Exploratory Study: A Blind Integrated School-Based Prevention Program on Eating Disorders and Obesity

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ABSTRACT

Disturbances in physical self-perceptions (PSP) can lead to inappropriate attitudes and eating behaviours (IAEB) including eating disorders (ED) and obesity. This exploratory study assesses the effects of a blind integrated prevention program—the SILENCE Program—with high school students. No significant effect of the SILENCE Program on the IAEB of the 61 adolescents was observed between pre- and post-test, but a positive evolution of specific PSP components (global self-esteem, perceived physical appearance, etc.) during 14 consecutive weeks was demonstrated compared to an ED-only program and the control condition. Promising avenues for integrated prevention programs (like SILENCE Program) are discussed.

Keywords: physical self-perceptions, integrated health, school-based controlled trial, Ecological Momentary-Assessment

RÉSUMÉ

Des perturbations des perceptions du soi physique (PSP) peuvent mener à des attitudes et comportements alimentaires inappropriés (ACAI) incluant les troubles du comportement alimentaire et l'obésité. Cette étude exploratoire évalue les effets d'un programme de prévention voilé (c.-à-d. que les élèves ignorent l'objectif primaire du programme) et intégré—le programme SILENCE—auprès d'élèves

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This research was supported in part by RBC Royal Bank, whose patronage helped finance the completion of this study.

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du secondaire. Les résultats montrent aucun effet significatif du programme sur les ACAI des 61 adolescents lors du test-retest bien qu'une évolution positive des composantes spécifiques des PSP (estime de soi globale, apparence physique perçue, etc.) durant 14 semaines consécutives est noté en comparaison au programme des ACAI et à la condition contrôle. Des pistes prometteuses sur les programmes de préventions intégrés (comme le SILENCE Program) sont discutées.

Mots-clés : Perception du soi physique; santé intégrée; étude contrôlée en milieu scolaire; évaluation écologique instantanée

The prevention of inappropriate attitudes and eating behaviours (IAEB) in adolescents, particularly, is essential (Ojevero et al., 2020). Indeed, the Covid-19 context recently catalyzed this phenomenon (Touyz et al., 2020). This implies the need to integrate eating disorder (ED) and obesity prevention programs in order to avoid conflicting messages from obesity-only and ED-only prevention programs (Leme et al., 2019). To focus on physical self-perceptions (PSP) would be key to integrating ED and obesity prevention programs. This is the challenge of the SILENCE Program, a blind integrated prevention program of IAEB in adolescents. According to fourth generation ED primary prevention programs (Noordenbos, 2016), the SILENCE Program is grounded in evidence-based principles of using interactive processes with respect to PSP and employs multiple sessions over 14 consecutive weeks (Stice & Shaw, 2004). This exploratory study assesses the effects of the SILENCE Program in 61 high school students.

THEORETICAL CONTEXT

Obesity affects 31.4% of adolescents in Canada (Rao et al., 2016) and continues into adulthood in almost 60% of cases (Ward et al., 2017). Well-known biopsychological complications of this metabolic disease include type 2 diabetes (Kinlen et al., 2018), low self-esteem (Sagar & Gupta, 2018), and intimidation and stigmatization (Thompson et al., 2020). Furthermore, eating disorders are the third most common chronic disease associated with obesity among adolescents. Among children and adolescents who are overweight or obese, 26% have a binge eating disorder.

Eating disorders are mental disorders mainly caused by body image disturbances (Fairburn & Harrison, 2003). The most common chronic illnesses in adolescents (Garner, 2004), eating disorders are also the deadliest mental disorders (Fichter et al., 2008). For anorexia nervosa and bulimia nervosa, mortality rates can be as high as 21%, with an average rate of 7% (Huas et al., 2013). Complications and concomitant conditions include hypotension (Westmoreland et al., 2016); anxiety disorders (Jordan et al., 2008); stigmatization (McLean et al., 2014); and, in the case of binge eating disorders, several metabolic risk factors. Finally, when associated with obesity, eating disorders as a somatoform problem constitute two sides of the same coin—physical and mental—among adolescents. With a holistic view of the individual, the dimensional approach associated with IAEB offers an alternative to categorical medical approaches (Alvarenga et al., 2010; Bonanséa et al., 2016; Turgeon et al., 2015).

Inappropriate attitudes and eating behaviours fall along a continuum of severity from appropriate eating behaviours (associated with biopsychosocial features of well-being) to eating disorders (ED) outlined in the

Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; Johnson, 1994; Leung et al., 1996; Sundgot-Borgen & Torstveit, 2010). Beyond eating disorders in the DSM-5, IAEB include all "inappropriate eating attitudes," such as thinking obsessively about calories and the body, dieting frequently, consuming energy drinks, and using excessive exercise to lose weight (Alvarenga et al., 2010; Ozier & Henry, 2011). A recent study (Bonanséa et al., 2016) suggests dividing IAEB into two sub-types: restrictive behaviours (i.e., dieting, fasting, excessive physical exercise, or the use of energy drinks or appetite suppressants) and binge eating and purging (i.e., the use of laxatives, enemas or induced vomiting). In IAEB perspectives, the epidemiologic rate is not limited to 1-3% of Canadian people, as 50.2% of adolescent girls and 38.1% of adolescent boys try to control their weight through unhealthy behaviours, and 7.5% of adolescents and young adults use induced vomiting to do so (Morris & Katzman, 2003; Neumark-Sztainer et al., 2012; Woodhall et al., 2015). IAEB are adequate to capture changes in eating behaviours during the critical period of adolescence, when genetic effects may increase (Fairweather-Schmidt & Wade, 2015), and are suitable in an educational context where diagnosis of psychopathology is not the primary mission of Canadian schools such as the Programme de formation de l'école québécoise (PFEQ). Unfortunately, even considering the significant benefits of IAEB perspectives (Neumark-Sztainer, 2005), most prevention programs, particularly obesity prevention interventions, are based on the categorical and medical approach of splitting metabolic (obesity) and mental (ED) concerns (Gumz et al., 2017; Warshburger & Zitzmann, 2018) However, this approach can have many consequences.

Obesity-only programs, which focus on reducing body weight through healthy habits and physical activity (a) promote restrictive, inappropriate diets; (b) focus on forbidden foods (e.g., energy-dense, nutrient-poor foods); (c) stigmatize overweight people; and (d) encourage sport to compensate for caloric intake. All of these behaviours may contribute to the development of EDs (Leme et al., 2019). In contrast, ED-only programs focus on protective factors of well-being; encourage self-acceptance of body size, regardless of weight; and do not encourage changes in behaviour (Irving & Neumark-Sztainer, 2002). Other experts agree that separating these conditions could be confusing for adolescents who receive conflicting messages from obesity-only and ED-only programs (Leme et al., 2019). Thus, focusing on consistent messaging would be key to integrating ED and obesity prevention programs, which could lead to improvement in physical health and self-esteem. Indeed, physical self-perceptions are targeted in both strategies; however, the information is frequently inconsistent across programs (Leme et al., 2019).

