-fat weight bias. Thus, it appears that even though teachers may not explicitly report weight bias, implicit bias could be present (Fontana et al., 2013; Peterson et al., 2012), which may colour teachers’ health promotion efforts for students’ who live in large bodies (Fontana et al., 2013; Russell-Mayhew et al., 2012).

In summary, teachers are in the position to support the health of their students, but many teachers may be underprepared to do so (Fontana et al., 2013; McCabe et al., 2007; O’Dea & Abraham, 2001; Peterson et al., 2012). When teachers are educated in the area of health, they are more likely to engage their students in creative and meaningful opportunities for health promotion (Bostock et al., 2011; Russell-Mayhew et al., 2012; Speller et al., 2010; Webster et al., 2010; Welch & Wright, 2011). However, recommendations for what kind of teacher education is required and how it should be approached are scarce (Russell-Mayhew et al., 2012). In order to determine what training teachers require, we first need to better understand their current health and weight beliefs and behaviours so that training can target what they need most to be health promoters once they enter schools (Russell-Mayhew et al., 2012; Speller et al., 2010; Yager & O’Dea, 2005). This study explored the health and weight-related beliefs and behaviours of pre-service teachers to identify the areas where teacher education can assist in preparing future teachers to be health promoters and positive role models.

Research Questions and Method

Beliefs and behaviors related to health and weight were collected from 226 undergraduate primary and secondary education students (i.e., pre-service teachers), with varying specializations (e.g., math, English, physical education, etc.), in a large and urban research-intensive university. The study was designed to answer the research question: “what are the

health and weight-related beliefs and behaviours of pre-service teachers?" The aim was to understand areas requiring educational intervention so that teachers may be better prepared to promote the health of their students at the onset of their careers. Three specific questions of inquiry were posed:

1. What are the positive and negative health behaviours of pre-service teachers as measured by their a) exercise behaviour, b) nutrition behaviour, c) health risk behaviour, d) health responsibility, e) social support, f) stress management, and g) life appreciation?
2. Are pre-service teachers' health behaviours associated with their implicit weight bias, body satisfaction, and self-reported Body Mass Index (BMI)?
3. Are pre-service teachers' self-reported BMI's associated with their self-reported body satisfaction and implicit weight bias?

Measures

The scales used in the current analysis were the a) Body Satisfaction Scale (BSS [Slade et al., 1990]); b) pencil-and-paper version of the Implicit Attitude Test for implicit weight bias (IAT [Fontana et al., 2013; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003; Russell-Mayhew et al., 2012]); and c) Healthy Lifestyle Scale for University Students (HLSUS [Wang, Xing, & Wu, 2012]). Internal reliability reported by studies using the BSS have been moderate-to-good, with internal values ranging from .71 to .92 (McCabe et al., 2010; Neumark-Sztainer, Sherwood, Collier, & Hannan, 2000). The Cronbach's alpha of the BSS in the current sample was .84. The IAT also demonstrated good internal ($\alpha = .78$ [Cunningham et al., 2001]), test-retest ($r = .80$ [Coleman et al., 2015]; $r = .65$), and split-half reliabilities ($r = .67$ [Teachman et al., 2003]). The Cronbach's alpha of the IAT in the current analysis was high ($r = .92$). Finally, the HLSUS has shown high reliable split-half ($r = .84$) and Cronbach's alpha ($\alpha = .89$) values (Wang et al., 2012). The Cronbach's alpha for the total HLSUS scale in the present study was good ($\alpha = .87$) and the split-half reliability was moderate ($r_{sb} = .65$).

Participants in the study were also asked several self-report demographic questions gathering their a) age, b) gender, c) ethnicity, d) height, and e) weight to situate the sample in the literature. Finally, participants were asked "are you currently doing anything to lose weight?" and "are you currently doing anything to gain muscle?" to assess for weight loss and muscle building behaviour (McVey, Tweed, & Blackmore, 2007; Russell-Mayhew et al., 2012).

Participants

All participants for the study were recruited from the bachelor of education (B.Ed.) program within the university. Participants were collected in two samples, the first in the spring of 2014 ($n = 88$) and the second in the fall of 2014 ($N = 160$). All students in the analysis were in the final semester of a five-year program during their participation in the study. The total sample in the present study consisted of 226 individuals (191 females, 35 males) with an age range of 21- to 45-years ($M = 27.2$; $SD = 5.61$) and BMI range of 15.8 kg/m² to 37.3 kg/m² ($M = 23.6$ kg/m²; $SD = 3.93$ kg/m² [Table 1]). Ethnicities reported by participants included 78.5% Caucasian, 12.8% Asian, 2.7% Latin American, 2.2% East Indian, 1.3% First Nation, 0.9% African American, and 1.6% unknown. Due to the unequal distribution of the participant ethnicities, the sample was split into Caucasian and non-Caucasian groups. However, even with such modification, the

