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Perceived stress, coping and eating behaviours in Maltese adolescents: Developing an effective online intervention

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**PERCEIVED STRESS, COPING AND EATING BEHAVIOURS IN MALTESE
ADOLESCENTS: DEVELOPING AN EFFECTIVE ONLINE INTERVENTION**

by

DANIELA CASSOLA

A thesis submitted to Plymouth University
in partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

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Faculty of Health, Education and Society

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Abstract

Perceived stress, coping and eating behaviours in Maltese adolescents: Developing an effective online intervention

Daniela Cassola

Prevalence rates of overweight and obesity in Maltese adolescents are amongst the highest in the world. Stress-induced eating and dysfunctional coping skills have been linked to overeating and obesity.

This study was undertaken in two phases. Phase 1 examined the relationship between perceived stress, coping and eating behaviours in Maltese adolescents and devised a model to guide the development of an effective Internet-based intervention. Based on the findings, Phase 2 developed ACES – a novel online intervention for the reduction of perceived stress and emotional eating in Maltese adolescents – and assessed its feasibility.

In Phase 1, cross-sectional data were gathered from 79 Maltese adolescents using an online questionnaire with 6 self-report measures examining perceived stress, coping responses, eating behaviours, self-efficacy, physical exercise and social support. Findings suggested that emotional eating behaviours can be decreased by reducing perceived stress and dysfunctional coping strategies (*self-controlling* and *escape-avoidance*) and increasing self-efficacy and functional coping strategies (*seeking social support* and *planful problem solving*).

In Phase 2, ACES was developed and a feasibility study, with a one-group pretest-posttest design, carried out to assess the functionality, usability, perceived utility and acceptability of ACES and to test the design of a definitive randomized controlled trial. Forty-six out of 125 participants completed ACES. Findings suggested that ACES is feasible and well-received by participants. Preliminary effectiveness results provide additional support for the Phase 1 findings concerning the variables that need to be taken into account to decrease emotional eating behaviours.

This study has made significant contributions to the literature and offered insights into specific functional and dysfunctional coping strategies impacting perceived stress and eating behaviours. It has produced an online intervention, which is a feasible avenue for the reduction of perceived stress and emotional eating, that could be built upon by practitioners and researchers, with potential implications for obesity prevention.

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List of Abbreviations

ACES (Phase 1)	Adolescents Coping Eating and Stress study
ACES (Phase 2)	Adolescents Coping with Emotional eating and Stress
ANOVA	Analysis of Variance
BMI	Body Mass Index
CMS	Content Management System
DEBQ	Dutch Eating Behaviour Questionnaire
GSE	General Self Efficacy Scale
EU	European Union
HBSC	Health Behaviour in School-aged Children study
HELENA	Healthy Lifestyle by Nutrition in Adolescence
IOTF	The International Obesity Task Force
IPAQ	International Physical Activity Questionnaire
MSPSS	Multidimensional Scale of Perceived Social Support
MSCARED	Motivational Strategies of Change for Adolescents Recovering from an Eating Disorder
PIN	Personal Identification Number
PSD	Personal and Social Development
PSS	Perceived Stress Scale
RCT	Randomized Controlled Trial
SNAKE	Stress Nicht Als Katastrophe Erleben (stress prevention program)
SPSS	Statistical Package for the Social Sciences
URL	Uniform Resource Locator
USA	United States of America
USB	Universal Serial Bus
WHO	World Health Organization

Glossary

Accepting responsibility - “acknowledges one's own role in the problem with a concomitant theme of trying to put things right” (Folkman & Lazarus 1988, p.7).

Adolescence - refers to the teenage years from thirteen to nineteen. It is viewed as a period of transition from childhood to adulthood that is characterised by morphological, physiological, and cognitive changes (McNamara 2000).

Confrontive coping - “describes aggressive efforts to alter the situation and suggests some degree of hostility and risk-taking” (Folkman & Lazarus 1988, p.7).

Coping - “the cognitive and behavioral efforts to manage specific external and/or internal demands appraised as taxing or exceeding the resources of the individual.” (Folkman & Lazarus 1988, p.2).

Distancing - “describes cognitive efforts to detach oneself and to minimize the significance of the situation” (Folkman & Lazarus 1988, p.7).

Dysfunctional coping - strategies empirically associated with an inability to cope (Frydenberg & Lewis 2000).

Eating behaviours - refers to three types of eating behaviours that are believed to be associated with excessive snacking, weight gain, and bingeing, namely, emotional eating, external eating, and restrained eating (van Strien & Oosterveld 2008).

Emotional eating - eating in response to negative emotions (van Strien & Oosterveld 2008).

Escape-avoidance - “describes wishful thinking and behavioral efforts to escape or avoid the problem” (Folkman & Lazarus 1988, p.7).

External eating - eating in response to seeing or smelling food (van Strien & Oosterveld 2008).

Functional coping - “direct attempts to deal with the problem, with or without reference to others” (Lewis & Frydenberg 2002, p.423).

Obesity - Obesity is defined as excess accumulation of adipose tissue under the skin as well as around organs in the body to an extent that impairs both physical and psychosocial health and well-being (James 2004). Defining overweight and obesity is essential since their reported prevalence differs considerably depending on the criteria or cut-off points used for their

definition (The International Association for the Study of Obesity 2004). There are different anthropometric measures for describing obesity. In the current study, body mass index (BMI; weight in kilograms divided by the square of the height in metres) and waist circumference were used to quantify overweight and obesity status.

Perceived stress - the degree to which situations in an individual's life are appraised as (considered) stressful (Cohen et al. 1983; Herrero & Meneses 2006; Wichianson et al. 2009). The term "stressful", in turn, is defined as unpredictable, uncontrollable and overloading (Örücü & Demir 2009).

Planful problem solving - "describes deliberate problem-focused efforts to alter the situation, coupled with an analytic approach to solving the problem" (Folkman & Lazarus 1988, p.7).

Positive reappraisal - "describes efforts to create positive meaning by focusing on personal growth. It also has a religious dimension" (Folkman & Lazarus 1988, p.7).

Restrained eating - eating less than desired to maintain or lose body weight (van Strien & Oosterveld 2008).

Seeking social support - "describes efforts to seek informational support, tangible support, and emotional support" (Folkman & Lazarus 1988, p.7).

Self-controlling - "describes efforts to regulate one's feelings and actions" (Folkman & Lazarus 1988, p.7).

Self-efficacy - a belief in one's ability or skill to execute a particular behaviour or attain a particular goal (Dwyer & Cummings 2001).

Stress - refers to an interface between the demands made on an individual and the amount of coping an individual believes is available to him or her. It refers to the interaction between an individual and the environment (Cohen et al. 1995; McNamara 2000).

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“Piglet noticed that even though he had a Very Small Heart, it could hold a rather large amount of Gratitude.”

A.A. Milne

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Statement of Contribution to Research Study

The researcher, with guidance from the Director of Studies and the Second Supervisor, was responsible for all aspects of the research study. These included, but were not limited to, the following :

- Literature review for Phase 1 and Phase 2
- Development of quadrant model (Figure 3)
- Study design and methodology of Phase 1 and Phase 2
- Preparation of the online questionnaires on LimeSurvey for Phase 1 and Phase 2
- Applying to relevant authorities to obtain permission to conduct Phase 1 and Phase 2 research studies
- Data collection and data analysis for Phase 1 and Phase 2
- Writing of all the content of the online intervention including the comic dialogue, interactive activities, and handouts for Phase 2
- Creation of the comic slides using www.toondoo.com for Phase 2
- Preparation of all the pictures used in the online intervention (e.g. in the handouts, in the interactive activities, etc) for Phase 2
- Preparation of paper prototype of online intervention for Phase 2
- Seeking sponsors for raffles
- Briefing students during recruitment periods for Phase 2
- Moderation of the online discussion board
- Contributing to and facilitating discussion on the online discussion board

Author's Declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Graduate Committee. Work submitted for this research degree at the Plymouth University has not formed part of any other degree either at Plymouth University or at another establishment. This study was financed with the aid of a studentship from the School of Health Professions, Plymouth University.

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Chapter 1: Introduction

“Before beginning a Hunt, it is wise to ask someone what you are looking for before you begin looking for it.”

A. A. Milne

1.1 Introduction

The current chapter describes the background and setting for this study. It then discusses the justification for and need to conduct this research, as well as the purpose of the study.

1.2 Setting

The Maltese archipelago covers an area of 316 square kilometres and is situated in the centre of the Mediterranean Sea (Grech & Farrugia Sant’Angelo 2009; Department of Health Information and Research 2008). This archipelago consists of three islands, namely Malta, Gozo and Comino (which is uninhabited). The total population is around 413,000, making it the country with the highest population density in the European Union (EU) – 1,307 persons per km² (National Statistics Office 2010; World Health Organization 2007).

Despite the fact that Malta is in the Mediterranean, the population does not strictly follow a Mediterranean diet. Dietary habits have been influenced by the almost 200-year long British rule as well as by the proximity to Italy and the cultural and commercial ties Malta has with this country (Piscopo 2004; Department of Health Information and Research 2008). Malta’s long dependence on food imports and the advent of fast food chains have also had their impact (Atkins & Gastoni 1997; Piscopo 2004).

Malta has shifted towards a westernised diet with an increase in the consumption of meat, milk and dairy products, eggs, vegetable oils, salt, as well sugar intake (confectionery and non-

alcoholic beverages), and a decrease in the consumption of cereals (Bellizzi 1993). Bellizzi (1993) provides two quotations that summarise the changes in Maltese eating habits over the years. The first is from a report, written in 1839, for the British Government about the health of the troops in Malta which states that “the Maltese use very little animal food; bread, with the vegetables of the country, and occasionally a little fish, forms their principal sustenance” (as cited in Bellizzi, 1993). The second is a statement written by the World Health Organization (WHO) in 1986, i.e. almost 150 years later, that maintains that – “the average Maltese diet is not a healthy one. It is especially rich in fats and sugar and low in fibre.” (as cited in Bellizzi, 1993).

When it comes to physical exercise, “unfortunately [the Maltese population’s] relaxed Mediterranean attitude and hot climate does not induce one to practice much sport” (Department of Health Information and Research 2008). Data collected in the 2005 Eurobarometer on Health and Food (European Commission 2006) carried out amongst 20 European countries showed that Malta had the lowest average walking time, the lowest average duration of physical activity during the day, and the lowest number of days with moderate as well as vigorous physical activity. Another study reports that Malta has the highest level of physical inactivity (71.9%) in adults (15 years or older) out of 122 countries (Hallal et al. 2012) resulting in Malta being described by the media as the laziest country in the world.

The poor diet, coupled with the apparent lack of exercise, undoubtedly has an impact on the health of the Maltese population. In fact, as can be seen in Figure 1, diseases of the circulatory system account for around 39% of deaths in Malta (National Statistics Office 2010). Furthermore, the Maltese population has been identified as having a high prevalence of Type 2 diabetes and associated metabolic syndrome co-morbidities, i.e. obesity, hypercholesterolemia and hypertension (Scerri & Savona-Ventura 2010; Department of Health Information and Research 2008).

