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Body Image 4 (2007) 115–136
Body Image
www.elsevier.com/locate/bodyimage

Healthy Schools-Healthy Kids: A controlled evaluation of a comprehensive universal eating disorder prevention program

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Received 10 May 2006; received in revised form 14 December 2006; accepted 6 January 2007

Abstract

This study was a controlled evaluation of a comprehensive school-based universal prevention program involving male and female students, parents, teachers, school administrators and local public health professionals. A total of 982 male and female Grades 6 and 7 middle school students (and 91 teachers/school administrators) completed self-report surveys at baseline on measures of body satisfaction, internalization of media ideals, size acceptance, disordered eating, weight-based teasing, weight loss and muscle-gaining behaviours, and perceptions of school climate (teachers only). Eighty-four percent of the students repeated the surveys immediately following the 8-month school-wide intervention and 71% again 6 months later. Repeated measures ANCOVAs revealed that participation in the Healthy Schools-Healthy Kids (*HS-HK*) program had a positive influence by reducing the internalization of media ideals among male and female students and by reducing disordered eating among female students. The program was also associated with reductions in weight-loss behaviours among the students, although this effect was lost by the 6-month follow-up. When the intervention students were sub-divided into low versus high-risk groups, the high-risk group appeared to benefit most from the intervention with significant reductions in internalization of media ideals, greater body satisfaction, and reduced disordered eating over time. There were no intervention effects for teachers. Challenges of engaging teachers in prevention are discussed.
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Keywords: Comprehensive prevention; Internalization of media ideals; Dieting; Eating disorders; Male and female early adolescents

Introduction

Society's current norm for overvaluing female thinness and equating that thinness with beauty, success, and happiness has led to widespread body dissatisfaction among women and adolescent girls (Paquette & Raine, 2004) as well as among some girls as young as 6 years of age (Davison, Markey, & Birch, 2003). Body dissatisfaction among children and adolescents can have significant weight-related health implications. For example, in their longitudinal study, Neumark-Sztainer, Paxton, Hannan, Haines, and Story (2006b) found that lower body satisfaction among both adolescent males and females was predictive of higher levels of dieting and binge eating, placing those individuals at an increased risk of poor overall health. Body dissatisfaction has also been associated with depression and poor self-esteem (Stice & Bearman, 2001). Given these

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doi:10.1016/j.bodyim.2007.01.004

findings, it is not surprising that experts have advocated that interventions should strive to increase levels of body satisfaction (Neumark-Sztainer et al., 2006b).

Although targeted eating disorder prevention interventions (those targeting at-risk individuals) have shown promising results (see Fingeret, Warren, Cepeda-Bento, & Gleaves, 2006; Stice & Shaw, 2004 for reviews) there remains a need to assess the outcome of untargeted interventions. In universal prevention, the goal is to foster resilience and reduce risk among nonsymptomatic populations (i.e., the entire student body). In the short-term, universal prevention programs are expected to increase resiliency and decrease risk factors. In the long term, it is expected that those changes will lead to fewer eating problems and fewer cases of eating disorders.

Universal prevention approaches have several advantages. First, a population-based approach has the potential to help those at-risk while also helping to prevent the development of new cases. Second, an inclusive broad-based approach to prevention can help children learn to cope with the sociocultural influences that have been linked with the development of body image dissatisfaction (Stice & Whitenton, 2002). For example, the thin ideal is transmitted and reinforced via parents, peers, and the media. Studies have shown that children whose parents transmit messages about the importance of thinness, either through role modeling or direct comments, are more likely to develop concerns with their own weight and shape (Davison & Birch, 2001; Smolak, Levine, & Schermer, 1999). Moreover, prospective research has shown that perceptions of peers' desire for thinness and watching appearance-focused television are associated with girls' desire for thinness, appearance satisfaction, and self-esteem (Dohnt & Tiggemann, 2006). Similarly, weight-based teasing by peers and parents has also been linked to body dissatisfaction in children and youth (Eisenberg, Neumark-Sztainer, & Story, 2003; Lieberman, Gauvin, Bukowski, & White, 2001).

Teaching children and youth how to support one another through positive peer modeling, mutual respect, and acceptance (regardless of size or shape) can foster a healthy and more equitable environment. This approach can help to offset the development of disordered eating as well as other risky behaviours (e.g., drug use, depression). Before conclusions are drawn about the usefulness of universal prevention within the field of eating disorders, however, there is a need to broaden the scope of the intervention work. This requires targeting multiple sociocultural influences and evaluating their effectiveness using high-quality research.

Presently, strategies used by researchers conducting primary prevention work fall into one of three distinct categories (Levine & Smolak, 2006). First, some researchers have drawn on social cognitive theory (Bandura, 1986) or cognitive-behavioural theory to develop prevention programs. According to Social Cognitive Theory (SCT), behaviour is influenced by the interplay between cognitive and emotional processes within the person, behavioural patterns, and the environment. Within the eating disorder literature, particular attention is given to the sociocultural factors that create or maintain disordered eating, as previously described. The focus of SCT-driven prevention programs is on decreasing risk factors associated with disordered eating such as the idealization of slenderness, drive for thinness, or fear of fatness (using cognitive-behavioural techniques), while also fostering protective factors such as healthy eating attitudes and behaviours. Levine and Smolak (2006) refer to this as the Disease-Specific (DS) pathways approach to prevention. Second, the Non-Specific Vulnerability-Stressor (NSVS) approach to prevention fosters generic life-skills such as stress management, assertion, decision-making, social competency and resiliency. A third approach, entitled the Feminist Empowerment-Relational (FER) model, emphasizes developing critical thinking towards the gendered issues contributing to negative body image and promotes new norms of relating, acceptance, support, and power using a participatory approach (Piran, 1999a, 2004; Levine & Piran, 2001).

The present study used classroom curriculum and nurse-facilitated peer support groups (McVey, Davis, Tweed, & Shaw, 2004; McVey, Lieberman, Voorberg, Wardrope, & Blackmore, 2003a) as a starting point in the development of a longer and more intensive comprehensive program within an ecological approach. Those previously tested strategies were shown to improve body satisfaction and body esteem by way of helping girls critically analyze messages and develop general life-skills and healthier peer norms. Elements from all three models described previously were included (i.e., DS, NSVS, and FER-models). An ecological approach was considered for the present study because it takes into consideration the interaction of multiple systems and their potential influences on a person's behavior (personal competencies, peer, parent and media influences, school characteristics, etc.) (Bronfenbrenner, 1979). The present intervention drew also from the comprehensive Health-Promoting School Framework (HSF); a framework used in intervention research designed to improve school health in general (Leger,

1999) and eating attitudes in particular (Anderson & Piran, 1999; Neumark-Sztainer, 1996; Neumark-Sztainer et al., 2006a; O'Dea & Maloney, 2000). The HPS framework focuses on three key elements including school curriculum, school environment/climate, and school-community relationships, all of which are expected to function as an interactive system.

Varnado-Sullivan et al. (2001) implemented one of the first comprehensive eating disorder prevention programs, entitled the Body Logic Program. This included in-class curriculum (three sessions with students), a teacher workshop, and information sessions for parents. Participants were male ($n = 130$) and female ($n = 157$) students in Grades 6 and 7 drawn from two private schools. The Body Logic program was found to have a positive influence on female, but not male participants (e.g., as measured by reductions in scores on the fear of fatness scale). While this study contributed important findings to the prevention literature, the generalizability of Varnado et al.'s findings to diverse groups was limited due to the inclusion of a relatively small, predominantly Caucasian (91%), and upper middle class (i.e., private school setting) sample of students. In another study, Austin, Field, Wiecha, Peterson, and Gortmaker (2005) developed and evaluated the effectiveness of a multi-level school-based obesity prevention program targeting disordered eating in early adolescent girls ($N = 480$, aged 10–14 years). Students from 10 middle schools were matched and randomly assigned to the intervention or control condition and the obesity prevention program was implemented over two school years. Both girls and boys from Grades 6 and 7 (primarily Caucasian) were enrolled in the Planet Health program, however, only the females were included in the evaluation of the program. The intervention, which focused on reducing television viewing and the consumption of high fat foods, while also increasing physical activity and fruit and vegetable consumption, included classroom lessons with extensive teacher input (from across different disciplines), training for teachers, wellness sessions, and fitness funds. The program had a positive impact on reducing purging behavior and diet-pill use in females. Most recently, Haines, Neumark-Sztainer, Perry, Hannan, and Levine (2006) developed and evaluated the effectiveness of a multi-component, school-based intervention designed to prevent teasing and unhealthy weigh-control behaviours. Like Austin et al. (2005), the program lasted 8 months. However, the study by Haines et al. was conducted with a slightly smaller (intervention group $n = 79$, control group $n = 72$), younger (Grades 4 through 6), and more culturally diverse sample. Components included an after-school program (a theatre program), school environment components (school staff training, no-teasing campaign, book of the month), and a family-component (family nights, parent postcards, booth at parent–teacher night, and theater production). The intervention was associated with a reduction over time in the number of students who reported being teased, but no changes in weight control behaviours were reported.