Table 1

Participant Descriptive and Comparison Statistics for the 2014 Spring and Fall Samples

	Sample			$\chi^2(df)$	<i>p</i>
	Spring 2014	Fall 2014	Combined		
Categorical Variables	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		
Total sample	75	151	226		
Gender					
Female	68 (90.7)	123 (84.8)	191 (84.5)	3.25 (1)	.08
Male	7 (9.3)	28 (24.3)	35 (15.5)		
Ethnicity					
Caucasian	58 (86.5)	109 (75.7)	181 (80.4)	3.65 (1)	.07
Non-Caucasian	9 (13.5)	35 (24.3)	44 (19.6)		
Continuous Variables	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	<i>F</i> (<i>df</i>)	<i>p</i>
Age (years)	27.2 (5.54)	27.2 (5.66)	27.2 (5.61)	.03 (224)	.86
BMI (kg/m ²)	23.3 (3.98)	23.8 (4.01)	23.6 (3.93)	.74 (224)	.50

group sizes remained too unbalanced for statistical analysis; as a result, descriptive comparisons are provided.

Data Analysis

Data from the total sample ($N = 226$) was analyzed in a correlational analysis. Participant total and subscale HLSUS scores were correlated with their BMI and total BSS and IAT scores, along with their agreement to the closed questions “are you currently doing anything to lose weight?” and “are you currently doing anything to lose muscle?” Participant BMIs were divided into underweight (i.e., scores less than 18.5 kg/m²), normal (i.e., scores 18.6 kg/m² to 24.9 kg/m²), overweight (i.e., 25 kg/m² to 29.9 kg/m²), and obese (i.e., 30 kg/m² and higher) categories and correlated with the closed question scores, HLSUS subscale scores, and total HLSUS, BSS, and IAT scores.

Results

Participants’ desire for weight loss and muscle gain, and total IAT, BSS, and HLSUS scores are presented in Table 2. Scores for participants in underweight, normal, overweight, and obese BMI categories are included for descriptive purposes, but should be interpreted with caution given their unequal sample sizes. Additionally, BSS item scores most often associated with weight-related self-esteem (i.e., weight, shape, thighs and stomach [McCabe et al., 2007; Neumark-Sztainer et al., 2000]) are included.

In the total sample, 102 participants (45.1% of the total sample) reported currently trying to lose weight, despite 63 of the participants (27.9% of the total sample) being in the normal BMI range (i.e., 18.6 kg/m² to 24.9 kg/m²). Individuals who self-identified as Caucasian were more likely to be engaging in weight loss behaviours than individuals who self-identified as non-

Table 2

BMI Categories and Weight Loss, Muscle Gain, IAT, HLSUS, and BSS Scores

	Low	Normal	Overweight	Obese	Total
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Participants	11 (4.9)	152 (67.3)	45 (19.9)	18 (8.0)	226 (100)
Are you currently doing anything to lose weight?	0 (0)	63 (41.4)	24 (53.3)	15 (83.3)	102 (45.1)
Are you currently doing anything to gain muscle?	5 (45.5)	97 (63.8)	22 (48.9)	11 (61.1)	135 (59.7)
IAT	2.8	1.7	1.8	1.5	1.7
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
HLSUS	143.3 (16.8)	140.9 (14.1)	139.7 (13.7)	137.1 (16.8)	140.5 (14.4)
BSS	23.5 (4.2)	21.0 (4.8)	20.2 (4.9)	18.3 (5.2)	20.8 (4.9)
	(<i>N</i>) (%)	(<i>N</i>) (%)	(<i>N</i>) (%)	(<i>N</i>) (%)	(<i>N</i>) (%)
BSS Unhappy with:					
Weight	1 (9.1)	35 (23.0)	17 (37.8)	13 (72.2)	66 (29.2)
Shape	2 (18.2)	27 (17.8)	11 (24.4)	10 (55.6)	50 (22.1)
Thighs	0 (0)	40 (26.3)	15 (33.3)	8 (44.4)	63 (27.9)
Stomach	2 (18.2)	53 (34.9)	19 (42.2)	11 (61.1)	85 (37.6)

Note. IAT, HLSUS, and BSS are the abbreviations for the Implicit Association Test, Healthy Lifestyle Scale for University Students, and Body Satisfaction Scale, respectively.