Physical self-perceptions (PSP) are defined as the perception and appreciation of oneself over time (Kernis, 2005; Lavin & Cash, 2001). This construct integrates global self-esteem and body image according to a multidimensional, hierarchical model with global self-esteem at the apex; physical self-worth at the next level; and physical strength, sport competence, physical condition, perceived physical appearance, and body image at the base (Kernis et al., 1993). Based on the bidirectionality of the relationships between PSP's dimensions theorized by Fox and Corbin (1989), research demonstrates that a positive or negative change in global self-esteem or a sub-dimension of physical self-perceptions (e.g., due to a remark on physical appearance) almost instantaneously affects the proximal and distal physical self-concept structure in an adolescent with or without EDs (Marsh et al., 2006). Theoretical consensus reveals that physical self-perceptions constitute both personality traits and psychological states which depend on past and current disturbances within a dynamic approach (Cash et al., 2002; Fox & Corbin, 1989). More precisely, the PSP

global component remains relatively stable over time, while experiences vary over time and across situational contexts (Melnyk et al., 2004). Studies on PSP mainly use the ecological momentary assessment method (EMA; Shiffman et al., 2008), which strategically utilizes ecological, instantaneous reporting of data over time (Colautti et al., 2011). Positive evolution of PSP constitutes a real challenge due to both the physical and psychological upheaval characterizing adolescence and the widespread societal messaging in Western cultures, which favours thin, muscular bodies (Rodgers et al., 2017). In this developmental period and social context, PSP disturbances (mainly low physical self-esteem, body distortion, and body dissatisfaction related to weight and body shape) are well-established risk factors for the development of weight-related problems and are a main risk factor for EDs (Ovejero et al., 2020). In Québec in 2010–2011, approximately half of adolescents (48.8% of girls and 48.5% of boys) were dissatisfied with their physical appearance. In addition, almost one in four girls (23.6%) and more than one in ten boys (14.1%) reported a low level of global self-esteem (Camirand et al., 2015). Considering the increase in IAEB among adolescent girls and boys, it is essential to focus on PSP to develop prevention programs in schools.

EMPIRICAL CONTEXT

Primary prevention programs in academic literature shows that school-based prevention programs that focus on PSP contribute to a significant reduction in IAEB, PSP disturbances, and other risk factors. More precisely, Table 1 presented in Lemieux (2020) shows that these programs may help to (a) decrease body dissatisfaction and desire for thinness (IAEB) and (b) improve physical self-perceptions thus mitigating other risk factors. In addition, other studies have demonstrated a reduction of the behavioural effects of EDs, such as a decrease in IAEB, in ED symptoms, and in risk factors of EDs among students in experimental groups. These studies demonstrate an improvement in the psychological and emotional characteristics of adolescents at risk for EDs, a decrease in IAEB and body dissatisfaction, and an increase in self-esteem. These outcomes recently allowed researchers to highlight a fourth generation of ED primary prevention programs (Noordenbos, 2016). The first generation focused on the consequences of risk factors, the second aimed to critically evaluate environmental pressures, and the third targeted the at-risk population with interactive sessions to reinforce ED protective factors (Stice & Shaw, 2004). The fourth generation advocates the importance of having a blind aim (i.e., not revealing program objectives to the target population—in this case, students) and integrates physical and mental health, simultaneously targeting both obesity and ED/ IAEB. Thus, characteristics of effective eating disorder prevention programs are as follows: be universal. focus on protective factors, be in the ecological environment, integrate physical and mental health, have a blind aim, and use ecological momentary assessment (Monthuy-Blanc, 2018; Ojevero et al., 2020; Stice & Shaw 2004). Programs which maximize protective factors as such could reduce IAEB.

SILENCE Program principles depend on the fourth generation of ED primary prevention programs (Noordenbos, 2016; Stice & Shaw, 2004). This program has been developed by research unity—Groupe de Recherche Transdisciplinaire des Troubles du Comportement Alimentaire-Loricorps (GR2TCA-Loricorps) characterized by transdisciplinary teams (education, physical activity, psychology, etc.). Grounded in evidencebased principles, the SILENCE-Program is a blind integrated prevention program of IAEB in adolescents. These principles focus on PSP, avoiding psychoeducation about ED and obesity, being interactive, and have multiple sessions. In light of the inefficacy of first-generation programs which explicitly focused on the

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Table 1

sview	Results	EG vs. CG: ↓ 24% of odds of IAEB at follow-up	EG vs. CG ↑ healthy eating strategies (T1, T2) ↑ UWCB in EG	EG ↓ social appearance anxiety ↓ physical + social anxiety ↓ rumination ↓ perfectionism	EG vs. CG ↓ ED Sx, weight/shape concern, body checking (T1) ↑ SE, BI, positive affects (T1)	↓ attitudes towards eating (ML & NUT and CG)	EG vs. CG No significant difference on eating disorder pathology	EG vs. CG ↓ attitudes towards eating (T1, T2) ↓ weight + desire to be slimmer (T1, T2)
ol-Based Prevention in Adolescence: A Re	Program	↓ screen-time activities and ↑ nutrition and PA integrated in school curriculum	10 key messages (on nutrition, PA, healthy lifestyle and IAEB) delivered in different spheres of the student's life.	Dissonance intervention = thin-ideal + a role-play + homework.	Workshop done by the students during the whole year on school time on 6 topics: BI, ED, mindful eating and exercise, SE, weight bias and media messages.	Healthy eating + criticizing aesthetic models.	Criticizing TI, ML, cost/benefits of beauty ideal, body perception, SE, healthy nutrition and PA, risk factors + ED Sx, ↓ ED stigma.	Balanced eating and analysis of menus + criticizing aesthetic models.
Studies Evaluating Schoo	Dependent variables	Disordered weight control behaviour	Disordered eating behaviours and binge eating, body satisfaction	ED Sx, DT, BD, thin- ideal internalization, exercise dependence, appearance anxiety, worry, depression, perfectionism, transdiagnostic, shame and guilt.	Attitude toward eating behaviours, weight/shape concern, body dissatisfaction, self-esteem	Attitude toward eating behaviours	Eating disorder pathology	Attitudes towards eating, weight and desire to be slimmer
	Sample	N: 16 369 EG: n.a.	EG: 142 CG: 111	EG: 332 girls	EG: 48 CG: 23	EG1: 143 EG2: 99 CG: 201	EG: 1187 CG: 1155	EG1: 57 EG2: 78 CG: 128
	Studies	Austin et al. (2012)	Barco Leme et al. (2019)	Christian et al. (2019)	Eickman et al. (2018)	Gonzales et al. (2011)	Gumz et al. (2017)	Lopez- Guimera et al. (2011)

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Table 1, continued

		Studies Evaluating Scho	ol-Based Prevention in Adolescence: A Re	eview
Studies	Sample	Dependent variables	Program	Results
Mccabe et al. (2006)	EG: 200 CG: 168	Positive and negative affect, body image	Sessions included in the school curriculum on PA, BI, SE, peer relationship	EG vs. CG ↑ BMI = ↑ BD ↑ Negative affect (F, T1) ↑ Positive affect (M, T1, T2)
McVey et al. (2007)	EG: 318 CG: 369	Body satisfaction, body size acceptance, disordered eating, weight loss and muscle-gaining behaviours	SE, ML, BI, active living, non- dietary, stress management + play presentation (shape teasing/size acceptance) + video (bullying/ problem solving on weight-based teasing) + poster in school (healthy eating, empowerment, fun and fitness).	EG vs. CG ↑ BS (M, T2 + F, T2) ↓ ED (F, T2) ↑ Weight loss and muscle-gaining behaviour (F & M, T2)
Mora et al. (2015)	EG1: 59 EG2: 53 CG: 88	Attitudes towards eating, disordered eating, body dissatisfaction, self-esteem	Healthy eating + criticizing aesthetic model + script (on $NUT + ML$) learned during class and performed in front of the community.	EG vs. CG ↑ SE for both EG group vs. CG
Ojevero et al. (2020)	EG: 99 CG: 115	BMI, disturbing eating attitudes and behaviours, self-esteem, body dissatisfaction, emotional intelligence, standard esthetics ideals, criticism thin ideal	Media literacy (analysis advertising message, beauty ideal cross-cultural, etc.), healthy eating habits (food pyramid, satiety, food myths, etc.), healthy coping styles (PA), emotional intelligence, activism (making video of parody of advertisement)	EG vs. CG A Body satisfaction and SE A Emotional repair U Self-oriented perfectionism DT U Ideal muscularity
Sharpe et al. (2013)	EG: 261 CG: 187	Body esteem, binge eating and compensatory behaviours, self-esteem	Lessons delivered by teacher on ML, beauty, ideal, critical media images, peer interaction, positive psychology + boosting mood and SE	EG vs. CG ↑ BE and SE (T1, T2)
Warsh- burger et Zitzmann 2018	EG: 568 CG: 544	ED Sx, bulimic Sx and drive for thinness, body dissatisfaction, emotional elements of exercise, social comparison	Group discussion, education and role- playing were used to work on healthy nutrition, media and peer pressure on beauty ideal, problem-solving strategies and SE.	EG vs. CG ↓ BD ↓ DT ↓ Emotional element of exercise