In the present study, prevention curriculum (Seaver, McVey, Fullerton, & Stratton, 1997) was implemented in all classes including Health Education, Math, Science, English and Drama to ensure the delivery of a consistent school-wide message. In addition, training was offered to teachers (and school administrators) and parents to help make them aware of their own potential weight-based biases and the issues that influence body image. It was felt that subtle forms of body discrimination (or weight based teasing) could go unnoticed by parents or teachers if they themselves were ''fat-phobic'' or invested in current sociocultural ideals of thinness. Other elements of the HPS included in the present intervention were the (a) setting of goals that where based on identifiable community needs (e.g., surveys conducted by local public health units revealed that eating and body image issues were considered high priority issues facing the schools), (b) involvement of members of the community in the development (a public health nutritionist, student enrolled in teacher's college, a high school intern, members of provincial and national nutrition and physical activity organizations) and the delivery (teachers, local public health nurses, local Drama and English teachers, local high school drama students) of the intervention, and inclusion of school staff, students, parents, and local public health staff as targets of the intervention. Male students were also included in both the implementation and evaluation of the intervention in light of evidence showing that they too experience body dissatisfaction and pressures to conform to a lean, ''bulked up'' physique that is being touted as ''ideal'' (McCabe & Ricciardelli, 2001, 2003; McCreary & Sasse, 2000; Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999; Smolak, Levine, & Schermer, 1998). Furthermore, evidence suggests that boys are more likely than girls to initiate weight-based teasing and harassment of other children (Stein, 1999). This multi-dimensional approach has shown promising results in school-based drug abuse and tobacco use prevention programs (Biglan, Ary, Duncan, & Black, 2000; Pentz et al., 1989).

The present study adds to the existing body of work investigating the effectiveness of an ecological approach to the prevention of disordered eating by using a randomized controlled trial to test the

effectiveness of an intensive (8-month intervention) comprehensive, multi-level intervention conducted with a large and multi-cultural sample of students drawn from lower to middle class neighbourhoods. Male and female students were involved in both the intervention and the evaluation process. Student outcome variables included body satisfaction, internalization of media ideals, body size acceptance, weight-based teasing, disordered eating, and weight loss and muscle gaining behaviours. The effectiveness of the intervention on teachers' body satisfaction, internalization of media ideals, and eating attitudes and behaviours were also assessed, as well as its impact on their perceptions of the school climate. Middle school students were a selected group for this universal prevention study because of the normative developmental stressors that trigger disordered eating during this stage of early adolescence (e.g., natural increases in body fat and weight associated with puberty, increased desire for peer acceptance, onset of romantic interests, changes in academic expectations) (Smolak & Levine, 1996).

The overall aim of the present study was to examine the influence of the comprehensive, universal-selective intervention in improving body satisfaction and size acceptance and in reducing the internalization of media ideals, weight-based teasing, disordered eating and weight-loss or muscle-gaining behaviours. It was hypothesized that the participants of the *Healthy Schools-Healthy Kids (HS-HK)* intervention would show significantly greater improvements over time in body satisfaction and size acceptance, and significantly greater reductions in the internalization of media ideals, weight based teasing, disordered eating and weight loss and muscle-gaining behaviours, compared to controls. The intervention was expected to have a greater impact on female students, given their propensity for eating problems (and their risk factors) to affect them more than males. Similar hypotheses were predicted for the teachers' scores on these same measures. In addition, teachers' perceptions of the school climate were expected to show improvements over time among those in the intervention group compared to those in the comparison group.

Method

Participants

Students

The initial study sample measured at baseline included 982 students in Grades 6 ($n = 526$) and 7 ($n = 456$) (M age = 11.27 years, $SD = .67$) drawn from four middle schools that were matched on geographic location, size, and cultural make-up. While the study was open to all students within each of the four schools, the overall response rate was 52% (slightly lower than reported by Austin et al., 2005), reflecting the number of parents who returned an active consent form for their child to complete the study questionnaires. Approximately 84% of the original study sample (85% Grade 6; 83% Grade 7) completed surveys immediately following the 8-month intervention, with 70% (71% Grade 6; 69% Grade 7) of the initial sample also completing surveys at the 6-month follow-up. As a result, 687 male ($n = 332$) and female ($n = 355$) participants ($n = 318$ intervention, $n = 369$ comparison) were included in the present analysis.

A majority of the participants were Canadian born (66%), reported English as their first language (61%), and were living with two parents (78%). Approximately 38% of students identified themselves as Caucasian, 26% were South Asian, 17% were East Asian, 13% were African Canadian, and the remaining 14% declared themselves as 'other'. Students were allowed to identify with as many cultural backgrounds as were applicable. Self-reports of the students' weights were collected, while heights were measured by the research staff. From the data collected, a mean Body Mass Index (BMI) score ($M = 18.41$, $SD = 3.87$) and percentile value ($M = 49.96$, $SD = 32.33$) were calculated for 86% of participants. Approximately 7.3% of those students who reported were above the 95th percentile for age and sex, while an additional 15.6% of students fell below the 10th percentile for age and sex (Centers for Disease Control and Prevention, 2000). As a measure of pubertal status, 49% of females reported that they had experienced their first menstrual period. No measure of male pubertal status was collected.

Teachers

At baseline, 91 male ($n = 26$) and female ($n = 65$) teachers participated in the study. Of the 91 teachers, 59 were drawn from one of the two intervention schools, while the remaining 32 were recruited from one of the comparison schools. The number of teachers who completed the surveys versus the total number eligible was 91 out of a possible 175, for an overall response rate of 52%. A subset of teachers ($n = 39$) completed surveys at post-intervention ($n = 28$ intervention, $n = 11$ comparison) and at the 6-month follow-up ($n = 28$) (all intervention). Self-reports of heights and weights revealed a mean BMI of 24.6 ($SD = 3.7$) for females and 26.5 ($SD = 3.5$) for males. In addition, 5.4% of

female and 12.5% of male teachers reported heights and weights that corresponded to a BMI which was greater than or equal to 30.

Procedure

Permission to conduct the comprehensive school-based intervention study was granted from the ethics committees at the sponsoring agency (University Health Network: Toronto General Hospital) and the local school board. All students in each of the four schools were eligible to participate. A letter explaining the study was sent home to parents requesting written parental consent. Only students with active parental consent (and who verbally assented) were allowed to complete the surveys. The research team visited each school on several occasions to administer the surveys to the study participants. Within each grade, groups of study participants were gathered in separate classrooms to complete the surveys. Attempts were made to minimize the disruption of instruction time by scheduling the survey sessions during the homeroom period. A subset of female intervention participants ($n = 93$ out of a possible 160 female intervention participants) also took part in the 12-week *Girl Talk* peer support group (optional) component of the *HS-HK* intervention and completed an additional survey. Teachers completed their surveys independently and left them in a box for the research team to collect. Due to the school-wide nature of the intervention, each of the four schools was randomly assigned by the flip of a coin to either the intervention or the comparison group. Neither the research team nor the participating schools were blind to the assignment. Participants of the comparison group completed the questionnaires at the same time intervals without receiving any intervention from the research team.

Healthy Schools-Healthy Kids Program

The 8-month intervention program, entitled *Healthy Schools-Healthy Kids,* was developed around a comprehensive approach, including multiple components at both the individual and socio-environmental levels (see Tables 1 and 2 for a description of the components). This involved (a) workshops offered by the research team to all of the teachers (and school personnel) and parents of the school, (b) teacher-led curriculum delivered to all of the students within the school (male and female) (interdisciplinary curriculum), (c) peer-support groups led by trained local public health nurses for a subgroup of female students who volunteered to participate in the 12-session (once a week) lunch-time program (offered separately for Grades 6 and 7, twice a year, within each of the intervention schools), (d) a one-session focus group, led by the research team, offered to all of the male students within each of the intervention schools (groups of 15–30 gathered in the school gym and they were further broken down into groups of 5–6) presenting them with information about the negative effects of bullying (including teasing), as well as providing them with assertive coping skills to cope with these pressures. Additional school-wide activities included a play performance (written by a high school Drama and English teacher and performed by local high school students) delivered to students within each grade level (emphasizing media and peer pressures to adopt body-change strategies), which were followed by debriefing discussion sessions; the delivery of daily public service announcements; video presentations (by the physical education teacher to all of the students in the school); and posters that promoted messages about healthy eating, active living, size acceptance, and general self-acceptance.