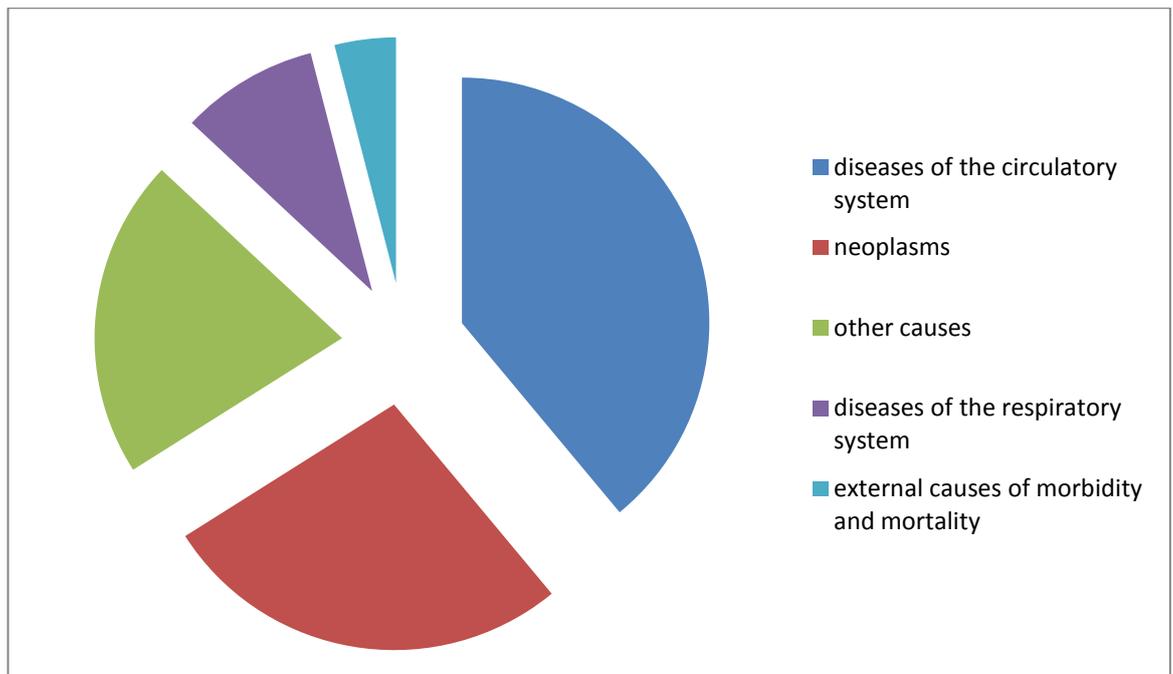


Figure 1: Major causes of death in Malta in 2000 (National Statistics Office 2010)

There is an increasing recognition that obesity is a serious medical problem as well as a contributing factor to life-threatening illness (O'Donnell & Warren 2004). Obesity is a major public health problem in Malta, and it is believed that, unless tackled, obesity will cost Malta 70,000,000 euros per year (Grech & Farrugia Sant'Angelo 2009) and the current trends will lead to an astronomical increase in morbidity and mortality from stroke, cancers, and ischemic heart disease (Grech 2007).

1.3 The prevalence of overweight and obesity

In developed countries, obesity has already reached epidemic proportions and it is also rapidly increasing in numerous middle-income as well as less-developed countries (James 2004; Erenoglu et al. 2006; Johnson-Taylor & Everhart 2006; Salazar-Martinez et al. 2006). Evidently obesity is on the increase worldwide with data from 1995 reporting 200 million obese adults, rising to a reported 300 million in the year 2000 (Salazar-Martinez et al. 2006)

Estimates of the prevalence rates of overweight and obesity in men and women aged 45 to 59 (middle-aged) range from 5% in parts of Africa to nearly 80% in Eastern Europe (James 2004).

However, the obesity epidemic is not circumscribed solely to the adult population. The prevalence of overweight and obesity among youth is increasing worldwide (Cole et al. 2000; Janssen et al. 2004; Salazar-Martinez et al. 2006). Over the past two decades, the prevalence of obesity amongst adolescents has, reportedly, tripled (Neumark-Sztainer et al. 2006). Research has shown an annual increase in the rate of prevalence of overweight within the adolescent population e.g. 0.2% for China, 0.4% for the United States of America (USA) and 0.5% for Brazil (Salazar-Martinez et al. 2006).

The prevalence rates of overweight and obesity in Maltese adolescents are very high. According to the 2001-2002 Health Behaviour in School-Aged Children Study (HBSC), out of 34 countries investigated, Malta has the second highest prevalence of overweight (17.5%, ± 2.28) and obese (7.9%, ± 1.62) youth, behind the USA (overweight [18.3%] and obese [6.8%]) (Janssen et al. 2005). Decelis, Fox and Jago (2013) assessed the prevalence of overweight and obesity in 10 and 11-year-old Maltese children using objective measures with a nationally representative sample. The researchers found that the prevalence rates (20.4% overweight and 14.2% obese) are higher than those previously estimated using self-reported height and weight, and second only to Greece out of all the countries in the world (Decelis et al. 2013).

1.4 Overweight, obesity and health

Obesity is a metabolic condition which is both complex and multifactorial (Butland et al. 2007; Larrañaga et al. 2007). It develops from the interactions between predisposing factors (genotype) and environmental factors (Larrañaga et al. 2007). The WHO has recognised obesity as being one of the top ten health problems (Davis et al. 2004).

Numerous physical health problems have been associated with obesity. The co-existence of type 2 diabetes and obesity has been frequent enough to lead to the creation of the expression “diabesity” (Astrup & Finer 2000). Obesity has been associated with the occurrence of atherosclerotic disease and also many other metabolic disorders (Panagiotakos

et al. 2006). Breathing difficulties (sleep apnoea), chronic musculo-skeletal problems (osteoarthritis of the knees, low back pain), cancers (breast cancer in postmenopausal women, endometrial cancer, colon cancer), skin problems and impaired fertility are other health problems that are associated with obesity (World Health Organization 1998).

Children who are overweight and obese are at a greater risk of type 2 diabetes, fatty liver, as well as endocrine and orthopaedic disorders (Larrañaga et al. 2007). Child obesity has been associated with several risk factors for developing later heart disease as well as other chronic diseases which include hyperlipidaemia, hyperinsulinaemia, hypertension, and early atherosclerosis, some cancers and also other alterations including psychiatric conditions (Cole et al., 2000; Larrañaga et al., 2007).

It is likely that overweight children and adolescents remain overweight into adulthood (Pesa et al. 2000; Janssen et al. 2004; Singh et al. 2008). At least 70% of obese adolescents will become obese adults (Robinson 2000; Reilly 2006). Moreover, even in the event of subsequent weight loss that is sustained, there is evidence which states that adults who were obese during adolescence have an increased risk of mortality (Larrañaga et al. 2007).

Being overweight has also been associated with considerable psychiatric morbidity and psychosocial well-being. Especially amongst women, being overweight is strongly stigmatized by society. This often leads to social isolation as well as reactive depression (Davis et al. 2004). The psychological and psychosocial consequences of being obese may, in turn, trigger emotional eating suggesting that individuals who are anxious and depressed use food in order to soothe a disturbed affect, thus, contributing to maintained obesity and even to further weight gain (Davis et al. 2004; Adolfsson 2004).

1.5 Factors associated with overweight and obesity

Overweight and obesity can be said to have a strong association with certain types of diets, namely those that include large amounts of fats, animal-based foods, as well as processed foodstuffs. The lack of physical activity during leisure time and leading more sedentary lifestyles (including spending a greater amount of time watching television) are other important factors. The growth of what has been described as an obesogenic environment by many authors is also a contributing factor. This term refers to the spread of fast food chains and vending machines, the increased acceptance as well as intake of snacks and processed foods, increased food portion sizes in restaurants, and an increased use of elements that lead to less physical activity such as television and computers (Salazar-Martinez et al. 2006).

Researchers state that the development of obesity is the result of interacting cultural, social, psychological, behavioural and genetic factors (Adolfsson 2004). Different factors, within a population, have been found to have an influence on eating behaviour. These include age, gender, body weight, dieting, drinking, as well as social status (Erenoglu et al. 2006). Furthermore, people with different traditions, cultures or from different countries have differing beliefs with regards to the role of food as a means of promoting health (Erenoglu et al. 2006).

It is evident that a broad range of factors influences obesity. The obesity system map (Butland et al. 2007) provides a number of variables that can be divided into seven key themes:

- the physiology cluster e.g. genetic predisposition, resting metabolic rate
- the individual activity cluster e.g. physical activity level, parental modelling of activity
- the physical activity environment cluster e.g. cost of physical exercise, reliance on labour-saving devices
- the food consumption cluster e.g. portion size, energy density of food
- the food production cluster e.g. cost of ingredients, societal pressure to consume

- the individual psychology cluster e.g. stress, self-esteem
- the social psychology cluster e.g. TV watching, social acceptability of fatness

Despite the multitude of factors that have an impact on obesity, the majority of obesity interventions target the reduction in energy intake, increased physical exercise and increased knowledge (Manzoni et al. 2009; Ozier et al. 2008). Even though an energy deficit is necessary for losing weight, long term weight maintenance is difficult to sustain, therefore, other variables need to be considered (Ozier et al. 2008). One such variable is stress. Researchers believe that the relationship between food and stress needs to be taken into account (Manzoni et al. 2009; Ozier et al. 2008). “Decreasing stress levels” is one of the potentially effective intervention points that have been identified (Butland et al. 2007, p.88).

1.6 Stress, coping and eating behaviours in adolescence

Long-term health behaviours and life-long health are influenced by the behavioural patterns that are established in adolescence (Casazza & Ciccazzo 2007). Adolescence appears to be a time of life when key habits and attitudes that relate to the maintenance of a healthy body weight are established (O’Donnell & Warren 2004). The eating behaviours adopted during adolescence are thought to have a notable impact on both immediate and long-term health outcomes such as eating disorders and osteoporosis (Neumark-Sztainer et al. 1998).

Adolescence is viewed as a period of transition from childhood to adulthood that is characterised by morphological, physiological, and cognitive changes (McNamara 2000). It is a time when significant demands, such as academic, personal and social dilemmas, are placed on young people and, for some, these demands generate high levels of stress. Even though stress is a normal part of life, and many adolescents are able to manage it effectively, there are times when coping strategies are needed to manage stress (Cheshire & Campbell 1997). An adolescent’s success at managing stress depends on the repertoire of coping strategies that

the adolescent has (Frydenberg & Lewis 1993). Many coping strategies are established during adolescence; moreover, literature also indicates that adolescents between the ages of 14 and 16 experience a slump in their ability to cope (Eacott & Frydenberg 2009). This age group can, therefore, be considered a key target population for teaching functional skills as well as for health promotion (Eacott & Frydenberg 2009; Lohaus 2010).

Stress has an effect on an individual's health through changes in health behaviour, such as the types and amounts of food consumed, and not only through direct physiological processes (Wallis & Hetherington 2009). It is associated with an increased consumption of highly palatable, sweet, high fat snacks and well as increased food intake (Wallis & Hetherington 2009).

Coping may serve as a mediator between perceived stress and health outcomes such as dietary intake in adolescents (Laitinen et al. 2002; Dinsmore & Stormshak 2003). Dysfunctional coping (e.g. worry, wishful thinking, not coping, ignoring the problem, tension reduction, keeping to self, self-blame) has been linked to overeating, unhealthy eating and obesity (Fryer et al. 1997; Martyn-Nemeth et al. 2009) whereas, functional coping (e.g. focusing on solving the problem, physical recreation, seeking relaxing diversions, investing in close friends, seeking to belong, working hard to achieve, focusing on the positive) has been associated with healthy behaviours and fewer risk-taking behaviours (Steiner et al. 2002). Researchers have, therefore, concluded that unhealthy eating behaviours and subsequent obesity may be prevented by teaching adolescents skills to decrease stress and to use more functional coping strategies (Martyn-Nemeth et al. 2009).

There are three types of eating behaviours that are believed to be associated with excessive snacking, weight gain, and bingeing. These are:

1. Emotional Eating – eating in response to negative emotions
2. External eating – eating in response to seeing or smelling food

3. Restrained eating – eating less than desired to maintain or lose body weight (van Strien & Oosterveld 2008).

Researchers found that children between the ages of 8 and 11 with high levels of dietary restraint consumed more snacks and a greater number of total calories when they experienced higher levels of stress (Roemmich et al. 2002). This may lead to an increase in body weight and adiposity (Roemmich et al. 2002). Other researchers also posit that restrained eaters, women, and overweight or obese individuals tend to consume a greater amount of food when stressed (Cartwright et al. 2003). In another study, a significant positive relationship between perceived stress and emotional eating behaviour was found in 11 to 15-year-old adolescents (Nguyen-Rodriguez et al. 2008). Since higher levels of perceived stress have been found to be related to higher levels of emotional eating, it is also important at this point to take into consideration that a high percentage of Maltese adolescents experience school-related stress (Currie et al. 2008). Out of 41 countries surveyed, Maltese adolescents who felt pressured by schoolwork ranked as follows: 5th place in 11-year-olds, 3rd place in 13-year-olds, and 4th place in 15-year-olds (Currie et al. 2008).

1.7 Internet-based interventions

The use of the Internet for delivering health care interventions is increasing rapidly (Nanou et al. 2002; Griffiths et al. 2006). The reasons for the popularity of this medium of delivery include cost effectiveness, increased user convenience, decrease in stigma, increased user and supplier control of the intervention provided, and effective provision of timely information (Griffiths et al. 2006). The advantages of using the Internet are summarised in Figure 2.