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dissatisfaction self-esteem nerceived nessure to be thin/	2015)	CG: 24	dietary restraint, body	4 weeks on media internalization,	↓ trend for shape/weight concern *
			dissatisfaction, self-esteem	perceived pressure to be thin/	↓ Feelings of ineffectiveness
muscular and weight concern				muscular and weight concern	

eating usorier, DO – experimental group, DOT – experimental group 1, DOZ – Experimental group 2, F – remark, PADD – mappropriate antitudes an eating behaviours; M = male; ML = media literacy; NUT = nutrition; PA = physical activity; SE = self-esteem; Sx = symptom; TI = thin ideal; T1 = post-test; T2 = follow-up; T3 = 2nd follow-up; UWCB = unhealthy weight control behaviour; * = not significant.ö

effects of EDs (Noordenbos, 2016), the SILENCE Program utilized a "full-blind" strategy in which users were unaware of the program's objectives. Teachers of art, French, and dramatic arts integrated these lessons into the Québec lower secondary education curriculum, whose transdisciplinary pedagogical support was the graphic novel *Korkifaipo* and its virtual environment (Monthuy-Blanc & al., 2015). Indeed, the use of virtual reality improves students' motivation while encouraging them to continue doing the required task in addition to positively improve PSP (Lemieux et al., accepted; Liou et al., 2017). This program focused on physical self-perceptions, the influence of the media, emotional management, family and peer influence, and physical activity in order to promote healthy eating and physical habits. All sessions were administered by the physical education teacher (Table 2).

This study assessed the effects of the "SILENCE Program—Inappropriate Attitudes and Eating Behaviours," a blind integrated intervention targeting PSP in a school-based program with Canadian adolescent girls and boys. This controlled trial (a) evaluated whether the SILENCE Program reduced IAEB in adolescents compared to an ED-only prevention program and a control group (first specific objective #SO.1) and (b) compared the evolution of PSP—level and variability across time—within an ED-only prevention program versus the SILENCE Program (second specific objective #SO.2).

METHODS

Participants and procedures. This exploratory study was designed as a school-based controlled trial, including pre- and post-test and idiographic designs. This study was approved by the Research Ethics Review Boards at the Université du Québec à Trois-Rivières: CER-17-231-07.26 Following this approval, a school which was affiliated with a member of the research team and had previously expressed an interest in PSP-focused prevention programs was invited to assign first- and second-grade classes to either program (ED-only prevention program or SILENCE Program) or the control condition (no program) depending on teaching constraints and intervention-related classes within the respective prevention programs. According to UNESCO's International Standard Classification of Education, the classes correspond to the first- and second-year level of lower secondary education (UNESCO Institute for Statistics, 2012). Three classes from one public high school in Trois-Rivières, Québec, agreed to participate. As shown in Figure 1, following parental and student consent to participate in the study, 83 adolescent students aged between 11 to 14 completed baseline questionnaires then privately completed health assessments (height and weight, with covert weighing) conducted by two research assistants. Of the 84 eligible to participate, only one declined, with no explicit reason. Students in the intervention groups then received their assigned programming over the following 14 weeks, while control-group students participated in their usual class lessons. Ultimately, 53 participants (i.e., 22 in the ED-only group, 17 in the SILENCE group, and 14 in the control group) completed the baseline assessment (the Monday of week one) and the post-test (the Friday of week 14) for the first specific objective (SO.1). Thirty-seven participants (i.e., 28 in ED-only group and 9 in SILENCE group) completed this weekly follow-up logbook for these 14 consecutive weeks (i.e., each Friday for 14 weeks) for the second specific objective (SO.2).

Table 2

Description of the Content of the 14-Week Silence Program

Module Topic	Description
Peer and family influence	This module aims to educate participants on the influence of peers and the family on self-esteem and body-esteem. Topics examples include: Committed family Questioning the thrive for thinness among peers School support
Culture influence	This module aims to educate participants about the influence of the culture on self- esteem and body-esteem. Topics examples include: Questioning the drive for thinness in the culture Culture not focused on weight Sports culture not weight-oriented Sports structures support
Emotion management	This module aims to help participants understand and regulate their emotions. Topics examples include: Emotional management Mental flexibility
Self-esteem and body image	This module is designed to promote a positive body image and to help participants understand their strengths. Topics examples include: Positive self-perceptions Healthy and realistic perfectionism Body image focused on body diversity Body differences in different cultures
Positive physical activity	This module is designed to promote a healthy relationship with physical activity. Topics examples include: Physical activity for fun Development of a critical eye on physical training Influence of physical activity on people



Intervention. The GR2TCA-Loricorps developed two programs grounded in the evidence-based principles of being interactive, avoiding psychoeducation about eating disorders and obesity, and having multiple sessions (Stice & Shaw, 2004), with 18 lessons of 75-minute duration delivered at the rate of two to four lessons per week, depending on the program, over 14 consecutive weeks. The ED-only program used a blind objective and focused on mental health (IAEB) building on the Healthy School Approach (Approche École en Santé; INSPQ, 2010) and the Québec Education Program (Programme de formation de l'école Québécoise; Gouvernement du Québec, 2001). Based on IAEB prevention, the ED-only program consisted of class lessons on preventive factors for EDs, such as peer and family influence, cultural influence (e.g., media, sport, and art), management of emotions, and physical self-perceptions (self-esteem and body image). The SILENCE Program is an integrated program of mental health (the ED-only program) and physical health (obesity). This program used a blind objective and integrated the ED-only program with the interdisciplinary physical activity program based on Healthy School Approach, which was established in this school in September 2016 (Le Bodo et al., 2019).

Measures

Sociodemographic characteristics. Through the Sociodemographic and Sport Questionnaires, participants were asked about general information (e.g., age and weight) and more specific information (e.g., history of weight, physical activity practiced, quality of interpersonal skills) in order to draw their general profile and to refine teacher explanations of characteristics related to ED and obesity.

Inappropriate attitudes and eating behaviours (IAEBs). Two questionnaires were selected to evaluate the students' IAEB: the Questionnaire for Eating Disorder Diagnosis (QEDD) and the Eating Disorders Inventory–adolescent version (EDI-A-24). QEDD (French version) allowed the researchers to measure the presence (vs. absence) and severity (and frequency) of 11 overeating crises and inappropriate attitudes and eating behaviours (Callahan et al., 2003; Mintz et al., 1997). Three items were used to evaluate each dimension (i.e., binge eating, induced vomiting, laxatives, diuretics, fasting, chewing and spitting, enemas, appetite suppressants, strict dieting, energy drinks, and exercise). One dimension—energy consumption—was added to fit with the reality of the host environment. Various response modes were presented for different items: "yes/no" format, multiple choice (i.e., duration and frequency of behaviour), or a request for substantive information in the form of open response (e.g., height and weight). In this study, the Cronbach's alpha is between 0.49 and 0.74 for the different subscale of the QEDD. *EDI-A-24* (French version) evaluated disruption in food-related attitudes and behaviours (Garner et al., 1983; Maïano et al., 2009). In this study, only the symptom subscale (which includes bulimia, body-dissatisfaction, and desire-for-thinness items) was analyzed. Participants responded to each item using a five-point Likert scale ranging from 5 "always" to 0 "never." In this study, the Cronbach's alpha is between 0.77 and 0.92 for the different subscale of EDI-A-24.