The following message content was weaved into the various components of the *HS-HK* program: the socio-cultural pressures on women to be thin (and males to be muscular) that is filtered through the media, the danger in valuing oneself primarily for one's appearance, the natural physical changes associated with puberty (increase in weight and body fat) and the genetic influences on body size, the changing definition of ideal size or shape throughout history and across cultures, the tendency to internalize negative feelings or stress and to use food or body change strategies to cope, the negative influence of peer pressure to diet or peer teasing, and general stress management and self-esteem enhancement skills.

In addition to in-service training offered to teachers and administrators at the start of the intervention, members of the research team visited the teachers throughout the school year, during their routine monthly staff meetings, to monitor their progress with the delivery of the study's curriculum. In addition to the monthly workshops offered to parents, information was delivered to them by writing an article in the monthly school newsletter about the various curriculum topics presented to students. Teachers and parents were encouraged to examine their personal attitudes and beliefs about food, weight and shape issues (including awareness-raising about weight discrimination), and to develop strategies that promoted positive body image in children.

The *Girl Talk* peer support program (optional component of the *HS-HK*) was facilitated by local public health nurses to ensure that the peer dynamics worked in favor of the prevention goals and to provide

Table 1
Healthy Schools-Healthy Kids (HS-HK) intervention components

Delivery	Participants	Description	Goal	Comments
School staff training	Teachers from all disciplines, principals and administrative staff, custodians, librarians	One 2-h didactic workshop facilitated by the first author during the beginning of the school year (at school, following school day).	Share with teachers and school staff the influence they have on student's body image and lifestyle patterns (through role modeling and within their teaching practices). Discuss how the normative stressors associated with early adolescence can trigger the onset of body image concerns and restrictive dieting (or other extreme weight loss methods). Review content of student curriculum and rationale for selected topics.	Limited time to communicate with teachers and school staff due to competing demands; mixed interest by school staff in participating in program; tendency to see training and curriculum delivery as role of health and physical education teachers only (despite emphasis on cross curriculum approach to delivery).
		Monthly follow-up feedback sessions with teachers from each grade level to ensure their understanding and ongoing delivery of the *HS-HK* classroom curriculum (facilitated by research staff during staff meetings).	Self-report survey administered to teachers at baseline, post-intervention, and 6-month follow-up, assessing their perception of the school climate, internalization of media stereotypes, body satisfaction, and disordered eating.	Low participation in surveys, especially by post-intervention and the 6-month follow-up.
Parent education (*Workshops, Newsletters/Handouts, School functions*)	Parents	Bimonthly midday and evening 2-h workshops facilitated by research team.	Increase parents' awareness of the normative stressors associated with early adolescence that can trigger the onset of body image concerns and restrictive dieting (or other extreme weight loss methods). Review with parents the topics delivered during the student curriculum and the Girl Talk peer support groups. Increase their awareness about the messages they send to youth (e.g., personal values, beliefs concerning, food, weight and shape issues).	Low parental involvement in the workshops (approximately eight parents per workshop); however, those who attended reported very positive feedback about their daughters' involvement in the Girl Talk peer support groups.
		Articles published in the school newsletter on topics relevant to the student *HS-HK* intervention (monthly newsletters delivered to parents by school).	No separate evaluation of this component.	All of the parents received newsletters and handouts. Culturally diverse sample raised issues of language preference in the delivery of the material to parents.
		Separate one-page handouts prepared by the research team and delivered to parents by the school or by the research team at school functions.		

In-class curriculum	Male and female students in Grades 6 and 7	Teacher delivery of daily in-class curriculum based on *Every BODY Is a Somebody* (Seaver et al., 1997) facilitator's guide which included six modules on the following topics: media l iteracy; ways to promote self-esteem and body image; individual variability in body size and shape and set-point; ways to promote a non-dieting approach to eating, active living; developing stress management techniques and relationship skills. Additional resources were shared with teachers from the Dairy Farmers of Ontario and the Ontario Physical and Health Education Association.	Increase awareness about the unrealistic and unhealthy messages within the media concerning ideal body shapes for men and women, dieting and other body change strategies. Improve students' resilience against unhealthy practices by teaching them media literacy and life skills (self-esteem enhancement, improved body image, improved size acceptance, improved problem solving skills to fight weightism, teasing and peer pressure to diet, improved relationships with peers).	Curriculum often only delivered in health or physical education classes whereby male and female students were separated; short (less than 15 min) activities preferred.
			Teachers were asked to record which activities from the study's curriculum they conducted with students.	All of the students from each of the two intervention schools participated in the intervention, as the components were weaved into the routine curriculum and school activities. Teachers were not compliant in recording which activities they conducted with students.
			Self-report surveys were administered to students at baseline, post-intervention and at the 6-month follow-up assessing body satisfaction, internalization of media stereotypes, size acceptance, weight-based teasing, weight loss and muscle gaining behaviours, and disordered eating (females only).	Attrition by post-intervention due to students and their families moving away.
Girl Talk-peer support group and training of local public health nurses.	Subset of female students; groups offered separately for students in Grades 6 and 7	Twelve weekly, 50-min sessions facilitated by public health nurses trained by the research team. Groups were delivered during the school's lunch period. Sessions were based on the manualized program entitled *Empowering Early Adolescent Girls* (Lecroy and Daley, 2001) and included: how to be a girl in today's society; making and keeping friends; dealing with anger; non-dieting approach to active living and healthy eating; and problem-solving strategies to combat stress.	Empower girls to be more assertive during a time when they are likely to rely more on the opinions of others and to be influenced by their peer group. Help modify/improve health promoting attitudes and behaviors within the peer culture.	Lunch period was less than optimal time to deliver group given the other extra-curricular activities which occur during this time, but issues of keeping the group accessible to everyone was a competing challenge.

Table 1 (*Continued*)

Delivery	Participants	Description	Goal	Comments
			Self-report evaluations were administered to the participants of the GT groups immediately before and after the 12-week program, measuring silencing of the self and satisfaction with the program.	Students reported very positive feedback about their participation in the group. Parents (who attended parent workshop) and principals also reported very positive feedback about the program. They especially appreciated the added support of having local nurses come into the school to deliver this service.
Play presentation	Male and female students in Grades 6 and 7, teachers, administrative staff, public health	50-min play presentations, entitled *Every BODY Is A Somebody—The Musical*, to large groups of students within each grade level with follow-up discussion on issues of weight and shape teasing, size acceptance, media and peer pressures.	Empower students to discuss how they feel about weight and shape teasing and how teasing makes others feel.	Depicting teasing can have a negative impact on the children by increasing teasing if students are not debriefed appropriately.
			Script developed by English and Drama teachers from a local high school, with direction from the research team. Performances delivered by outside high school students (Grades 9–13) offering opportunity for peer-modeling by older peers. No separate evaluation of this component.	
Focus groups for male students	Male students in Grades 6 and 7	One 50-min session with 15–30 students; further broken down into groups of 5–6; facilitated by the research team, which consisted of a video presentation on bullying, an activity designed to teach assertiveness to help problem solve weight based teasing. Opinions solicited about a boy's peer group model.	Empower male students to discuss how teasing makes them feel, increase size acceptance, and strategize around ways to deal with teasing.	Disclosure of bullying of older male students towards younger ones. Lots of interest by students in the development of a peer support group model for boys.
			No separate evaluation of this component.	
Posters/video presentations	Male and female students, teachers, parents	Posters were placed around the school throughout the academic year, depicting images of empowerment, healthy eating, fun and fitness, size acceptance.	Promote self-empowerment, health-promoting behaviours, positive role models (e.g., athletes of all sizes and shapes), and a more positive school environment.	Posters were especially effective in empowering the girls; videos were an effective way to promote class discussion and make teachers feel more comfortable with the topics.

		Videos selected by the research team were included with the handout material to teachers (e.g., *BodyTalk 2; Behind Closed Doors*) for them to present to students. These same videos were presented during the teacher and parent workshops.	No separate evaluation of this component.	
Public Service Announcement (PSAs)	Entire school	Announcements originally developed by the researcher team and later developed by the graduates of the *Girl Talk peer support groups* were read aloud over the schools public announcement system each morning.	Promote self-empowerment, health-promoting behaviours, and create a more positive school environment.	Student involvement in the delivery of the PSA's was dependent on the style of the school administration
			No separate evaluation of this component.	

girls with an adult mentor who could advocate on their behalf for school-wide changes. In addition to sensitizing the group facilitators to how their own beliefs, values, and attitudes concerning food, weight and shape issues can influence those of children and youth, they were trained on the content of a manualized program, entitled *Empowering Adolescent Girls* (Lecroy & Daley, 2001). Interactive activities and discussions were led on the following weekly topics: (a) being a girl in today's society (including the unrealistic body images portrayed by the media); (b) establishing a positive mindset and learning ways to improve self-esteem and body image; (c) puberty and the genetic influences on body shape; (d) problem solving strategies to combat stress; (e) expressing feelings and dealing with anger; (f) building communication skills; (g) making and keeping friends; and (h) building a positive school climate. These peer support groups were offered once per week, for 1 h, over 12 weeks, with 10–14 participants per group. Separate peer groups were offered for students in Grades 6, and 7, and were repeated in both the fall and winter months, allowing students the flexibility to fit the groups within their schedules. The facilitators and the research team met as a group intermittently throughout the implementation phase to exchange feedback and ask questions. This peer group model has been shown to be helpful in reducing disordered eating among females (McVey et al., 2003a; Piran, 1999b), but its effectiveness with male youth remains unexplored. In lieu of peer groups, a male-only session was offered to small groups of male students in the present study to solicit their opinions about participating in a future peer group program designed for males. This male-only session, led by the research team, provided students with a skill-building exercise to cope with weight-based teasing and bullying.

