

Research Article

Effects of the Pythagorean Self Awareness Intervention on Childhood Emotional Eating and Psychological Wellbeing: a Pragmatic Trial

Despina S. Kalogiratou¹, Flora Bacopoulou², Christina Kanaka-Gantenbein^{1,2}, Xanthi Tigani¹, Orsalia Gerakini¹, Dimitrios Vlachakis³, George P. Chrousos^{1,2} and Christina Darviri¹

¹Postgraduate Course Stress Management and Health Promotion, Medical School, National and Kapodistrian University of Athens, 4 Soranou Ephessiou Str., Athens 11527, Greece

²First Department of Pediatrics, Medical School, National and Kapodistrian University of Athens, Aghia Sophia Children's Hospital, National and Kapodistrian University of Athens, 1 Thivon Str., Athens 11527, Greece

³Laboratory of Genetics, Department of Biotechnology, School of Applied Biology and Biotechnology, Agricultural University of Athens, Athens, Greece

Received on October 31, 2019; Accepted on December 15, 2019; Published on December 30, 2020

Correspondence should be addressed to Christina Darviri ; Tel: +30 2106597644; E-mail: cdarviri@yahoo.com

Abstract

Background: Emotional eating is the tendency to regulate negative emotions (such as stress, depression and anxiety) through increased or unhealthy food intake. Emotion management, such as stress management could be an appropriate approach to prevent or control maladaptive eating behavior among children. **Materials and methods:** This is a controlled pragmatic trial, testing the effects of Pythagorean Self Awareness Intervention (PSAI), a cognitive stress management program in a primary school setting. The eligibility criterion was being a 4th grade active pupil. Participants were randomly assigned to either the intervention group (n = 23) or the control group (n = 22). Self-report measures were used for the evaluation of various variables at the beginning and the end of the 8-

week monitoring period. Descriptive and inferential statistic methods were used for the statistical analysis. **Results:** At the end of the 8-week period pupils in the intervention group experienced statistically significant reduction in stress (SIC, $p < 0.001$), anxiety (STAIC-trait anxiety, $p = 0.019$, STAIC-state anxiety, $p = 0.006$), guilt ($p < 0.001$) and emotional eating (EES-C, $p < 0.001$) and an increase in Mediterranean diet quality (KIDMED, $p = 0.001$) and pride ($p < 0.001$). No statistically significant differences between the two groups were recorded regarding depression symptoms (CDI, $p = 0.551$) and shame ($p = 0.120$). **Conclusions:** PSAI had positive effects on a sample of primary school attendants' emotional eating and psychological state.

Introduction

Emotional eating is defined as an increase in food intake in response to negative emotions such as anger, depression, boredom, anxiety, loneliness, stress (Ganley 1989), shame (Wong & Qian 2016), as it is thought to temporarily provide comfort and distraction (Spoor *et al.* 2007). Eating in response to emotions among children and adolescents has been associated with a strong preference for high energy dense foods (Nguyen-Michelet *al.*

2007), binge eating (Stice *et al.* 2002), high rates of overweight/obesity (Braet & Van Strien 1997) and eating pathology (Braet *et al.*, 2008). Given that children and adolescents who display maladaptive eating behaviors are likely to develop additional weight-related difficulties, treating their current eating issues is of most importance in order to prevent future unhealthy patterns (Wilfley *et al.* 2011). Recently, there has been a strong interest in the application of mind-body approaches to disordered eating in adults. There is some evi-

dence on the effectiveness of several interventions (cognitive behavior therapy (Cassin *et al.* 2016), working memory training (Houben *et al.* 2016), relaxation training (Manzoni *et al.*, 2009)) on emotional eating reduction in clinical populations. However, sparse data exist on interventions focused on reducing emotional eating in children (Ho *et al.* 2013, Mazzeo *et al.* 2016).