Given the widespread use of Internet in this day and age and the interest of children and adolescents in technology, researchers (Whiteley et al. 2008) believe that the Internet may be the way forward in effectively reaching youth in order to reduce overweight, prevent weight

gain, and tackle the obesity epidemic. The use of the Internet as a medium for engaging youth in health promotion is also supported by other researchers (Skinner et al. 2006).

Fridrici and Lohaus (2009) conclude that Internet-based interventions are a viable alternative to school-based prevention, particularly in the case of stress prevention. This is because the willingness of teachers and governing bodies to implement prevention programmes in schools is low as these are viewed as “a loss of lessons” in an environment that focuses on academic performance (Fridrici & Lohaus 2009)

Internet Feature	Description of the Feature(s)
Convenient	No travel is required Can be accessed any time
Appealing	The Internet is already used and enjoyed as a form of education and entertainment by most youth in the United States and other industrialized nations
Stand alone or adjunct	Programs can be designed to stand alone or be used in conjunction with face-to-face delivery of health promotion programming
Cost-effective	After the initial development costs, the program is less expensive to deliver than most traditional face-to-face health promotion counseling programs
Automated data collection	Data can be collected and stored automatically
Potential for feedback	Automated targeted or tailored information Individuals can chat with a professional (synchronous, 2 way) Individuals can receive personalized e-mails (asynchronous, 1 way)
Individual tailoring	The data that are collected can be used to generate messages for the individual users that are tailored
Social support	Receive positive reinforcement on a regular basis from an e-coach
Easy to disseminate	Because the Internet is readily available to so many individuals, if found to be effective, programs have the potential to be widely distributed
Theoretical variables can be targeted	Theoretical constructs such as increasing awareness of the benefits of the behavior, self-monitoring, social support, goal setting, and receiving feedback can be targeted in an Internet program
Standardization	A high degree of standardization across multiple participants can be achieved

Figure 2: Advantages of the Internet (Whiteley et al. 2008, p.161)

In a multisite randomized controlled trial (RCT) evaluating the reduction of overweight and eating disorder symptoms via the Internet in adolescents, Celio Doyle et al. (2008) found that satisfaction with the program was quite high. Based on their findings, the researchers suggest that Internet interventions are appealing to an adolescent population and that incentives or using innovative means (e.g. mobile phone text messaging) as reminders would improve adherence and outcome (Celio Doyle et al. 2008).

1.8 Summary and purpose of the study

It is known that stress-induced eating and inadequate coping skills have been linked to overeating and obesity. Taking into account that the prevalence rate of obesity in Maltese adolescents is high and that obesity is a contributing factor to life threatening illness, and in view of the literature available to date, it is believed that an investigation focusing specifically on the associations between perceived stress, coping and overeating in Maltese adolescents would be a logical step forward in providing more clarity within this area and help in identifying avenues for obesity prevention and management. A clearer understanding of the interrelationships among these factors would facilitate the development of an Internet-based intervention that could be used to improve coping responses and eating behaviours and reduce perceived stress in Maltese adolescents. In order to develop an effective Internet-based intervention, however, the development of a model that links these factors is needed.

This study, therefore, focuses on developing an effective Internet-based intervention for the reduction of perceived stress and overeating in Maltese adolescents. It is carried out in two phases. Phase 1 examines the relationship between perceived stress, coping and eating behaviours in Maltese adolescents and devises a model to guide the development of an effective Internet-based intervention. Based on the findings, Phase 2 develops an Internet-based intervention aimed at reducing stress and overeating and assesses its feasibility.

Chapter 2: Literature review

“And now all the others are saying, “What about Us?” So perhaps the best thing to do is to stop writing Introductions and get on with the book.”

A.A. Milne

2.1 Introduction

This chapter explores the literature pertaining to perceived stress, coping and eating behaviours. It begins by highlighting the link between coping and health. It provides a definition for stress as well as an overview of three different ways within which stress has been conceptualised. The important role of coping as a mediator between stress and health outcomes is then presented. The chapter continues by examining the three eating behaviours that have been found to be related to stress - emotional, external, and restrained eating. The relationship between perceived stress, coping and eating behaviours is reviewed and an overview of intervention studies is given. Possible moderating factors of the relationship between perceived stress, coping, and eating behaviours are examined. The chapter concludes by providing a summary of the literature reviewed and presenting a model that portrays the hypothesised relationship between perceived stress, coping responses, and weight status in adolescents.

2.2 Coping and health

Extensive research has been carried out in the area of adolescent coping and its relationship with health-risk behaviour. Previous studies have found that the lack of adequate coping skills puts adolescents at risk of poor academic performance, psychological distress, suicidal attempts, anxiety, depression, smoking, substance abuse, high-risk sexual behaviours, conduct problems, violence, poor metabolic control and a lower degree of diabetes-related quality of

life, overeating, unhealthy eating, eating disorders and obesity (Garcia 2010; Graue et al. 2004; Horwitz et al. 2011; Martyn-Nemeth et al. 2009; Fryer et al. 1997; Frydenberg & Lewis 2004). Researchers have found that, in response to a stressful situation, an adolescent's use of functional coping strategies is associated with fewer negative outcomes than the use of dysfunctional coping strategies, such as less general health problems, less mental health problems and less eating and dietary problems (Elgar et al. 2003; Steiner et al. 2002). If the coping skills of an adolescent can be improved, more positive health outcomes should, therefore, be expected as the adolescent would perceive and react to a stressor in a different manner (Garcia 2010). Hence, improving coping skills should lead to a decrease in overeating as a result of stress. To date, no research about stress, coping, and eating behaviours has been carried out with Maltese adolescents.

2.3 Stress

The term *stress* has been used as early as the 14th century to signify hardship, adversity or affliction (Lazarus & Folkman 1984). Lazarus and Folkman (1984, p.2) comment that, as is the case with many words, the term *stress* "antedates its systematic or scientific use".

There are currently three main models within which stress can be conceptualised. These are the environmental/engineering model, the medical model, and the psychological/interactive model (McNamara 2000; Wilson 2002). Out of these three models, the one that is most widely accepted, and which is used for the current study, is the psychological model (McNamara 2000; Wilson 2002). It is, however, useful to understand how stress is portrayed in each of these three models as well as the implications of each model for adolescents.

2.3.1 Environmental model

In the environmental model, stress is portrayed as the load or demand that is placed upon an individual. Analogous to the concepts and terms used in Hooke's Law of Elasticity in metals, an

individual is said to have an 'elastic limit' within which a certain degree of strain can be tolerated, thus, allowing the individual to adapt to it and return to homeostasis. If, however, this 'elastic limit' is exceeded by subjecting the individual to an intolerable amount of stress, psychological and physical damage occurs (McNamara 2000; Wilson 2002). In this model, an individual is viewed as a subject rather than an actor (Wilson 2002). The key problem with this explanation is that it fails to consider the role of individual differences in the stress process (McNamara 2000). Therefore, in the case of the current study, in this model the adolescent is viewed as a passive subject and situations such as examinations could give rise to demands that are beyond the adolescent's 'elastic' or adaptive limit. This model fails to recognise the role of coping.

2.3.2 Medical model

Stress is mainly viewed as an outcome variable in the medical model. The focus is on the psychological and physiological responses of an individual resulting as a consequence of stress (McNamara 2000; Wilson 2002). This model originated from the writings of Hans Selye in 1956, who believed that an individual's body responded to stress via a three-stage pattern regardless of the nature of the stressor. This three-stage pattern, known as the 'General Adaptation Syndrome', consists of:

- Alarm,
- resistance, and
- adaptation or exhaustion (McNamara 2000).

As is the case with the environmental model, an individual is, once again, viewed as a passive subject and any stressor would evoke the same physiological response (McNamara 2000; Wilson 2002). The main criticism of the medical model lies in this latter assumption. Research has found that different individuals respond in a different manner to the same levels of stress and that the use of different coping strategies (functional versus dysfunctional coping

strategies) has an effect on physiological responses and health outcomes (McNamara 2000; Garcia 2010; Lazarus & Folkman 1984). Therefore, in the case of the current study, this model also presents adolescents as passive subjects and the concepts of individual differences and coping are not taken into account.

2.3.3 Psychological model

In the psychological model, stress is treated as an interactive relationship that exists between an individual and the environment (McNamara 2000). Stress is, therefore, defined as “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman 1984, p.19).

There are two mediating processes that are fundamental to this interactive relationship according to Richard Lazarus, the most influential proponent of this model (McNamara 2000). These are cognitive appraisal and coping. When an individual faces a potentially stressful situation, the individual appraises the situation and then evaluates the coping resources available to him or her. If the individual perceives the environmental demands to be greater than an individual’s ability to cope, an individual considers him/herself stressed and experiences a concomitant negative emotional response (Cohen et al. 1995).

Within this model, an individual (and in the case of the current study, an adolescent) is not viewed as a passive subject but, on the contrary, the adolescent is viewed as an actor capable of interpreting the meaning of a stressful event and of evaluating the adequacy of coping resources available to him or her (Wilson 2002; Cohen et al. 1995). It is, specifically, the recognition of the role of coping resources as mediating processes that makes this the model of choice for the current study. Previous research has also suggested that coping may act as a mediator between stress and health outcomes including eating behaviours (Fryer et al. 1997; Martyn-Nemeth et al. 2009). There has been an increasing recognition since the 1960s, that

while stress is an inevitable part of life, coping is what “makes the big difference in adaptational outcome” (Lazarus & Folkman 1984, p.6) and that effective stress management depends on the repertoire of coping strategies available to the individual (Cheshire & Campbell 1997).

2.4 Coping

Coping can be defined as the “constantly changing cognitive and behavioural efforts” that a person makes use of to manage stress (Lazarus & Folkman 1984, p.141; Garcia 2010; Frydenberg & Lewis 2000). This definition indicates that coping responses are not fixed, implying that different coping strategies may be used at different ages (Amirkhan & Auyeung 2007). What is especially relevant to this research is that adolescence has been identified as a critical period in the development of coping skills (Liu et al. 2004). Furthermore, the purposeful use of the terms “efforts” and “manage” in the definition highlight two important points about coping. The first is that a coping response is not reflexive in nature but rather volitional – a conscious decision (Amirkhan & Auyeung 2007). Secondly, attempting to manage stress rather than master it indicates that coping does not necessarily equate with success. Indeed, there are coping strategies which are successful in reducing stress, i.e. functional coping strategies, and coping strategies which may be ineffectual and also counter-productive, i.e. dysfunctional coping strategies (Amirkhan & Auyeung 2007).

Within the literature, coping strategies have been categorised using a variety of terms such as problem-focused versus emotion-focused coping (Lazarus & Folkman 1984), approach coping versus avoidant coping (Ebata & Moos 1991), and functional versus dysfunctional coping (Frydenberg & Lewis 2000; Lewis & Frydenberg 2002; Frydenberg 1997). Frydenberg and Lewis (2000) point out that any categorisation used serves as a tool of convenience. The inconsistencies in terminology used in the classification of coping strategies make comparisons between different studies difficult and confusing. Therefore, for the purpose of clarity and

simplicity, in the current research, the terms functional and dysfunctional coping were selected. Functional coping strategies represent “direct attempts to deal with the problem, with or without reference to others” (Lewis & Frydenberg 2002, p.423), whereas dysfunctional coping strategies represent strategies empirically associated with an inability to cope (Frydenberg & Lewis 2000). Functional coping includes strategies such as problem solving, seeking social support, positive reappraisal, physical recreation, investing in close friends, and seeking relaxing diversions. Dysfunctional coping, on the other hand, includes strategies such as escape-avoidance, distancing, accepting responsibility, worry and wishful thinking (Frydenberg & Lewis 2000; Folkman & Lazarus 1988).

Coping processes are influenced by culture. This is possibly due to the effect of socialisation on the development of coping skills and on the appraisal of stressful situations (Liu et al. 2004). Compas et al. (2001) point out that most of the research carried out has focused almost exclusively on Caucasian populations of middle socioeconomic status. According to Compas et al. (2001), the coping strategies that children and adolescents from diverse backgrounds and living in different social environments use and which coping strategies they find effective are not known and need to be addressed in future research. Therefore, since the social environment has an impact on coping, and no research that surveyed coping skills in Maltese adolescents has been found, an important first step is to establish which coping responses Maltese adolescents use to manage their stress. Moreover, Compas et al. (2001) conclude that basic research into child and adolescent coping needs to be coupled with and be used to inform the development and refinement of interventions that aim to improve the way they cope with stress. In fact, the current study not only aims to identify coping strategies in Maltese adolescents but also aims to develop an online intervention with a focus on improving coping skills.