Caucasian; although, such a finding should be interpreted with caution due to the unequal sample sizes. Additionally, 135 participants (59.7% of the total sample) were trying to gain muscle; five of these individuals (2.2% of the total sample) were underweight (i.e., less than 18.5 kg/m²), while 97 (42.9% of the total sample) were in the normal BMI range. Furthermore, 20% of the sample reported being completely or somewhat unhappy with their body weight and/or shape, thighs, and stomach. 74% percent of participants reported engaging usually or always in HLSUS health promoting behaviours, with scores ranging 92.5 to 175 ($M = 140.5$; $SD = 14.4$) out of a maximum of 190 (Wang et al., 2012). However, 86.9% of the sample reported reading or using the computer continuously for more than one-hour at a time. Finally, IAT effects, calculated by Greenwald et al.'s suggestion of dividing the mean IAT score by the sample standard deviation, were high across all BMI categories (i.e., valued as 2.8, 1.7, 1.8, and 1.5, for the underweight, normal, overweight, and obese categories, respectively [Greenwald et al., 1998]) and for the total sample (i.e., valued at 1.7 [Greenwald et al., 1998]).

Participants' scores and maximum values for each HLSUS subscale are reported in Table 3. All participants reported that they engage some of the time in the HLSUS subscale health promoting behaviours for a) exercise, b) regular behaviour (e.g., consistent sleep patterns), c) nutrition, d) health risk, and e) stress management, regardless of their BMI. Participants also reported engaging usually or always in the health promoting behaviours of responsibility, social support, and life appreciation, across all categorizations of BMI. Across all BMI categories, participants' scores on the exercise and stress management subscales were the lowest, and scores on the life appreciation subscale were the highest.

Table 3

HLSUS Subscale Scores by BMI Category

	Low	Normal	Overweight	Obese	Total
	<i>M(SD)</i> ; Max	<i>M(SD)</i> ; Max	<i>M(SD)</i> ; Max	<i>M(SD)</i> ; Max	<i>M(SD)</i> ; Max
Exercise Behaviour	11.5 (3.2) 20	12.1 (3.1) 20	12.4 (3.0) 20	11.8 (2.9) 20	12.1 (3.1) 20
Regular Behaviour	16.0 (2.4) 20	14.8 (3.4) 20	14.8 (3.3) 20	12.4 (4.0) 20	14.8 (3.4) 20
Nutrition Behaviour	15.1 (3.2) 20	15.4 (2.9) 20	15.5 (2.9) 20	15.9 (2.8) 20	15.4 (2.9) 20
Health Risk Behaviour	14.2 (2.0) 20	14.2 (1.9) 20	14.2 (1.9) 20	14.0 (2.6) 20	14.2 (1.9) 20
Health Responsibility	25.5 (3.0) 30	24.1 (3.2) 30	24.2 (3.1) 30	23.6 (3.3) 30	24.1 (3.2) 30
Social Support	23.5 (4.5) 30	23.5 (3.6) 30	23.6 (3.6) 30	23.7 (4.1) 30	23.5 (3.6) 30
Stress Management	17.7 (4.2) 25	17.3 (3.3) 25	17.3 (3.3) 25	16.7 (3.1) 25	17.3 (3.3) 25
Life Appreciation	19.7 (2.8) 20	19.0 (2.8) 20	18.9 (2.7) 20	19.1 (3.4) 20	19.0 (2.8) 20

Note. IAT, HLSUS, and BSS are the abbreviations for the Implicit Association Test, Healthy Lifestyle Scale for University Students, and Body Satisfaction Scale, respectively. Higher scores represent more frequent engagement in health promoting behaviours. The maximum score on the HLSUS is 190 (Wang et al., 2012).

Participants who self-identified as non-Caucasian were more likely to engage in responsible health behaviours (e.g., keeping public environments clean) than individuals who self-identified as Caucasian. Likewise, female participants were more likely to engage in responsible health behaviours and regular health behaviours (e.g., eating breakfast daily) than male participants. However, such comparisons between participant gender and ethnicity should be interpreted cautiously due to significantly different sample sizes and the descriptive and arbitrary nature of group comparison.

Correlations between participants' self-reported BMI, attempts for weight loss and muscle gain, and total BSS, HLSUS, and IAT scores are listed in Table 4. Significant correlations are marked with an asterisk. Participants with higher BMI's were significantly more likely to be engaging in weight loss behaviours ($r = -.35$), with a fair degree of relationship (r ranging .25 to .50 [Colton, 1974]). Participants trying to lose weight were significantly more likely to be attempting to gain muscle ($r = .29$), or dissatisfied with their bodies ($r = .29$), with fair degrees of relationship (Colton, 1974). Finally, participants with higher BSS scores (i.e., higher body satisfaction) were more likely to engage in health promoting behaviours ($r = .42$), in a fair relationship (Colton, 1974). It should be noted that correlations between a) BMI and BSS, b) the IAT and weight loss, and c) the BSS and IAT were flagged as significant, however, since their correlations were all below .25, these are weak relationships and have little or no clinical meaning (Colton, 1974).