The *HS-HK* intervention took place throughout the duration of one academic school year (September–June), with the 6-month follow-up extending into the following school year. Upon completion of the study, comparison schools were given the opportunity to incorporate aspects of the prevention program into their school.

Measures

Students

Body-satisfaction. A six-item version of the Body Satisfaction Scale (Slade, Dewey, Newton, Brodie, & Kiemle, 1990, as used in Neumark-Sztainer, Sherwood, Coller, & Hannan, 2000) was used to assess body satisfaction, using a 5-point scale ranging from

Table 2
Topics covered within each arm of the Healthy Schools-Healthy Kids Intervention

	Teacher-led Classroom Curriculum (Male & Female)	Teacher/ administrator Training	Parent Education	Public Health Nurse Training	Nurse-led Peer Support Groups (Females)	Small Group discussion (Males)	School Play	Posters/Video Presentations	Public Service Announcements
Media Ideals	✓	✓	✓	✓	✓		✓	✓	✓
Peer Pressure	✓	✓	✓	✓	✓	✓	✓	✓	
Healthy Eating	✓	✓	✓	✓	✓			✓	✓
Active Living	✓	✓	✓	✓	✓			✓	✓
Problem-Solving (e.g., Assertive Communication)	✓	✓	✓	✓	✓	✓	✓	✓	
Relationship Issues	✓	✓	✓	✓	✓		✓	✓	
Weight-based teasing/harassment	✓	✓	✓	✓	✓	✓	✓	✓	
Size Acceptance	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adult role models		✓	✓	✓				✓	
Normative stressors that trigger body image concerns	✓	✓	✓	✓	✓	✓	✓	✓	

1(*completely unhappy*) to 5 (*completely happy*) of how happy they were with the following body parts/characteristics: height, weight, body shape, thighs, stomach, and face. Scores ranged from 5 to 30 with higher scores reflective of greater body satisfaction. The scale has demonstrated good reliability and convergent validity with other measures of body satisfaction (Slade et al., 1990). The alpha coefficient was equal to .88 in the present sample.

Internalization of media ideals. Internalization of sociocultural ideals was assessed using the internalization sub-scale of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995). Level of internalization was measured using an eight item, 5-point scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scores ranged from 8 to 40 with higher scores reflective of greater internalization of media ideals. The scale has demonstrated adequate reliability and validity among middle school children, as well as strong convergent validity among adult samples, with an alpha coefficient in the present sample equal to .89 (Heinberg et al., 1995; Smolak, Harris, Levine, & Shisslak, 2001a; Smolak, Levine, & Thompson, 2001b).

Body size acceptance. An adapted 4-item scale (Neumark-Sztainer et al., 2000) from the Sociocultural

Attitudes Towards Appearance Questionnaire (Heinberg et al., 1995) was used to assess students' acceptance of varying body shapes and sizes. Participants responded to items such as "I don't care if my friends are fat or thin" and "Girls don't have to be thin to be pretty" on a 4-point scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Scores ranged from 4 to 16, with larger scores representing a greater tendency to accept a wide variety of body shapes and sizes. The scale has reported somewhat weak reliability (alpha = .63) but acceptable concurrent validity, demonstrating positive correlations with measures of body satisfaction and lowered teasing of friends about weight and negative correlations with measures of disordered eating (Neumark-Sztainer et al., 2000). In the present sample, the scale demonstrated good convergent validity with the measure of body satisfaction and acceptable reliability with an alpha coefficient equal to .73.

Being teased about weight and shape. Adolescents' perceptions of appearance or weight-based teasing were measured using The Perception of Teasing Scale (POTS)—Revised for Adolescents Scale (Williams, 2000). This scale was adapted from The Perception of Teasing Scale which has demonstrated adequate convergent validity among young adult samples (POTS; Thompson, Cattarin, Fowler, & Fisher, 1995). It is a 15-item self-report questionnaire scored on a 5-point scale ranging from 1 (*never*) to 5 (*very often*). Scores ranged from 15 to 75, with higher scores reflective of a greater perception of others teasing an individual about their weight and shape. The Cronbach's alpha coefficient in the present student sample was .92.

Disordered eating (females only). The children's version of the Eating Attitudes Test (ChEAT) was used to measure the level of disturbed eating attitudes and behaviours among students (Maloney, McGuire, & Daniels, 1988; Maloney, McGuire, Daniels, & Specker, 1989). Like the Eating Attitude Test (EAT-26) for adults (used with teachers in the present study) (Garner, Olmsted, Bohr, & Garfinkel, 1982), the ChEAT is a 26-item, self-report questionnaire measured on a 6-point scale. The scoring used in the present study was as follows: 3 (*always*), 2 (*usually*), 1 (*often*), 0 (*sometimes*), 0 (*rarely*), and 0 (*never*). Possible scores ranged from 0 to 78, with lower scores reflective of less negative eating attitudes and behaviours. The ChEAT has established concurrent validity and reliability among middle school students with an alpha coefficient of .80 in the present sample (Smolak & Levine, 1994). Of note, this measure was given to female students only.

Weight loss and muscle-gaining behaviours. Using a yes/no response format, participants were asked to answer the questions "Are you currently doing anything to lose weight?" and "Are you currently doing anything to gain muscle?"

Girl Talk peer support groups (additional measures)

Loss of voice. The Silencing the Self Scale (STSS) for adolescents was administered to the participants of the *Girl Talk* peer support groups immediately before and after the 12-session program. The original 24-item version (Jack & Dill, 1992) of the measure was adapted by Sippola and Bukowski (1996) for use with an adolescent population, whereby the items were altered to reflect intimacy with friends rather than relationships. Examples from the scale include, "I tend to judge myself by how I think my friends see me" and "I think it's better to keep feelings to myself when they conflict with my friend's". The total STSS score was used in the present study as a measure of "loss of voice", a term first introduced by Gilligan (1982) to describe girls' investment in maintaining relatedness and relationships at the expense of recognizing or expressing their own opinions. This construct has been linked to eating problems in both adult and adolescent females (Steiner-Adair, 1986). The Cronbach's alpha coefficient for the present sample was equal to .83.

Program satisfaction. Information was solicited from the participants regarding their satisfaction with each of the 12-session peer group topics (12 closed-ended questions), as well as their overall satisfaction with the program (one open-ended question), using a self-report measure developed for the purpose of the present study. Participants indicated their level of satisfaction with each topic/session on a 5-point Likert scale (i.e., 1 = *Didn't like it at all* to 3 = *It was ok* and 5 = *It was great!).* In addition, one open-ended question was included on the questionnaire to solicit the participants' feedback about what they liked or disliked about the peer support group (e.g., favorite and least favorite sessions, likes and dislikes regarding the group leader, suggestions for additional discussions).

Teachers (and school administrators)

A subset of the measures mentioned previously was administered to the teachers including, body satisfaction, internalization of media stereotypes, and disordered eating (EAT-26 version). In addition, teachers were asked to answer yes or no to the questions "Are you currently doing anything to lose weight?" and "Are you currently doing anything to gain muscle?" The following measures were additional ones given to teachers only.

Disordered eating. The EAT-26 is a 26-item scale used to measure the level of disturbed eating attitudes

Table 3
Participant ratings of Girl Talk satisfaction by session

Girl Talk session	% Participants satisfied	% Participants unsatisfied
(1) Introduction	76.7	23.4
(2) Being a girl in today's society	74.2	25.8
(3) Establishing a positive mindset	55.6	44.4
(4) Expressing our feelings and dealing with anger	69.3	30.8
(5) Building communication skills 1	68.8	31.3
(6) Building communication skills 2	60.0	40.0
(7) Let's talk about puberty	38.9	61.0
(8) Dealing with stress	66.9	32.8
(9) Making and keeping friends 1	67.8	32.3
(10) Making and keeping friends 2	64.4	35.6
(11) School climate	60.4	39.7
(12) Review and closing	90.0	10.0

Note. $n = 93$.

and behaviours among adults (Garner et al., 1982). Each item is scored on a 6-point scale, 3 (*always*), 2 (*usually*), 1 (*often*), 0 (*sometimes*), 0 (*rarely*), and 0 (*never*), with higher scores indicative of less healthy eating attitudes and behaviours. The EAT-26 has demonstrated good concurrent and predictive validity in clinical and non-clinical adult samples with an alpha coefficient of .85 in the present sample of teachers (Garfinkel & O'Shaughnessy, 1985; Williams, Schaefer, Shisslak, Gronwaldt, & Comerci, 1986).