2.5 Eating behaviours

Overeating behaviours are said to have different causes for different persons (van Strien 2010). Whereas, as discussed above, some researchers believe that the inability to cope with stress effectively leads to overeating, other researchers believe that eating per se is used as a dysfunctional coping strategy and that individuals may attempt to cope with stress by overeating (Solomon 2001; Ozier et al. 2007; Kubiak et al. 2008; Bennett et al. 2013). Three eating behaviours, namely, external eating, emotional eating and restrained eating have been found to relate to stress (Snoek, Engels, et al. 2007; Alberts et al. 2012; Conner et al. 1999; Newman et al. 2008; O'Connor & O'Connor 2004; Wardle et al. 2000; Hou et al. 2013). There have been no studies investigating eating behaviours in Maltese adolescents to date. Each of these three eating behaviours, described as being unhealthy, leads to overeating and corresponds to one of three psychological theories on the aetiology of overeating - the Psychosomatic Theory (emotional eating), the Externality Theory (external eating) and the Restraint Theory (restrained eating) (Braet et al. 2008; Snoek, Engels, et al. 2007; Hou et al. 2013).

2.5.1 Emotional eating

Emotional eating is overeating in response to a negative emotion (van Strien 2010). Even though the physiologically normal reaction to stress and other emotional arousal states, such as anger, fear, or anxiety, is loss of appetite (van Strien 2010; Snoek, Engels, et al. 2007; Snoek, van Strien, et al. 2007), some individuals appear to respond to negative emotions like stress "by excessive eating or at least not eating less; a phenomenon that has been named emotional eating" (Snoek, Engels, et al. 2007, p.223). It appears that eating more as a reaction to stress seems to be not only dependent on the context and the type of stress but may also be an individual characteristic (Snoek, Engels, et al. 2007). According to the psychosomatic theory, this individual characteristic is a lack of interoceptive awareness. In other words, any arousal state may lead to overeating in these individuals because they are not able to distinguish

between whether they are hungry, satiated or troubled by any other discomfort (van Strien 2010). A primary concern is that if such emotional eating behaviour occurs frequently it may result in weight gain and obesity (van Strien et al. 2012; van Strien 2010).

It is still unclear why some people develop this emotional eating behaviour whilst others do not. Published studies suggest that parents might have an important role in the development of this eating behaviour in children (Snoek, Engels, et al. 2007). Feeding a child in response to emotional distress to comfort the child (known as an emotional feeding style) or the use of food to control a child's behaviour, such as using food as a reward, may enhance emotional eating (Snoek, Engels, et al. 2007; van Strien et al. 2009). This is because when the child grows up s/he will overeat in response to virtually any emotional arousal state since s/he will be unable to distinguish whether s/he is hungry, satiated or feeling any other kind of discomfort (van Strien 2010; Snoek, Engels, et al. 2007). In simpler terms, emotional eaters, due to early learning experiences have learned to associate negative feelings with hunger and, consequently developed an overeating habit to "benumb negative feelings" (Braet et al. 2008, p.734; Ouwens 2003; van Strien et al. 2012).

2.5.2 External eating

External eating is defined as overeating in response to an external food cue such as seeing or smelling food regardless of hunger and satiety (van Strien 2010; Braet & van Strien 1997; Evers et al. 2011; Snoek, van Strien, et al. 2007; Heaven et al. 2001). The psychological theory that corresponds to external eating is known as the externality theory (Schachter & Rodin 1974). This theory posits that, as in the psychosomatic theory, an individual is relatively insensitive to internal physiological cues of hunger and satiety such as gastric motility. However, unlike the psychosomatic theory, the emphasis is not on the individual's internal emotions, but on the external environment as a determinant of the individual's eating behaviour (Braet et al. 2008; van Strien 2010; van Strien et al. 2009). Therefore, the individual is more inclined eat and also

overeate in the absence of hunger because of cues such as the time of day, the smell of food, or the presence of tasty food (Braet et al. 2008).

Previous research has found that there is a greater probability for persons who often engage in external eating to snack in stressful situations (Alberts et al. 2012; Newman et al. 2008; Conner et al. 1999). It has been suggested that a possible reason for stress-induced eating in external eaters is that, during times of stress, an individual's attention shifts from the self to the individual's immediate environment. Therefore, this increased awareness of the immediate environment makes the individual more aware of environmental cues including external food cues thus increasing food intake (Newman et al. 2008). Another important point to note is that overweight children have been found to be more vulnerable to triggers of external eating, such as smelling tasty food, than normal-weight children (Jansen et al. 2003).

2.5.3 Restrained eating

Restrained eating refers to reducing caloric intake in order to lose or maintain body weight (Heaven et al. 2001; van Strien & Oosterveld 2008). Restrained eating can lead to overeating "after a period of slimming when the cognitive resolve to eat less than desired is abandoned" (van Strien 2010, p.4). Polivy and Herman (1987, p.636) sum up restrained eating as "eating restrictive amounts, becoming disinhibited, increasing intake". Restrained eating has been linked to weight gain and a higher body mass index (BMI) (Snoek et al. 2008).

The restraint theory, in contrast to the psychosomatic and externality theories, attributes overeating (bingeing) to unsuccessful dieting (Braet et al. 2008; van Strien 2010; Ouwens 2003). According to this theory, an individual's conscious restriction of food in an attempt to lose weight, leads to the body initiating physiological defences such as the arousal of persistent hunger as well as lowering the metabolic rate (van Strien 2010). Furthermore, when disinhibitors such as anxiety, depression, alcohol, or even foods that are high in calories, undermine the individual's self-control, the individual's cognitive resolve to diet is easily

abandoned and the individual is more likely to overeat. This is known as counter regulation (van Strien 2010; Snoek, van Strien, et al. 2007; Lowe & Timko 2004; Lowe 1993; Polivy et al. 1988).

A number of research studies have indicated that restrained eaters are more susceptible to eating increased amounts in response to stress than unrestrained eaters (O'Connor & O'Connor 2004; Newman et al. 2008; Wardle et al. 2000; Roemmich et al. 2002). Restrained eaters appear to be "more likely to disinhibit - or lose control whilst experiencing stress" (O'Connor & O'Connor 2004, p.280).

2.6 Relationship between perceived stress, coping and eating behaviours

A growing body of literature has investigated the relationship between perceived stress, coping and eating behaviours in adolescents. However, many of these studies have only focussed on this relationship from an eating disorders perspective (e.g. Fryer et al. 1997; García-Grau et al. 2002; García-Grau et al. 2004; Sierra Baigrie & Lemos Giráldez 2008; Loth et al. 2008).

A cross-sectional study by Nguyen-Rodriguez et al. (2008) with 517 minority students in Los Angeles County investigated the moderating effects of BMI on the relationship between perceived stress in emotional eating. Nguyen-Rodriguez et al. (2008) found that perceived stress and emotional eating were correlated independent of BMI status. These researchers conclude that the study provides further support for the association between perceived stress and emotional eating, and that it appears that emotional eating is not an issue that pertains solely to individuals who are overweight or obese (Nguyen-Rodriguez et al. 2008). However, their study fails to explain why some individuals who engage in emotional eating in the face of stress are overweight whilst others fall in the normal weight category. Nguyen-Rodriguez et al. (2008, p.244) suggest that the individuals within the normal weight category "may possess

certain qualities or engage in other compensatory behaviors” such as eating less the following day, might overeat to a lesser degree than those individuals who are overweight, or else they are not overweight yet but will be if the emotional eating behaviour continues.

In 2009, Martyn-Nemeth et al. conducted a cross-sectional study to investigate the relationships between self-esteem, stress, social support, coping, eating behaviour, and depressive mood in adolescents. Martyn-Nemeth et al. (2009) surveyed 102 students between the ages of 14 and 18 and found that stress and low self-esteem were related to dysfunctional (avoidant) coping and depressive mood, and that low-self-esteem and dysfunctional coping were related to unhealthy eating behaviour. The eating behaviours investigated in their study included regularity of meals, frequency of eating meals with the family, skipping meals, and watching television while eating. The focus was, therefore, not on overeating behaviours but on a range of variables that relate to nutritional health and normative eating patterns (Martyn-Nemeth et al. 2009).

Many of the studies that have investigated the relationship between perceived stress, coping and eating behaviours in adolescents have concluded that future research needs to focus on interventions that aim at improving coping skills and stress management skills as a means to decrease emotional eating (Bennett et al. 2013; Nguyen-Rodriguez et al. 2008), decrease the predisposition to develop an eating disorder (García-Grau et al. 2002), prevent binge eating (Sierra Baigrie & Lemos Giráldez 2008), decrease disturbed eating attitudes (Fryer et al. 1997), decrease night-eating (an eating pattern that involves morning anorexia and evening hyperphagia) (Wichianson et al. 2009) and improve eating behaviours (Sanlier & Ogretir 2008).

Despite the fact that so many studies reach the same conclusion, there is a paucity of literature concerning intervention studies that focus on improving coping skills and decreasing stress with the aims of improving eating behaviours in adolescents. Table 1 presents a number of intervention studies within which emotional, external or restrained eating behaviours were

tackled. As can be seen from this table, the majority of the intervention studies target women. The lack of research in males within the fields of disordered eating, eating behaviours such as emotional eating, and obesity has been noted by a number of researchers (Michel 2006; Thome & Espelage 2004; Sheble 2006; e.g. Kearney et al. 2012).

Moreover, the studies presented in Table 1 have had mixed results and have focused mainly on stress-management techniques and not on specific coping skills training targeting the specific needs of the populations investigated. Also, the findings of the only study in Table 1 that investigated a male population cannot be generalised because the sample consisted of veterans with a high prevalence of post-traumatic stress disorder. Considering the links between perceived stress, overeating behaviours and dysfunctional coping skills, focusing merely on stress management is unsatisfactory because it fails to take into account the mediating role of coping.

Results	Participation in the acceptance-based behavioural intervention for weight loss resulted in weight loss and improvements in psychological variables targeted (e.g. cognitive restraint, disinhibition, urge-related eating behaviour, emotional eating , eating-related experiential acceptance, mindfulness and motivation)
	Relaxation training effective in reducing emotional eating episodes, depressive and anxiety symptoms, and in improving self-efficacy for eating control
	Participants in mindfulness intervention (as opposed to waiting list control group) showed significantly greater decreases in food cravings, dichotomous thinking, body image concern, emotional eating and external eating
	Participation in mindfulness-based stress reduction did not result in reductions in emotional eating or uncontrolled eating
	Participation in stress management (as opposed to control group who only followed a weight-loss regime) resulted in significant improvement in weight loss, higher restrained eating behaviour , and no significant difference in perceived stress levels

Table 1: Intervention studies within which

Author	Purpose of study	Participants	Intervention
Forman et al. (2009)	To test the preliminary feasibility, acceptability, effectiveness, and possible mechanisms of action of an acceptance-based behavioural intervention for weight loss	29 overweight or obese women	12-week program consisting of a standard behavioural package plus an acceptance-based intervention (distress tolerance, mindfulness, and commitment enhancement)
Manzoni et al. (2009)	To evaluate the efficacy of a 3-week relaxation protocol enhanced by virtual reality and portable mp3 players in reducing emotional eating	60 female inpatients with obesity who report emotional eating	12 individual relaxation training sessions (4 sessions per week for 3 weeks) provided traditionally (imagination condition) or supported by virtual reality (virtual reality condition); included combination of different relaxation techniques mainly based on Progressive Muscular Relaxation and Applied Relaxation technique
Alberts, Thewissen and Raes (2012)	To explore the efficacy of a mindfulness-based intervention on eating behaviour , food cravings, dichotomous thinking and body image concern	26 women with disordered eating behaviour	8-week mindfulness-based eating program that consisted of five core components: 1) mindful eating (awareness of sensations e.g. taste), 2) awareness of physical sensations (hunger, satiety, craving and stress), 3) awareness of thoughts and feelings related to eating (e.g. inner self-talk, beliefs, expectations, guilt), 4) acceptance and non-judgement of sensations, thoughts, feelings and body, 5) awareness and step-by-step change of daily patterns and eating and physical activity habits
Kearney et al. (2012)	To investigate whether participation in mindfulness-based stress reduction would have a positive influence on eating behaviours and nutritional intake through changes in emotional eating, uncontrolled eating , and type and quantity of food consumed	48 veterans at a large urban Administration medical centre	8-week mindfulness-based stress reduction (without modification to place emphasis on mindful eating); techniques taught included body scan, sitting meditation, gentle yoga, walking meditation
Christaki et al. (2013)	To evaluate the efficacy of an 8-week stress management programme that included progressive muscle relaxation and diaphragmatic breathing on weight loss and eating behaviour	34 overweight and obese women recruited from an outpatient obesity clinic	8-week self-administered stress management programme (progressive muscular relaxation and diaphragmatic breathing) applied concurrently with a weight-loss regime

2.7 Effect on weight

Nguyen-Rogdriguez et al. (2009) emphasise the necessity of investigating the potential determinants of behaviours that lead to weight gain so that obesity prevention methods can be identified. Stress has a negative influence on dietary habits (Austin et al. 2009). As has been discussed in the introductory chapter, an increase in the amount of food consumed and unhealthy food choices (high sugar and high fat foods) have been linked to stress (Wallis &

Hetherington 2009; Austin et al. 2009). Stress-induced eating and dysfunctional coping are associated with overeating, a higher BMI and the development of obesity (Bennett et al. 2013; Snoek et al. 2013; Geliebter & Aversa 2003; Torres & Nowson 2007; Fryer et al. 1997; Martyn-Nemeth et al. 2009). Notwithstanding the associations of stress, coping and stress-induced eating with overeating and the development of obesity, and the high prevalence rates of obesity in Malta, nothing is known about emotional, external and restrained eating in Maltese adolescents and their relationship with perceived stress and coping.

