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Teaching Adolescents About Changing Bodies: Randomized Controlled Trial of an Internet Puberty Education and Body Dissatisfaction Prevention Program

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Abstract

This study tested the efficacy of an Internet-based prevention program, *Trouble on the Tightrope: In Search of Skateboard Sam*, on pubertal knowledge, body esteem, and self-esteem. One hundred ninety participants (mean age 11.6 years) were randomized to either an intervention or attention placebo control condition and were assessed at baseline, after 3 Internet-based sessions, and at 3-month follow-up. Although the primary hypotheses were not supported, exploratory moderator analyses indicated that the intervention was beneficial for select students. Specifically, pubertal status moderated the effects on weight-related body esteem and several domains of self-esteem, resulting in positive effects for participants in the intervention group who had begun puberty. Gender differences were found on self-esteem subscales, indicating more robust effects for girls than boys. Tailored Internet programs based on personal characteristics such as gender and pubertal status may be a fruitful area for future research with adolescents.

Keywords

puberty; body image; early adolescence; Internet; self-esteem

The middle school years represent a unique phase when adolescents are faced with many transitions, including emerging self-reflection, drive for autonomy, puberty, and changes in both social networks and social expectations (Patton & Viner, 2007). Longitudinal research supports the contention that the transition to middle school comes with changes in several domains of self-concept, including a precipitous drop in self-perceived physical attractiveness and concomitant body image concerns among girls, and decreased self-perceived competence in social acceptance for both boys and girls (Cole et al., 2001).

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The emerging evidence indicates that body dissatisfaction predicts harmful weight change practices, eating disorders, depression, and substance abuse (Cash & Deagle, 1997; Marcotte, Fortin, Potvin, & Papillon, 2002). Further, early pubertal status influences body dissatisfaction and increases vulnerability to eating disorders and depression (Biro, Striegel-Moore, Franko, Padgett, & Bean, 2006; Davison & McCabe, 2006), with a particular gender disadvantage for early maturing girls (Hayward & Sanborn, 2002).

As recently reviewed by Levine and Smolak (2009), prevention programs have been developed to address body dissatisfaction and disordered eating in children and adolescents (Richardson, Paxton, & Thomson, 2009; Stice, Presnell, Gau, & Shaw, 2007). Taylor and Jones (2007) provide a compelling argument for the use of Internet-based prevention programs but currently they are few in number (Paxton & Franko, 2010). One well-researched example is *Student Bodies*, an Internet-based program developed to decrease weight and shape concerns (Taylor et al., 2006). Abascal, Brown, Winzelberg, Dev, and Taylor (2004) evaluated *Student Bodies* with 13–16 year old girls as part of the physical education curriculum and reported that all groups improved on measures of eating disordered attitudes and behaviors. Heinicke, Paxton, McLean, and Wertheim (2007) evaluated an Internet-based intervention with seventy-three adolescent girls and found clinically significant improvements in body dissatisfaction, disordered eating, and depression at post-intervention and follow-up.

With the increasing use of technology by children and in school settings, Internet-based programs offer distinct advantages over leader-led programs, including greater capacity for dissemination, less training time, and the ability to target information to relevant factors such as gender. Thus, this randomized controlled study tested the efficacy of an Internet-based universal prevention program, *Trouble on the Tightrope: In Search of Skateboard Sam ("Skateboard Sam")*, designed to educate about puberty, body image, and self-esteem in a school-based sample. The primary hypotheses were that exposure to *Skateboard Sam*, relative to the control condition, would improve participants' (1) puberty knowledge; (2) body image; and (3) self-esteem.

Method

Design

This randomized controlled trial was conducted at five middle schools in the northeastern US between January and June 2006 and was approved by the Inflexxion, Inc. institutional review board.

Participants

Depending on the school district's policy, the study took place within the school day in health classes ($n = 4$), or after school ($n = 1$). Teachers placed information sheets and a consent form into students' folders to take home. Of the 256 students given the materials, 190 (74.2%) students returned signed consent forms and were eligible to participate. Inclusion criteria for the study required that participants: (a) were enrolled in a 6^{th} grade classroom; (b) had parents willing to provide consent; and (c) were willing to provide assent.