School climate. The 24-item Environmental Scan developed by van Roosmalen, Gusella, Beattie, and McVey (2006) was used to assess teachers' perception of their school climate, including aspects of their school's social, behavioural, and nutrition/physical activity environments. Items such as "Professional development opportunities for staff focused on improving school climate," "All teachers are encouraged to examine their own teaching practices to ensure that body image discrimination does not occur in their teaching methods," and "Health/physical education classes emphasize an inclusive body positive focus" were ranked on a 5-point scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Higher scores were reflective of a perception of a more positive school climate in that particular environmental area. The reliability of the total scale in the present sample was .89, with subscale reliabilities ranging from .77 to .81.

Results

Students

Preliminary analyses

To examine whether attrition-bias was present, comparisons were made between those students who dropped out of the study and those who had data at all three measured time points. Using Chi-square analyses, those who dropped out of the study did not differ from those with complete data on factors of gender, grade, specific school attended, condition (intervention versus comparison), or cultural background ($p > .05$). Using one-way analyses of variance (ANOVAs), however, comparisons between drop-outs and non-drop-outs on the dependent variables at baseline did reveal that those who dropped out of the study had significantly higher disordered eating (drop-out $M = 9.50$, $SD = 9.06$, non-drop-out $M = 7.37$, $SD = 6.98$, $p = .004$) and perceptions of weight-based teasing (drop-out $M = 18.19$, $SD = 9.12$, non-drop-out $M = 16.89$, $SD = 7.31$, $p = .02$), as well as significantly lower body satisfaction (drop-out $M = 21.17$, $SD = 6.37$, non-drop-out $M = 22.59$, $SD = 5.71$, $p = .001$), than those who completed the study surveys at all three time points.

Of the 687 students remaining in the present analyses, initial *t*-tests examining baseline dependent variable differences by gender yielded significant differences on measures of body satisfaction, $t(683) = 3.06$, $p = .002$ (boys $M = 23.28$, $SD = 5.31$, girls $M = 21.95$, $SD = 5.99$), and size acceptance, $t(684) = 6.21$, $p < .001$ (boys $M = 11.94$, $SD = 2.44$, girls $M = 13.07$, $SD = 2.35$), but not for internalization, $t(672) = 1.64$, $p = .10$ (boys $M = 19.01$, $SD = 7.22$, girls $M = 18.05$, $SD = 8.01$), or perceptions of weight-based teasing, $t(678) = 0.44$, $p = .66$ (boys $M = 17.02$, $SD = 8.20$, girls $M = 16.77$, $SD = 6.39$).

Finally, analyses of variance (ANOVAs) performed on the dependent variables (body satisfaction, internalization of media ideals, body size acceptance, weight-based teasing, and disordered eating) did not reveal any significant differences in scores based on specific school attended at baseline ($p > .05$). Despite

these results, specific school attended was used as a covariate in the student ANCOVA analyses as a means of nesting the design and accounting for randomization at the school, rather than at the individual level. Due to the small number of schools used within the study, a mixed model analysis was not deemed appropriate.

In the following analyses, an alpha level of .05 was used for all tests of significance. Table 3 presents the means and standard deviations for each of the dependent variables for male and female students by condition across all three time points.

Intervention effects

Repeated measures ANCOVA analyses were performed (controlling for specific school attended) on each of the student continuous outcome variables of body satisfaction, internalization of media ideals, body size acceptance, weight-based teasing, and disordered eating (female students only). In each analysis, condition (intervention vs. comparison) and gender (with the exception of the disordered eating variable only measured in females) served as two-level between-subjects factors, while time (baseline, re-test immediately following the 8-month intervention, and re-test 6 months following the intervention) served as the three-level within-subjects factor. In each ANCOVA, the (1) main effect of time; (2) the Condition × Time interaction; and the (3) Condition × Time × Gender interaction were tested for statistical significance. Where appropriate, Bonferroni pair wise comparisons were used to ascertain the source of significant interactions. Only significant results are reported.

There were no significant Condition × Time × Gender effects on any of the outcome variables. Results revealed a significant Condition × Time interaction for internalization of media ideals, $F(2, 596) = 3.30$, $p = .03$, and for disordered eating, $F(2, 276) = 2.73$, $p = .04$ only. There were no significant Condition × Time effects or main effects for measures of body satisfaction, body size acceptance, or perceptions of weight-based teasing.

Follow-up pair wise comparisons within each of the conditions across time revealed that the intervention condition's internalization of media ideal scores decreased significantly from baseline to post-intervention ($p = .05$), and again from post-intervention to the 6-month follow-up ($p < .001$; see Fig. 1). Similarly, the comparison condition's internalization of media ideal scores decreased from baseline to post-intervention ($p = .002$), however, these decreases were not maintained at the 6-month follow-up ($p = .04$). Between-condition pair wise comparisons across time revealed a trend towards significantly lower internalization scores in students from the intervention condition at the 6-month follow-up ($p = .09$). There were no significant differences between the two conditions at baseline

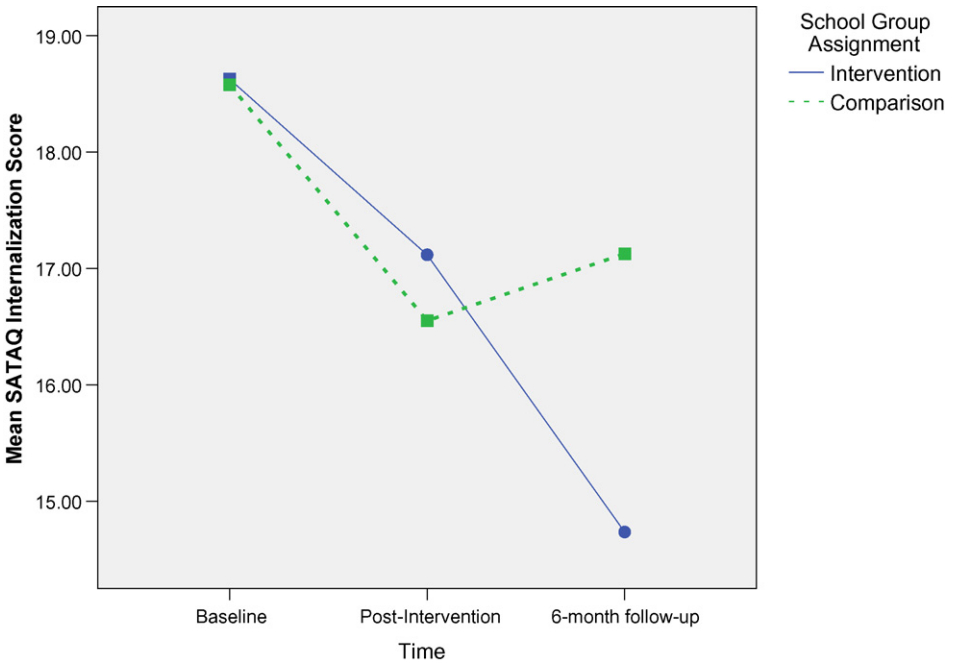

Fig. 1. Mean Internalization of Media Ideals scores at baseline, post-intervention, and the 6-month-follow-up for girls in the HS-HK intervention and control conditions.

Table 4
Means and standard deviations of the dependent variables for male and female students at baseline, post-intervention, and 6-month follow-up periods by condition (intervention or comparison)

Dependent measure	Intervention (n = 318)			Control (n = 369)		
	Baseline	Post-intervention	6-month follow-up	Baseline	Post-intervention	6-month follow-up
Body satisfaction						
Males	22.8 (5.9)	23.7 (5.5)	24.3 (5.2)	22.5 (5.9)	23.6 (5.4)	23.9 (5.6)
Females	22.0 (5.9)	22.3 (5.9)	21.9 (6.1)	21.5 (6.0)	21.9 (5.7)	22.1 (5.6)
Disordered eating						
Males						
Females	6.6 (6.9)	3.9 (8.0)	4.5 (7.5)	8.4 (8.4)	10.7 (8.0)	8.7 (7.6)
Internalization of media ideals						
Males	19.6 (7.2)	17.1 (7.5)	14.9 (7.1)	19.2 (7.3)	16.5 (7.0)	16.0 (6.9)
Females	17.7 (8.0)	17.1 (8.1)	14.6 (7.3)	18.0 (8.5)	16.6 (8.6)	18.2 (8.3)
Body size acceptance						
Males	11.8 (2.6)	12.4 (2.2)	12.1 (2.4)	12.0 (2.2)	12.2 (2.2)	11.9 (2.4)
Females	13.1 (2.2)	13.6 (2.1)	13.5 (2.1)	13.0(2.4)	13.3 (2.2)	13.4 (2.0)
Perceptions of weight-based teasing						
Males	17.1 (7.3)	17.6 (8.7)	16.7 (7.0)	17.9 (9.4)	17.6 (8.6)	17.5 (9.0)
Females	17.3 (7.6)	17.4 (7.7)	16.7 (6.5)	16.9 (7.1)	17.3 (7.8)	17.0 (7.4)

(p = .98) or at post-intervention (p = .69). Refer to Table 3 for means and standard deviations.