2.8 Moderating factors

A moderator is a variable that has an effect on the strength and/or direction of the relationship between a predictor and a criterion variable (Grant et al. 2006). The relationship between stress and its negative effects such as illness or psychopathology is complex and there has been a lot of interest in identifying the individual, group and environmental characteristics which moderate this relationship (Grant et al. 2006; McNamara 2000).

In order to provide a clearer picture of the relationship between perceived stress, coping, and eating behaviours, possible moderating factors also need to be examined. As Grant et al. (2006, p.258) maintain, “in terms of practical applications, knowledge of individual/group/environmental characteristics that protect subgroups of youth from the negative effects of stressors would be helpful in designing effective prevention and intervention programs for youth exposed to stressors.”

The potential moderating factors that were investigated in the current study include environmental variables such as social support as well as individual factors such as self-efficacy and physical activity which will be discussed in the following sections.

2.8.1 Social support

Social support has been viewed as one of the cornerstones of coping with stress (Frydenberg & Lewis 2004). It is believed to promote health in a number of ways, such as

- by preventing the occurrence of daily hassles and stressful life events,
- making an individual feel less vulnerable to stress,
- providing a reduction in the impact, intensity, and also the duration of stress-related symptoms, and also
- by offering the help, support, and advice needed to remove the stressor or strain imposed (McNamara 2000; Uchino et al. 1996; Cohen 2004).

Within the adolescent population, perceived social support has been linked to decreased levels of depression and lower rates of anxiety and worry (Laugesen et al. 2003). Social resources and positive effects of family enhance self-esteem, shape coping behaviour, and also contribute to general resiliency in adolescents (McNamara 2000). The lack of social support has been linked with disordered eating and emotional eating (Wonderlich-Tierney & Vander Wal 2010; Raspopow et al. 2013), whereas the availability of social support has been linked to improved weight loss (Marcoux et al. 1990).

A recurrent theme in the literature is that social support acts as a stress buffer thus eliminating or reducing the effects of stressful experiences (Uchino et al. 1996; McNamara 2000; Cohen 2004). In a review of studies that have tested for the moderators or mediators of the relationship between stressors and child and adolescent psychopathology, Grant et al. (2006) found that, out of the 32 studies reviewed, approximately half of these studies provided support for the buffering hypothesis. Grant et al. (2006) state that this is probably due to the wide variety of constructs and measures that were used in these studies.

2.8.2 Self-efficacy

Self-efficacy is defined as a belief in one's ability or skill to execute a particular behaviour or attain a particular goal (Dwyer & Cummings 2001). It "represents a personal resource factor that may facilitate efficient coping" (Parto & Besharat 2011, p.642).

Researchers believe that self-efficacy determines whether a coping behaviour should start, how long the coping behaviour lasts and also how much effort is expended (Parto & Besharat 2011). This implies that self-efficacy is a significant variable in the processes of stress and coping and higher self-efficacy could act as a moderator of stress (Parto & Besharat 2011; Dwyer & Cummings 2001). Higher levels of self-efficacy have been found to be related to lower levels of stress and depression. Higher levels of self-efficacy have also been related to higher levels of functional coping and lower levels of dysfunctional coping (Dwyer & Cummings 2001; Parto & Besharat 2011; Lohaus 2010).

2.8.3 Physical activity

Physical exercise is another factor that needs to be taken into consideration when examining the relationship between perceived stress, coping and eating behaviours. This is because physical exercise has been found to not only improve physical wellbeing but also psychological health. Previous research has found that physical exercise improves body image, mood states, and self-esteem and also decreases stress, depression, binge eating behaviours and anxiety (Thome & Espelage 2004; Norris et al. 1992; Moksnes et al. 2010; Deboer et al. 2012).

Several mechanisms that could explain how physical activity can alleviate the effects of stress have been suggested in the literature. Thome and Espelage (2004) suggest that, apart from being a health behaviour, physical exercise might also act as a coping strategy for some individuals. Thome and Espelage (2004) found that coping through physical exercise, and not exercise behaviour per se, was associated with lower anxiety.

Other research (e.g. Gerber & Pühse 2008; Moksnes et al. 2010; Norris et al. 1992) has focused on the role of physical activity as a moderating factor. The findings so far have been mixed. For example, in a cross-sectional study with 1508 Norwegian adolescents between the ages of 13 and 18, Moksnes et al. (2010) did not find any support for the moderating role of physical activity in the relationship between stress and psychological functioning (anxiety, depression and self-esteem). Gerber and Pühse (2008) carried out a cross-sectional study with 407 Swiss adolescents, with a mean age of 14, to investigate whether the relationship between school-based stress and psychosomatic complaints (headaches and fatigue) was moderated by physical activity or self-esteem. No support for the moderating role of both physical activity and self-esteem was found. Gerber and Pühse (2008) comment, however, that approximately two thirds of the 30 empirical studies, that had been published by the time they carried out the study, at least partially confirm the moderating role of physical activity in the relationship between stress and illness. Ten of these research studies were carried out with an adolescent population. One of the studies that Gerber and Pühse (2008) refer to is that by Norris, Carroll and Cochrane (1992). In their cross-sectional study, Norris et al. (1992) surveyed 147 British adolescents between the ages of 13 and 18. They investigated the moderating role of physical activity in the relationship between stress and psychological wellbeing and found that adolescents reporting greater physical activity also reported less stress and lower levels of depression.

Yet another mechanism through which physical activity may reduce stress is through the ability “to master difficult exercise tasks” (Wijndaele, Matton, Duvigneaud, Lefevre, De Bourdeaudhuij, et al. 2007, p.426). This is said to result in psychological processes which evoke feelings of mastery and competence and enhance self-esteem, self-efficacy and energy. These, in turn, allow an individual to appraise a particular stressor as being less harmful and, therefore, perceive less stress (Wijndaele, Matton, Duvigneaud, Lefevre, De Bourdeaudhuij, et al. 2007).

It is evident that the findings about physical activity and the mechanisms by which it decreases stress have been inconsistent and that some studies point to the beneficial effect of engaging in physical exercise, whereas others indicate that the benefits are not directly related to the amount of exercise but rather to other aspects of physical activity such as using it as a coping strategy or to its associated gains in self-efficacy. It is, therefore, believed that a better study would concurrently investigate different aspects of physical activity such as exercise self-efficacy as well as time spent engaging in physical exercise.

2.9 Problem Statement

In summary, stress is an interactive relationship between the person and the environment. Cognitive appraisal and coping are the two mediating processes of this interactive relationship. Effective stress management depends on the repertoire of coping skills available to the individual. There are coping strategies which are successful in reducing stress (functional coping) and others which may be ineffectual or even counterproductive (dysfunctional coping). Dysfunctional coping has been linked to a number of negative health outcomes including overeating and obesity.

Three overeating behaviours which have been linked to stress are emotional, external, and restrained eating. Many of the studies investigating the relationship between perceived stress, coping and eating behaviours in adolescents have only focussed on this relationship from an eating disorders perspective. Within the adolescent population, previous research has found that dysfunctional coping is related to unhealthy eating and that emotional eating is not an issue that pertains solely to individuals who are overweight or obese. A number of studies that have investigated the relationship between perceived stress, coping and eating behaviours in adolescents have concluded that future research needs to focus on interventions that aim to improve coping skills and stress management skills as a means to decrease e.g. emotional

eating, and improve eating behaviours. However, intervention studies are scarce, and the majority target women and focus on stress management, failing to take coping into account.

In order to provide a clearer picture of the relationship between perceived stress, coping, and eating behaviours, possible moderating factors that could have an effect on this relationship need to be examined. These moderating factors include environmental factors (social support) and individual factors (self-efficacy and physical activity).

The schematic representation (quadrant model) presented in Figure 3 portrays the hypothesised relationship between perceived stress, coping responses, and weight status in adolescents. As can be observed in this model, the adolescents are divided into the 4 possible subpopulations depending on their perceived stress levels and their weight status. The term high BMI refers to overweight or obese adolescents whilst the term low BMI refers to normal weight or underweight adolescents.

As can be seen in this model, when an adolescent confronts a stressor, the outcome is determined by the adolescent's environmental factors (such as social support) and the personal factors (such as self-efficacy), i.e. moderators of stress, and also by which type of coping strategy is used, be it functional or dysfunctional. The type of coping strategy used determines whether an adolescent can effectively manage stress. Therefore, as can be seen in the quadrant model, the use of functional coping strategies would result in low perceived stress levels, whereas the use of dysfunctional coping strategies would result in high perceived stress levels. Overweight and obesity are influenced by a broad range of factors (as discussed in the introductory chapter) and not only by stress and coping. Therefore, adolescents with a high BMI and high perceived stress and also adolescents with a high BMI and low perceived stress (subgroups A and B) are found in the model. However, it is believed the adolescents using functional coping strategies would have better eating behaviours (less emotional, external and restrained eating behaviours) than adolescents using dysfunctional coping

strategies since these three eating behaviours have been linked to stress. Furthermore, adolescents in the low BMI groups would exhibit better eating behaviours (less emotional, external and restrained eating behaviours) in relation to stress than adolescents in the high BMI group.