Given that children may feel the urge to eat when under emotional distress (Michels *et al.* 2012, Michels *et al.* 2015), stress management and self-control training may be an important target to decrease emotional eating in children (Chao *et al.* 2016). Cognitive restructuring as a collaborative therapeutic intervention in which distressed individuals are taught how to identify, evaluate, and modify the negative thoughts, evaluations, and beliefs that are considered responsible for their psychological disturbance (Clark 2013) tend to show a promising approach for emotional eating. The present study tested a cognitive stress management program dubbed Pythagorean Self Awareness Intervention (PSAI) to reduce childhood emotional eating. The Pythagorean Self Awareness technique encourages cognitive reconstruction and aims to reduce psychological distress and anxiety by ameliorating daily routine, perception and response to stressors, and by enhancing self-esteem, health locus of control, academic performance, level of satisfaction and general well-being. PSAI has demonstrated significant improvements in stress levels and coping skills of healthy subjects (freshmen students), and in the cognitive and psychological state of adult patients (Anagnostouli *et al.* 2018, Bitchava *et al.* 2017, Chatzikonstantinou *et al.* 2018, Darviri *et al.* 2016, Tsoli *et al.* 2018). Considering youth's lifestyle particularities in comparison to adults, we adapted Pythagorean Self Awareness Intervention for Children and Adolescents (PSAI-CA). We designed an intervention that would be feasible for sustained delivery in a real-world practice setting.

Aim of the study

The primary aim was to reduce emotional eating. The secondary aim was to improve diet quality according to Mediterranean patterns, as well as to reduce stress, shame, depression, anxiety levels and improve lifestyle habits.

Materials and Methods

Trial design and participants

This pilot controlled cluster-randomized, pragmatic trial was conducted in a primary school setting in the urban area of Attica Province (Greece) between April and June 2018. The study protocol was designed by the Postgraduate Course Stress Management and Health Promotion, Medical School of the National and Kapodistrian University of Athens. The PSAI-CA was integrated into the school curriculum (Flexible Zone lesson) for 8-weeks, while the class teacher was simultaneously present. All the procedures were delivered by a dietitian-nutritionist, qualified in stress management and health promotion (DK) and a Professor of Health Promotion (Postgraduate Course Stress Management and Health Promotion, National and Kapodistrian University of Athens), expert in stress management and health promotion (XD).

The only eligibility criterion was being enrolled in the 4th grade of primary education. All eligible students and their parents were informed about the study's proceedings and purposes. Exclusion criteria included: 1. practice of other stress management techniques, 2. absence of parental informed written consent. The 4th grade consisted of two classes. One of them was randomly assigned to the intervention group and the other to the control group. The control group did not receive any intervention, but followed the usual school provision.

Assessment

Baseline assessments were conducted in both groups (intervention group and control group) and included self-reported questionnaires, demographic data (sex, age, family status, paternal educational level, maternal educational level) and anthropometric data (measured body weight and height, waist circumference, hip circumference). Body weight was recorded to the nearest 0.1 kg with the use of a digital calibrated scale, with participants standing, without shoes, in the minimum clothing possible. Height was measured to the nearest 1 cm with participants standing without shoes, with the use of a stadiometer. Body Mass Index (BMI) was estimated by dividing weight in kilograms by the height in meters squared (Nuttall, 2015). BMI z-scores were calculated based on World Health Organization (WHO) growth charts (de Onis *et al.* 2006). Waist-to-hip ratio was calculated by dividing waist to hip circumference.

Primary outcome measures

Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C): EES-C is a 26-item self-report measure used to assess the urge to cope with negative affect by eating. It generates three subscales: depression, anger/anxiety/frustration, and feeling unsettled. Respondents rate their desire to eat in response to each emotion on a 5-point scale (no desire, small desire, moderate desire, strong urge, and overwhelming urge to eat). Higher scores indicate a greater reported desire to eat in response to negative mood states. It yields very good internal consistency (Cronbach's Alphas: from 0.83 to 0.95) and demonstrates good convergent and discriminant validity in children and adolescents aged 8-17 years old (Tanofsky-Kraff *et al.* 2007).

Secondary outcome measures

KIDMED index: This is the Mediterranean diet quality index for children and adolescents. It is based on principles sustaining Mediterranean dietary patterns and comprises 16 “yes” or “no” questions that could be self-administered or conducted by interview. Questions denoting a negative connotation, with respect to the Mediterranean diet, were assigned a value of -1, and those with a positive aspect +1. The sums of the values from the administered test are classified into three levels: 1. >8, optimal Mediterranean diet, 2. 4–7, improvement needed to adjust intake to Mediterranean patterns, 3. <3 very low diet quality (Serra-Majem *et al.* 2004). This index has been validated in the Greek population (Kontogianni *et al.* 2008).