Physical self-perceptions. Two questionnaires were utilized in the weekly follow-up notebook to evaluate PSP: an adaptation of the Body Image Questionnaire (QIC-EVA; Stunkard et al., 1983) and a Frenchlanguage amended version of the Very Short Form of the Physical Self Inventory (PSI-VSF, Maïano et al., 2008), adapted from the Physical Self Perception Profile by Fox and Corbin (1989). These two questionnaires were included in facing pages in the notebook, with the PSI-VSF on the left and the QIC-EVA on the right. The adapted QIC-EVA used an analog visual scale of perceived and desired bodies to monitor students' body dissatisfaction (according to the idiographic approach). The response scale consisted of a spectrum of body shapes and sizes, in which each unit of measurement was located below the left toe of the corresponding silhouette. A freewriting area entitled "Personal and social events related to my answers" was located below the figures. On the left page of the notebook, PSI-VSF measured the intra-individual evolution of global self-esteem and physical self-perceptions. Participants responded to the items by drawing a vertical line, corresponding to the intensity of the chosen answer, on a 100-mm horizontal line called the "visual analog scale." The distance of the drawn line from the left end ("not at all") to the right end ("quite") was used as a measure of intensity. A control item asking the participant to place a line in the center of the response zone made it possible to estimate measurement errors.

Statistical Analyses

All data analyses were conducted using IBM SPSS Statistics v.25 (IBM Corps., New York, New York, USA). First, descriptive analyses are completed. Baseline differences across the three groups on the OEDD and the Sociodemographic and Sport Questionnaire were analyzed with ANOVA, p < .05. Then, analyses are performed to the pre- and post-test data. The effect of the intervention was measured using one-way analysis of covariance (ANCOVA) with treatment group membership as the independent variable, post-test score on the QEDD as the dependent variable, and the baseline score as the covariate. Prior to running the ANCOVA model, interaction analysis between the baseline score and group membership was checked to ensure that ANCOVA analyses respected the assumption of homogeneity of regression slopes. Considering the very small amount of missing data, no replacement strategy was used. Finally, analysis of a time series (i.e., an extended set of successive observations, ordered and equally spaced in time) containing all 14 consecutive weeks of logbook data was applied. If missing data was lower than 25%, the missing data replacement strategy was the SPSS linear trend at point, which made the time series appropriate for analysis (Monthuy-Blanc et al., 2012). Means of (a) standard deviations, (b) ranges (the maximum minus the minimum of observation), and (c) mean daily changes (the difference between two consecutive observations of time series, as such M[xt-1-xt] where xt is observation at time t) of time series represent the level and three indicators of (in) stability of PSP over the 14-week period. A paired t-test was used with the means of time series observations over the first week (W1) and those over last week (W14) to compare PSP levels in the SILENCE group and the ED-only group. A paired t-test was used with the overall mean of standard deviations, ranges, and mean daily changes of time series observations over the 14-week period to compare the instability of PSP in the SILENCE group and the ED-only group.

RESULTS

Descriptive data. As shown in Table 3, only two notable differences between the three groups at the time of baseline assessment were evident. The first was age, as the control group was significantly older than the others. In addition, on the QEDD subscale, the ED-only group scored lower than the other two groups on binge eating and chewing and spitting behaviours. There were no other significant demographic differences between the three groups. For SO.2, there were no significant differences between the two experimental groups.

Pre- and post-test data. No significant difference in IAEB between the two experimental groups was found in pre- and post-test data (see Table 3).

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Table 3

0.03 0.03 0.040.030.01 0.01 0.11 n2 ī ī ī P value P value **0.04*** 0.87 0.01*0.06 0.22 0.76 0.470.23 *00 0.82 0.32 0.72 0.22 0.490.040.91 -0.44 0.78 0.31 Difference in the Sociodemographic and IAEB between ED-Only Group, Silence-Group and Control F (2. 60) (09) 22.63 F (2. 1.18 2.97 1.53 **3.4**6 ...14 19 263.46 (209.60) Control Group 20.38 (5.20) 0.20 (20.0) 0.13 (0.35) 0.13 (13.3) 0.13 (0.35) 0 (0.0) 0.07 (0.27) $\begin{array}{c} 0.20 & (20.0) \\ 0 & (0.0) \\ 0 & 0.07 & (6.7) \\ 0 & (0.0) \\ 0 & 0.07 & (0.26) \\ 0.07 & (0.26) \end{array}$ 0.07 (6.7) 0.14 (0.36) 4.61 (2.69) 13.47 (.52) M (Fc%) *M(S.D.)* M (SD) (n = 15)0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0.40183.46 (91.48) Silence Group 21.24 (6.05) 0.24 (23.8) 0.14 (0.36) 0 (0.0) 0.10 (0.30) 4.38 (2.54) 0 (0.0) 0.10 (0.30) 0.14 (14.3) 0.19 (0.40) 12.48 (.68) 0.05 (0.22) 0.05 (4.8) 0 (0.0) M (Fc%) *M(S.D.)* (n = 21)M (SD) (0.0) 0 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0 (0.0) 0(0.0) 0.14ED-only Group 146.43 (97.56) 20.25 (4.12) 0 (0.0) 0.04 (0.20) 0 (0.0) 0 (0.0) 0 (0.0) 0.04 (0.20) 0 (0.0) 0.04 (0.20) 0 (0.0) 0.08 (0.28) 3.36 (2.50) 0 (0.0) 0.12 (0.33) 0.08 (8.0) 0.04 (0.20) 12.28 (.46) 0.04 (4.0) 0 (0.0) 0.16 (0.37) 0.04(4.0)M (Fc%) M(S.D.) (n = 25)M (SD) 0 (0.0) 0 (0.0) 0.28 Weekly total time of sports practice Weekly total frequency of sport Intentional weight loss Appetite suppressant* Sociodemographic data Induced vomiting* Chewing and spit* Self-report BMI Energy drinks Binge eating Strict diet* Laxative* Diuretic* Enema* Fasting QEDD Age

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(u)	D-only Group n = 25	Silence Group $(n = 21)$	Control Group $(n = 15)$			
Sports 0.0	.60 (60.0) .52 (0.51)	0.43 (42.9) 0.43 (0.51)	0.60 (60.0) 0.47 (0.52)	.796 0.31	0.46 0.74	0.01
DI-A-24 M	A (SD)	M (SD)	M (SD)	F (2. 60)	P value	п2
Symptom scale 13	3.84 (10.16) 3.44 (10.61)	13.38 (8.77) 12.57 (8.06)	17.33 (10.33) 17.47 (10.65)	0.83 <i>0.20</i>	0.44 0.42	0.08
ody dissatisfaction questionnaire M	4 (SD)	M (SD)	M (SD)	F (2. 60)	P value	
						n2
Body dissatisfaction 0.3	36 (0.95) 1.44 (0.71)	$0.43 (1.08) \\ 0.43 (1.08)$	0.33 (1.00) 0.40 (0.83)	0.40 0.34	0.67 0.71	0.10

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Table 4

P value 89 90 89 97 99 96 68 84 .67 -.14 -.13 -.15 .05 -.05 Silence Group (n = 9)-.21 .43 .43 t Diff. W1-W14 -.28 (6.46) -.28 (5.65) .29 (6.10) .03 (6.49) -.04 (2.21) -.42 (6.09) .07 (4.48) 42 (2.93) 34 (2.35) (S.D.) Difference in the Level of the PSP between ED-Only Group and Silence Group P value .71 .62 .55 .53 .64 .96 .17 80 ED-Only Group (n = 28)-1.41 .50 .60 -.47 -.71 .05 26 38 t Diff. W1-W14 Paired T-Test -.38 (1.41) -.36 (2.68) 38 (3.33) .44 (3.64) 19 (4.03) .25 (3.54) 37 (3.86) .39 (4.33) 02 (1.88) (S.D.) P value 87 67 81 81 08 52 45 45 13 F(1.36) 2.37 3.24 19 10 43 49 .59 03 8.07 (2.05) 4.74 (1.13) 6.78 (3.71) 6.82 (3.33) 1.19 (1.88) 6.76 (3.62) 6.77 (3.49) 7.16 (3.92) 6.06 (2.05) **Baseline Characteristics** M (SD) Silence Group (n = 9)5.09 (1.18) 7.22 (2.31) 6.60 (2.00) 6.49 (2.35) 6.50 (2.07) 5.52 (1.95) 6.93 (2.48) 7.09 (2.48) 44 (1.03) ED-Only Group (n = 28)M (SD) Body dissatisfaction Physical self-worth Global self-esteem Sports competence Perceived physical Physical condition Physical strength Perceived body Desired body appearance **PSI-VSF**