For disordered eating scores (measured in females only), follow-up comparisons within each of the conditions across time revealed that the intervention condition's scores decreased significantly from baseline to post-intervention (p = .04). In contrast, the comparison condition's scores increased significantly from baseline to the post-intervention (p = .008) follow-up. Between-condition comparisons across time also revealed significantly lower disordered eating scores among students from the intervention condition at the post-intervention (p = .01) period as compared to those in the comparison condition. There were no significant differences between the two conditions at baseline (p = .48) or the 6-month follow-up (p = .13).

To examine the impact of the intervention on students' weight loss and muscle-gaining behaviours, Chi-square analyses were conducted on the students' frequencies of "currently trying to lose weight" and "currently trying to gain muscle" at baseline, immediately following the intervention, and at the 6-month follow-up for both the intervention and comparison groups. While there were no significant differences between the two conditions at baseline (intervention 27.8%, controls 31.1%), χ^2 (1, N = 667) = 1.95, p = .16, results of the Chi-square analyses revealed that significantly fewer students in the intervention condition reported "currently trying to lose weight" at post-intervention (19.6%) compared to controls (26.8%), χ^2 (1, N = 611) = 4.29, p = .03. However, by the 6-month follow-up, significantly fewer students from the control condition were "currently trying to lose weight", yielding no significant difference between the two conditions by the 6-month follow-up (intervention 19.7%, controls 21.0%), χ^2 (1, N = 666) = 0.16, p = .69. In contrast, results of the Chi-square analyses indicated no group differences in students' reported endorsement of "currently trying to gain muscle" at baseline (intervention 33.6%, control 34.7%), χ^2 (1, N = 661) = .10, p = .75, post-intervention (intervention 30.7%, control 33.9%), χ^2 (1, N = 606) = 0.69, p = .41, or the 6-month follow-up (intervention 28.2%, control 26.3%), χ^2 (1, N = 665) = 1.03, p = .31.

High versus low risk

In order to examine whether the program had differential effects for intervention students at varying levels of risk, repeated measures ANCOVAs were conducted for each of the continuous outcome measures using BMI category (BMI percentile category of underweight, average weight, and overweight) as the between-subjects factor and time as the three-level within-subjects factor. Similar analyses were also conducted using endorsement of currently trying to lose weight (yes or no) and currently trying to gain muscle (yes or no) as two-level between-subjects risk categories. In each of these ANCOVAs, only the Time × Risk category interaction was tested for significance. Where appropriate, significant interactions were followed up with Bonferroni pairwise comparisons.

Among the intervention participants, analyses revealed no significant BMI Category × Time interactions for body satisfaction, internalization of media

ideals, body size acceptance, perceptions of weight-based teasing, or disordered eating. ANCOVA analyses did however indicate significant Risk Group × Time interactions for internalization of media ideals, $F(2, 256) = 5.82$, $p = .003$, and body satisfaction, $F(2, 261) = 3.11$, $p = .04$, when risk was defined by *currently trying to lose weight*. These analyses did not yield significant Risk × Time interactions for body size acceptance, perceptions of weight-based teasing, or disordered eating.

Follow-up pair wise comparisons within the risk group condition across time revealed that intervention participants in the high-risk group (i.e., who endorsed currently trying to lose weight) had significantly lowered internalization of media ideals scores between baseline and post-intervention ($p < .001$), and between post-intervention and the 6-month follow-up ($p = .02$). In comparison, internalization of media ideal scores for intervention participants in the low risk group (i.e., who did not endorse currently trying to lose weight) decreased significantly from baseline to the 6-month follow-up ($p = .002$), but did not change significantly between baseline and post-intervention ($p = .21$).

For body satisfaction scores, follow-up pair wise comparisons across time within the risk conditions revealed that intervention participants in the high-risk group had significantly increased body satisfaction scores at post-intervention ($p = .04$), which were maintained at the 6-month follow-up ($p = .002$). In contrast, body image scores of intervention participants in the low risk group did not change significantly across time ($p > .05$).

Additionally, as with the general results, there was a significant Risk Group × Time interaction for the internalization of media ideals, $F(2, 256) = 3.85$, $p = .02$, and disordered eating, $F(2, 125) = 5.85$, $p = .004$, when risk was defined by *currently trying to gain muscle*. These analyses revealed no significant Risk Group × Time interactions for measures of body satisfaction, body size acceptance, or perceptions of weight-based teasing.

Follow-up pair wise comparisons within each of the risk conditions across time revealed that intervention participants in the high-risk group (i.e., who endorsed currently trying to gain muscle) had significantly lowered internalization of media ideals scores at post-intervention ($p < .001$), which were maintained at the 6-month follow-up ($p < .001$). In comparison, internalization of media ideal scores for intervention participants in the low risk group decreased significantly from baseline to the 6-month follow-up ($p = .004$), but did not change significantly between baseline and post-intervention ($p = .452$).

Similarly, follow-up pair wise comparisons within each of the risk conditions across time indicated that intervention participants who endorsed currently trying to gain muscle had significantly lowered disordered eating scores at post-intervention ($p = .003$), which were maintained at the 6-month follow-up ($p = .01$). In contrast, disordered eating scores of intervention participants who did not endorse trying to gain muscle did not change significantly across time ($p > .05$).

Finally, when risk was defined by currently trying to lose weight or currently trying to gain muscle, there were significant main effects of time for body size acceptance, $F(2, 263) = 4.18$, $p = .02$, and $F(2, 263) = 6.27$, $p = .002$, respectively whereby all intervention participants' size acceptance scores increased across time regardless of whether or not they endorsed currently trying to lose weight or currently trying to gain muscle.

Girl Talk participants/program satisfaction

To account for potential baseline differences, one-way ANOVAs were performed on each of the outcome variables to examine whether the scores of the girls who participated in *Girl Talk* differed from those of girls who participated in the intervention only (without *Girl Talk*) or from those who participated in the comparison group. Results demonstrated that the baseline scores of the subgroup of females who took part in the Girl Talk group ($n = 93$, representing 58% of the female intervention participants) did not differ significantly from the other girls participating in the study on any of the outcome measures.

Next, a paired samples *t*-test was performed on the Silencing of the Self Scale to compare the mean score before and immediately following the completion of the 12-week *Girl Talk* peer support program, among the *Girl Talk* participants only. The paired samples *t*-test revealed a significant decrease in the Silencing of the Self scores between the beginning ($M = 68.56$, $SD = 12.48$) and the end of the 12-week *Girl Talk* peer support group ($M = 62.10$, $SD = 14.86$), $t(62) = 4.13$, $p < .001$, signifying a greater level of assertive attitudes and behaviours. Participants of the *Girl Talk* group reported that they liked the group activities, making friends, learning how to deal with stress and pressures, and the relationships they built with the group facilitators. Table 4 reports the participant satisfaction of each of the *Girl Talk* sessions. Their favorite topics were *being a girl in today's society* (74.2%), *expressing feelings and dealing with anger* (69.3%), *building communication skills* (68.8%), *making and keeping friends* (67.8%), and *dealing with stress* (66.9%).

Relationships with boys and getting parents to listen were nominated as topics to add to future sessions. The participants' responses to the one open-ended question were categorized into general themes to capture an overall sense of what they appreciated about the experience. These themes included (a) learning new skills (e.g., skills to critically analyze the media and to cope with teasing and with general relationship issues), (b) improving confidence (e.g., confidence with body image and general sense of self-worth), (c) having access to a supportive environment to share opinions, and (d) feeling a sense of connectedness and belonging to a group (e.g., learning that others had similar concerns).