Participant HLSUS subscale correlations with BMI, weight loss and muscle gain attempts, and total BSS and IAT scores are reported in Table 5. Significant correlations with fair (r ranging .25 to .50 [Colton, 1974]) to moderate (r ranging .50 to .75 [Colton, 1974]) degrees of

Table 4

Total Scale Score Correlations with Participants' BMI, Weight Loss, Muscle Gain, BSS, HLSUS, and IAT Scores

	BMI	Are you currently doing anything to lose weight?	Are you currently doing anything to gain muscle?	BSS	HLSUS	IAT
BMI	--	-.35**	.09	-.23**	-.13	-.05
Lose Weight		--	.29**	.29**	.02	-.16*
Gain Muscle			--	-.12	-.21**	-.10
BSS				--	.42**	-.15*
HLSUS					--	-.10
IAT						--

Note. IAT, HLSUS, and BSS are the abbreviations for the Implicit Association Test, Healthy Lifestyle Scale for University Students, and Body Satisfaction Scale, respectively. The weight loss and muscle gain questions were scored where 1=yes and 2=no, thus negative correlations represent weight loss or muscle gain attempts.

** Correlation significant at .01 (two-tailed).

*Correlation significant at .05 (two-tailed).

Table 5

HLSUS Subscale Correlations

	BMI	Are you currently doing anything to lose weight?	Are you currently doing anything to gain muscle?	BSS	IAT
Exercise Behaviour	-.11	-.10	-.54**	.32**	-.01
Regular Behaviour	-.15*	.14*	-.08	.22**	-.02
Nutrition Behaviour	-.05	-.20	-.21**	.31**	-.10
Health Risk Behaviour	-.02	.08	-.04	.02	-.01
Health Responsibility	-.14*	-.01	.03	.18**	-.02
Social Support	-.04	-.02	-.11	.20**	-.08
Stress Management	-.04	.01	.00	.35**	-.07
Life Appreciation	-.02	.01	-.06	.31**	-.13

Note. IAT and BSS are the abbreviations for the Implicit Association Test and Body Satisfaction Scale, respectively. The weight loss and muscle gain questions were scored where 1=yes and 2=no, thus negative correlations represent weight loss or muscle gain attempts.

** Correlation significant at .01 (two-tailed).

*Correlation significant at .05 (two-tailed).

relationship include HLSUS exercise behaviour and attempts to gain muscle ($r = -.54$), and the BSS with HLSUS a) exercise behaviour ($r = .32$), b) nutrition behaviour ($r = .31$), c) stress management ($r = .35$), and d) life appreciation with the BSS ($r = .31$). Other significant relationships flagged in Table 5 indicate little or no clinically meaningful relationship (Colton, 1974).

Discussion

The present study utilized the Healthy Lifestyle Scale for University Students (HLSUS [Wang et al., 2012]), Body Satisfaction Scale (BSS [Slade et al., 1990]), Implicit Association Test (IAT [Greenwald et al., 1998]), and participant demographic information to answer the research question “what are the health and weight-related beliefs and behaviours of pre-service teachers?” Additionally, three sub-research questions were explored: a) what are the positive and negative health behaviours of pre-service teachers; b) are pre-service teachers’ health behaviours associated with their implicit weight bias, body satisfaction, self-reported BMI, and weight loss and muscle gain attempts; and c) are pre-service teachers’ self-report BMI’s associated with their implicit weight bias, body satisfaction, and weight loss and muscle gain attempts? Each of the sub-research questions’ findings and specific recommendations will be addressed prior to a discussion of the overarching research question, outcomes, implications, limitations, and future directions.

Research Question One: Health Behaviours of Pre-Service Teachers

An average of 74% of participants reported that they engage in health promoting exercise, nutrition, and social emotional behaviours usually or always, and infrequently smoke or drink alcohol. Thus, the pre-service teachers in the present sample were leading fairly healthy lifestyles according to this measure (Wang et al., 2013). However, 86.9% of students reported consistently using a computer or reading for more than an hour at a time; while unsurprising given their academic workloads (Hacihanoglu, Yildrum, Karakurt, & Saglam, 2011), this behaviour comes with health risks (Wang et al., 2012), and may be an important area for health promotion interventions with university students (Shaheen, Nassar, Amre, & Hamdan-Mansour, 2015).