Stress in Children (SIC): This is a self-report psychometric instrument for children aged 9-11 years that contains 21 questions about physical, emotional, and symptomatic aspects of stress. Each question is answered using a 4-point Likert-type scale (1 = never, 4 = very often) (Osika, Friberg, & Wahrborg, 2007). SIC translation has been used in a study in Greek children and adolescents (Emmanouil *et al.* 2018).

Child Depression Inventory (CDI): CDI is a 27-item measure used to evaluate depressive symptoms in children. In each item the child has three possible answers: 0 indicating an absence of symptoms, 1 indicating mild symptoms, and 2 definite symptoms. The total score can range from 0 to 54 (Kovacs 1985). CDI has been validated in the Greek population (Giannakopoulos *et al.* 2009).

State - Trait Anxiety in Children (STAIC): STAIC is a 40-item self-report measure of state

and trait anxiety developed for use within the primary school setting. It consists of two forms of 20 items; one form asking children how they feel at a particular moment in time responding to the state anxiety scale (STAIC-state anxiety), and the other asking children how they feel generally responding to the trait anxiety scale (STAIC-trait anxiety). Each question is answered using a 3-point Likert-type scale (Spielberger & Edwards 1973). STAIC has been validated in the Greek population (Psychountaki *et al.* 2003).

State Shame and Guilt Scale (SSGS): SSGS is a self-report measure comprised of 15 items. Five items for each of three subscales measure state-feelings of shame, guilt, and pride. An example of a guilt item is, “I felt bad about something I did.” An example of a shame item is, “I want to sink into the floor and disappear.” Participants are asked to respond to how they currently feel and response items are rated on a 5-point Likert scale (1 = Not feeling this way at all to 5 = Feeling this way very strongly) (Marschall *et al.* 1994).

Everyday Lifestyle-Health Questionnaire for Children (ELHQ-CH): ELHQ-CH was developed by the Postgraduate Course Stress Management and Health Promotion, School of Medicine, National and Kapodistrian University of Athens. Support and aerobic exercise were assessed with a 4-point scale ranging from 1 “rarely/never” to 4 “always”. Meal timing was assessed with a 4-point scale ranging from 1 “never” to 4 “very often”. Concerning life satisfaction, participants rated how satisfied they felt about, a) their life in general (every day activities, sleep, free time), b) their school (academic performance) and c) interpersonal relationships (family, friends), with a 5 point scale ranging from 1 “not at all” to 5 “very much”. Bedtime was assessed with the question “during the last thirty (30) days, what time do you go to sleep every night”. Sleep quality was assessed with the question “during the past thirty (30) days, how would you rate your sleep quality” with a 4 point scale ranging from 0 “very good” to 4 “very bad”.

Intervention

Participants met once per week (90 min. per session) over 8 weeks. Prior to the first session, students were trained individually in diaphragm breathing using the Biofeedback software. Pedometers were provided as an incentive for exercising. During sessions, participants received instructions on the practice of PSAL-CA and were encouraged