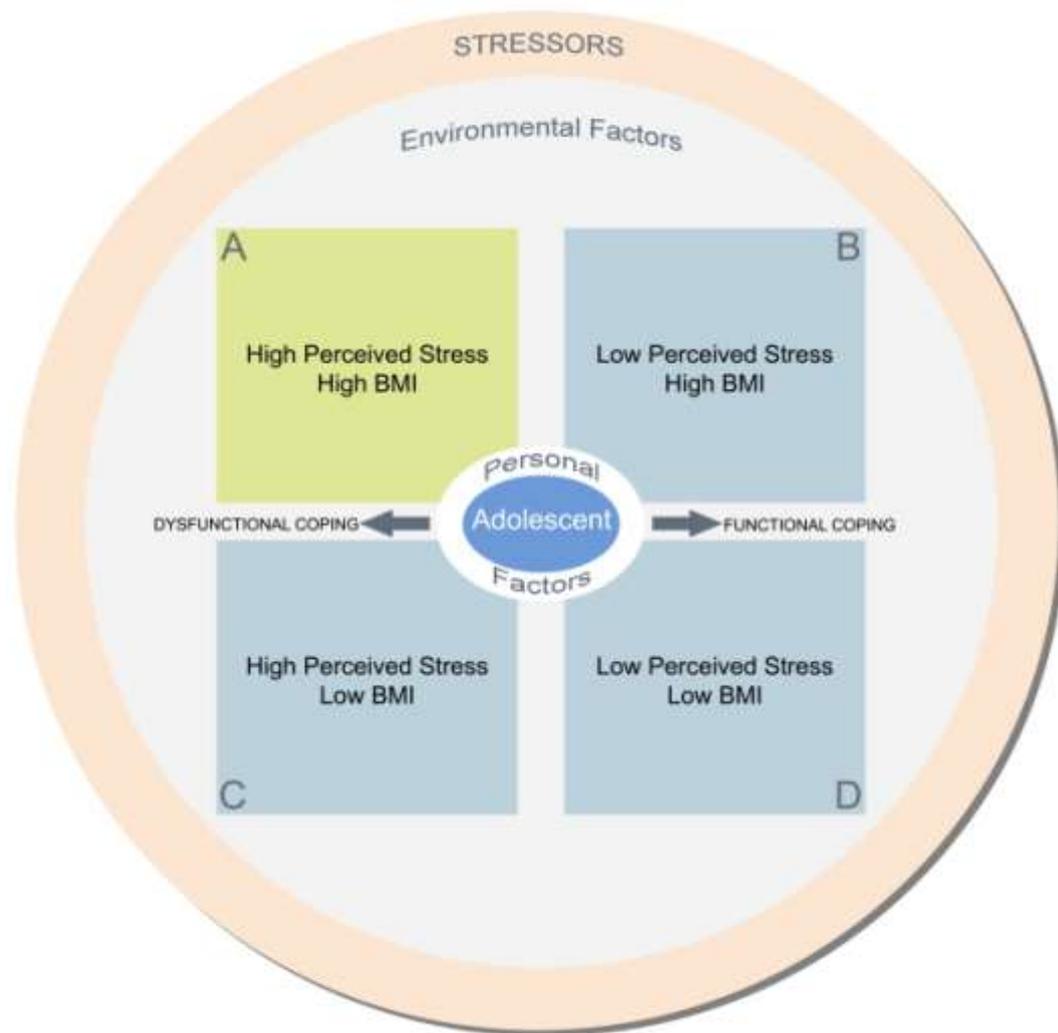


Figure 3: Quadrant model depicting hypothesised relationship between perceived stress, coping responses and weight status in adolescents

2.10 Developing online interventions

As was discussed in the introductory chapter, delivering an intervention via the Internet has numerous advantages (Figure 2). However, developing online interventions that are effective is a complex process that requires multiple steps (Whittemore et al. 2010).

A number of different approaches and guiding principles to developing effective and engaging online interventions can be found in the literature (e.g. Collins et al. 2007; Skinner et al. 2006). These include the Multiphase Optimization Strategy, the Spiral Technology Action Research, and the guiding principles derived from the TeenNet research (Collins et al. 2007; Norman & Skinner 2007; Skinner et al. 2006). Following guidelines when developing an online intervention is important because, in the words of Skinner et al. (2006), “unlike the early days of the Internet, the plethora of eHealth resources no longer ensures the adage ‘if you build it, they will come’”.

A number of key features can be derived from the different approaches and guiding principles available. These include:

- identifying the needs and perspectives of the target population;
- developing an intervention that is
 - engaging and fun,
 - easy to navigate and uses appropriate language and tone,
 - visually appealing and provides interactive features,
 - perceived as useful and relevant, and
 - trustworthy;
- the need for initial pilot testing in order to assess the feasibility of an online intervention;
- evaluating effectiveness via an RCT (Crutzen et al. 2008; Linke et al. 2008; Collins et al. 2007; Norman & Skinner 2007; Skinner et al. 2006; Schneider et al. 2012).

In the case of the current study, the first step that needs to be taken, prior to developing the online intervention, is that of identifying the variables that are to be included in the

intervention and, subsequently, devising a model to guide the development of the online intervention (i.e. Phase 1 of this research). This step, therefore, involves identifying the needs of the target population as will be presented in the following chapters.

Chapter 3: Phase 1

3.1 Phase 1 - Methodology

“The old grey donkey, Eeyore stood by himself in a thistly corner of the Forest, his front feet well apart, his head on one side, and thought about things. Sometimes he thought sadly to himself, “Why?” and sometimes he thought, “Wherefore?” and sometimes he thought, “Inasmuch as which?” and sometimes he didn't quite know what he was thinking about.”

A. A. Milne

3.1.1 Introduction

As has been established in the introductory chapter and the literature review, there is considerable urgency to develop interventions that target specific health behaviours that may have an important role in obesity prevention and management. However, before an intervention targeting Maltese adolescents can be developed, the relationship between relevant variables needs to be identified, interpreted and understood.

Recognising the importance of a systematic research design and methodology, this chapter presents the purpose of Phase 1, the hypotheses that were tested, and the study design used. It then describes the targeted respondents, illustrates the data collection instruments, presents the ethical issues pertinent to the study, as well as highlights the procedures involved in the data collection. This chapter also includes details about how the data in the current study were analysed.

3.1.2 Purpose of study

The purpose of Phase 1 was twofold - firstly, to examine the relationship between perceived stress, coping responses and eating behaviours in Maltese adolescents, and secondly, to develop a model to guide the development of an Internet-based intervention for the reduction of perceived stress and overeating in Maltese adolescents (i.e. Phase 2 of this research).

3.1.3 Statement of hypotheses

The hypotheses that the current study aimed to test were the following (Figure 3):

- Hypothesis 1: Adolescents using functional coping strategies will have lower levels of perceived stress than adolescents using dysfunctional coping strategies.
- Hypothesis 2: Adolescents using functional coping strategies will have better eating behaviours (less emotional, external and restrained eating behaviours) than adolescents using dysfunctional coping strategies.
- Hypothesis 3: Adolescents with a low BMI (normal weight or underweight) will exhibit better eating behaviours (less emotional, external and restrained eating behaviours) in relation to stress than adolescents with a high BMI (overweight or obese).

3.1.3.1 Operational hypotheses

In an attempt to seek answers pertaining to the theoretical hypotheses linking perceived stress, coping responses, and eating behaviours, the following operational hypotheses are put forward:

- Operational hypotheses for Hypothesis 1:
 - There will be a significant negative correlation between the Perceived Stress Scale (PSS) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
 - There will be a significant positive correlation between the PSS and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms.
- Operational hypotheses for Hypothesis 2:

- There will be a significant negative correlation between emotional eating (as measured by the Dutch Eating Behaviour Questionnaire [DEBQ]) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
 - There will be a significant positive correlation between emotional eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms;
 - There will be a significant negative correlation between external eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
 - There will be a significant positive correlation between external eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms;
 - There will be a significant negative correlation between restrained eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
 - There will be a significant positive correlation between restrained eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms.
- Operational hypothesis for Hypothesis 3:
 - There will be significant group differences between the groups put forward in the quadrant model formed by the independent variables (perceived stress and BMI) and the scores on eating behaviours, with the High PSS & Low BMI group exhibiting better eating behaviours (less emotional, external and restrained eating behaviours) than the High PSS & High BMI group.

3.1.4 Research design

The research design employed for Phase 1 was a cross-sectional survey methodology that included 6 survey instruments as well as a demographic and background information questionnaire (Appendix B). An online questionnaire was employed to gather cross-sectional data from a non-clinical sample of adolescents.

3.1.5 Participants

3.1.5.1 Inclusion Criteria

Adolescents, living in Malta, who met the following inclusion criteria for Phase 1, were eligible to participate in the study:

- 14 to 17 years-of-age, inclusive;
- obtained informed consent from legal guardian to take part in the study;
- have access to and be able to use a computer with an Internet connection (to complete the Internet-based data collection tool); and
- able to read and write in English (for the purposes of completing the Internet-based data collection tool).

3.1.5.2 Sample Size Justification

An a priori power analysis for Phase 1 was carried out using G*Power (Faul & Erdfelder 1992). The desired statistical power level ($1 - \beta$) for this exploratory study was 0.8, with an alpha level set at 0.05 and an anticipated medium effect size, i.e. a correlation coefficient value (Pearson's r) of 0.3, indicating moderate relationships between variables. The total sample size to be recruited for the current study, based on these parameters, was 82 adolescents (Figure 4).

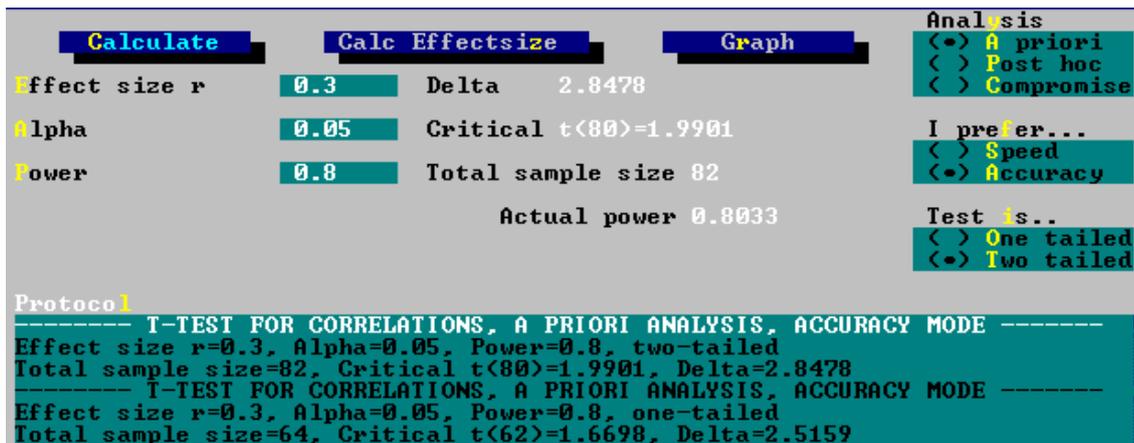


Figure 4: Output of a priori power analysis using G*Power (Faul & Erdfelder 1992)

3.1.6 Materials

3.1.6.1 Online questionnaire

The online questionnaire included a number of published self-report measures that collected information about perceived stress, coping responses, eating behaviours, self-efficacy, physical exercise and social support, along with a demographic questionnaire. These were:

1. 10-item Perceived Stress Scale (PSS-10; Cohen et al. 1983)
2. Ways of Coping Questionnaire (Folkman & Lazarus 1988)
3. Dutch Eating Behaviour Questionnaire (DEBQ; van Strien 2010)
4. Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al. 1988)
5. General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem 1995)
6. Nutrition Self-Efficacy Scale and Exercise Self-Efficacy Scale (Schwarzer & Renner 2000)
7. International Physical Activity Questionnaire (IPAQ 2001).

The above measures were chosen as these have been assessed, and have demonstrated adequate reliability and validity, they are not too long or complex, and are culturally as well as developmentally appropriate. (These measures are described in Sections 3.1.6.3.1 to 3.1.6.3.8)

The online questionnaire also contained a demographic questionnaire and a background information questionnaire specifically designed for this study. The demographic questionnaire included questions about anthropometric measurements, e.g. current height (in cm) and weight (in kg) needed to calculate each participant's BMI (kg/m^2), in order to provide an objective weight measure, as well as current waist circumference (in cm), and other personal information, e.g. gender and access to Internet at home. (The two measures used to determine overweight and obesity status, i.e. BMI and waist circumference, will be described in further detail in Sections 3.1.6.3.1 and 3.1.6.3.2, respectively.) The background information questionnaire collected information such as the availability of support from family and friends with regards to improving food choice as well as about smoking and drinking habits.

Since the data collection tool is long, the order in which the questions were placed reflects the degree of importance of the questions to the study. Hence, questions about perceived stress, coping responses, eating behaviours and demographic data including weight status are placed at the beginning of the questionnaire. This was done so that in the eventuality of premature termination, i.e. adolescents deciding not to fill in the entire questionnaire, the chance of collecting data about the main variables under investigation would be maximised.

Prior to preparing the online questionnaire, permission was sought as to whether the Ways of Coping Questionnaire (Folkman & Lazarus 1988) and the DEBQ (van Strien 2010) could be changed to an online format and hosted on a secure website with access limited to an agreed number of participants. This was necessary since both of these tools are copyrighted and not free to use for research purposes.

The online form of the questionnaire was produced using *LimeSurvey*, an open source survey application, and was hosted on the Plymouth University server. All data collected in the study were saved on this secure server with back-up copies saved on the researcher's private computer.

The questionnaire consisted of both multiple-choice and open-ended questions. For multiple-choice questions, radio buttons were associated with all possible responses, whilst for open-ended text type questions, comment boxes were created. All the items, belonging to a particular measure used in the study, were presented on the same screen page as would be the case in paper-and-pencil questionnaires. Rules were set, using *LimeSurvey*, so that participants would:

- require a token (unique access code) to access the questionnaire,
- not be able to progress to the next question until the current question was answered to avoid any missing data in submitted questionnaires,
- be able to save partially finished questionnaires and continue from where they left off on another occasion (by clicking on a 'Resume Later' button on the bottom left-hand-side of each screen; Figure 5), as well as,
- not be able to use the token (unique access code) again once the survey is completed.