Participant subscale scores on the HLSUS a) regular behaviour (e.g., consistent sleep patterns), b) nutrition, and c) health risk subscales indicated that the pre-service teachers were engaging in these behaviours at least some of the time; however, when such behaviours are not regular their benefits are marginal (Warf-Higgins et al., 2010) and pre-service teachers may still benefit from education on such topics (Hacihanoglu et al., 2011; Warf-Higgins et al., 2010). The high scores on the HLSUS health responsibility, social support, and life appreciation subscales may indicate strengths that future teacher education programs could draw upon to increase student learning or commitment to action (e.g., designing workshops that use peer-groups to explore or teach learning objectives around health [Speller et al., 2010; Warf-Higgins et al., 2010]). For instance, McMahan and Penny (2013) demonstrated that health and physical education teachers who participated in peer-group discussions about their personal and positive experiences with their bodies were more likely to take a nuanced approach to adopting the health curriculum in schools. Finally, scores on the exercise and stress management subscales reflected inconsistent health promoting behaviours (e.g., frequently accepting things in life that cannot be changed while failing to take time for relaxation daily), and are areas in need of health promotion with students since consistent exercise and coping is paramount in the promotion of physical and mental health (Dodd et al., 2010; Warf-Higgins et al., 2010).

Several studies assessing the health behaviours of university students support the current findings. In a study of 410 university students conducted by Dodd et al. (2010), it was found that 70% were not meeting the exercise recommendations made by the United Kingdom

government, mirroring the inconsistent exercise behaviours in the present sample. Other studies assessing the health behaviours of university students report that physical activity scores tend to be inadequate and the lowest of all health promoting behaviours (Rezaei-Adaryani & Rezaei-Adaryani, 2012; Wang et al., 2009). Furthermore, a group of Chinese researchers demonstrated that students' health promoting behaviours, particularly physical activity (Choi-Hui, 2002), tend to decrease as their year of study increases (Choi-Hui, 2002). Finally, research has shown that university student stress management and mental health (Choi-Hui, 2002) are also quite poor, perhaps because students tend to prioritize academic achievement (Choi-Hui, 2002; Warf-Higgins et al., 2010). In the present sample, inconsistent exercise and stress management scores demonstrate that although the pre-service teachers were engaging in these health promoting behaviours—at least some of the time—they may not have been making exercise and stress management a priority.

Research Question Two: Health Behaviours and Correlates

When participants HLSUS scores were correlated with their self-reported BMI, body satisfaction (BSS), and implicit weight bias (IAT), one significant (Colton, 1974) relationship was found. Higher BSS scores were positively associated with health promoting behaviours ($r = .42$), demonstrating a relationship between an individual's body satisfaction and health lifestyle. Such a finding in the present analysis is well situated in the existing literature addressing the relationship between body satisfaction and health lifestyle behaviours (Bednarzyk, Wright, & Bloom., 2013; Kim & Lee, 2010).

For instance, a recent study by Kim and Lee (2010) addressed the association between perceived body weight, health lifestyle, weight control behaviours, and depression in 532 Korean university students. Students' BMIs were calculated and they were asked to report their perceived weight status (i.e., underweight, healthy weight, overweight, or obese). Sixty-four percent of the sample overestimated their body weight status, and students who overestimated their weight status were significantly more likely to report frequent smoking and drinking behaviour, poor body satisfaction, restrictive eating practices, and symptoms of depression even when their calculated BMI status was in the normal or underweight range. Thus, students who had distorted views of their bodies were engaging in less health promoting behaviours and exhibited lower body satisfaction, which mirror the findings of the present study. Furthermore, Kim and Lee demonstrated that weight overestimation is related to poor body satisfaction and mental health concerns, which may provide insight into the curriculum required in teacher education. However, further research in this area is needed, as the present study suggests there may be differences between the health beliefs and behaviours of Caucasian and non-Caucasian individuals. More specifically, additional research is required to establish relevant and meaningful differences between the health beliefs and behaviours of university students from different ethnic backgrounds.

In another study, Bednarzyk et al. (2013) assessed 1,056 university students' self-reported body satisfaction and health lifestyle behaviours. Students with lower body satisfaction were less likely to engage in health promoting behaviours, including daily physical activity and eating a well-balanced diet, compared to their peers with higher body satisfaction, regardless of BMI. Bednarzyk et al. concluded that an individual's body satisfaction is important in predicting health promoting behaviours, and may provide more information about an individual's health behaviours than their weight status. Thus, interventions designed to improve body satisfaction

may be important in promoting university student health (Bednarzyk et al., 2013).

