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Life Smart: A pilot study of a school-based program to reduce the risk of both eating disorders and obesity in young-adolescent girls and boys

Journal:	<i>Journal of Pediatric Psychology</i>
Key Words:	Eating and Feeding Disorders, Prevention/Control, Risk, Obesity

Abstract

Objective: To develop and pilot *Life Smart*, an 8-lesson program aimed at reducing risk factors for both eating disorders and obesity. **Methods:** Grade 7 girls and boys ($N=115$) from one independent school were randomly allocated to the *Life Smart* (2 classes; $N=51$) or control (3 usual classes; $N=64$) conditions. Risk factors were measured at baseline and post-program (5-weeks later). **Results:** Life Smart was rated as moderately enjoyable and valuable by participants. ANCOVAs with baseline as a covariate revealed a significant main effect for group favouring Life Smart for shape and weight concern (Effect Size [ES] = .54), with post-hoc testing finding girls particularly benefited on this variable (ES = .78). **Conclusions:** Feedback was generally favourable, with some suggestions for even more interactive content. The program showed more promise with girls. Informed by these findings, the program underwent revisions and is now being evaluated in a randomized controlled trial.

Keywords: prevention; eating disorders; obesity; risk factors

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3 The respective fields of eating disorder prevention and obesity prevention have
4 remained largely separate to one another over the years. However, in recent years
5 researchers have called for the development of programs that seek to simultaneously
6 prevent *both* problems (e.g., Neumark-Sztainer et al., 2006). Reasons for this include:
7 obesity is a risk factor for disordered eating while some with disordered eating are more
8 likely to gain weight over time (Stice, Cameron, Killen, Hayward & Taylor, 1999); the
9 need for consistency in approaches to preventing both problems; and, a realization that
10 preventing one problem is likely to have benefits to preventing the other problem (Austin,
11 Field, Wiecha, Peterson & Gortmaker, 2005). However, the most important reason for
12 seeking to combine prevention efforts is the increasingly common finding that there is
13 overlap in the risk factors for both problems. Specifically, risk factors such as dieting,
14 body dissatisfaction, media consumption, depressive symptoms, perfectionism, shorter
15 sleep duration, social problems and difficulties with emotion regulation, have been found
16 to increase the risk of both disordered eating and weight gain (Stice, Presnell, Shaw &
17 Rohde, 2005; Haines, Neumark-Sztainer, Eisenberg & Hannan, 2006; Haines, Neumark-
18 Sztainer, Wall & Story, 2007; Neumark-Sztainer et al., 2007). As such, an intervention
19 that can reduce these risk factors could have a preventative effect for both problems.
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40 Despite these calls, only two school-based programs have been investigated for
41 their effects on both problems. First, *Planet Health*, a 2-year interdisciplinary obesity
42 prevention program with girls and boys in Grades 6-8 was found to significantly reduce
43 both obesity onset and growth of purging behaviours amongst girls in the intervention
44 condition (Austin et al., 2005). *Planet Health* seeks to target traditional obesity
45 prevention goals of: reduced television viewing, decreased consumption of high-fat
46 foods, increased fruit and vegetable intake, and increased physical activity levels.
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56 Second, *Healthy Buddies*, a 21-week program pairing students in Grades 4-7 with a
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3 student in Kindergarten – Grade 3, led to significantly lower increases in body mass
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5 index (BMI) amongst the older students in the intervention condition compared to the
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7 control condition, while no significant differences were found for the body image
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9 variables (Stock et al., 2007). This program included an equal focus on healthy eating,
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11 healthy exercise and positive body image, respectively. While not a school-based
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13 program, the *Healthy Weight* program by Stice and colleagues (Stice, Marti, Spoor,
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15 Presnell & Shaw, 2008) was found to reduce the risk of eating pathology by 61% and
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17 obesity by 55% in female university and high-school students relative to assessment-only
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19 controls over a three-year follow-up. This three-hour program similarly targeted
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21 traditional obesity prevention goals (e.g., healthy eating and physical activity) and was
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23 delivered to high-risk participants in small groups. These respective programs provide
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25 evidence that reduced risk can be simultaneously achieved for both eating disorders and
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27 obesity.
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32 The current study involved the development and pilot testing of an 8-lesson
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34 school-based curriculum, *Life Smart*, with Grade 7 girls and boys (12-13 years of age).
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36 This program seeks to build on earlier interventions by not only including traditional
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38 obesity prevention targets, but also targeting psychological risk factors that have rarely
39
40 been addressed in obesity prevention programs, namely: perfectionistic thinking;
41
42 managing emotions; sleep; and, peer-teasing. These topics were selected based on their
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44 support in prospective risk factor research for weight gain and where all but sleep
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46 duration have also been implicated in the development of disordered eating (Stice et al.,
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48 2005; Haines et al., 2006; Haines et al., 2007; Neumark-Sztainer et al., 2007). The
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50 targeting of young-adolescents was also informed by these prospective studies where
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52 baseline risk factor scores at this age predicted future eating pathology, while other
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54 prevention studies have achieved significant reductions in the risk of eating pathology
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3 with participants of this age (e.g., Austin et al., 2005; Stock et al., 2007; Wilksch &
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5 Wade, 2009).
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8 This paper describes the first phase of a larger research program. The primary
9
10 aim was to assess student enjoyment and perceived value of *Life Smart*, with a view to
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12 feedback informing improvements to the program in preparation for a large randomized-
13
14 controlled trial (RCT). The secondary aim was to investigate the efficacy of the program
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16 targeting a universal (including boys) sample where eating disorder behaviours are not
17
18 yet likely to be present. Efficacy was judged by the impact on measures of risk factors
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20 for both eating disorders and obesity from pre- to post-intervention. While it is
21
22 acknowledged that universal prevention programs require follow-up assessments to
23
24 evaluate their longer-term value, our experience in developing an efficacious school-
25
26 based eating disorder prevention program (Wilksch & Wade, 2009) suggests a pilot study
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28 (Wilksch, Tiggemann & Wade, 2006) can be a very helpful approach in refining program
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30 content and evaluation methodology.
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34 **Methods**