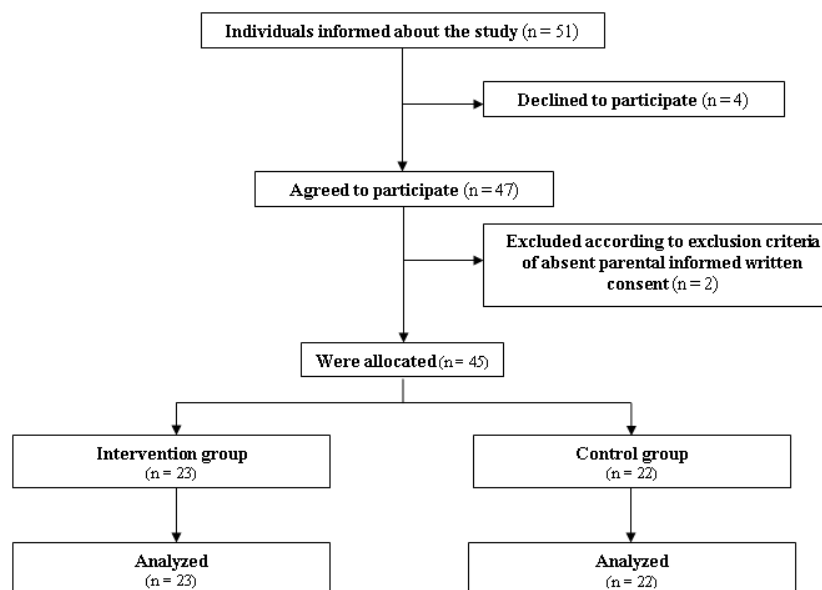


Figure 1. Flow diagram of the study.

to participate in group discussions of practical issues or ideas that might have emerged during the previous days. In each session a weekly activity log, reading materials, and homework assignments were provided.

Sample size

The intervention was successfully completed without any dropouts. Out of the 51 pupils who were registered in the 4th grade (2 classes) of the school setting, 47 consented to participate and their parents were asked to provide written informed consent. Two were excluded due to absence of parental written consent form. Finally, 45 students took part in the study. We randomly allocated one class of the 4th grade as the intervention group ($n = 23$) and the other class as the control group ($n = 22$). Blinded design could not be employed.

PSAI-CA

PSAI-CA is practiced shortly before night sleep while adopting a relaxed position in a quiet area. The individual has to follow three cognitive processes. Firstly, the individual has to recall every event throughout the day in the exact time sequence that it happened. In order to facilitate recall, events are categorized as follows: diet, physical activity, personal relationships, sleep, spiritual improvement, and scheduled activities. In the second step, the individual chooses the events that seem important to him/her and remember precise the details accompanying them (e.g. the exact quantity of food at breakfast, all the words used in a discussion). For the categories of diet, exercise

and sleep, details are straightforward. However, for personal contacts, the individual has to choose those that seem to bear personal or emotional significance. At the last step, each selected event is subjected to the critical appraisal using three questions: “In what have I done wrong?”, “What have I done right?”, “What have I omitted that I ought have done?”. The individual tries to remain detached by the emotional burden of the event and contemplate on the performed actions as if he/she was a “judge” of him-/her-self. With regards to diet, exercise and sleep, guidance is already given during the first session. Events or choices pertinent to personal relationships are judged freely by the individual, since the primary goal is to enhance self awareness and not to criticize them. Pythagorean virtues (such as cooperation, order and accuracy, fairness, truthfulness, industriousness, discipline and respect for the law, contribution to the general good, courage, decent behavior, cleanliness and perfect appearance, temperance, charity and spirituality) consist the moral reference for this critical appraisal.

Statistical Analyses

Baseline characteristics and outcome data were presented as means, standard deviations (SD), or frequencies within groups. For baseline data comparisons between groups were performed by using Pearson's exact chi-square and Mann-Whitney U tests for categorical and interval characteristics, respectively. The main endpoints were addressed by using non-parametric tests due to the small study's sample. Absolute differences (Δ =final measurement minus baseline measurement) were

Table 1. Demographic, anthropometric data and baseline measurements across the study groups.