In the present sample, no significant correlation between the pre-service teachers' BMI and health promoting behaviours was found. All participants were engaging consistently in health promoting behaviours (i.e., completing health promotion behaviour usually or always) across weight status, demonstrating that weight is multifaceted and should not be reduced to a proxy for an individual's health behaviours (Russell-Mayhew et al, 2012). Thus, the common societal discourse that individuals who live in large bodies do not lead healthy lifestyles ignores the complexity of the many factors influencing weight (e.g., genetics, hormones, or physical disorders) and health, and needs to be revised (Bednarzyk et al. 2013; Russell-Mayhew et al., 2012). Furthermore, interventions targeting body satisfaction may be effective in promoting the physical, mental, and social/emotional health of undergraduate education students from a variety of specializations (Bednarzyk et al. 2013; Russell-Mayhew et al., 2012), which will in turn support their modeling of positive health behaviours once they enter the field (Dodd et al., 2010; Yager & O'Dea, 2005).

Research Question Three: Body Mass Index and Correlates

Consistent with previous literature (Bednarzyk et al., 2013; Kim & Lee, 2010), in the present sample, higher BMIs were associated with more weight loss behaviours ($r = -.35$). However, the means of such weight loss behaviours need to be explored since the HLSUS does not assess for potentially dangerous methods of weight loss such as food restriction, extreme exercise, vomiting, or laxative use (Yager & O'Dea, 2005). Furthermore, although weight loss attempts in the present sample were more likely as BMI increased, 63 individuals (27.9% of the total sample) reported trying to lose weight despite reportedly being in a normal BMI range. Therefore, the weight loss attempts in the current sample may actually be detrimental to the pre-service teachers' health and is potentially related to poor body satisfaction (Bednarzyk et al., 2013).

Bednarzyk et al. (2013) suggested that participant response bias on self-reported body satisfaction measures may be high, leading to inflated body satisfaction scores. In their study of 1,056 university students, 71% of the sample reported that they were satisfied with their body, and 65.1% were in a healthy BMI range. However, 60.3% of the students in the study were trying to lose weight: Bednarzyk et al. concluded that the students' self-reported body satisfaction scores likely misrepresented the participants' true feelings about their bodies, reflecting a response bias on body satisfaction questionnaires.

Likewise, Russell-Mayhew et al. (2012) showed a disconnect between pre-service teacher self-reported body satisfaction, weight loss behaviours, and BMI. In the Russell-Mayhew et al. (2012) sample, participant body satisfaction, measured with the BSS was relatively high ($M = 22.4$, $SD = 3.6$), but like the present analysis, a large portion of the sample (78.6%) were trying to lose weight despite the majority having BMIs in the normal range. The authors concluded that pre-service teachers are at risk for poor body image regardless of their BMIs, and that self-report body satisfaction measures need to be considered in context with weight loss behaviours for a more accurate representation of participant body satisfaction. Thus, the finding in the present sample that students were satisfied with their bodies should be viewed with caution, given that almost half of the study participants were trying to lose weight, irrespective of self-reported BMI.

Synthesis of Findings

Four overarching conclusions can be made from the present investigation. First, although the pre-service teachers self-reported body satisfaction was high, almost half of the participants were trying to lose weight regardless of their BMI (Bednarzyk et al., 2013; Kim & Lee, 2010; Russell-Mayhew et al., 2012). Thus, many pre-service teachers in the normal or underweight range may be engaging in weight loss behaviours that put their health at risk (e.g., food restriction [Russell-Mayhew et al., 2012]). However, since BMI is less accurate when categorizing the weight status of petite or muscular individuals (Buss, 2014; Janssen, Katzmarzyk, & Ross, 2004), and no measure of weight was taken in the present study (e.g., waist circumference; Janssen et al., 2004), the results should be interpreted with caution.

Second, participants with lower body satisfaction were less likely to engage in health promoting behaviours, irrespective of BMI, suggesting that an individual's body satisfaction may be more related to health behaviours than body weight itself (Bednarzyk et al., 2013; Kim & Lee, 2010). Third, more detailed inquiry is warranted into the methods pre-service teachers are using for weight loss, including measures of restrictive eating practices, laxative use, dieting, and extreme exercise behaviours (Kim & Lee, 2010; Yager & O'Dea, 2005). Finally, participant implicit weight bias, measured by the IAT, was high in the sample (1.7; Greenwald, Poehlman, Uhlmann, & Banaji, 2009), suggesting that the societal message that individuals living in large bodies are stupid, lazy, and bad is pervasive (Fontana et al., 2013; Sira & White, 2010), and teachers are at risk of weight bias in their future practice (Fontana et al., 2013; Russell-Mayhew et al., 2012).