35 **Participants**

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37 Five Grade 7 classes ($N=114$; M age = 12.71 years, $SD = .41$) from one Adelaide
38
39 metropolitan independent private school participated in this study where two classes
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41 ($N=50$; 45% girls) were randomly allocated to *Life Smart* and the other 3 classes ($N=64$;
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43 45% girls) served as controls (usual school lessons). Randomisation of class (rather than
44
45 school) was informed by Cochrane Review recommendations that this is a more
46
47 methodologically rigorous approach, given that students within the same school are
48
49 thought to be more alike than compared to other schools (Pratt & Woolfenden, 2002).
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51 While no additional demographic data were collected beyond student age and gender,
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53 anecdotal reports from school staff indicated the school was comprised typically white
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3 students from middle income families. It should be noted that Grade 7 classes in South
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5 Australian schools are taught by a single teacher as opposed to students attending
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7 different classes for different subjects. As such, class allocation is random rather than
8
9 being determined by other constraints.
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12 Baseline body mass index did not significantly differ between *Life Smart* and
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14 Control participants for either girls (*Life Smart* [$M=20.92$]; Control [$M=19.90$]) or boys
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16 (*Life Smart* [$M=20.22$]; Control [$M=19.23$]), with percentile charts indicating each
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18 group scoring between the 60th and 75th percentile. Distribution of overweight (85th to <
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20 95th percentile) and obesity (\geq 95th percentile) was generally even across conditions for
21
22 overweight girls (*Life Smart* = 10%; control 13.6%) and obese girls (*Life Smart* = 5%;
23
24 control = 6.4%), as well as across conditions for overweight boys (*Life Smart* = 21%;
25
26 control = 17.4%) and obese boys (*Life Smart* = 0; control = 2.9%). The remainder of the
27
28 sample was in the healthy weight range and no participants were underweight (<5th
29
30 percentile). These rates of obesity in boys were lower than current Australian obesity
31
32 rates of 9% for boys, while rates for girls matched the national average of 6% (Australian
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34 Bureau of Statistics, 2012). Recruitment, assessments and intervention delivery occurred
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36 between September and December, 2010. Approval for this research was received from
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38 the Flinders University Social and Behavioural Research Ethics Committee and the
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40 school principal of the participating school.
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45 **Intervention**

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47 *Life Smart* was informed by the principles of evidence-based prevention and thus:
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49 avoided psychoeducation about eating disorders and obesity; was interactive (e.g., regular
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51 small-group work and class discussions); was of multiple-session duration; and, was
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53 evaluated with valid outcome measures (Stice, Shaw & Marti, 2007). Curriculum targets
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55 were informed by eating disorder and obesity risk factor research, with a particular focus
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3 on shared risk factors. A central theme was taking a holistic approach where health is
4 made up of more than just weight and eating. A deliberate effort was made to present
5 traditional obesity program content in a manner that was concise and consistent with a
6 positive body image message. A brief description of the program is presented in **Table 1**.
7 Curriculum activities (e.g., class presentations, skills-based learning) were largely
8 informed by our previous experiences with eating disorder prevention (Wilksch et al.,
9 2006; Wilksch, Durbridge & Wade, 2008; Wilksch & Wade, 2009).

18 **Procedure**

20 Based on participation in a previous trial, a metropolitan private school was
21 invited and agreed to participate. Parental consent (hard copy consent form that was
22 given to students to pass on to their parents who then signed and returned to the school)
23 for data collection was high with 114 of the 119 Grade 7 students at the school (96%)
24 participating. Following receipt of parental consent, students from five Grade 7 classes
25 completed a baseline online battery of risk factor measures and then had their
26 anthropometric data (height, weight and blood pressure) measured by two research
27 assistants in a confidential manner where participants did not learn their measurements.