Procedure

After obtaining parental consent and child assent, students were randomized to groups by gender, using block randomization. Students in the intervention condition used the *Skateboard Sam* website program, while control participants viewed a series of "attention control" science-based websites (e.g., animal life) intended to approximate the viewing time and interactive nature estimated for *Skateboard Sam*.

Three sessions, each approximately one hour in length, took place in the schools' computer labs. During session one, students completed the baseline assessment and used the website for the remainder of the time. During sessions two and three, they again worked through the website, and then completed the post-test assessment. Three months later, students were brought back into the labs to complete the assessment; all assessments were administered using Perseus® survey software (http://www.vovici.com/index.aspx). Students were given a detailed instruction sheet for viewing the web programs in each condition. Research Assistants attended a three-hour training session, monitored all of the sessions to make sure that students were completing the tasks as instructed, and were supervised closely throughout the study. Upon completion of the study, all classrooms were given access to the *Skateboard Sam* computer program. Compensation for participation was $10 after the baseline assessment and $25 after both the post-test and 3-month follow-up assessments.

Intervention

Trouble on the Tightrope—In Search of Skateboard Sam (www.skateboard-sam.com) is a fully animated computer program that covers six health topics including puberty, nutrition, physical activity, self-esteem, and peer relations. The modules, approximately 15 minutes in length, offer targeted information based on a short 14-item profile quiz taken by each participant assessing relevant characteristics (e.g., gender). The program takes place in a carnival setting and the user interacts with the various teenagers who work at the attractions. Balanced for gender, the main characters are siblings, Tilly and Sam. Sam mysteriously disappears, which springs Tilly and friends into action. The user collects clues about Sam's whereabouts and receives both general educational and targeted messages about each health topic through games, quizzes and videos in which characters describe the challenges of growing up. The user eventually discovers that Sam has had a growth spurt and feels like he does not fit in because he now is taller than all of his friends. In the end, the user learns that everyone matures at different rates and in different ways, but all develop unique characteristics and traits to explore and feel confident about as they mature.

Measures

Demographic questionnaire—An 11-item demographic survey was administered to assess relevant variables (e.g., gender, age).

Pubertal status—Although there is debate in the literature as to how best to assess pubertal status, we followed the suggestions made by Dorn (2006) and Bond et al. (2006) and chose the *Physical Development Scale*, which was administered at the baseline assessment (PDS; Petersen, Crockett, Richards, & Boxer, 1988). The PDS is a five-item scale that asks how much, if any, development has begun as perceived by each participant on each of several characteristics of pubertal change. The first three questions pertain to both genders (1-growth in height; 2-growth of body hair, e.g., underarm, and 3-any skin changes, especially pimples). Girls are asked whether they have noticed if their (4) breasts have begun to grow and if they (5) have started to menstruate. Boys are asked whether they have noticed (4) deepening of their voice and (5) growth of facial hair. Participants rate their perceived pubertal development according to four possible responses: has not yet started growing; has barely started growing; is definitely underway; and seems completed. Alpha coefficients based on Petersen et al.'s (1988) sample with participants in sixth grade ranged from .68 to .78 for boys and .76 to .83 for girls. Criterion validity ranged between .61 -. 67 for physician ratings and .72 -. 80 for self-ratings with the Sexual Maturation Scale (Tanner, 1962). Alpha coefficients for the current sample were .62 for boys and .64 for girls. Each participant was categorized into either *puberty not begun* or *puberty underway*, based on Petersen et al. (1988). In this sample, 48% of boys were categorized in the puberty not begun category, relative to 13% of the girls.

Puberty knowledge—Because no suitable measure could be found, this questionnaire was developed and piloted in previous work (Cousineau, Franko, Green, Watt, & Rancourt, 2006; Watt, Rancourt, Cousineau, & Franko, 2005). An initial pool of 35 items was generated from several sources: the scientific literature, puberty-specific questions extrapolated from a sexual health survey (Winn, Coleman, & Roker, 1995), and project consultants. This version was tested in a small focus group and was then administered to 34 middle school students, after which the distribution for each question and total percent correct for all students and by gender were examined. After review, 15 multiple choice and 9 True/False items were retained. Higher scores indicate greater knowledge. The coefficient alpha in the current study sample was .88, which suggests reasonable internal consistency.