Vote. EG1 = experimental group 1; EG2-Silence = experimental group 2-Silence; n = number of participants; M = mean; S.D. = standard deviation; PSI-VF = physical self-inventory – very short form; BMI = body mass index; Diff. W1-W14 = difference week 1 with week 14; t = t results; P value = probability value

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Table 5

Difference in the Variability of the PSP between ED-Only Group and Silence-Group for Three Indicators of (In)Stability over 14 Week Period: The Standard Deviation, the Range and Mean Daily Changes of Time Series

	Average of	the Standard	Deviatic	u	Average of tl	he Range			Average of t	the Different	iated S	series
	ED-only	Silence			ED-only	Silence			ED-only	Silence		
	group	group			group	group			group	group		
	(n = 28)	(n = 9)			(n = 28)	(n = 9)			(n = 28)	(n = 9)		
PSI-VSF	M (S.D.)	M (S.D.)	t	P value	M (S.D.)	M (S.D.)	t	P value	M (S.D.)	M (S.D.)	t	P value
Global self-esteem	2.29 (.54)	2.97 (.46)	-2.35	.05	8.63 (1.68)	9.04 (1.48)	70	.49	02 (.30)	.03 (.47)	41	.68
Physical self-worth	2.62 (.53)	3.00 (.38)	-2.10	.03*	8.56 (1.75)	9.08 (1.35)	94	.36	03 (.30)	.02 (.47)	38	.71
Sports competence	2.74 (.51)	2.99 (.39)	-1.55	.14	8.92 (1.27)	8.89 (1.08)	.08	.94	03 (.26)	.02 (.47)	40	69.
Physical condition	1.74 (1.33)	3.07 (.27)	-2.96	.01*	5.76 (4.34)	9.53 (.86)	-4.35	*00*	.03 (.28)	.02 (.43)	.10	.92
Physical strength	2.44 (.42)	2.72 (.29)	-2.30	.03*	7.70 (1.78)	8.09 (1.31)	80	.44	.03 (.33)	01 (.34)	.27	.80
Perceived physical	2.73 (.48)	3.18 (.40)	-2.79	.01*	8.76 (1.48)	9.20 (1.22)	90	.38	02 (.31)	003	07	.95
appearance										(.50)		
Perceived body	1.80 (.30)	2.06 (.46)	-1.61	.14	6.99 (1.68)	7.73 (2.19)	93	.37	.028 (.21)	03 (.23)	.71	.49
Desired body	1.04 (.20)	1.25 (.21)	-2.64	.02*	3.80 (2.19)	4.52 (.74)	-2.43	.03*	001 (.14)	.003 (.17)	06	.95
Body dissatisfaction	1.29 (.32)	1.50 (.54)	-1.46	.16	4.77 (1.86)	5.60 (2.65)	87	.40	.03 (.11)	03 (.18)	1.11	.27
	-			-		;	, T	-			-	

Note. EG1 = experimental group 1; EG2-Silence = experimental group 2-Silence; n = number; M = mean; S.D. = standard deviation; PSI-VSF = physical self-inventory - very short form; t = t results; P value = probability value; data highlighted in bold = statistically significant. **Idiographic data.** No significant difference in the level of the time series in the two experimental groups was found (see Table 4). However, results demonstrate higher instability for the SILENCE group compared to the ED-only group over the time series of the overall mean of the standard deviations of five specific components of PSP and in the overall mean of the ranges of two specific components of PSP (see Table 5).

On the overall mean of the standard deviations of physical self-worth, the SILENCE group had higher instability (M = 3.00, SD = 0.38) than the ED-only group (M = 2.52, SD = 0.53). This difference is significant: t(35) = -2.10, p = .030. On the overall mean of the standard deviations for perceived physical appearance, the SILENCE group had higher instability (M = 3.07, SD = 0.27) than the ED-only group (M = 1.74, SD = 1.33). The SILENCE group shows significantly higher instability than the ED-only group on overall mean of the standard deviations for the physical self-worth, perceived physical appearance, physical strength, sport competence, body dissatisfaction, perceived physical appearance, and ranges of body dissatisfaction. To visually represent the means and three indicators of instability over the 14-week period, the SILENCE Program participants' PSP are presented in Figure 2.

Figure 2





DISCUSSION

The aim of this exploratory study was to assess the effects of the SILENCE Program, a blind integrated intervention based on PSP in a school-based program, in adolescent girls and boys. Overall outcomes demonstrate that the SILENCE Program had no effect on IAEB but reduced PSP disturbances, especially when considering the evolution of PSP during the 14 consecutive weeks. Consequently, this study highlights the necessity to focus on full integrated prevention programs and state-part PSP functioning by utilizing nomothetic and idiographic designs, respectively.

More precisely, this study evaluated whether the SILENCE Program mitigated IAEB in adolescents, compared to an ED-only prevention program and a control group. No significant difference between the ED-only group, the SILENCE group, and the control group was found in terms of IAEB. These results are in line with certain studies which demonstrate a non-significant decrease in IAEB following school-based interventions (Buccholz et al., 2008; Gumz et al., 2017; Wilksch, 2015). The lack of a significant effect of the SILENCE Program can be explained by both the SILENCE Program's content and the methodological limitations of the study's design. First, the SILENCE Program integrates healthy self-regulation of eating and physical activity practices without presenting a good/bad foods dichotomy (as in obesity-only programs) or an explicit connection between well-being and self-acceptance of body size (as in the ED-only program). The SILENCE Program dispenses with these methods to avoid providing conflicting messages to adolescents (Irving & Neumark-Sztainer, 2002; Neumark-Sztainer, 2005). However, the delivery of content within the two programs was limited to four different teachers and their respective classes—in the case of the SILENCE Program, one physical education teacher; and in the case of the ED-only program, art, French, and dramatic arts teachers. This limited context was due to the interdisciplinary physical activity program within the school. However, a unique intervention integrating the content from ED-only and obesity-only programs, administered across the entire curriculum to correspond with relevant class lessons, was ideal for student learning. Thus, it is possible to distinguish two models of integration: "partial integration" (e.g., the SILENCE Program and ED-only program in this study), meaning that in-class lessons utilize principles of both obesity and ED prevention programs, but are not integrated across the curriculum; and "full integration," meaning that program content draws on both obesity and ED prevention programs and are presented across the curriculum. It is worth noting that traditional ED-only programs are assumed to be fully integrated; however, what they fail to integrate is a holistic focus on IAEB and PSP, which the SILENCE Program successfully contributes.

In this study, the partial integration of both the SILENCE Program and ED-only program could have created a similarity between the results of these two interventions. Moreover, the blind characteristic of the programs was a form of integration in that prevention interventions were included as class lessons. It is worth noting that this characteristic could, therefore, have contributed to the low refusal and/or non-response rate. For most studies, this rate ranges from 3% to 97%, whereas for the SILENCE Program, the refusal rate did not exceed 1%.

Secondly, the risk of students from different classes discussing their respective program content may have to led to contamination effects, which could explain any observed differences between the programs given. This contamination effect may have made the groups' outcome measures more similar (Wilksch, 2015). Moreover, the fact that this study was done in an ecological context (vs. experimental context) may

not have allowed the researchers to control all design conditions, although they were careful to account for this limitation in pre- and post-test design (Moore et al., 2016). This may have been counter-balanced by combining this design with an implementation evaluation study to analyze the influence that the context of the program could have had on the variations of the effects (Champagne et al., 2011). This would have generated explanations about the contextual factors involved in the implementation of the three programs and a better understanding of the variations observed between the three groups, thus strengthening the conclusions of the study (Champagne et al., 2011).