28 Over the following four weeks, two classes received the 8-lesson *Life Smart*
29 program at the rate of two 50-minute lessons per week during lesson time normally
30 dedicated to English lessons, while the remaining three classes participated in their usual
31 English classes. *Life Smart* was delivered by a male Clinical Psychologist (SW), with the
32 regular class teacher present. At the conclusion of each lesson, a brief feedback form was
33 completed by *Life Smart* participants to assess program value and enjoyment, along with
34 any recommendations for improving the lesson. Post-program (5-weeks after baseline),
35 the online battery of eating disorder and obesity risk factors were again completed, where
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3 post-program data was available from $N= 43$ Life Smart participants (86% of baseline
4 participants) and $N= 57$ control participants (89% of baseline participants).
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7 **Measures**

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10 Measures included self-report qualitative feedback about the program and
11 questionnaires of relevant risk factors. Risk factor measures were selected based upon
12 their reliable use in our previous prevention trials with early-adolescents (Wilksch et al.,
13 2006; Wilksch et al., 2008; Wilksch & Wade, 2009), while obesity risk factor measures
14 were selected based upon their reliable use in previous large-scale longitudinal risk factor
15 studies, namely Project Eating Amongst Teens (Project EAT; Haines et al., 2006) and the
16 Growing Up Today Study (GUTS; Field et al., 2003). While anthropometric assessments
17 were conducted, it was decided not to report these as outcome measures given the pre-
18 post nature of the study where study duration was not sufficient to observe meaningful
19 change on these measures. Instead, this data was collected to pilot our evaluation
20 methods for the next phase of our research (RCT).
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33 **Qualitative Feedback**

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36 To obtain qualitative feedback, at the end of each lesson students were asked to
37 complete a brief measure rating how enjoyable and valuable they thought the lesson was
38 on a scale of 1 (*Not At All*) to 4 (*Very*), what they had learned and if they had any
39 suggestions for improvements to the program.
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45 **Risk Factors**

46 ***Shape and Weight Concern***

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49 The shape concern (7-item) and weight concern (6-item) scales from the Eating
50 Disorder Examination – Questionnaire (Fairburn & Beglin, 1994) were combined to
51 provide a single measure (12-items) of these constructs. Participants responded to items
52 (e.g., “*Have you had a strong desire to lose weight?*”) on 7-point Likert scales ranging
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3 between 0 (*not at all*) and 6 (*marked*), and thus higher scores reflect greater levels of
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5 concern. Fairburn and Beglin found scores on both the shape concern ($r = .80$) and
6
7 weight concern ($r = .79$) subscales to correlate highly with the scores on the Eating
8
9 Disorder Examination, which is considered the ‘gold standard’ measure of disordered
10
11 eating. Wade and Lowes (2002) reported high internal reliability for the shape concern
12
13 ($\alpha = .85$) and weight concern ($\alpha = .92$) subscales in an adolescent population, while the
14
15 combined scales were highly reliable in the current study (girls $\alpha = .95$; boys $\alpha = .95$).
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18 ***Dieting***

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20 The 10-item Dutch Eating Behavior Questionnaire – Restraint scale (Van Strien,
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22 Frijters, Bergers & Defares, 1986) assessed participants’ intentions to restrict food intake
23
24 for weight reasons (e.g., “*When you put on weight do you eat less than you usually do?*”)
25
26 where responses range from 1 (*never*) to 5 (*often*). Mean item scores were used where
27
28 higher scores indicated higher levels of dietary restraint. The internal consistency and
29
30 test-retest reliability of the DEBQ-R has previously been shown to be acceptable for use
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32 with Australian young adolescent girls (Tilgner, Wertheim & Paxton, 2004) and was
33
34 highly reliable in the current study (girls $\alpha = .94$; boys $\alpha = .91$).
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39 ***Body Dissatisfaction***

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41 The 9-item Eating Disorder Inventory – Body Dissatisfaction scale (EDI-BD:
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43 Garner, Olmstead & Polivy, 1983) was used to assess the degree of satisfaction with
44
45 various parts of the body. Responses range from 1 (*never*) to 6 (*always*), with 5 items
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47 reversed scored due to being worded in a positive direction (e.g., “*I think my stomach is*
48
49 *just the right size*”). The continuous scoring used was different to that prescribed by the
50
51 manual which is recommended for use with clinical populations (i.e., the 3 most extreme
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53 disordered responses are scored 3, 2 and 1 respectively, with the remaining responses
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55 scored 0). The reason for this difference was a desire to measure the full variation of
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3 body dissatisfaction in a non-clinical sample, and this approach has been used in other
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5 Australian studies (e.g., Tilgner et al., 2004). The measure is widely used in eating
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7 disorder research and has been found to be reliable and valid measure for 11-18-year-old
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9 participants (Shore & Porter, 1990).

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11 An adapted measure of the EDI-BD was used with male participants, based on
12
13 adaptations made by Hallsworth, Wade and Tiggemann (2005). These changes included
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15 reversing the direction of some items (e.g., “too big/large” changed to “too small”), and
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17 making body part references male appropriate by adding items relating to chest and bicep
18
19 size, and omitting items relating to hip size. Internal reliability for the respective
20
21 measures in the present study was also good for both girls ($\alpha = 0.90$) and boys ($\alpha = 0.83$).

22 23 ***Media Internalization***

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25 The 9-item Internalization – General Scale from the 30-item Sociocultural
26
27 Attitudes Towards Appearance Questionnaire-3 (Thompson, van den Berg, Roehrig,
28
29 Guarda & Heinberg, 2004) was used to measure levels of internalization of culturally
30
31 ideal body types presented in the media (e.g., “*I compare my body to the bodies of TV*
32
33 *and movie stars*”). Participants rated their responses on 5-point Likert Scales ranging
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35 from 1 (*definitely disagree*) to 5 (*definitely agree*), with higher scores indicating a higher
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37 level of internalization. A recent Australian validation study (Wilksch & Wade, 2012)
38
39 supports the reliable use of this scale with young-adolescent girls and boys and the scale
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41 was again reliable in the current study (girls $\alpha = .94$; boys $\alpha = .96$).