Teachers

Preliminary analysis

To examine whether attrition-bias was present, comparisons were made between those teachers who dropped out of the study and those who had data at baseline and the post-intervention follow-up. Using Chi-square analyses, those who dropped out of the study did not differ from those with complete data on factors of gender, grade, specific school, or condition (intervention versus comparison) ($p > .05$). Similarly, using one-way analyses of variance (ANOVAs), comparisons between drop-outs and non-drop-outs on the dependent variables at baseline were not significant for measures of internalization of media ideals (drop-out $M = 20.60$, $SD = 7.40$, non-drop-out $M = 17.89$, $SD = 6.96$), body satisfaction (drop-out $M = 21.40$, $SD = 4.81$, non-drop-out $M = 19.77$, $SD = 4.19$), disordered eating (drop-out $M = 4.98$, $SD = 5.20$, non-drop-out $M = 4.12$, $SD = 4.26$), and school climate: social (drop-out $M = 31.15$, $SD = 5.66$, non-drop-out $M = 30.31$, $SD = 5.75$), behavioral (drop-out $M = 31.58$, $SD = 3.45$, non-drop-out $M = 31.06$, $SD = 3.70$), and nutrition/physical activity environments (drop-out $M = 26.65$, $SD = 4.84$, non-drop-out $M = 26.42$, $SD = 6.34$).

Intervention effects

Similar to those analyses used with students, repeated measures ANCOVA analyses were performed (controlling for specific school attended) on each of the following continuous outcome variables: body satisfaction, internalization of media ideals, and disordered eating. In addition, multivariate analysis of covariance (MANCOVA) was used to examine any intervention effects on the three subscales of the school climate measure (social environment, behavioural environment, or nutritional/physical environment). In each analysis, condition (intervention versus comparison) served as the two-level between-subjects factor, while time (baseline and re-test immediately following the 8-month intervention) served as the two-level within-subjects factor. The low ratio of male: female teachers did not permit the study of gender differences. Also, analyses were performed using only the baseline and post-intervention time periods, since only those teachers from the intervention condition participated in the 6-month follow-up. In each ANCOVA and MANCOVA, the (1) main effect of time; and (2) the Condition $\times$ Time interaction were tested for significance.

Repeated measures ANCOVAs revealed no significant Time $\times$ Condition interaction effects for the outcome measures of body satisfaction, $F(1, 23) = .07$, $p = .80$, internalization of media ideals, $F(1, 33) = .08$, $p = .79$, or disordered eating, $F(1, 30) = .04$, $p = .84$. Similarly, the MANOVA analyses revealed no significant interaction effects for the school climate measure (social environment, behavioural environment, or nutritional/physical environment), $F(3, 31) = 2.32$, $p = .10$. Similarly, there were no significant main effects of time, $p > .05$, for any of the measures.

To examine the impact of the intervention on teachers' weight loss and muscle-gaining behaviours, Chi-square analyses were conducted on the teachers' frequencies of "currently trying to lose weight" and "currently trying to gain muscle" at baseline and immediately following the intervention for both the intervention and comparison groups. These analyses revealed no significant differences between the conditions at baseline (intervention 50.0%, control 44.8%), χ^2 (1, $N = 85$) = .21, $p = .65$, or post-intervention (intervention 34.6%, control 45.5%), χ^2 (1, $N = 37$) = .39, $p = .53$, on endorsement of "currently trying to lose weight." Similarly, there were no differences between groups in their endorsement of "currently trying to gain muscle" at baseline (intervention 41.8%, control 42.9%), χ^2 (1, $N = 83$) = .08, $p = .93$, or post-intervention (intervention 46.4%, control 45.5%), χ^2 (1, $N = 39$) = .03, $p = .96$.

Discussion

In the present study, the effectiveness of a universal-selective program, using an ecological approach, was assessed with students in Grades 6 and 7 attending middle school. The *HS-HK* intervention evolved from previous prevention work conducted with middle school students (McVey et al., 2003a, 2003b, 2004). However,

in the present study, the existing classroom curriculum (McVey et al., 2004) and peer support group model (McVey et al., 2003a) previously implemented with females only was enhanced in several ways. First, male students were included in both the intervention and in the evaluation of the study. Teachers and parents were offered workshops and intervention material to review. Teachers were asked to conduct classroom activities with their students based on intervention material developed by the researchers. Additional school-wide strategies were implemented including a play performance, wall posters, public service announcements and video presentations. It was hypothesized that participation in the *HS-HK* program would lead to improvements in body satisfaction and size acceptance, and reductions in the internalization of media ideals, weight-based teasing, disordered eating, as well as weight-loss and muscle-gaining behaviors. The aim of the study was to sensitize teachers about ways to recognize and prevent acts of body discrimination or teasing, teach children strategies to help them resist media and peer pressures to conform to the thin ideal and to adopt stress management skills to improve communication, assertion and decision-making, as well as interactive activities to promote self-esteem, body satisfaction, and size acceptance. The study lasted 2 years and the evaluation examined gender differences among the student participants. The influence of the intervention on teachers was also examined. Parents were included in the intervention by way of receiving workshops and newsletter articles on the various intervention topics covered with students. They were not, however, included in the evaluation of the intervention.

With respect to the student measures, the findings revealed an absence of statistically significant Gender × Condition × Time effects on any of the outcome measures, suggesting that the intervention did not influence males and females differently. The *HS-HK* intervention did however, appear to have some influence on body satisfaction, at least among the group of intervention students who were in the high-risk category (defined as currently trying to lose weight). This finding is encouraging given the evidence that body dissatisfaction in young adolescents can lead to poor self-esteem and future health problems when they are older (Neumark-Sztainer et al., 2006b; Stice & Bearman, 2001). Of note, body satisfaction scores among intervention students in the low-risk category remained fairly stable throughout the intervention period and the 6-month follow up.

The success of the *HS-HK* intervention in reducing student scores on the internalization of media ideals supports the findings of O'Dea and Abraham (2000) who conducted their universal intervention with middle school students also. Internalization of media ideals decreased among both male and female students in their study as well. Neumark-Sztainer et al.'s (2000) 6-session universal prevention program led to similar reductions among female students in Grades 5 and 6. When the *HS-HK* study sample was divided into low- versus high-risk groups, there appeared to be a stronger intervention effect for those in the high-risk category in terms of reducing the internalization of media ideals (whether risk was defined by currently trying to lose weight or currently trying to gain muscle). As mentioned previously, the transmission of the thin ideal through the media can have a negative impact on children's body satisfaction (Dohnt & Tiggemann, 2006). Reducing the internalization of media ideals through universal prevention work has the potential to increase resilience against body dissatisfaction. Longitudinal research is required to follow students throughout adolescence and young adulthood to see if those who experienced a reduction in the thin-ideal internalization following their participation in a middle school primary prevention program are less likely than their peers to develop body dissatisfaction or clinically significant eating pathology down the road. Participants of the *Girl Talk* peer support groups showed significant reductions in silencing behaviours (reflecting greater assertiveness) by the end of the 12-week component. Previous controlled evaluations of this peer group model have shown it to be successful in decreasing disordered eating (McVey et al., 2003a). Of note, the enthusiasm of the *Girl Talk* graduates to develop and deliver their own public service announcements following the *HS-HK* study might have mediated the influence of the intervention on student's internalization of media ideals. With the help of the facilitators, the graduates of the *Girl Talk* program were empowered to share their media literacy activities with their peers by displaying their work on the walls of the school. They also selected to deliver (and develop some of their own) *HS-HK* public service announcements (e.g., ''Be active your way, every day'') to the rest of the school. Future studies may select the *Girl Talk* component as a *first* step in the implementation process of a comprehensive intervention (to engage students and staff from a particular school). Following this initial phase, participating students could be given the opportunity to be involved in the delivery of the remaining school-wide components (e.g., have them create their own play with issues specific to their school). Similarly, teachers and school support staff could themselves identify specific

ways in which their school might adopt new strategies to make their environment healthier for students (e.g., the development of breakfast clubs or after-school activities).

Focus group testing with the male participants from the present study revealed that there was genuine interest in having a male version of the *Girl Talk* peer support groups offered. Future research could involve the development and evaluation of peer support groups for males that are similar to *Girl Talk*, but within a format young boys would enjoy. This might require additional research on risk and protective factors associated with disordered eating among male youth to delineate program components that are tailored to their specific needs.

The *HS-HK* was associated with decreases over time in the number of male and female participants who were currently trying to lose weight (immediately following the intervention but not by the 6-month follow up) and in reducing the disordered eating scores among the female students (both in the general sample of females, and more so among the females in the higher risk category who endorsed currently trying to gain muscle). This is somewhat promising given that restrictive dieting/weight loss attempts among children can trigger weight gain (Field, Austin, & Taylor, 2003), interrupt normal physical growth (Lock, Reisel, & Steiner, 2001) or set the stage for more disturbed levels of eating (Hsu, 1997). Few controlled studies of primary prevention programs conducted with this age group have shown direct intervention effects on dieting/weight loss behaviour. Exceptions include the study by O'Dea and Abraham (2000) which focused on enhancing self-esteem in 11–14-year-old through stress management and media literacy techniques. The week-long program led to reductions in dieting behaviour at the 12-month follow up among the female participants. However, a replication of O'Dea and Abraham's intervention by Ghaderi, Martensson, and Schwan (2005) with fifth grade school children revealed no significant improvements in eating attitudes, self-esteem or body image. Moreno and Thelen (1993) found that their teacher-led curriculum led to reductions in dieting behaviour among female youth (ages 13–14 years). Similarly, Stewart, Carter, Drinkwater, Hainsworth, and Fairburn (2001) found that their intervention conducted with 13–14-year-old females led to significant reductions in dieting behavior both immediately, and 6 months after, the completion of the 6-session program. Finally, McVey et al. (2004) found that their 6-session psychoeducation and 12-week nurse-led peer support group program (McVey et al., 2003a) conducted with middle school females led to reductions in disordered eating scores (in the short term). However, a replication of the nurse-led peer support group program did not show any intervention effects on disordered eating (McVey et al., 2003b).