Conclusion One: Body-Satisfaction is related to Health Behaviours

The finding that body satisfaction is related to health behaviours is a relatively new phenomenon being explored in the literature (Bednarzyk et al. 2013; Kim & Lee 2010). Both Bednarzyk et al. (2013) and Kim and Lee (2010) found that participants with poor self-reported body satisfaction and/or body size overestimation were more likely to be engaging in negative health behaviours irrespective of their BMI. The present study also demonstrated a relationship between an individual's perception about their body and their health behaviours such that pre-service teachers with greater body satisfaction were engaging more frequently in health promoting behaviours such as regular exercise and consistent sleep patterns. Furthermore, the present study demonstrated a greater relationship between body satisfaction and health behaviours than self-reported BMI and health behaviours, suggesting that one's beliefs about their body shape and weight are important in understanding lifestyle, and an individual's health should not be reduced to the concept of body weight alone (Bednarzyk et al. 2013; Russell-Mayhew et al., 2012). Teacher education programs may be improved by including such information and promoting the health of pre-service teachers themselves, which in turn may improve the quality of health and wellness initiatives in schools

Conclusion Two: High Propensity for Weight Loss Behaviours

The finding that pre-service teachers have a high propensity for weight loss raises several concerns. Firstly, a desire for weight loss is a risk factor for the development of eating disorders such as anorexia nervosa or bulimia nervosa (Kim & Lee, 2010; Neumark-Sztainer, Goeden,

Story, & Wall, 2004), which can lead to serious health concerns (Neumark-Sztainer et al., 2004; Yager & O'Dea 2005). Thus, the pre-service teachers' concerns about their body weight are not necessarily benign. Secondly, since teachers are role models for their students (Dodd et al., 2010) explicit negative body comments or observable weight loss behaviours may be observed, and have the potential to be taken up by students (O'Dea & Abraham, 2001; Yager & O'Dea, 2005). Finally, teachers struggling with their body weight may also feel uncomfortable to address these topics with their students (Russell-Mayhew et al., 2012), which could lead to the omission of health curriculum and/or a failure to identify students at risk or in need of help (Deschesnes et al., 2010; Russell-Mayhew et al., 2012; Speller et al., 2010).

Conclusion Three: Greater Understanding of Methods of Weight Loss Are Warranted

Almost half of the pre-service teachers in the present sample were engaging in weight loss behaviours, highlighting the need for further exploration of their reasons for and methods of weight loss. Further exploration of the methods pre-service teachers are using to lose weight are imperative given that certain methods put their own personal health at risk as well as create dangerous opportunities for modeling poor health behaviours to their students (Dodd et al., 2010; Yager & O'Dea, 2005). Furthermore, by identifying the reasons for and methods of weight loss attempts by pre-service teachers, curriculum for teacher education may be delineated.

Conclusion Four: Pre-Service Teachers Exhibit Weight Bias

Finally, the finding that pre-service teachers exhibit high weight bias has several potential consequences for their interactions with students. First, teachers with high implicit weight bias, particularly those who specialized in health education (Fontona et al., 2013), may assume children in large bodies are disinterested in physical activity and may fail to include them in such activities, or underestimate their athletic abilities (Fontana et al., 2013). Second, teachers with good intentions who hold biased beliefs about weight may make inappropriate or even dangerous recommendations to students who live in large bodies or approach them about weight related concerns (Yager & O'Dea, 2005). For example, O'Dea and Abraham (2001) demonstrated 85% of male and 87% of female home economics and physical education educators would advise students who are overweight to lose weight with no reference to considerations of the range of healthy body weights for children, the child's nutritional needs or the role of genetics or hormones in the child's body weight or shape. Russell-Mayhew et al. (2012) cautions that advising an overweight student to lose weight could lead to further struggles with body satisfaction and/or dangerous weight loss behaviours, such as restrictive eating, of the student.

Interventions designed to educate teachers on health promotion may improve their own health (Dooris & Doherty, 2010; Polat, Ozen, Kahraman, & Bostanoglu, 2015), as well as promote the health of their future students (Deschesnes et al., 2010; McVey et al., 2007). For example, McVey et al. (2007) demonstrated that when a school implemented a comprehensive school health program, which included teacher education and curriculum modifications, the body satisfaction and size acceptance of the students increased significantly, whereas the rates of disordered eating, internalization of media ideals, and weight-based teasing decreased significantly compared to a school that did not include a comprehensive health program.

Likewise, a recent study evaluating the effectiveness of ten schools implementing a comprehensive school health program called the Alberta Project Promoting Active Living and Healthy Eating (APPLE [Fung et al., 2012]) demonstrated that training teachers about health resulted in greater health promoting behaviours by the students. For example, students who attended the APPLE schools ate more fruits and vegetables, were more physically active, and were less likely to be classified as obese than students from the 150 control schools (Fung et al., 2012). It was concluded that school health promotion initiatives seem to promote student health beyond that of traditional health prevention approaches as a part of a comprehensive approach to school health may even improve the health of students (Joint Consortium for School Health, 2013; Vinciullo & Bradley, 2009).