42 43 ***Depression***

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45 The 10-item Children’s Depression Inventory – Short Form (Kovacs, 1992)
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47
48 measures a range of depressive symptoms, including disturbed mood, vegetative
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50 functions, and interpersonal behaviours, and was used to measure depression in the
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52 current study. For each item, participants select one of three options on a 3-point Likert
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3 scale (e.g., 0 [*I am sad once in a while*], 1 [*I am sad many times*], 2 [*I am sad all the*
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13 time]), with higher scores indicating a higher level of depression. The CDI has been
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reliably used with early adolescent Australian samples (Roberts, Kane, Thomson, Bishop & Hart, 2003), and internal reliability was again adequate for the current study (girls $\alpha = .83$; boys $\alpha = .82$).

Concern Over Mistakes

The nine-item Concern over Mistakes scale from the Multidimensional Perfectionism Scale (Frost, Marten, Lahart & Rosenblate, 1990) was used to assess the extent to which an individual has excessive fears about making mistakes, and attributing such mistakes personally (e.g., "*If I fail at work/study, I am a failure as a person.*"). Participants respond on a 5-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). This scale has been used extensively, including with an Australian adolescent population (Wade & Lowes, 2002), where it was found to have acceptable reliability ($\alpha = .85$), while internal consistency was high in the current study (girls $\alpha = .92$; boys $\alpha = .89$).

Peer Teasing

The relevant 8-items from the McKnight Risk Factor Survey (McKnight Investigators, 2003) were used to assess peer teasing. Participants respond to questions (e.g., *In the past year, how often have girls/young women (including sisters) made fun of you because of your weight?*), on Likert scales ranging from 1 (*Never*) to 5 (*Always*), where higher scores indicate higher levels of teasing. The McKnight Risk Factor Survey (2003) underwent a thorough development and validation process leading to high levels of internal reliability, test-retest reliability and convergent validity, while internal reliability was high in the current study (girls $\alpha = .94$; boys $\alpha = .93$).

Eating Habits

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3 Three items from the Project Eating Among Teens (EAT-II: Haines et al., 2006)
4 survey were included to assess frequency of eating regular meals. Participants responded
5 to questions (e.g., “*during the past week, how many days did you eat lunch?*”) with
6 responses ranging from 1 (*Never*) to 5 (*Always*), where higher scores were desirable and
7 indicated more regular eating of meals. The Project EAT survey is a comprehensive
8 measure that has undergone revisions and has informed numerous risk factor studies
9 (e.g., Haines et al., 2007; Neumark-Sztainer et al., 2007).
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18 ***Screen Time***

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20 A further 4 items from the EAT-II (Haines et al., 2006) were used to assess screen
21 time relating to television/DVD and Internet/computer use (not for school work),
22 averaged across weekdays and weekends. Participants respond to items such as “*In your*
23 *free time on an average weekday (Monday-Friday), how many hours do you spend*
24 *watching TV and DVDs?*” range from 0 (*0 hours*) to 6 (*5+ hours per day*).
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32 ***Physical Activity***

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34 Six items relating to average time spent playing outside, competitive sport and
35 bike riding on weekdays and weekends from the GUTS (Field et al., 2003) were included
36 to assess levels of physical activity. Participants responded to items (e.g., *On the*
37 *weekend, how many hours do you usually spend playing outside?*) on a Likert Scale of 1
38 (*0-1 hour*) to 3 (*4-6 hours*), where higher scores indicate higher levels of physical
39 activity. The measure has been found to have adequate test-retest reliability and be
40 moderately associated with cardiorespiratory fitness (Berkey et al., 2000).
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49 **Results**

50 **Student Feedback**

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52 For the whole *Life Smart* sample, no significant differences emerged regarding
53 perceived value of each lesson, while Lesson 2 (healthy eating) was rated as significantly
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3 more enjoyable than other lessons apart from Lessons 7 and 8 (small group presentations
4 and reviewing program content), [$F(6, 265)=6.69, p<.001; ES = .32$]. Gender differences
5 emerged for two lessons, with boys ($M = 3.07; SD=0.59$) rating Lesson 2 (eating) as
6 significantly more valuable than girls ($M = 2.56; SD=0.73$), [$t(29) = -2.12, p = .043$],
7 while girls ($M = 2.94; SD=0.66$) rated Lesson 3 (exercise and sleep) as significantly more
8 valuable than boys ($M = 2.46; SD=0.72$), [$t(39) = 2.22, p <.033$]. Qualitative descriptions
9 of favourite learning activities clearly favoured interactive components of the program
10 such as role-plays and class discussions. While few students recorded suggestions for
11 how to improve a lesson, the most common suggestions were to further increase
12 interactive activities.
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24 **Baseline Measures**

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27 Independent sample t-tests revealed no significant differences between baseline
28 risk factor scores for girls in the *Life Smart* and control conditions and boys in the *Life*
29 *Smart* and Control conditions. Mean total scale scores are presented in **Table 2** where it
30 can be seen that the majority of scores were in the mid-range, and participants reported
31 eating regular meals. Responses on screen time reflected an average of 2-3 hours viewing
32 per day, while physical activity scores were averaging 1-2 hours per day. An
33 investigation of the distribution of participants with clinically significant shape and
34 weight concern (total score ≥ 44) revealed 5% of the overall sample met this clinical
35 indicator (girls: *Life Smart* $N = 1$; control $N = 4$; boys: *Life Smart* $N = 1$; control $N =$
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49 **Repeated Measures for Risk Factors**