Body esteem—The *Body Esteem Scale for Adolescents and Adults* (BES; Mendelson, Mendelson, & White, 2001) is a 23-item scale that taps the affective evaluations of adolescents' bodies, using a Likert scale response format. A factor analysis of the scale resulted in three subscales: *Appearance, Weight,* and *Attribution* (Mendelson et al., 2001). The BES purports to measure a respondent's feelings and attitudes about his/her weight and appearance, as well as the extent to which he or she attributes high/low esteem from others. The internal consistency coefficients in the initial sample for 12 – 13 year old girls were .94, .94, and .84, and .86, .89, and .81 for boys (for the *Appearance, Weight, and Attribution* subscales). For the current sample, the alpha coefficients for these three subscales were .76, .87, and .89 for the girls, and . 79, .81, and .85 for the boys. Higher scores indicate higher body esteem on the relevant scales.

Self-esteem—The *Self-Perception Profile for Adolescents* (*SPP*; Harter, 1985) comprises six subscales measuring children's feelings of competence in two areas (scholastic and athletic), and feelings of acceptance in three areas (social acceptance, physical appearance, and behavioral conduct), as well as a total score. The global self-worth subscale is intended to serve as a summary scale for the entire test. We used three of the scales most relevant to this project: *Social Acceptance, Physical Appearance,* and *Global Self-Worth*, as well as the total score of the *SPP*. The scale has excellent reliability and validity (Schumann et al., 1999). Cronbach alpha coefficients for the three subscales were .76, .78, and .83, respectively (ages 9–14), as reported by Harter (1985). In the current study, alphas were .68, .77, and .72 for the girls, and . 64, .68, and .74 for the boys, respectively, for the three subscales (*Social Acceptance, Physical Appearance, and Global Self-Worth)*. Higher scores indicate a greater sense of competence on the relevant scales.

Statistical Analyses—Mixed model analyses were performed for all outcomes in an intent-to-treat analysis. This approach adjusts for individual-level covariates, efficiently maximizes the correlated nature of the repeated measures data, and handles missing data or unbalanced groups, thereby maximizing the power of the analysis. The primary analysis of estimating differences between the groups across the time points is reflected in the Condition × Time interaction effect, which assesses whether participants who were exposed to the *Skateboard Sam* program improved more over time than participants who were not exposed to the program. A Toeplitz covariance structure was used to account for correlations between an individual's responses over time and assumes that the observations that are close in time will be more correlated than observations that are farther apart. The effect sizes provided are *d*-values and were calculated based on the change scores for each group from baseline to post-test and baseline to the 3-month follow-up assessment, accounting for any differences among outcome measures at baseline (Cohen, 1988). All reported *p*-values were two-tailed. Additionally, analyses of two moderator variables, gender and pubertal status, were conducted based on findings in the literature suggesting the importance of these variables (Marcotte et al., 2002). Moderator analyses were performed using linear mixed modeling to examine the three-way interaction between the moderator variable, condition, and time. In these analyses, all higher

level two-way interactions (Condition × Time, Time × Moderator, and Condition × Moderator) were entered into the model to control for these effects on the three-way interaction.

All data analysis was performed using SAS statistical software (SAS Institute Inc., Cary, NC, USA, Release 9.1) and SPSS 14.0 for Windows.

Results

The sample consisted of 82 boys (43%) and 108 girls (57%). The mean age of the sample 11.7 years (*SD* = .06) and 81% were Caucasian. *T*-tests conducted to assess for baseline differences between the intervention and control group indicated no differences. Similarly, no differences were found between participants who completed the study during school *(n* = 163) and those who completed the study in an after school setting (*n* = 27). Complete data were available for 178 out of 190 enrolled participants (94%).