Additionally, applying idiographic design (particular to the ecological context), which aimed to measure intra-variability (vs. inter-variability) over time may have corrected the contamination effect (Stein & Corte. 2003). Indeed, this study compared the evolution of PSP—level and variability of a time series—within an ED-only prevention program versus the SILENCE Program (SO.2). The primary outcomes on PSP levels showed a non-significant effect over a 14-week period for adolescent girls and boys within both the ED-only and SILENCE programs. In contrast, the secondary outcomes demonstrated higher fluctuation of specific components within PSP for these adolescents; these included physical self-worth, physical condition, physical strength, perceived appearance, and their desired body when related to body dissatisfaction. More precisely, one can suppose (from significant indicators of instability: standard deviation and range) that adolescents engaged in the SILENCE Program experienced integrated intervention more intensely than adolescents from the classical ED-only program. These overall outcomes confirm Kernis and colleagues' (1993) theory that PSP functions as a sociometer in that specific components of PSP fluctuate depending on the context (e.g., aversive body remarks), which is demonstrated in adolescents with and without EDs (de Ruiter et al., 2018; Kernis, 2005; Monthuy-Blanc et al., 2012; Tiggemann, 2005; Vallacher et al., 2015; Wong et al., 2014). Most nomothetic research methods (i.e., pre- and post-test or longitudinal designs) focusing on PSP exclusively as a trait of personality have shown significant effects of school-based prevention programs on global components of PSP among adolescents; these components include global self-esteem, physical selfworth, and body image (Eickman et al., 2018; López-Guimera et al., 2011; Mora et al., 2015; Sharpe et al., 2013; Warshburger & Zitzmann, 2018).

Moreover, some researchers have recently underscored the necessity of utilizing multidimensional tools to examine specific components of PSP in the absence of changes in its global components (e.g., global self-esteem; Tirlea et al., 2019). These overall findings could position assessment methods of PSP-focused prevention programs as dependent on methods of PSP conceptualization. As previously noted, PSP is a dynamic system which functions in terms of both personality traits and psychological states (de Ruiter et al., 2018; Vallacher et al., 2015; Wong et al., 2014). Studies of exclusively "trait-part PSP functioning" highlight the effects of ED prevention programs on global PSP components by utilizing nomothetic designs with longitudinal post-measures (Eickman et al., 2018; López-Guimera et al., 2011; Mora et al., 2015; Sharpe et al., 2013; Warshburger & Zitzmann, 2018). Studies of "state-part PSP functioning" highlight the effects of ED prevention programs on specific PSP components by utilizing idiographic design without accounting for the impact of each repetitive (daily or weekly) prevention intervention. To study trait- and state-part PSP functioning to assess effects of school-based prevention programs, researchers must respond to two major findings. First, adolescents are more susceptible to the influence of daily situational contexts (e.g., family and especially peers) on their health behaviours (Eisenberg et al., 2012) and are more likely to develop unhealthy

weight-control behaviours (e.g., "I want to lose weight, so I started training"; "I can't lose weight"; Leme & Philippi, 2017; Sánchez-Carracedo et al., 2012). Secondly, multiple interactive sessions (daily to weekly) constitute one of the fundamental principles of efficient ED and obesity prevention programs that can be evaluated (Le et al. 2017).

CONCLUSION

Despite no significant pre- and post-test effect on the IAEB, effects of SILENCE Program on positive evolution of PSP components are promising avenues for integrated prevention programs. The blind integrated school-based program on eating disorders and obesity—the SILENCE Program—is promising, as it offers a new perspective on prevention programs focused on PSP. Some highlights emerged:

- IAEB prevention approach: (a) captures a holistic vision of the participant without splitting "head and body;" and (b) approaches physical and mental health as inseparable by restructuring the organization of health services (Patel et al., 2018). This makes it possible to have a combined approach to the prevention of ED and obesity through public health initiatives that aim to promote positive PSP and prevent IAEB across age groups (i.e., children, adults, and seniors).
- Blind characteristic: (a) avoids lack of cooperation (in a program or study) or denial of behaviour specific to IAEB; (b) guarantees the mitigation of IAEB risk behaviours (inappropriate compensatory behaviours); and (c) supports fourth-generation prevention programs based on ED protective factors by using a "full-blind program."
- Integrated characteristic: (a) minimizes the costs related to the development and delivery of two
 different obesity- and ED-only prevention programs; (b) avoids conflicting messages across obesityand ED-only programs; and (c) is more efficient in complete integration (vs. partial integration)
 when program content integrates shared principles from ED- and obesity-only interventions.
- Focus on PSP: (a) highlights the primary congruence between ED- and obesity-only programs; and (b) can account for the individual risk factors for EDs and obesity (PSP trait-part functioning) and individual-context risk factors for EDs and obesity (PSP state-part functioning).

REFERENCES

- Alvarenga, M. D. S., Scagliusi, F. B., & Philippi, S. T. (2010). Development and validity of the disordered eating attitude scale (DEAS). *Perceptual and Motor Skills*, 110(2), 379–395.
- Austin, S. B., Spadano-Gasbarro, J. L., Greaney, M. L., Blood, E. A., Hunt, A. T., Richmond, T. K., Wang, M. L., Mezgebu, S., Osganian, S. K., & Peterson, K. E. (2012). Peer reviewed: Effect of the Planet Health Intervention on Eating Disorder Symptoms in Massachusetts middle schools, 2005–2008. *Preventing Chronic Disease*, 9, 225–235.
- Bonanséa, M., Monthuy-Blanc, J., Aimé, A., Therme, P., & Maïano, C. (2016). Attitudes et comportements alimentaires inappropriés et caractéristiques psychosociales des sportifs: comparaison entre deux niveaux de pratique sportive. *Revue québécoise de psychologie*, *37*(1), 39–60.
- Buchholz, A., Mack, H., McVey, G., Feder, S., & Barrowman, N. (2008). BodySense: An evaluation of a positive body image intervention on sport climate for female athletes. *Eating Disorders*, 16(4), 308–321.