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52 Prior to outcome analyses, data for all variables were inspected for missing
53 values, normality and outliers. Eleven scales required square root or log transformations,
54 as they were significantly positively skewed and these scales are identified in **Table 3**.
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Analyses of covariance (ANCOVAs) were conducted to assess the efficacy of *Life Smart* with baseline observations entered as a covariate to ensure that any effects were due to changes at post-program and not due to variation in scores at baseline or measurement error. This involved a 2 (group: Life Smart, control) X 2 (gender: girls, boys) design. This approach allows for direct comparisons between the *Life Smart* and control groups at post-program by accounting for variance across conditions at baseline. The alpha level for testing for main effects and interactions remained at .05. A priori Bonferroni-adjusted pairwise comparisons were conducted, while Cohen's d was calculated for significant interactions, main effects and between-groups post-hoc comparisons ($d = [2 \sqrt{F}] / \sqrt{df(error)}$), where .2 = small, .5 = moderate, .8 = large.

Adjusted mean total post-program scores and covariate values by group and gender are presented in **Table 3**. Although presented separately, these analyses were conducted simultaneously and not repeated by gender. A significant main effect for group of moderate effect size was found for shape and weight concern [$F(1,56)=4.071$, $p=.048$; ES = .54], where *Life Smart* participants ($M=17.04$, $SE= 2.16$) scored significantly lower at post-program compared to controls ($M=22.32$, $SE= 1.44$). **Table 3** presents pairwise comparisons where it can be seen that this finding was primarily due to improvements in scores for *Life Smart* girls (ES=.78) rather than boys. While this was the only variable to have a significant main effect for group, post-hoc testing revealed differences of a medium effect size for girls on body dissatisfaction, peer-teasing and media internalization. **Table 3** reveals *Life Smart* girls were scoring significantly lower than control girls on these measures at post-program. No significant differences emerged on any weight gain risk factors for either girls or boys. However, *Life Smart* boys did experience an increase in physical activity of small-moderate effect (ES= .37).

Discussion

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3 This study involved a pilot evaluation of *Life Smart*, a new school-based program
4 to simultaneously reduce risk factors for both eating disorder and obesity risk factors and
5 represented the first phase of a larger research program. With respect to the first aim,
6 ratings of student enjoyment and perceived value were generally positive. Our previous
7 research has indicated that favourable participant ratings of program enjoyment and value
8 co-occur with a beneficial impact on risk factors (Wilksch et al., 2006; Wilksch & Wade,
9 2009). The importance of interactive, student-centred learning activities has been
10 previously described (Stice et al., 2007) and in the current study students again rated
11 engaging in group work activities as the most enjoyed components of the program.
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23 It was of interest that the lesson focusing on healthy eating was rated as one of the
24 most enjoyable lessons in the program, particularly so for boys. In developing this
25 lesson, we sought to keep content as clear possible since it seems healthy eating is an area
26 where young people regularly hear many and possibly conflicting messages .
27
28 Conversely, girls enjoyed the sleep and exercise lesson more than boys. The main
29 learning activity in the healthy eating lesson was small group work on a presentation to
30 share with the class while the sleep and exercise lesson predominantly involved a
31 PowerPoint presentation. It is possible that girls found the information about sleep and
32 exercise more relevant to them as they might already have been familiar with messages
33 about healthy eating.
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45 Taken collectively, the feedback indicated that the students did consider the
46 program worthwhile and many reported the take home messages to be useful. In regard
47 to suggested areas of improvement, it seems making some lessons even more interactive,
48 less writing, and more class discussion, would improve student's perceptions of the
49 program. These considerations have informed improvements to the program and the
50 development of an accompanying student workbook for an RCT involving *Life Smart*.
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3 With respect to the second aim, the only significant between-group difference
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5 found was for shape and weight concern, with post-hoc testing finding girls experienced a
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7 reduction of large effect due to participating in *Life Smart*. Shape and weight concern is
8
9 one of the most proximal and strongest risk factors for eating disorders and disordered
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11 eating (McKnight Investigators, 2003) and the effect size found for girls at post-program
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13 compares favourably with the same stage of our previously successful eating disorder
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15 prevention program *Media Smart* (Wilksch & Wade, 2009). Given this previous trial
16
17 found an increase in effect size as time went on over the 2.5-year follow-up, the post-
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19 program shape and weight concern result for *Life Smart* in the current trial can be taken
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21 as encouraging.
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25 *Life Smart* girls also experienced benefits of moderate effect size for body
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27 dissatisfaction, peer-teasing and media internalization. These findings were positive
28
29 given their risk to both disordered eating (Stice, 2002) and weight gain (Stice et al., 2005;
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31 Neumark-Sztainer et al., 2007). Boys who participated in *Life Smart* experienced no
32
33 significant benefits, with their post-program scores generally being very similar to the
34
35 control group. The one notable improvement for boys was for physical activity. The
36
37 general lack of significant effects for group was expected since programs with universal,
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39 mixed-gender, young-adolescent audiences are generally seeking a prevention rather than
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41 treatment effect, where a halt in growth of risk factor over time is the sought goal and
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43 where the time frame of this study was too short to adequately measure such a possible
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45 effect. This is particularly the case in universal samples with generally low baseline risk
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47 of disordered eating or obesity.
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52 Given the main purpose of the current study was to develop and pilot *Life Smart*
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54 focussing particularly on students' perceived value and enjoyment of the program, some
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56 components of more rigorous quantitative research were lacking. Specifically, the
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3 absence of follow-up measurement, the small sample size, the sole inclusion of private
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5 school participants limiting the generalizability of results, the absence of data on
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7 participant ethnicity and socioeconomic status, the sole use of self-report rather than
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9 clinical interviews, and the absence of measurement of some *Life Smart* risk factor targets
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11 (e.g., sleep duration) and disordered eating behaviours (particularly binge eating given its
12
13 relevance to both weight gain and disordered eating (Field et al., 2003)) were all
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15 limitations. Further, whilst a control group was included, these participants attended their
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17 usual school classes taught by their usual class teachers and as such, non-specific effects
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19 cannot be ruled out for the findings in the intervention condition. Finally, while it is
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21 considered methodologically rigorous to have both intervention and control participants
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23 from the same school (Pratt & Woolfenden, 2002), it is acknowledged that this does risk
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25 contamination effects (e.g., conversation between peers from different classes), though it
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27 should also be acknowledged that this is likely to reduce rather than inflate differences
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29 between intervention and control participants.
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34 Overall, given the generally positive feedback and some evidence of benefit on
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36 important risk factors, the current study provides support for a thorough evaluation of
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38 *Life Smart* and we are currently investigating its efficacy in a large RCT in comparison to
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40 two other prevention programs. As is the case for universal prevention trials with young-
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42 adolescent samples, follow-up evaluations will be central to determining the programs'
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44 efficacy.
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References