	PSAI group N=23 mean \pm SD or n (%)	Control Group N=22 mean \pm SD or n (%)	P Value
Age	9.78 \pm 0.36	9.70 \pm 0.28	0.066
Gender			0.641
Male	12(52.2)	13(59.1)	
Female	11(47.8)	9(40.9)	
Parental marital status			0.372
Unmarried	0	1	
Married	20(87)	20(90.9)	
Divorced	3(13)	1(4.5)	
Maternal education level			0.974
High School	2(8.7)	2(9.1)	
University	15(65.2)	13(59.15)	
Master	6(26.1)	7(31.8)	
Paternal education level			0.735
High School	3(13)	1(4.5)	
University	13(56.5)	12(54.6)	
Master	7(30.4)	9(40.9)	
BMI z-score	0.6 \pm 1.25	1.2 \pm 1.03	0.059
Waist to hip ratio	0.86 \pm 0.08	0.83 \pm 0.04	0.199
SIC	39 \pm 5.03	40.1 \pm 8.45	0.845
STAIC-trait anxiety	32.05 \pm 7.14	30.2 \pm 9	0.278
STAIC-state anxiety	28.4 \pm 5.95	25.9 \pm 4.35	0.145
EES-C	55.3 \pm 19.27	63.5 \pm 29.4	0.504
CDI	24.9 \pm 2.41	26.6 \pm 3.19	0.120
KIDMED	7.7 \pm 1.84	7.0 \pm 2.39	0.281
SSGS-shame	6.5 \pm 1.94	7.7 \pm 3.5	0.530
SSGS-guilt	10.26 \pm 3.95	9.6 \pm 4.34	0.484
SSGS-pride	21.8 \pm 2.83	21.3 \pm 4.1	0.980
Life Satisfaction	34.1 \pm 4.65	35.6 \pm 5.06	0.189
Support	8.6 \pm 1.95	9.36 \pm 2.4	0.243
Aerobic Exercise	2.9 \pm 1.13	3.5 \pm 0.98	0.055
Meal timing	13.3 \pm 3.7	14.6 \pm 3.87	0.194
Go to bed time	21.91 \pm 0.74	21.56 \pm 2.67	0.536
Sleep quality	1.1 \pm 1.05	0.59 \pm 0.79	0.063

BMI: Body Mass Index, SIC: Stress in Children, STAIC: State-Trait Anxiety Scale, EES-C: Emotional Eating Scale in Children and Adolescents, CDI: Child Depression Inventory, KIDMED: Mediterranean Diet Quality Index in Children and Adolescents, SSGS: State Shame Guilt Scale, Life satisfaction-Support-Aerobic exercise-Meal timing-Go to bed time-Sleep quality: questionnaire ELHQ-CH, SD: standard deviation

Frequencies were analyzed by Pearson's chi square (categorical by categorical comparisons) and non-parametric Mann-Whitney U-test (categorical by quantitative comparisons)

*Significance level $p = 0.05$

Table 2. Comparisons of outcomes' differences across study groups.

	PSAI group N= 23	Control Group N=22	P Value
	mean \pm SD	mean \pm SD	
Δ SIC	-7.2 \pm 5.4	3.1 \pm 12.05	<0.001*
Δ STAIC-trait anxiety	-7.3 \pm 4.6	-2,1 \pm 7.2	0.019*
Δ STAIC-state anxiety	-3.68 \pm 3.8	0.3 \pm 4.28	0.006*
Δ EES-C	-18.7 \pm 12.33	2 \pm 5.01	<0.001*
Δ CDI	0.9 \pm 2.7	1 \pm 5.2	0.551
Δ KIDMED	2.9 \pm 1.23	-0.2 \pm 1.75	<0.001*
Δ SSGS-shame	-1 \pm 1.41	0.14 \pm 3.48	0.120
Δ SSGS-guilt	-4.5 \pm 3.40	1.1 \pm 3.91	<0.001*
Δ SSGS-pride	1.6 \pm 1.72	-2 \pm 3.38	<0.001*
Δ Life Satisfaction	4 \pm 4.15	0.6 \pm 6.51	0.020*
Δ Support	1.4 \pm 2.13	-0.5 \pm 2.42	0.014*
Δ Aerobic Exercise	0.6 \pm 1.17	-0.2 \pm 1.15	0.019*
Δ Meal timing	3.9 \pm 4.14	0 \pm 3.34	0.002*
Δ Go to bed time	-0.2 \pm 0.53	0.65 \pm 2.7	0.020*
Δ Sleep quality	-0.8 \pm 0.91	0.4 \pm 1.12	<0.001*

Non-parametric Mann-Whitney U tests for categorical by numerical comparisons;

Level of significance $p < 0.05$

SD: standard deviation

used as dependent variables in the Mann-Whitney U tests for the between-group comparisons. The level of significance was set at 0.05. Analyses were performed using SPSS version 22.0 (Chicago IL).