However, much of the existing literature fails to identify what topics such interventions should address to meet the specific needs of pre-service teachers (McMahon & Penny, 2013; Russell-Mayhew et al., 2012). The present study helped to identify several areas in which pre-service teachers would benefit from health education, including a) body satisfaction; b) personal health lifestyle, with a specific focus on promoting pre-service teachers' physical activity and coping strategies; and c) weight bias.

Lastly, the present analysis identified several strengths of pre-service teachers, which may enhance teacher health education including responsible health behaviours, consistent social support, and life appreciation. Such pre-existing health promoting behaviours (e.g., regular physical activity or seeking social support during periods of stress) will be more easily modeled to support student health than behaviours that teachers are taught to model but have not previously engaged in (McMahon & Penny, 2013). Likewise, if pre- or in-service teachers are encouraged to participate in peer-to-peer discussions about their personal positive health behaviours, while also ensuring to refer to the literature and/or curriculum, they may be able to bring a nuanced approach to health curriculum and/or concrete examples of health promoting behaviours, while ensuring to deliver accurate information. Health education that builds on these strengths (e.g., through collaborative workshops or the sharing of personal empowering stories [Speller et al., 2010; McMahon & Penny, 2013; Warf-Higgins et al., 2010]), may increase pre-service teacher engagement and improve their learning in content areas where they feel less confident (McMahon & Penny, 2013).

Study Limitations

While the present study provides some support for the development of pre-service teacher health education and potential topics for inclusion, several limitations to the research should be noted. First, the present analysis was unable to make statistical comparisons of the sample demographic or determine quantitative measures for gender, ethnicity, or BMI due to unequal sample sizes. Such a comparison may have provided insight into potential between-group differences, which may be important in designing health education curriculum. However, to provide some insight into areas for further research, descriptive information of these groups was provided. Second, the present analysis used the pencil-and-paper version of the IAT, which may be more subject to participant faking (Greenwald et al., 2009; Stieger, Goritz, Hergovich, & Voracek, 2011). However, the computerized versions of the IAT tend to demonstrate even higher implicit biases than the pencil-and-paper version (Greenwald et al., 2009), and a high weight bias in the present sample would have likely been found regardless of the IAT version used. Third, participant response bias on the quantitative measures, particularly the BSS, may have

been present in the sample and have been reported in previous studies assessing body satisfaction and health behaviours (Bednarzyk et al, 2013; Russell-Mayhew et al., 2012). Fourth, the study used self-reported height and weight to determine the BMI and weight status (i.e., underweight, normal weight, overweight, obese) of the study participants, which may or may not have been reported accurately. Likewise, while BMI is a frequently used measure, it is less accurate when categorizing individuals with certain body types or compositions (Buss, 2014; Janssen et al., 2004). For example, individuals with high percentages of muscle mass may be incorrectly categorized as overweight or obese and short individuals may be incorrectly categorized as underweight (Buss, 2014). Fifth, the study asked the pre-service teachers if they were currently doing anything to lose weight or gain muscle, which may have been leading and unnecessarily focused on weight as an indicator of health. The study may have benefitted from asking participants “are you doing anything to improve your health,” and then ask them to describe any behaviours they were engaging in instead. Future research may benefit from asking more open-ended questions about health promotion rather than limiting questions to weight loss or muscle gain only. Nevertheless, the present study provides meaningful data identifying some of the needs for pre-service teacher health education and outlines areas that would benefit from further investigation.

Conclusion

Research on the utility of health promotion efforts which incorporate health education have demonstrated success (Polat et al., 2015; Shi, Tubb, Fingers, Chen, & Caffrey, 2013), and in particular, educational facilities have been deemed excellent environments for health education and promotion due to their disciplinary focus and potential to influence future educators (Dooris & Doherty, 2010; Dooris, 2001; Polat et al., 2015; Shi et al., 2013).

The literature states that pre-service teachers have a role in student health promotion (Dooris & Doherty, 2010; Russell-Mayhew et al., 2012), while also demonstrating that many pre-service teachers have inaccurate or harmful beliefs about health and weight (O’Dea & Abraham, 2001; Puhl et al., 2014; Yager & O’Dea, 2005). The current study provided further evidence for the need for pre-service teacher health education, and what topics such education may include (Veugelers & Schwartz, 2010; Webster et al., 2010), including body satisfaction, weight bias, and health lifestyle behaviours (Russell-Mayhew et al., 2012; Webster et al., 2010). Such interventions may promote pre-service teachers’ personal health, and potentially the health of their future students (Dooris & Doherty, 2010; Dooris, 2001; Polat et al., 2015). Teachers play a key role in health promotion (Dooris & Doherty, 2010; Fahlman et al., 2013) and by investing in the health education of pre-service teachers, we are investing in health for generations to come.

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