- 1
2
3
4
5 Austin, S. B. (2000). Prevention research in eating disorders: Theory and new directions.
6
7 *Psychological Medicine, 30*, 1249-1262.
8
9
10 Austin, S. B., Field, A. E., Wiecha, J., Peterson, K. E. & Gortmaker, S. L. (2005). The
11
12 Impact of a School-Based Obesity Prevention Trial on Disordered Weight-
13
14 Control Behaviors in Early Adolescent Girls. *Archives of Pediatrics & Adolescent*
15
16 *Medicine, 159*, 225-230.
17
18
19 Australian Bureau of Statistics (2012). Gender Indicators Overweight/Obesity, Australia,
20
21 Jan 2012 (cat. no. 41025). www.abs.gov.au.
22
23
24 Berkey, C. S., et al. (2000). Activity, Dietary Intake, and Weight Changes in a
25
26 Longitudinal Study of Preadolescent and Adolescent Boys and Girls. *Pediatrics,*
27
28 *105*, e56.
29
30 Fairburn, C. G. & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-
31
32 report questionnaire? *International Journal of Eating Disorders, 16*, 363-370.
33
34
35 Field, A. E., et al. (2003). Relation between dieting and weight change among
36
37 preadolescents and adolescents. *Pediatrics, 112*, 900-6.
38
39 Frost, R. O., Marten, P., Lahart, C. & Rosenblate, R. (1990). The dimensions of
40
41 perfectionism. *Cognitive Therapy and Research, 14*, 449-468.
42
43
44 Garner, D. M., Olmstead, M. P. & Polivy, J. (1983). Development and validation of a
45
46 multidimensional Eating Disorder Inventory for anorexia nervosa and bulimia
47
48 nervosa. *International Journal of Eating Disorders, 2*, 15-34.
49
50 Haines, J., Neumark-Sztainer, D., Eisenberg, M. E. & Hannan, P. J. (2006). Weight
51
52 teasing and disordered eating behaviors in adolescents: longitudinal findings from
53
54 project EAT (Eating Among Teens). *Pediatrics, 117*, e209-e215.
55
56
57
58
59
60

- 1
2
3 Haines, J., Neumark-Sztainer, D., Wall, M. & Story, M. (2007). Personal, Behavioral,
4 and Environmental Risk and Protective Factors for Adolescent Overweight.
5 *Obesity, 15*, 2748-2760.
6
7
8
9
10 Hallsworth, L., Wade, T. & Tiggemann, M. (2005). Individual differences in male body-
11 image: An examination of self-objectification in recreational body builders.
12 *British Journal of Health Psychology, 10*, 453-465.
13
14
15
16 Kovacs, M. (1992). *Children's Depression Inventory Manual*. New York, Multi-Health
17 Systems.
18
19
20
21 McKnight Investigators (2003). Risk factors for the onset of eating disorders in
22 adolescent girls: Results of the McKnight longitudinal risk factor study. *American*
23 *Journal of Psychiatry, 160*, 248-254.
24
25
26
27 Neumark-Sztainer, D., Levine, M. P., Paxton, S. J., Smolak, L., Piran, N. & Wertheim, E.
28 H. (2006). Prevention of Body Dissatisfaction and Disordered Eating: What Next?
29 *Eating Disorders: The Journal of Treatment & Prevention, 14*, 265-285.
30
31
32
33
34 Neumark-Sztainer, D., Wall, M. M., Haines, J. I., Story, M. T., Sherwood, N. E. & van
35 den Berg, P. A. (2007). Shared Risk and Protective Factors for Overweight and
36 Disordered Eating in Adolescents. *American Journal of Preventive Medicine, 33*,
37 359-369.
38
39
40
41
42
43 Pratt, B. M. & Woolfenden, S. R. (2002). Interventions for preventing eating disorders in
44 children and adolescents. *The Cochrane Database of Systematic Reviews, Issue 2*.
45 Oxford, UK, Update Software.
46
47
48
49 Roberts, C., Kane, R., Thomson, H., Bishop, B. & Hart, B. (2003). The prevention of
50 depressive symptoms in rural school children: A randomized controlled trial.
51 *Journal of Consulting and Clinical Psychology, 71*, 622-628.
52
53
54
55
56
57
58
59
60