Although participants in the intervention group increased their scores on the puberty knowledge questionnaire slightly from baseline to post-test and maintained this increase at the 3-month follow-up compared to the control group, this difference did not reach significance ($p = .06$), as shown in Table 1. Moderator variables had no impact on knowledge.

No significant Condition × Time interactions were found on the *BES*. However, moderator analyses indicated that participants in the intervention group for whom puberty was underway showed improvement on the *Weight* subscale from baseline to post-test, relative to control group ($p = .02$), as shown in Table 2. The effect sizes ranged from .02 to .25, indicating a small effect.

There were no significant Condition × Time interaction effects on the *SPP*. However, self-reported pubertal status was found to moderate the results on the *SPP Physical Appearance* subscale ($p = .008$), the *Global Self-Worth* subscale ($p = .002$), and the total *SPP* score ($p = .008$), as shown in Table 2. In each case, participants in the intervention group with puberty underway increased their scores relative to control participants over time. The effect sizes ranged from .07 to .89 in these analyses, indicating small to moderate effects.

Gender moderated the findings on the *Social Acceptance* subscale, *Global Self-Worth* subscale and the total *SPP* score. On the *Global Self-Worth* subscale, girls in the intervention condition improved their scores from baseline to post-test ($p = .005$), relative to controls. Girls in the intervention group showed a similar improvement on the total *SPP* score from baseline to post-test as compared to control girls ($p = .002$). Boys in the intervention group, however, evidenced a decline in their scores on both the *Global Self-Worth* and the total *SPP* subscales, relative to boys in the control group, who showed an improvement. The effect sizes ranged from .18 to .53, indicating small effects.

Discussion

Although the primary hypotheses were not supported, pubertal status was found to moderate the effects on weight-related body esteem and several domains of self-esteem. It may be that the focus on pubertal education was particularly relevant for students in the midst of body changes. Given that more girls than boys were in puberty, it is likely the moderator effects were accounted for by the girls in the sample. This is consistent with the moderating effects of gender on self-esteem. Girls in the intervention group improved on several of the self-esteem scales, whereas boys' scores decreased on both the global self-worth subscale and the total self-esteem score. Although the program was developed with input from boys and girls, the characters were evenly divided between the genders, and the activities were balanced for both action-oriented and creative tasks, it is possible that girls were more responsive to the relational

theme. An alternative explanation may be related to the differential meaning of puberty for boys and girls (Siegel, Yancey, Aneshensel, & Schuler, 1999). The results suggest that further tailoring may be needed to affect positive outcomes in boys and girls.

Strengths of the study include the low attrition rate, the ease of use and short completion time of the program, and the assessment of multiple domains. However, the measure of puberty knowledge developed for this study will require evaluation of its psychometric properties. Additional limitations include the small magnitude of our moderator variable effects, raising the question of clinical versus statistical significance. The negative finding of declines in self-esteem scores for boys suggests that the program may be better utilized with girls and that programs that are helpful to boys will need to be developed. Future research might focus on designing programs that are suited for pre-pubertal adolescents and further refining efforts to address risk factors in early adolescence.

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References

Abascal L, Brown JB, Winzelberg AJ, Dev P, Taylor CB. Combining universal and targeted prevention for school-based eating disorder programs. International Journal of Eating Disorders 2004;35:1–9. [PubMed: 14705151]

Biro FM, Streigel-Moore RH, Franko DL, Padgett J, Bean JA. Self-esteem in adolescent females. Journal of Adolescent Health 2006;39:501–507. [PubMed: 16982384]

Bond L, Clements J, Bertalli N, Evans-Whipp T, McMorris BJ, Patton GC, et al. A comparison of self-reported puberty using the Pubertal Development Scale and the Sexual Maturation Scale in a school-based epidemiologic survey. Journal of Adolescence 2006;29:709–720. [PubMed: 16324738]

Cash T, Deagle EA. The nature and extent of body-image disturbances in anorexia nervosa and bulimia nervosa: A meta-analysis. International Journal of Eating Disorders 1997;22:107–125. [PubMed: 9261648]

Cohen, J. Statistical power analysis for the behavioral sciences. 2. New York: Lawrence Erlbaum; 1988.