The use of tokens (unique access codes) eliminated the possibility of the same participant submitting multiple completed questionnaires as well as the receipt of unsolicited responses, i.e. the participation of individuals who were not recruited in the study. Using tokens/codes is a recommended solution to avoid these potential sampling issues (Wright 2005).

The tokens (unique access codes) set for this study were 7 character alphanumeric codes, containing both uppercase and lowercase letters (e.g. 15Tv822), which were unique to each participant and without which the study questionnaire could not be accessed. The tokens for this study were randomly generated using an online strong password generator (<http://strongpasswordgenerator.com>).

The screenshot displays a data entry interface for an online questionnaire. It consists of four vertically stacked question panels, each with a light blue header and a white body. Each panel contains a question number, a question text, and a set of five radio button options. The questions are:

- *30. Do you have a desire to eat when you are frightened?** Choose one of the following answers: never, rarely, sometimes, often, very often.
- *31. Do you take into account your weight with what you eat?** Choose one of the following answers: never, rarely, sometimes, often, very often.
- *32. Do you have a desire to eat when you are disappointed?** Choose one of the following answers: never, rarely, sometimes, often, very often.
- *33. When you are preparing a meal are you inclined to eat something?** Choose one of the following answers: never, rarely, sometimes, often, very often.

At the bottom of the screen, there are four buttons: 'Resume Later' on the left, '<< Previous' and 'Next >>' in the center, and 'Exit and Clear Survey' on the right.

Figure 5: Data entry screen shot depicting the 'Resume Later', 'Previous', 'Next', and 'Exit and Clear Survey' buttons

The initial screen of the online questionnaire provided the participants with study details including the aims of the research and an assurance of confidentiality. A space to enter the token, which was necessary to access the questionnaire, was also provided on this initial screen.

As with a paper-and-pencil questionnaire, back-tracking and changing previous answers in the online questionnaire was possible by clicking the 'Previous' and 'Next' buttons on the bottom of the screen (Figure 5). An 'Exit and Clear Survey' button, at the bottom right-hand-side of each screen (Figure 5), enabled respondents to discontinue their participation in the survey at any point without any of their answers being saved. Respondents could also keep track of how many items still needed completion by means of a progress bar (expressed in percentages) at the top of each screen (Figure 6). The inclusion of a progress bar was deemed important because it provides the opportunity for respondents to estimate the length of a questionnaire

and the time required for completion, therefore decreasing the likelihood of abandonment/premature termination (Lumsden 2007; Lumsden & Morgan 2005).

0% 100%

Dutch Eating Behaviour Questionnaire
The following questions relate to how you may react around food and what you would do in situations related to food.

*1. Do you have the desire to eat when you are irritated?
Choose one of the following answers

- never
- rarely
- sometimes
- often
- very often

*2. If food tastes good to you, do you eat more than usual?
Choose one of the following answers

- never
- rarely
- sometimes
- often
- very often

*3. Do you have a desire to eat when you have nothing to do?
Choose one of the following answers

- never
- rarely
- sometimes
- often
- very often

*4. If you have put on weight, do you eat less than you usually do?
Choose one of the following answers

Figure 6: Data entry screen shot depicting progress bar at the top of the screen

3.1.6.2 Rationale for using the online questionnaire

Although the use of self-report methodologies has been the focus of many criticisms over the years due to the possibility of, for example, response distortions (Kasl 1987; Kessler 1987; Frese & Zapf n.d.; Ganster & Schaubroek 1991), it is a methodology which, nevertheless, offers advantages which are both practical and conceptual in nature (Razavi 2001). It was considered appropriate for this research study as it is economical both in terms of time and money, enables the collection of information from a large number of respondents within a short time-frame, eliminates possible interviewer bias, and also reduces bias as standardised questions are used (i.e. all participants are asked the same questions) (Ballinger & Davey 1998; Gillham 2000; Stein & Cutler 2000). Moreover, the use of self-report questionnaires, be they paper-and-pencil or computerised, minimises any potential social desirability bias and maximises participants' willingness to disclose sensitive information (such as smoking and drinking habits), two potential biases which could be problematic in face-to-face as well as in telephone

interviews (Bowling 2005). Both of these potential biases were deemed important in the current study since an adolescent population is being investigated and peer pressure has a strong influence within this particular age group.

It was decided that the best mode of questionnaire administration for this study was via an online medium, i.e. an Internet-based self-report questionnaire rather than the paper-and-pencil version of the questionnaires. This decision was taken primarily because this study is being conducted in order to be able to devise a model that will guide the development of an effective Internet-based intervention. It, therefore, made sense to collect data from a population that had the characteristics of future potential users of the Internet-based intervention, hence, having the necessary level of familiarity with using a computer and the computer literacy requirements coupled with preference for a computerised administration mode in terms of questionnaire completion, and an interest in participating in research carried out online. Interestingly, previous studies have shown that individuals who demonstrate a high level of computer experience exhibit a strong preference towards completing computerised questionnaires (Wijndaele, Matton, Duvigneaud, Lefevre, Duquet, et al. 2007). Therefore, put simply, data that would be used to devise a model that would guide the development of an effective Internet-based intervention were obtained from a population that had respondent preference for computerised questionnaires. One may argue that this limits the generalisability of the data collected in the current study, however, delimiting the generalisability to a population of Internet users who are more open/likely to participate in online research in the current study is purposeful.

The setting in which data collection is conducted is one of the various factors which may impact the truthfulness of responses. The environment may motivate participants to respond in a way they believe is more socially desirable (Razavi 2001). Furthermore, another factor that is related to social desirability bias specifically within an adolescent population is desire for attention. Behaviours that may be associated with status, such as the consumption of

alcohol, may also be misreported if asked in the wrong environment (Brener, Billy, et al. 2003). Hence, the Internet-based data collection tool was not completed within the school environment as this could have led to the possibility of social desirability bias occurring due to the influence of peer pressure or due to fear of reprisal from the school. The assurance of confidentiality further reduced the possibility of social desirability bias (Bowling 2005).

The use of an Internet-based questionnaire in this study also eliminated the chance of item non-response - an issue which is very common in paper-and-pencil questionnaires (Bowling 2005). This is because respondents in this study were not able to progress to the next screen until the current questions were answered. Premature termination, however, could not be prevented but this is an issue to which all survey methods are prone and is not reserved to Internet-based questionnaires (Bowling 2005). Even though it could not be completely eliminated, measures to minimise premature termination, such as providing a progress bar to enable participants to estimate the length of the questionnaire (Lumsden 2007; Lumsden & Morgan 2005), were taken.

Whilst recognising the numerous advantages of using an online medium for this study, the use of Internet-based versions of self-report questionnaires does raise concerns about their reliability and equivalence since the administration mode is different to pencil-and-paper questionnaires (Wijndaele et al., 2007). For this reason, the psychometric properties of the online version of a self-report questionnaire need to be explored (Holländare et al. 2010). Another factor that needs to be taken into consideration is that participants in the current study were offered an incentive, i.e. the opportunity to win a prize in a raffle if they completed the questionnaire. Montag and Reuter (2008) argue that “one of the main problems of conducting an online questionnaire combined with a lottery is the possibility of receiving useless questionnaire data due to participants clicking their way quickly through the items to head for the potential reward” (Montag & Reuter, 2008, p.719). In keeping with the method adopted by other researchers (e.g. Holländare et al. 2010; Montag & Reuter 2008), the

Cronbach's alpha, an indicator for the internal consistency and, therefore, the reliability of the questionnaires, was calculated as part of the data analyses in Phase 1. This was done in order to verify whether the use of an online medium and any possible hasty completion have an impact on reliability of the self-report questionnaires in the current study (Montag & Reuter 2008; Holländare et al. 2010).

3.1.6.3 Measures used in Phase 1

3.1.6.3.1 *Body Mass Index*

BMI is considered as a valid, indirect measure of adipose tissue having a high correlation with the amount of body fat (The International Association for the Study of Obesity 2004). BMI has been found to correlate well with comorbidity conditions in both adolescents and children (Davis et al. 2004; Salazar-Martinez et al. 2006). Furthermore, it is a low-cost method to measure body composition (Salazar-Martinez et al. 2006).

The International Obesity Task Force/Cole et al. (IOTF/Cole) BMI based classification system for childhood obesity was used within this study (Cole et al., 2000). The age- and gender-specific cut-off points were derived by utilising a pooled sample (males - n = 97,876; females - n = 94,851) from Great Britain, the United States, Holland, Singapore, Hong Kong and Brazil (Cole et al., 2000). The IOTF/Cole classification system is anchored to the internationally accepted BMI cut-off points for adult morbidity of 25 and 30 kg/m² that identify overweight and obesity respectively. This ensures that the definition of obesity for children and adolescents is consistent with that for adults (Cole et al., 2000).

3.1.6.3.2 *Waist circumference*

Waist circumference was used as an additional measure of overweight and obesity status. Waist circumference is a very simple measure. However, despite its simplicity, it appears to predict intra-abdominal fat as accurately as the waist/hip ratio, and also predict levels of

cardiovascular disease and risk factors as well as both BMI and waist/hip ratio (Seidell & Flegal 1997; Wang 2006).

The use of waist circumference in the current study was deemed important because there is research that links stress specifically to central adiposity, therefore waist circumference should be a more sensitive measure than BMI for finding an association with perceived stress (van Jaarsveld et al. 2009).

3.1.6.3.3 Perceived Stress Scale (Cohen & Williamson 1988; Cohen et al. 1983)

The Perceived Stress Scale (PSS) is a measure of the extent to which situations in an individual's life are considered stressful during the past 30 days (Cohen et al. 1983; Cohen & Williamson 1988; Cerclé et al. 2008). The items of the PSS were designed to measure three issues that have been found to be central components of the experience of stress, namely, how unpredictable, uncontrollable and overloaded a respondent finds his/her life. The scale is written at a junior high school reading level (i.e. suitable for age 12 and over) and is designed for use in community samples (Cohen & Williamson 1988).

For the purposes of the current study the PSS-10 was selected. This 10-item self-administered assessment is the most widely used measure of perceived stress (Sims et al. 2008; Wichianson et al. 2009). According to Cohen and Williamson (1988, p.34) the PSS-10 "allows the assessment of perceived stress without any loss of psychometric quality (actually a slight gain) over the longer PSS-14". The PSS-10 has substantial reliability and validity even within an adolescent population (Olpin 1996; Siqueira et al. 2000). It has a Cronbach's alpha coefficient of 0.78 (Olpin 1996).

The ten items are rated using a 5-point Likert scale ranging from 0 (almost never) to 4 (very often) with items 4, 5, 7, and 8 being reverse scored (Womble 2003; Örucü & Demir 2009). The scores range from 0 to 40 with higher scores indicating higher perceived stress (Olpin 1996; Mimura & Griffiths 2004).

3.1.6.3.4 *Ways of Coping Questionnaire* (Folkman & Lazarus 1988)

The purpose of the Ways of Coping Questionnaire is to identify the thoughts as well as the actions that an individual has used to cope with a specific stressful encounter (Folkman & Lazarus 1988). The Ways of Coping Questionnaire is the most widely used measure of coping (Lundqvist & Ahlström 2006; Engler et al. 2006)

It consists of 66 items that are rated on a 4-point Likert scale to indicate how frequently each strategy for coping is used (Folkman & Lazarus 1988; Chang et al. 2007; Moos & Holahan 2003). The 66 items are classified into 8 subscales that represent different types of coping strategies (Folkman & Lazarus 1988; Ghaderi 2003). These are presented in Table 2 taken from Folkman and Lazarus (1988, p.7).

The mean internal consistency for the subscales is 0.70. This is higher than that for most other measures of coping (Engler et al. 2006).