- 1
2
3 Shore, R. A. & Porter, J. E. (1990). Normative and reliability data for 11 to 18 year olds
4
5 on the Eating Disorder Inventory. *International Journal of Eating Disorders*, 9,
6
7 201-207.
8
9
10 Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic
11
12 review. *Psychological Bulletin*, 128, 825-848.
13
14 Stice, E., Cameron, R. P., Killen, J. D., Hayward, C. & Taylor, C. (1999). Naturalistic
15
16 weight-reduction efforts prospectively predict growth in relative weight and onset
17
18 of obesity among female adolescents. *Journal of Consulting and Clinical*
19
20 *Psychology*, 67, 967-974.
21
22
23 Stice, E., Marti, C., Spoor, S., Presnell, K. & Shaw, H. (2008). Dissonance and healthy
24
25 weight eating disorder prevention programs: Long-term effects from a
26
27 randomized efficacy trial. *Journal of Consulting and Clinical Psychology*, 76,
28
29 329-340.
30
31
32 Stice, E., Presnell, K., Shaw, H. & Rohde, P. (2005). Psychological and Behavioral Risk
33
34 Factors for Obesity Onset in Adolescent Girls: A Prospective Study. *Journal of*
35
36 *Consulting and Clinical Psychology*, 73, 195-202.
37
38
39 Stice, E., Shaw, H. & Marti, C. N. (2007). A meta-analytic review of eating disorder
40
41 prevention programs: Encouraging findings. *Annual Review of Clinical*
42
43 *Psychology*, 3, 207-231.
44
45
46 Stock, S., et al. (2007). Healthy Buddies: A Novel, Peer-Led Health Promotion Program
47
48 for the Prevention of Obesity and Eating Disorders in Children in Elementary
49
50 School. *Pediatrics*, 120, e1059-e1068.
51
52
53 Thompson, J., van den Berg, P., Roehrig, M., Guarda, A. S. & Heinberg, L. J. (2004).
54
55 The Sociocultural Attitudes Towards Appearance Scale-3: Development and
56
57 Validation. *International Journal of Eating Disorders*, 35, 293-304.
58
59
60

- 1
2
3 Tilgner, L., Wertheim, E. H. & Paxton, S. J. (2004). Effect of Social Desirability on
4
5 Adolescent Girls' Responses to an Eating Disorders Prevention Program.
6
7 *International Journal of Eating Disorders*, 35, 211-216.
8
9
10 Van Strien, T., Frijters, J. E., Bergers, G. P. & Defares, P. B. (1986). The Dutch Eating
11
12 Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and
13
14 external eating behavior. *International Journal of Eating Disorders*, 5, 295-315.
15
16 Wade, T. D. & Lowes, J. (2002). Variables associated with disturbed eating habits and
17
18 overvalued ideas about the personal implications of body shape and weight in a
19
20 female adolescent population. *International Journal of Eating Disorders*, 32, 39-
21
22 45.
23
24
25 Wilksch, S. M., Durbridge, M. & Wade, T. D. (2008). A preliminary controlled
26
27 comparison of programs designed to reduce risk for eating disorders targeting
28
29 perfectionism and media literacy. *Journal of the American Academy of Child and*
30
31 *Adolescent Psychiatry*, 47 939-947.
32
33
34 Wilksch, S. M., Tiggemann, M. & Wade, T. D. (2006). Impact of interactive school-
35
36 based media literacy lessons for reducing internalization of media ideals in young
37
38 adolescent girls and boys. *International Journal of Eating Disorders*, 39, 385-393.
39
40
41 Wilksch, S. M. & Wade, T. D. (2009). Reduction of shape and weight concern in young
42
43 adolescents: A 30-month controlled evaluation of a media literacy program.
44
45 *Journal of the American Academy of Child and Adolescent Psychiatry*, 48, 652-
46
47 661.
48
49
50 Wilksch, S. M. & Wade, T. D. (2012). Examination of the Sociocultural Attitudes
51
52 Towards Appearance Questionnaire-3 in a Mixed-Gender Young-Adolescent
53
54 Sample. *Psychological Assessment*, 24, 352-364.
55
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Table 1.