How did the present study fair compared to other school ecological interventions with similarly aged children? Varnado-Sullivan et al. (2001) did not report any intervention effects on dieting, but instead found that their universal program was successful in reducing fear of fatness among females. Of note, their multi-component program was shorter in duration than the *HS-HK* program (e.g., lasting 3–5 sessions). The study by Austin et al. (2005) lasted 8 months, similar to the length of the *HS-HK*, and was also found to have a positive effect on disordered eating symptoms among females (male students were not included in the evaluation), underscoring the value of longer-lasting and more intensive universal prevention programs.

Male involvement in universal prevention work seems warranted. The findings of the present study add to a growing body of research showing the success of universal prevention programs in positively influencing boys' knowledge, attitudes or intended behaviour (see Neumark-Sztainer et al., 2006a for a review) and of universal-selective prevention programs successfully altering disordered eating among high school male athletes (Goldberg & Elliott, 2000).

The absence of *HS-HK* intervention effects on weight-based teasing or size acceptance in the present study was surprising. A more recent intervention showed success in reducing teasing, however, this study was conducted with a slightly younger age group (Grades 4, 5, and 6) (Haines et al., 2006). Although a play performance was also used in their study to help demonstrate the negative influence of teasing, perhaps it was the involvement of the students from the intervention school in the production of the play (based on their own experiences of teasing) that made a difference. In the *HS-HK* program, high school students were invited to visit the intervention schools to perform the play (followed by group discussions about teasing experiences). Still, the topic of teasing was covered in additional components of the *HS-HK* program, including male-only sessions led by the researchers, the in-class curriculum, the peer support groups for females, the sensitivity training offered to teachers and school administrators, the handouts to parents, and the PSAs. It is possible that prevention strategies designed to reduce these particular attitudes and behaviours are most effective when they reach children at a younger age.

Given the competing demands on their time, asking teachers to deliver the in-class curriculum to students may have influenced the absence of intervention effects on some of the targeted attitudes and behaviours in the present study. Teachers from multiple disciplines were involved in the delivery of the in-class curriculum, a strategy used elsewhere (Gortmaker et al., 1999). The curriculum provided to teachers (for them to implement at their own pace throughout the entire school year) was purposely matched to a variety of topics so that the material could be integrated into Math, Science, English, Health and Physical Education. Despite training (and ongoing monthly meetings) with all of the teachers in the school, the Health and Physical Education teachers were perceived by the staff as being the most suitable to deliver the in-class material, however, they only represented 20% of the teachers in the schools. Members of the research team met with all of the teachers throughout the school year during regularly scheduled teacher meetings (Grades 6 and 7, separately) to encourage them to continue with the curriculum and to answer any question they might have had. Although a written check-list of activities implemented with students was made available to all teachers, few complied.

With respect to the measures completed by teachers, the *HS-HK* intervention appeared to have no influence on the teachers' attitudes or behaviours, or their perception of their school environments. School climate was assessed based on teachers' own perceptions of the school environment. Objective measures are required before conclusions can be drawn about the influence of the intervention on school climate. With respect to their behaviors, a trend was found whereby a smaller percentage of intervention teachers admitted to weight loss attempts after the completion of the intervention. However, those findings should be interpreted with caution, given the low sample size of teachers within the present study. This finding suggests that future efforts should focus on training and engaging teachers in this type of prevention work. The study of an online training program for teachers in Grades 4, 5 and 6 is currently underway to determine its influence on teachers' attitudes as well as their uptake of classroom and school-wide strategies (including how to build a school environment that helps to prevent disordered eating) (McVey, Gusella, Tweed, & Ferrari, 2007).

Scores on the outcome measures appeared to increase over time among participants in the control group. Perhaps the presence of the researchers in the schools (to administer the survey) had a spill-over effect in terms of raising awareness about body image issues. It should be noted that while control schools did not receive any direct components of the *HS-HK* intervention during the study period, those schools did have access to the regional school board's website which posted facts and news releases on topics of bullying, body image, and self-esteem. It is possible that access to this information diluted any intervention effects. Similar spill-over effects have been reported elsewhere (McVey & Davis, 2002; Smolak & Levine, 2001). On a positive note, this finding suggests that students in the control group as well as those in the low-risk intervention group were not negatively influenced by their participation in the intervention. For example, the significant main effect found among the intervention participants for the variable of size acceptance indicated that participants from the high-risk and low-risk groups (currently trying to lose weight or currently trying to gain muscle) showed increases over time in scores on body size acceptance. Finally, there were no differentiating effects on students according to their BMI, suggesting that students of varying weight categories responded similarly to the *HS-HK* intervention.

There were several limitations associated with the present study. The research team was given limited time to conduct training with the teachers, a barrier reported elsewhere (Smolak et al., 2001a, 2001b; Varnado-Sullivan et al., 2001). This limited training may have accounted for the teacher's lack of engagement in the study, which in turn might have influenced the true effectiveness of the intervention. Posters and video presentations used in the present study served as effective strategies to promote widespread messages about healthy lifestyles and the negative influence of teasing. These methods of dissemination were preferred by the teachers, a finding previously reported (Smolak et al., 2001a, 2001b). In fact, the teachers reported a preference for the videos (and other prepared materials) over the in-service training or the teacher-delivery of the curriculum (despite the lesson plans being matched to the ministry's student learning objectives). It is possible that more time spent with teachers (and focusing on their engagement in the prevention process) could have improved the overall effectiveness of the *HS-HK* on the students' as well as their own attitudes or behaviors.

An additional study barrier was the low parental involvement at the study information sessions. Anticipating this, health promotion materials were shared with parents via monthly school newsletters. Still, given the culturally diverse group of students and families in the present study, future work is required to determine language and dissemination preferences in the delivery of materials to students' homes (Ferrari, Tweed,

Rummens, & McVey, 2006). Working with parents to help children and youth achieve a positive body image has been underscored (Neumark-Sztainer, 2005). Finding effective ways to engage them in the prevention process remains a challenge for researchers. Finally, the present study was also limited by its design, given that randomization occurred at the school level. The school-wide nature of the intervention prevented individual random assignment, since all of the students and staff within a particular school setting would be influenced by its components. Still, larger scale studies are required that compare multiple schools who receive the prevention program with those that do not receive it, with longer follow up periods to determine if prevention efforts have a sustainable influence.

Despite these barriers and limitations, participation in the *HS-HK* intervention successfully modified some of the known risk factors associated with disordered eating given that it *prevented* an expected increase in the investment in the sociocultural ideal of thinness, and an increase in body dissatisfaction (among the high-risk intervention group) and in weight loss behaviours among males and females going through the period of early adolescence. Moreover, the *HS-HK* intervention brought no harm to students, as demonstrated by the participants' improvement in scores over time. The students in the present study (and their families) came from diverse ethno-cultural backgrounds, increasing the generalizability of the study's findings. The *HS-HK* intervention might be perceived as resource heavy particularly for teachers who have competing demands on their time. Ongoing efforts are being made, however, to gain the attention of Ministries (of Health and Education) to incorporate these universal prevention strategies into the school curriculum and to allow teachers more time to take part in sensitivity training so that they can become better role models and learn which school characteristics might protect against the development of disordered eating (McVey et al., 2005). Although this type of training might require a significant time commitment up front, the tools learned from adopting a Health Promoting School Framework might go a long way in helping to prevent not only disordered eating but other risky behaviours affecting children and youth today.

Acknowledgments

This study was supported by a Women's Health Council grant of Ontario (Grant # 000–45) to Gail L. McVey. The Council is fully funded by the Ontario Ministry of Health and Long Term Care. This research does not necessarily reflect endorsement by the Ministry of Health and Long Term Care. Gail L. McVey currently holds a mid-career award from the Canadian Institutes of Health Research—Institute of Gender and Health and the Ontario Women's Health Council. The authors thank the adolescents and their families who participated in the study, and the following individuals who assisted with the implementation of the study: Mary Turfryer, Melissa Lieberman, Angus Warner, Margus Heinmaa, Fiona Schulte, Brian Rybak, Alexandra Ashton, Maria Morais, Lora Stratton, Holly Develter, Elizabeth (Liz) Nolte, Amy Yee, and Rosanne Guy.

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