Cole DA, Maxwell SE, Martin JM, Peeke LG, Seroczynski AD, Tram JM, et al. The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. Child Development 2001;72:1723–1746. [PubMed: 11768142]

Cousineau TM, Franko DL, Green TC, Watt M, Rancourt D. Body Morph: Feasibility testing of an interactive CD-ROM to teach young adolescents about puberty. Journal of Youth and Adolescence 2006;35:1015–1021.

Davison TE, McCabe MP. Adolescent body image and psychosocial functioning. Journal of Social Psychology 2006;146:15–30. [PubMed: 16480119]

Dorn LD. Measuring puberty. Journal of Adolescent Health 2006;39:625–626. [PubMed: 17046496]

Harter, S. Manual for the Self-Perception Profile for Children. Denver: University of Denver; 1985.

Hayward C, Sanborn K. Puberty and the emergence of gender differences in psychopathology. Journal of Adolescent Health 2002;30(4 Suppl):49–58. [PubMed: 11943575]

Heinicke BE, Paxton SJ, McLean SA, Wertheim EH. Internet-delivered targeted group intervention for body dissatisfaction and disordered eating in adolescent girls: A randomized controlled trial. Journal of Abnormal Child Psychology 2007;35:379–391. [PubMed: 17243014]

Levine, MP.; Smolak, L. Recent developments and promising directions in the prevention of negative body image and disordered eating in children and adolescents. In: Smolak, L.; Thompson, JK., editors. Body image, eating disorders, and obesity in youth. Washington DC: American Psychological Association; 2009. p. 215-240.

Marcotte D, Fortin L, Potvin P, Papillon M. Gender differences in depressive symptoms during adolescence: Role of gender-typed characteristics, self-esteem, body image, stressful life events, and pubertal status. Journal of Emotional and Behavioral Disorders 2002;10:29–42.

Mendelson BK, Mendelson MJ, White DR. Body-esteem scale for adolescents and adults. Journal of Personality Assessment 2001;76:90–106. [PubMed: 11206302]

Patton GC, Viner R. Pubertal transitions in health. Lancet 2007;369:1130–1139. [PubMed: 17398312]

Paxton, SJ.; Franko, DL. Body image and eating disorders. In: Cucciare, MA.; Weingardt, KR., editors. Using technology to support evidence-based behavioral health practices: A clinician's guide. New York: Taylor and Francis; 2010. p. 151-168.

Petersen A, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: Reliability, validity, and initial norms. Journal of Youth and Adolescence 1988;17:117–133.

Richardson SM, Paxton SJ, Thomson JS. Is BodyThink an efficacious body image and self-esteem program? A controlled evaluation with adolescents. Body Image 2009;6:75–82. [PubMed: 19188101]

Schumann BC, Striegel-Moore RH, McMahon RP, Waclawiw MA, Morrison JA, Schreiber G. Psychometric properties of the Self-Perception Profile for Children in a biracial cohort of adolescent girls: The NHLBI Growth and Health Study. Journal of Personality Assessment 1999;73:260–275. [PubMed: 10624004]

Siegel JM, Yancey AK, Aneshensel CS, Schuler R. Body image, perceived pubertal timing, and adolescent mental health. Journal of Adolescent Health 1999;25:155–165. [PubMed: 10447043]

Stice E, Presnell K, Gau J, Shaw H. Testing mediators of intervention effects in randomized controlled trials: An evaluation of two eating disorder prevention programs. Journal of Consulting and Clinical Psychology 2007;75:20–32. [PubMed: 17295560]

Tanner, JM. Growth at adolescence. Springfield, Illinois: Thomas; 1962.

Taylor CB, Bryson S, Luce KH, Cunning D, Doyle AC, Abascal LB, et al. Prevention of eating disorders in at-risk college-age women. Archives of General Psychiatry 2006;63:881–888. [PubMed: 16894064]

Taylor, CB.; Jones, M. Internet-based prevention and treatment of obesity and body dissatisfaction. In: Wilson, GT.; Latner, J., editors. Self-Help for binge eating and obesity. New York: Guilford Press; 2007. p. 141-165.