Results

Figure 1 shows the flowchart of the study. The average age for our sample was 9.7 years, 55.6% were boys. Participants were normal weight (mean BMI z-score 0.9) with a mean waist to hip ratio of 0.8. Groups were compared regarding gender, parental marital status, maternal and paternal education level, waist to hip ratio and BMI z-score. Baseline outcome measurements between-groups were also compared (Table 1). No statistically significant differences were observed ($p > 0.05$ for all comparisons).

As shown in Table 2, participants in the intervention group experienced statistically signif-

icant greater reduction in stress levels (SIC, $p < 0.001$), anxiety levels (STAIC-trait, $p = 0.019$, STAIC-state, $p = 0.006$), emotional eating (EES-C, $p < 0.001$), guilt (SSGS-guilt, $p < 0.001$) and greater increase in Mediterranean diet quality (KIDMED, $p = 0.001$) and pride (SSGS-pride, $p < 0.001$) compared to the control group. Life Satisfaction ($p = 0.020$), support ($p < 0.001$), aerobic exercise ($p = 0.019$), meal timing ($p = 0.002$), go to bed time ($p = 0.020$), and sleep quality ($p = 0.014$) were also statistically significant improved. No statistically significant difference between the two groups was recorded regarding depressive symptoms (CDI, $p = 0.551$) and shame (SSGS, $p = 0.120$).

Discussion

In this present study we investigated the effect of a novel cognitive stress management program to primary education students. PSAI-CA resulted in

the reduction of emotional eating and improvements in the participants' psychological state and lifestyle habits. Furthermore, we quote some qualitative comments which we have been recorded during the intervention period on: 1) mood, "I feel happier", 2) sleep, "I wake up more rejuvenated", 3) cognitive reconstruction, "I can face a problem better", 4) interpersonal relationships, "I avoid arguing with my sister", 5) self, "I started believe in myself", 6) routine, "I avoid watching TV before sleep, I prefer reading my book".

Although stress mediators, such as cortisol, were not determined, we speculate that the observed reduction in emotional eating could be attributed to possible decreased cortisol levels, which is known to promote food intake. The PSAl-CA technique requires daily self-assessment, which leads to self-knowledge and self-control. As expected self-regulation kept participants away from overeating to provide distraction from aversive emotions, as emotional eating is intended to do (Spoor *et al.* 2007). The PSAl-CA was beneficial in stress and anxiety reduction, likewise other cognitive interventions in children and adolescents (Hampel *et al.* 2008, Stallard *et al.* 2014). Contrary to the results of another study in a larger sample of students (Challen *et al.* 2014), the participants' depressive symptoms did not improve. Guilt and pride improvement could be attributed to the PSAl technique's cognitive progress requirement, which enhances self control and emotion regulation.

The study has several limitations, such as the small sample size, the short duration of the intervention, the lack of follow-up assessment and the fact that participants were recruited from only one primary school setting. Furthermore, our outcome measures were based on self-reports and not on objective clinical and/or laboratory assessments. As such, generalization and validity of the results are cumbersome.

Our cognitive stress management technique's uniqueness lies in the concentration on a dysfunctional situation or idea and its resolution by cognitive self-appraisal and effort. Simultaneously, guiding resulting from Pythagorean virtues and their integration into daily self-assessment sets out a basic framework of behavior for children, through which they can evolve spiritually, morally, and physically. In addition to the aforementioned, compared to others, the PSAl-CA technique can easily be taught (after a small period of training) and can be practiced systematically by the individual on his/her own. A key aspect of

our study was that the class teacher, as a component of routine school practice was present during all sessions and contributed substantially by encouraging students to follow the intervention program. Furthermore, the school determined the time of the day that PSAl-CA would be delivered to adapt it to the school program in the best possible way.

In conclusion, this study showed that cognitive stress management programs yield positive results in reducing childhood emotional eating. Our current study enhances the understanding of the effectiveness of PSAl-CA in real-life conditions. Future studies should confirm these findings with larger sample sizes. It would be of importance to conduct a series of sessions involving the parents of the participants to enhance stress management techniques in all family members.

Conflict of Interest

Authors declare no conflicts of interest.