- Callahan, S., Rousseau, A., Knotter, A., Bru, V., Danel, M., Cueto, C., Levasseur, M., Cuvelliez, F., Pignol, L., O'Halloran, MS., & Chabrol, H. (2003). Diagnosing eating disorders: Presentation of a new diagnostic test and an initial epidemiological study of eating disorders in adolescents. *L'encephale, 29*(3 Pt 1), 239–247.
- Camirand, H., Cazale, L., & Bordeleau, M. (2015). Les élèves du secondaire sont-ils satisfaits de leur apparence corporelle? Institut de la statistique du Québec.
- Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders*, *10*(2), 103–113.
- Colautti, L. A., Fuller-Tyszkiewicz, M., Skouteris, H., McCabe, M., Blackburn, S., & Wyett, E. (2011). Accounting for fluctuations in body dissatisfaction. *Body Image*, 8(4), 315–321.
- Champagne, F., Brousselle, A., Hartz, Z., Contandriopoulos, A.-P., & Denis, J.-L. (2011). L'analyse de l'implantation. L'évaluation : concepts et méthodes: Deuxième édition: Les Presses de l'Université de Montréal.
- Christian, C., Brosof, L. C., Vanzhula, I. A., Williams, B. M., Ram, S. S., & Levinson, C. A. (2019). Implementation of a dissonance-based, eating disorder prevention program in Southern, all-female high schools. *Body Image*, *30*, 26–34.
- de Ruiter, N. M., Hollenstein, T., van Geert, P. L., & Saskia Kunnen, E. (2018). Self-esteem as a complex dynamic system: Intrinsic and extrinsic microlevel dynamics. *Complexity*, 2018.
- Eickman, L., Betts, J., Pollack, L., Bozsik, F., Beauchamp, M., & Lundgren, J. (2018). Randomized controlled trial of REbeL: A peer education program to promote positive body image, healthy eating behavior, and empowerment in teens. *Eating Disorders*, 26(2), 127–142.
- Eisenberg, M. E., Berge, J. M., Fulkerson, J. A., & Neumark-Sztainer, D. (2012). Associations between hurtful weightrelated comments by family and significant other and the development of disordered eating behaviors in young adults. *Journal of Behavioral Medicine*, 35(5), 500–508.
- Fairburn, C. G., & Harrison, P. J. (2003). Eating disorders. The Lancet, 361(9355), 407-416.
- Fairweather-Schmidt, A. K., & Wade, T. D. (2015). Changes in genetic and environmental influences on disordered eating between early and late adolescence: A longitudinal twin study. *Psychological Medicine*, 45(15), 3249–3258.
- Fichter, M. M., Quadflieg, N., & Hedlund, S. (2008). Long-term course of binge eating disorder and bulimia nervosa: Relevance for nosology and diagnostic criteria. *International Journal of Eating Disorders*, 41(7), 577–586.
- Fox, K. R., & Corbin, C. B. (1989). The physical self-perception profile: Development and preliminary validation. Journal of Sport and Exercise Psychology, 11(4), 408–430.
- Garner, D. M. (2004). Eating disorder inventory-3 (EDI-3). Professional Manual. Odessa, FL: Psychological Assessment Resources.
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2(2), 15–34.
- González, M., Penelo, E., Gutiérrez, T., & Raich, R. M. (2011). Disordered eating prevention programme in schools: A 30-month follow-up. *European Eating Disorders Review*, 19(4), 349–356.
- Gouvernement du Québec. (2001). Programme de formation de l'école québécoise. *Enseignement secondaire, premier cycle*. Ministère de l'éducation.
- Gumz, A., Weigel, A., Daubmann, A., Wegscheider, K., Romer, G., & Löwe, B. (2017). Efficacy of a prevention program for eating disorders in schools: A cluster-randomized controlled trial. *BMC Psychiatry*, 17(1), 293.
- Huas, C., Godart, N., Caille, A., Pham-Scottez, A., Foulon, C., Divac, S. M., Lavoisy, G., Guelfi, J. D., Falissard, B., & Rouillon, F. (2013). Mortality and its predictors in severe bulimia nervosa patients. *European Eating Disorders Review*, 21(1), 15–19.
- Institut national de santé publique du Québec (INSPQ). (2010). Réussite éducative, santé, bien-être: agir efficacement en context scolaire. Synthèse des recommandations. Gouvernement du Québec. [En ligne]. Disponible: http:// www.inspq.qc.ca/pdf/publications/1065_ReussiteEducativeSanteBienEtre.pdf
- Irving, L. M., & Neumark-Sztainer, D. (2002). Integrating the prevention of eating disorders and obesity: Feasible or futile?. *Preventive Medicine*, 34(3), 299–309.
- Johnson, M. (1994). Disordered eating in active and athletic women. Clinics in Sports Medicine, 13(2), 355–369.
- Jordan, J., Joyce, P. R., Carter, F. A., Horn, J., McIntosh, V. V., Luty, S. E., McKenzie, J. M., Frampton, C. M. A., Mulder, R. T., & Bulik, C. M. (2008). Specific and nonspecific comorbidity in anorexia nervosa. *International Journal of Eating Disorders*, 41(1), 47–56.

- Kernis, M. H. (2005). Measuring self-esteem in context: The importance of stability of self-esteem in psychological functioning. *Journal of Personality*, 73(6), 1569–1605.
- Kernis, M. H., Cornell, D. P., Sun, C.-R., Berry, A., & Harlow, T. (1993). There's more to self-esteem than whether it is high or low: The importance of stability of self-esteem. *Journal of Personality and Social Psychology*, 65(6), 1190.
- Kinlen, D., Cody, D., & O'Shea, D. (2018). Complications of obesity. *QJM: An International Journal of Medicine*, 111(7), 437–443.
- Lavin, M. A. & Cash, T. F. (2001). The effects of exposure to information about appearance stereotyping and discrimination on women's body images. *International Journal of Eating Disorders*, 29, 51–58.
- Le, L. K. D., Barendregt, J. J., Hay, P., & Mihalopoulos, C. (2017). Prevention of eating disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, 53, 46–58.
- Le Bodo, Y., Fonteneau, R., Harpet, C., Hudebine, H., Jabot, F., Sherlaw, W., & Breton, E. (2019). Analysing local public health action plans: Development of a tool for the French CLoterres Study. *European Journal of Public Health, 29*(Supplement 4), ckz186–468.
- Lemieux, V. (2020). Le programme « SILENCE » chez les élèves du premier cycle du secondaire : évolution des perceptions du soi physique et des attitudes et comportements alimentaires inappropriés. (Mémoire de maîtrise inédit). Université du Québec à Trois-Rivières.
- Lemieux, V., Monthuy-Blanc, J., Corno, G. (accepted). Application of Virtual Reality in an ED Primary Prevention Context: An Exploratory Study. *Annual Review of CyberTherapy and Telemedicine*.
- Leme, A. C. B., & Philippi, S. T. (2017). Home food availability, parents'/caregivers' support, and family meals influence on dietary servings of low-income urban adolescent girls from Brazil. *Nutrire*, 42(1), 30.
- Leme, A. C. B., Philippi, S. T., Thompson, D., Nicklas, T., & Baranowski, T. (2019). "Healthy Habits, Healthy Girls— Brazil": An obesity prevention program with added focus on eating disorders. *Eating and Weight Disorders-Studies* on Anorexia, Bulimia and Obesity, 24(1), 107–119.
- Leung, F., Geller, J., & Katzman, M. (1996). Issues and concerns associated with different risk models for eating disorders. *International Journal of Eating Disorders*, 19(3), 249–256.
- Liou, H. H., Yang, S. J., Chen, S. Y., & Tarng, W. (2017). The influences of the 2D image-based augmented reality and virtual reality on student learning. *Journal of Educational Technology & Society*, 20(3), 110–121.
- López-Guimerà, G., Sánchez-Carracedo, D., Fauquet, J., Portell, M., & Raich, R. M. (2011). Impact of a school-based disordered eating prevention program in adolescent girls: General and specific effects depending on adherence to the interactive activities. *The Spanish Journal of Psychology*, 14(1), 293–303.
- Maïano, C., Morin, A. J., Monthuy-Blanc, J., Garbarino, J.-M., & Stephan, Y. (2009). Eating disorders inventory: Assessment of its construct validity in a nonclinical French sample of adolescents. *Journal of Psychopathology* and Behavioral Assessment, 31(4), 387–404.
- Maïano, C., Morin, A. J., Ninot, G., Monthuy-Blanc, J., Stephan, Y., Florent, J.-F., & Vallée, P. (2008). A short and very short form of the physical self-inventory for adolescents: Development and factor validity. *Psychology of Sport and Exercise*, 9(6), 830–847.
- Marsh, H. W., Papaioannou, A., & Theodorakis, Y. (2006). Causal ordering of physical self-concept and exercise behavior: Reciprocal effects model and the influence of physical education teachers. *Health Psychology*, 25(3), 316.
- Mccabe, M. P., Ricciardelli, L. A., & Salmon, J. O. (2006). Evaluation of a prevention program to address body focus and negative affect among children. *Journal of Health Psychology*, 11(4), 589–598.
- McLean, S. A., Paxton, S. J., Massey, R., Hay, P. J., Mond, J. M., & Rodgers, B. (2014). Stigmatizing attitudes and beliefs about bulimia nervosa: Gender, age, education and income variability in a community sample. *International Journal of Eating Disorders*, 47(4), 353–361.
- McVey, G., Tweed, S., & Blackmore, E. (2007). Healthy Schools—Healthy Kids: A controlled evaluation of a comprehensive universal eating disorder prevention program. *Body Image*, 4(2), 115–136.
- Melnyk, S. E., Cash, T. F., & Janda, L. H. (2004). Body image ups and downs: Prediction of intra-individual level and variability of women's daily body image experiences. *Body Image*, 1(3), 225–235.
- Mintz, L. B., O'Halloran, M. S., Mulholland, A. M., & Schneider, P. A. (1997). Questionnaire for Eating Disorder Diagnoses: Reliability and validity of operationalizing DSM—IV criteria into a self-report format. *Journal of Counseling Psychology*, 44(1), 63.
- Monthuy-Blanc, J. (2018). Fondements approfondis des troubles du comportement alimentaire. Editions JFD.