Overview of the Life Smart lessons

<i>Lessons/ Main Topics</i>	<i>Example Activities</i>
1. Health: There's more to it than you might think!	<ul style="list-style-type: none"> • Examine magazines for advertisements that stereotype men and women • Introduction to Life Smart pie chart: Physical, mind and social health
2. Physical health: Fuelling our health	<ul style="list-style-type: none"> • Dispelling the myths: 4 healthy eating tips • Small group presentations aimed at convincing young people to follow the healthy eating tip
3. Physical health: Adding rest and play to our health	<ul style="list-style-type: none"> • Class discussion: What messages do we get about sleep and exercise? • PowerPoint: Tips for healthy sleep and exercise • Small group: Helping a friend struggling to get enough sleep or exercise
4. Healthy thinking!	<ul style="list-style-type: none"> • Identifying unhelpful thinking styles: class discussion and DVD clip • Role-plays: how would you help someone younger than you to follow tips for healthy thinking
5. Emotions: What do they do for us and how can we handle them?	<ul style="list-style-type: none"> • Class discussion: What are emotions and what role do they play? • Small group: What can we do with strong emotions? • Pie chart: How do our emotions affect the other parts of health?
6. Family & friends: How do they affect our health?	<ul style="list-style-type: none"> • Class discussion: What are the qualities of friends and safe people? • Small group: Making connections with safe people
7. How to be life smart: What do you think?	<ul style="list-style-type: none"> • Small group preparation for a presentation in lesson 8 addressing one of the following: "If someone is overweight, they are unhealthy – agree or disagree?" or "Looking after your health means..."
8. Where to from here? Looking to the future	<ul style="list-style-type: none"> • Small groups deliver presentations • Class discussion: the choices we have and program review

Table 2

Baseline means (and standard deviations) by gender (2) and group (2)

	Range	Girls		Boys	
		<i>Life Smart</i>	Control	<i>Life Smart</i>	Control
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
- Shape & weight concern	0-72	26.75 (15.24)	31.04 (17.28)	16.70 (18.53)	19.40 (17.32)
- Dieting	10-50	20.00 (8.73)	24.08 (8.95)	16.35 (7.79)	17.68 (6.83)
- Body dissatisfaction	9-54	28.15 (4.12)	28.87 (3.59)	33.20 (7.12)	33.47 (6.33)
- Depression	0-20	9.58 (1.16)	10.00 (1.00)	9.78 (1.19)	9.96 (1.08)
- Media internalisation	9-45	23.38 (8.60)	25.56 (9.21)	20.75 (9.15)	21.69 (8.84)
- Concern over mistakes	9-45	18.17 (6.44)	20.12 (7.20)	17.31 (7.74)	17.83 (5.87)
- Teasing	8-40	15.39 (8.08)	14.88 (7.30)	11.68 (5.49)	11.57 (5.37)
- Regular meals	1-5	4.56 (0.42)	4.49 (0.54)	4.76 (0.64)	4.88 (0.28)
- Screen time	1-7	3.50 (0.98)	3.51 (0.81)	3.94 (1.34)	3.92 (1.00)
- Physical activity	1-3	1.67 (0.54)	1.44 (0.34)	1.96 (0.35)	1.97 (0.40)

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Table 3.

ANCOVA for risk factors by group (2) and gender (2).

Measures	Baseline	Post-Program					
	Covariate	Girls			Boys		
		LS	Control	ES	LS	Control	ES
		M (SE)	M (SE)	<i>d</i>	M (SE)	M (SE)	<i>d</i>
- Shape & weight concern ^a	24.84	14.04 (3.12)	25.32 (2.40)	.78*	20.16 (2.88)	19.32 (1.92)	.07
- Dieting [±]	20.18	17.33 (1.49)	19.82 (1.11)	.35	19.10 (1.25)	18.68 (0.92)	.09
- Body dissatisfaction	24.39	19.98 (2.07)	25.65 (1.62)	.57*	24.03 (1.8)	23.49 (1.35)	.07
- Depression [±]	9.88	9.23 (0.47)	9.72 (0.33)	.26	10.16 (0.43)	9.72 (0.29)	.22
- Media internalisation	22.59	18.45 (2.16)	23.13 (1.62)	.44	22.50 (2.61)	23.31 (1.35)	.09
- Concern over mistakes [±]	18.20	17.73 (1.77)	18.05 (1.25)	.10	17.00 (1.47)	17.06 (1.04)	.08
- Teasing [±]	13.51	9.56 (1.21)	12.90 (.93)	.63*	13.82 (1.06)	12.52 (.79)	.24
- Regular meals [±]	4.74	4.79 (.91)	4.64 (.70)	.20	4.45 (.83)	4.69 (.61)	.15

Life Smart

- Screen time [±]	3.75	3.90 (.12)	3.81 (.06)	.22	3.81 (.09)	3.78 (.06)	.05
- Physical activity [±]	1.72	1.55 (.12)	1.58 (.82)	.07	1.82 (.11)	1.62 (.07)	.37

Notes. The effect of the baseline value has been statistically removed to allow for direct comparisons across Life Smart and Control groups at post-program. ^a = significant main effect for group. Cohen's *d* is for Bonferroni-adjusted post-hoc testing of between-groups' difference by gender at post-program. ES = Effect size; LS = Life Smart; M = adjusted estimated marginal mean; SE = standard error; [±] = While raw scores are presented, transformed scores were used for repeated measures analyses as scores were significantly positively skewed. Tests of significant pairwise comparisons between same-gender students in different groups: * $p < .05$, ** $p < .01$. Lower scores indicate lower risk on all variables except: regular meals, screen time and physical activity.