Authors' Contributions

Despina S. Kalogiratos designed the work, performed the statistical analysis, drafted the manuscript. Flora Bacopoulou, Christina Kanaka-Gantenbein and Xanthi Tigani supervised the project. Orsalia Gerakini carried out the data collection. George P. Chrousos and Christina Darviri conceived of the original idea and supervised the project. All authors read and reviewed the final manuscript.

References

- Anagnostouli M, Babili I, Chrousos G, Artemiadis A & Darviri C 2018 A novel cognitive-behavioral stress management method for multiple sclerosis. A brief report of an observational study. *Neurol Res* **41** 223-226
- Bitchava I, Paleologou AMP, Chrousos G, Artemiadis AK & Darviri C 2017 Pythagorean Self-Awareness serves effectively for Stress Management on Freshmen. *SOCRATES* **5** 15-37
- Braet C, Claus L, Goossens L, Moens E, Van Vlierberghe L & Soetens B 2008 Differences in Eating Style between Overweight and Normal-Weight Youngsters. *J Health Psychol* **13** 733-743
- Braet C & Van Strien T 1997 Assessment of emotional, externally induced and restrained eating behaviour in nine to twelve-year-old obese and

- non-obese children. *Behav Res Ther* **35** 863–873
- Cassin SE, Sockalingam S, Du C, Wnuk S, Hawa R & Parikh SV 2016 A pilot randomized controlled trial of telephone-based cognitive behavioural therapy for preoperative bariatric surgery patients. *Behav Res Ther* **80** 17–22
- Challen AR, Machin SJ & Gillham JE 2014 The UK Resilience Programme: a school-based universal nonrandomized pragmatic controlled trial. *J Consult Clin Psychol* **82** 75–89
- Chao A, Grey M, Whitemore R, Reuning-Scherer J, Grilo CM & Sinha R 2016 Examining the mediating roles of binge eating and emotional eating in the relationships between stress and metabolic abnormalities. *J Behav Med* **39** 320–332
- Chatzikonstantinou F, Miskedaki A, Antoniou C, Chatzikonstantinou M, Chrousos G & Darviri C 2018 A novel cognitive stress management technique for acne vulgaris: a short report of a pilot experimental study. *Int J Dermatol* **58** 218–220
- Clark DA 2013 Cognitive Restructuring. In SG Hofmann (Ed.) *The Wiley Handbook of Cognitive Behavioral Therapy* 1–22
- Darviri C, Zavitsanou C, Delikou A, Giotaki A, Artemiadis A, Terentiou A & Chrousos GP 2016 A Novel Non-Pharmaceutical Treatment for Patients with Mild Cognitive Impairment. *Psycho* **7** 678
- de Onis M, Onyango AW, Borghi E, Garza C, Yang H & WHO Multicentre Growth Reference Study Group 2006 Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutr* **9** 942–947
- Emmanouil CC, Pervanidou P, Charmandari E, Darviri C & Chrousos GP 2018 The effectiveness of a health promotion and stress-management intervention program in a sample of obese children and adolescents. *Hormones (Athens)* **17** 405–413
- Ganley RM 1989 Emotion and eating in obesity: A review of the literature. *Int J Eat Disord* **8** 343–361
- Giannakopoulos G, Kazantzi M, Dimitrakaki C, Tsiantis J, Kolaitis G & Tountas Y 2009 Screening for children's depression symptoms in Greece: the use of the Children's Depression Inventory in a nation-wide school-based sample. *Eur Child Adolesc Psychiatry* **18** 485–492
- Hampel P, Meier M & Kümmel U 2008 School-based stress management training for adolescents: Longitudinal results from an experimental study. *J Youth Adolesc* **37** 1009–1024
- Ho M, Gow M, Halim J, Chisholm K, Baur LA, Noakes M, Steinbeck K, Kohn MR, Cowell CT & Garnett SP 2013 Effect of a prescriptive dietary intervention on psychological dimensions of eating behavior in obese adolescents. *Int J Behav Nutr Phys Act* **10** 119
- Houben K, Dassen FCM & Jansen A 2016 Taking control: Working memory training in overweight individuals increases self-regulation of food intake. *Appetite* **105** 567–574
- Kontogianni MD, Vidra N, Farmaki AE, Koinaki S, Belogianni K, Sofrona S, Magkanari F & Yannakoulia M 2008 Adherence Rates to the Mediterranean Diet Are Low in a Representative Sample of Greek Children and Adolescents. *J Nutr* **138** 1951–1956
- Kovacs M 1985 The Children's Depression Inventory (CDI). *Psychopharmacol Bull* **21** 995–998
- Manzoni GM, Pagnini F, Gorini A, Preziosa A, Castelnuovo G, Molinari E & Riva G 2009 Can relaxation training reduce emotional eating in women with obesity? An exploratory study with 3 months of follow-up. *J Am Diet Assoc* **109** 1427–1432
- Marschall D, Sanftner J & Tangney J 1994 *The state shame and guilt scale (SSGS)*. George Mason University, Fairfax, VA
- Mazzeo S E, Lydecker J, Harney M, Palmberg AA, Kelly NR, Gow RW, Bean MK, Thornton LM, Tanofsky-Kraff M, Bulik CM, Latzer Y & Stern M 2016 Development and preliminary effectiveness of an innovative treatment for binge eating in racially diverse adolescent girls. *Eat Behav* **22** 199–205
- Michels N, Sioen I, Braet C, Eiben G, Hebestreit A, Huybrechts I, Vanaelst B, Vyncke K & De Henauw S 2012 Stress, emotional eating behaviour and dietary patterns in children. *Appetite* **59** 762–769
- Michels N, Sioen I, Boone L, Braet C, Vanaelst B, Huybrechts I & De Henauw S 2015 Longitudinal association between child stress and lifestyle. *Health Psychol* **34** 40–50
- Nguyen-Michel ST, Unger JB & Spruijt-Metz D 2007 Dietary correlates of emotional eating in adolescence. *Appetite* **49** 494–499
- Nuttall FQ 2015 Body Mass Index: Obesity, BMI, and Health A Critical Review. *Nutr Today* **50** 117
- Osika W, Friberg P & Wahrborg P 2007 A new short self-rating questionnaire to assess stress in children. *Int J Behav Med* **14** 108–117
- Psychountaki M, Zervas Y, Karteroliotis K & Spielberger C 2003 Reliability and Validity of the