Monthuy-Blanc, J., Blanc, E., & Wany, S. (2015). Korkifaipo : bande dessinée pédagogique. TRIP.

- Monthuy-Blanc, J., Morin, A. J., Pauzé, R., & Ninot, G. (2012). Directionality of the relationships between global selfesteem and physical self components in anorexic outpatient girls: An in-depth idiographic analysis. Advances in Psychology Research, 92, 59–75.
- Moore, R. C., Depp, C. A., Wetherell, J. L., & Lenze, E. J. (2016). Ecological momentary assessment versus standard assessment instruments for measuring mindfulness, depressed mood, and anxiety among older adults. *Journal* of Psychiatric Research, 75, 116–123.
- Mora, M., Penelo, E., Gutiérrez, T., Espinoza, P., González, M. L., & Raich, R. M. (2015). Assessment of two schoolbased programs to prevent universal eating disorders: Media literacy and theatre-based methodology in Spanish adolescent boys and girls. *The Scientific World Journal*, 2015.
- Morris, A. M., & Katzman, D. K. (2003). The impact of the media on eating disorders in children and adolescents. *Paediatrics & Child Health*, 8(5), 287–289.
- Neumark-Sztainer, D. (2005). Can we simultaneously work toward the prevention of obesity and eating disorders in children and adolescents?. *International Journal of Eating Disorders*, 38(3), 220–227.
- Neumark-Sztainer, D., Wall, M. M., Larson, N., Story, M., Fulkerson, J. A., Eisenberg, M. E., & Hannan, P. J. (2012). Secular trends in weight status and weight-related attitudes and behaviors in adolescents from 1999 to 2010. *Preventive Medicine*, 54(1), 77–81.
- Noordenbos, G. (2016). How to block the ways to eating disorders. *Eating Disorders*, 24(1), 47–53.
- Ojevero, O. J., Espinoza Guzmán, P., González González, M., Subiza Pérez, I., Becerra Castro, A., Escursell, R. M., & Mora Giral, M. (2020). Universal prevention program of eating, weight and body image problems in adolescents: A 12-month follow-up. *Psicothema*, 32(2).
- Ozier, A. D., & Henry, B. W. (2011). Position of the American Dietetic Association: Nutrition intervention in the treatment of eating disorders. *Journal of the American Dietetic Association*, 111(8), 1236–1241.
- Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., Chisholm, D., Collins, P., Cooper, J., Eaton, J., Herrman, H., Herzallah, M., Huang, Y., Jordans, M., Kleinman, A., Medina-Mora, E., Morgan, E., Niaz, U., Omigbodun, O., Prince, M., ... UnÜtzer, J. (2018). The Lancet Commission on Global Mental Health and Sustainable Development. *The Lancet*, 392(10157), 1553–1598.
- Rao, D. P., Kropac, E., Do, M. T., Roberts, K. C., & Jayaraman, G. C. (2016). Tendances en matière d'embonpoint et d'obésité chez les enfants au Canada. *Prévalence*, 20(15), 10.
- Rodgers, R. F., Watts, A. W. Austin, S. B., Haines, J., & Neumark-Sztainer, D. (2017). Disordered eating in ethnic minority adolescents with Overweight International. *Journal of Eating Disorders*, 50(6), 665–671.
- Sagar, R., & Gupta, T. (2018). Psychological aspects of obesity in children and adolescents. The Indian Journal of Pediatrics, 85(7), 554–559.
- Sánchez-Carracedo, D., Neumark-Sztainer, D., & López-Guimera, G. (2012). Integrated prevention of obesity and eating disorders: Barriers, developments and opportunities. *Public Health Nutrition*, 15(12), 2295–2309.
- Sharpe, H., Schober, I., Treasure, J., & Schmidt, U. (2013). Feasibility, acceptability and efficacy of a school-based prevention programme for eating disorders: Cluster randomised controlled trial. *The British Journal of Psychiatry*, 203(6), 428–435.
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. Annual Review of Clinical Psychology, 4, 1–32.
- Stein, K. F., & Corte, C. M. (2003). Ecologic momentary assessment of eating-disordered behaviors. *International Journal of Eating Disorders*, 34(3), 349–360.
- Stice, E., & Shaw, H. (2004). Eating disorder prevention programs: A meta-analytic review. *Psychological Bulletin*, 130(2), 206.
- Stunkard, A., Sorensen, T. & Schulsinger, F. (1983). Use of the Danish Adoption Register for the study of obesity and thinness. Association for Research in Nervous & Mental Disease, 60, 115–120.
- Sundgot-Borgen, J., & Torstveit, M. (2010). Aspects of disordered eating continuum in elite high-intensity sports. Scandinavian Journal of Medicine & Science in Sports, 20, 112–121.
- Thompson, I., Hong, J. S., Lee, J. M., Prys, N. A., Morgan, J. T., & Udo-Inyang, I. (2020). A review of the empirical research on weight-based bullying and peer victimisation published between 2006 and 2016. *Educational Review*, 72(1), 88–110.

- Tiggemann, M. (2005). Body dissatisfaction and adolescent self-esteem: Prospective findings. *Body Image*, 2(2), 129–135.
- Tirlea, L., Bonham, M., Dordevic, A., Bristow, C., Day, K., Brennan, L., Haines, T., & Murray, M. (2019). Measuring self-esteem changes in children and adolescents affected by overweight or obesity: A scoping review of instruments currently used in multicomponent weight-management interventions. *Childhood Obesity*, 15(8), 485–501.
- Touyz, S., Lacey, H. & Hay, P. (2020). Eating disorders in the time of COVID-19. Journal of Eating Disorders, 8, 19.
- Turgeon, M.-É., Meilleur, D., & Blondin, S. (2015). Évaluation des attitudes et des comportements alimentaires: comparaison entre un groupe d'adolescentes athlètes pratiquant un sport esthétique et un groupe témoin. Neuropsychiatrie de l'Enfance et de l'Adolescence, 63(3), 175–182.
- UNESCO Institute for Statistics. (2012). International standard classification of education: ISCED 2011. Author.
- Vallacher, R. R., Van Geert, P., & Nowak, A. (2015). The intrinsic dynamics of psychological process. Current Directions in Psychological Science, 24(1), 58–64.
- Ward, Z. J., Long, M. W., Resch, S. C., Giles, C. M., Cradock, A. L., & Gortmaker, S. L. (2017). Simulation of growth trajectories of childhood obesity into adulthood. *New England Journal of Medicine*, 377, 2145–2153.
- Warschburger, P., & Zitzmann, J. (2018). The efficacy of a universal school-based prevention program for eating disorders among German adolescents: Results from a randomized-controlled trial. *Journal of Youth and Adolescence*, 47(6), 1317–1331.
- Westmoreland, P., Krantz, M. J., & Mehler, P. S. (2016). Medical complications of anorexia nervosa and bulimia. *The American Journal of Medicine*, *1*29(1), 30–37.
- Wilksch, S. M. (2015). School-based eating disorder prevention: A pilot effectiveness trial of teacher-delivered M edia S mart. *Early Intervention in Psychiatry*, 9(1), 21–28.
- Wong, A. E., Vallacher, R. R., & Nowak, A. (2014). Fractal dynamics in self-evaluation reveal self-concept clarity. Nonlinear dynamics. *Psychology, and Life Sciences, 18*(4), 349–369.
- Woodhall, A. J., Gordon, K. L., Caine-Bish, N., & Falcone, T. (2015). The risk and prevalence of disordered eating behaviors in freshmen college students. *Journal of the Academy of Nutrition and Dietetics*, 115(9), A32.