Watt M, Rancourt D, Cousineau TM, Franko DL. Trouble on the Tightrope: An interactive body image program for middle schoolers. Journal of Nutrition Education and Behavior 2005;37:211–212. [PubMed: 16029693]

Winn S, Coleman J, Roker D. Knowledge about puberty and sexual development in 11 to 16 year olds: Implications for health and sex education in schools. Educational Studies 1995;21:187–201.

Table 1

Means, standard deviations and p-values for primary outcome measures

	Mean Score (*SD*)			
Measure	**Baseline**	**Post**	**3-month**	***p*-value**
Puberty Knowledge Test				
Intervention	0.69 (0.10)	0.72 (0.16)	0.73 (0.11)	.06
Control	0.67 (0.10)	0.67 (0.14)	0.69 (0.12)	
BES: Appearance subscale				
Intervention	24.58 (6.86)	25.06 (6.80)	24.30 (7.98)	.08
Control	23.69 (7.89)	24.64 (7.17)	25.36 (7.32)	
BES: Attribution subscale				
Intervention	13.97 (4.16)	14.42 (3.96)	14.45 (4.88)	.69
Control	13.41 (4.19)	14.22 (3.91)	13.87 (4.08)	
BES: Weight subscale				
Intervention	22.01 (6.50)	22.09 (6.49)	22.23 (7.24)	.95
Control	20.68 (7.60)	21.63 (6.53)	21.95 (7.02)	
SPP: Social Acceptance				
Intervention	18.28 (3.47)	18.77 (3.81)	19.12 (3.64)	.33
Control	18.07 (4.04)	18.05 (4.51)	18.73 (3.97)	
SPP: Physical Appearance				
Intervention	16.62 (4.52)	17.81 (4.69)	18.02 (4.39)	.48
Control	16.38 (4.50)	17.60 (4.58)	18.51 (3.90)	
SPP: Global Self-Worth				
Intervention	19.18 (3.66)	19.19 (4.43)	19.47 (4.49)	.64
Control	19.35 (3.75)	19.49 (3.97)	20.26 (3.75)	
SPP: Total				
Intervention	54.08 (9.36)	55.77 (10.34)	56.60 (10.51)	.38
Control	53.80 (9.87)	55.14 (10.96)	57.49 (9.62)	

Note: BES = Body Esteem Scale; SPP = Self-Perception Profile for Adolescents

Table 2

Means for moderator variable analyses for pubertal status and gender

Outcome variable	Intervention Group (n = 92)			Control Group (n = 98)		
	Baseline	Post	3-month	Baseline	Post	3-month
BES: Weight subscale*						
Puberty not begun	22.01	22.25	22.33	20.68	22.02	22.39
Puberty underway	18.33	21.42	21.50	19.71	19.29	20.54
SPP: Physical Appearance**						
Puberty not begun	16.81	18.28	17.40	16.81	17.99	18.51
Puberty underway	15.68	15.77	17.81	15.00	16.33	15.10
SPP: Global Self-Worth**						
Puberty not begun	20.01	19.68	19.40	19.93	20.25	20.64
Puberty underway	17.92	18.58	20.00	19.86	17.29	18.23
SPP: Total**						
Puberty not begun	56.00	56.94	56.53	55.46	56.63	58.41
Puberty underway	48.75	52.00	57.00	54.00	51.57	52.69
SPP: Global Self-Worth†						
Male	19.18	18.68	18.11	18.50	19.70	19.40
Female	19.19	19.68	19.85	19.84	19.38	19.83
SPP: Total†						
Male	55.03	54.80	53.93	50.72	53.21	53.10
Female	54.83	57.91	58.46	54.38	54.72	55.40

Note: BES = Body Esteem Scale; SPP = Self-Perception Profile for Adolescents

*Significant ($p < .05$) three-way interaction (Time × Condition × Pubertal Status),

**Significant ($p < .01$) three-way interaction (Time × Condition × Pubertal Status)

†Significant ($p < .01$) three way interaction (Time × Condition × Gender)

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