- Greek Version of the STAIC. *Eur J Psychol Assess* **19** 124–130
- Serra-Majem L, Ribas L, Ngo J, Ortega RM, García A, Pérez-Rodrigo C & Aranceta J 2004 Food, youth and the Mediterranean diet in Spain. Development of KIDMED, Mediterranean Diet Quality Index in children and adolescents. *Public Health Nutr* **7** 931–935
- Spielberger CD & Edwards CD 1973 *STAIC preliminary manual for the State-Trait Anxiety Inventory for Children (“How I Feel Questionnaire”)*. Palo Alto, Calif.: Consulting Psychologists Press
- Spoor STP, Bekker MHJ, Van Strien T & van Heck GL 2007 Relations between negative affect, coping, and emotional eating. *Appetite* **48** 368–376
- Stallard P, Skryabina E, Taylor G, Phillips R, Daniels H, Anderson R & Simpson N 2014 Classroom-based cognitive behaviour therapy (FRIENDS): a cluster randomised controlled trial to Prevent Anxiety in Children through Education in Schools (PACES). *Lancet Psychiatry* **1** 185–192
- Stice E, Presnell K & Spangler D 2002 Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychol* **21** 131–138
- Tanofsky-Kraff M, Theim KR, Yanovski SZ, Bassett AM, Burns NP, Ranzenhofer LM, Glasofer DR & Yanovski JA 2007 Validation of the Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C). *Int J Eat Disord* **40** 232–240
- Tsoli S, Vasdekis S, Tigani X, Artemiadis A, Chrousos G & Darviri C 2018 A novel cognitive behavioral treatment for patients with chronic insomnia: A pilot experimental study. *Complement Ther Med* **37** 61–63
- Wilfley DE, Kolko RP & Kass AE 2011 Cognitive Behavioral Therapy for Weight Management and Eating Disorders in Children and Adolescents. *Child Adolesc Psychiatr Clin N Am* **20** 271–285
- Wong M & Qian M 2016 The role of shame in emotional eating. *Eat Behav* **23** 41–47