Confrontive Coping	describes aggressive efforts to alter the situation and suggests some degree of hostility and risk-taking
Distancing	describes cognitive efforts to detach oneself and to minimize the significance of the situation
Self-Controlling	describes efforts to regulate one's feelings and actions
Seeking Social Support	describes efforts to seek informational support, tangible support, and emotional support
Accepting Responsibility	acknowledges one's own role in the problem with a concomitant theme of trying to put things right
Escape-Avoidance	describes wishful thinking and behavioral efforts to escape or avoid the problem. Items on this scale contrast with those on the Distancing scale, which suggest detachment
Planful Problem Solving	describes deliberate problem-focused efforts to alter the situation, coupled with an analytic approach to solving the problem
Positive Reappraisal	describes efforts to create positive meaning by focusing on personal growth. It also has a religious dimension

Table 2: Description of Coping Scales (Folkman & Lazarus 1988, p.7)

3.1.6.3.5 Dutch Eating Behaviour Questionnaire (DEBQ; van Strien 2010)

The Dutch Eating Behaviour Questionnaire (DEBQ) consists of three separate scales that assess emotional, external, and restrained eating behaviours in an individual (van Strien 2010). It consists of 33 items (13 items for emotional eating and 10 items each for external and restrained eating) that are rated on a 5-point Likert scale that ranges from 'never' to 'very often' (van Strien et al. 2009; Halvarsson & Sjöden 1998; van Strien 2010).

The DEBQ is suitable for use with adolescents and has been used successfully with children as young as nine-years-old (van Strien 2010; van Strien & Oosterveld 2008; Goossens et al. 2009). It is a reliable and valid tool that demonstrates high internal consistency, high convergent and discriminant validity and also high validity for food consumption (van Strien 2010; Snoek, Engels, et al. 2007)

3.1.6.3.6 Multidimensional Scale of Perceived Social Support (Zimet et al., 1988)

The Multidimensional Scale of Perceived Social Support (MSPSS) is a 12-item self-report measure of the perceived adequacy of social support from three sources, namely, family, friends, and a significant other (Zimet et al. 1990; Bruwer et al. 2008; Aroian et al. 2010). All the items on each of the subscales (i.e. Family, Friends, and Significant Other subscales) are rated on a 7-point Likert-type scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). The MSPSS yields four scores, with higher scores signifying higher perceived social support:

- a Family subscale score (obtained by summing the scores on items 3, 4, 8, and 11 and dividing by four),
- a Friends subscale score (obtained by summing the scores on items 6, 7, 9, and 12 and dividing by four),
- a Significant Other subscale score (obtained by summing the scores on items 1, 2, 5, and 10 and dividing by four), and

- a Total score (a score for global satisfaction with perceived support is obtained by summing the scores on all the items and dividing by twelve) (Zimet et al. 1988; Clara et al. 2003; Fischer & Corcoran 2007; Aroian et al. 2010).

The MSPSS is a simple to use, self-explanatory scale that requires a fourth-grade reading level based on the Flesch-Kincaid formula (Canty-Mitchell & Zimet, 2000; Cheng & Chan, 2004; Zimet et al., 1988). It is also brief and time conserving (Zimet et al. 1988; Cheng & Chan 2004). These features make the MSPSS ideal for use when the time of participants is at a premium and/or a number of instruments are administered at the same time, as is the case with the current study (Zimet et al. 1988).

Each respondent is free to define who his/her own significant other is (Canty-Mitchell and Zimet 2000; Cheng and Chan 2004). Thus, each and every respondent may interpret the items in the Significant Other subscale in a way that is most relevant to himself/herself (Canty-Mitchell and Zimet 2000). This feature makes the tool particularly useful within an adolescent population as this person may be a boyfriend/girlfriend, a teacher or a counsellor (Canty-Mitchell and Zimet 2000; Cheng and Chan 2004).

The MSPSS is a psychometrically sound measure of perceived social support. Its reliability and validity has been demonstrated in diverse subject samples and prior research suggests that the MSPSS can be confidently used across a wide range of populations that have a different age, gender, race, socioeconomic status, and/or nationality (Zimet et al. 1990; Canty-Mitchell & Zimet 2000; Bruwer et al. 2008).

The internal consistency of the scale is excellent, with Cronbach's alphas of 0.90 to 0.95 for the subscales and 0.91 for the total scale (Fischer & Corcoran 2007). Within a sample of 74 adolescents (15 to 19 years-of-age), living in Europe, the Cronbach's Coefficient Alpha Values were as follows:

Family subscale – 0.81

Friends subscale – 0.92

Significant Other subscale – 0.83

Total scale – 0.84 (Zimet et al., 1990).

3.1.6.3.7 General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem 1995), **Nutrition Self-Efficacy Scale and Exercise Self-Efficacy Scale** (Schwarzer & Renner 2000)

General self-efficacy assesses “a broad stable sense of personal competence” needed to deal effectively with various stressful situations (Schwarzer & Luszczynska 2007, p.3). The GSE “was created to predict coping with daily hassles as well as adaptation after experiencing various kinds of stressful life events” (Schwarzer & Luszczynska 2007, p.3).

This instrument has been used in numerous research studies and has been adapted in 28 different languages (Scholz et al. 2002; Luszczynska et al. 2005). It consists of 10 items (Schwarzer & Luszczynska 2007; Scholz et al. 2002; Luszczynska et al. 2005). Responses are given on a 4-point Likert scale that ranges from ‘not at all true’ to ‘exactly true’. The GSE has high reliability, stability and construct validity (Luszczynska et al. 2005). The Cronbach’s Coefficient Alpha Values have typically ranged between 0.75 and 0.91 in previous studies (Scholz et al. 2002).

Another two scales that measured perceived self-efficacy were used in Phase 1, namely the Nutrition Self-Efficacy Scale and the Exercise Self-Efficacy Scale. These scales measured “beliefs about the ability to perform certain health behaviours” (Schwarzer & Luszczynska 2007, p.4), specifically, the ability to stick to healthful foods, and the ability to carry out exercise intentions, respectively. Both of these scales consist of 5 items and, as with the GSE, they are rated on a 4-point Likert scale (Regina Lee & Loke 2013; Schwarzer & Luszczynska 2007). The Cronbach’s Coefficient Alpha Value for the Nutrition Self-Efficacy Scale is 0.87 while that for Exercise Self-Efficacy Scale is 0.88 (Regina Lee & Loke 2013).

3.1.6.3.8 International Physical Activity Questionnaire (IPAQ 2001)

The International Physical Activity Questionnaire (IPAQ) short form is a self-report questionnaire that was designed to be used chiefly for population surveillance studies of physical activity in which time is limited (Maddison et al. 2007; IPAQ Research Committee 2005). This questionnaire involves a 7-day recall of physical activity and is used to give an estimate of the time that is spent performing physical activities (walking as well as activity of moderate and vigorous intensity) and the time spent inactive (sedentary) in various domains, namely:

- leisure time physical activity
- domestic and gardening (yard) activities
- work-related physical activity
- transport-related physical activity (Maddison et al. 2007; De Cocker et al. 2010; IPAQ Research Committee 2005).

The IPAQ has been developed and tested for use in populations from different countries as well as socio-cultural contexts between the ages of 15 and 69 (Maddison et al. 2007; IPAQ Research Committee 2005). In the current study this tool was used with adolescents aged between 14 and 17. It was considered appropriate for use with adolescents as young as 14 years of age because the purpose of using this tool, in this study, was to obtain an estimate of the prevalence of physical activity and this has been effectively done in previous research involving this age group (Ceschini et al. 2009).

The IPAQ short form provides separate scores for walking, activities of moderate intensity and activities of vigorous intensity. In order to obtain the total score the summation of the duration (in minutes) and well as the frequency (days) of walking, activity of moderate

intensity and activity of vigorous intensity is required (IPAQ Research Committee 2005). Data collected using the IPAQ can be reported in two ways:

- as a continuous variable expressed in metabolic equivalent-minute/week, and also
- as a categorical variable with the three categories being low, moderate and high in terms of physical activity (IPAQ Research Committee 2005).

The question about time spent in sedentary activity is not incorporated as part of any summary score of physical activity. Any data obtained from this question are reported as median values and interquartile ranges (IPAQ Research Committee 2005).

Evaluations of the IPAQ's reliability and validity in 14 countries and across 6 continents have been reported (Sjöström et al. 2002; Rutkowski & Connelly 2011). Both the long and short versions of the IPAQ produce repeatable data (Spearman's $Rho = 0.8$). The short form, used in the current study, has been found to account for all the aspects of physical activity when compared to the long version (Sjöström et al. 2002). The criterion validity was similar to that of other self-report validation studies with a median of $\rho = .39$ (Sjöström et al. 2002).

For the purposes of this study the IPAQ instrument (IPAQ 2001) was modified slightly. Throughout the questionnaire the domain 'work' was replaced with 'school' (questions about physical activity at school replaced those about physical activity at work). This modification is in line with that carried out in the Healthy Lifestyle by Nutrition in Adolescence (HELENA) study (Hagströmer et al. 2008; De Cocker et al. 2010) and was considered necessary for the age group of the population being investigated in the current study.

Moreover, another question was added to the end of questionnaire (Question 8) asking whether the physical activity that the adolescents reported in relation to the past week reflected their level of physical activity during the past three months:

- *Compared to your physical activity over the past 3 months, was last week's physical activity more, less, or about the same?*

More

Less

About the same

Do not know

The placement of this additional question at the end of the IPAQ was intentional and appropriate as the IPAQ instructions recommend that “if additional questions on physical activity are needed they should follow the IPAQ items” (IPAQ 2001). The inclusion of this question was deemed important, since this study was cross-sectional, in order to gain insight into whether the information collected about physical activity reflected the adolescents' usual physical activity patterns or whether the adolescents reported an atypical level of physical activity.

3.1.7 Pre-Pilot and Pilot Study

The online questionnaire was pre-piloted with five undergraduate dietetics students. This information-gathering exercise was done in order to:

- identify any ambiguities in the questions, and
- test the functionality of the questionnaire in its online form (i.e. identify any problems with accessing the questionnaire using a unique access code [token] as well as any issues with navigation, response selection, and saving responses).

Following the pre-pilot (and prior to Phase 1 data collection), a pilot study of the data collection instrument was conducted with a sample of 14 to 16 year old students so as to identify and address potential problems with the survey, data collection procedures (including recruitment), and/or data analyses. This was considered invaluable in order to determine any issues with language, readability as well as gauge the approximate time required to complete the questionnaire (Currier 1990).

The pilot study was conducted through three different channels - 1 independent co-ed secondary school, 1 church boys' secondary school, and through direct contact with parents. The number of letters sent as well as the response rate for each channel are presented in Figure 7.

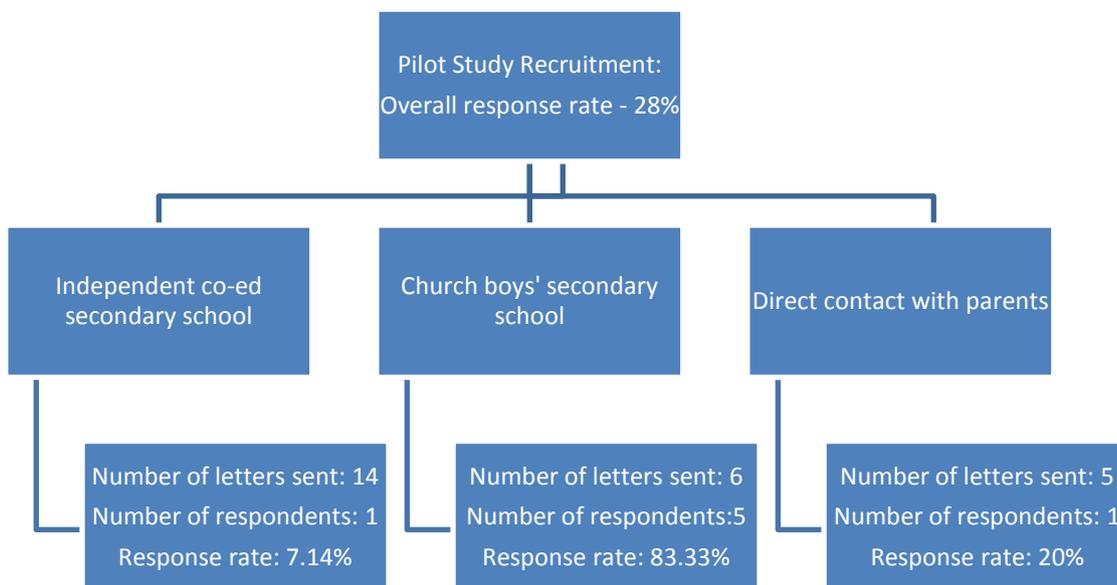


Figure 7: Pilot study response rates

In order to conduct the pilot study in the independent co-ed secondary school, initial contact with the Head of School (gatekeeper) of an independent secondary school in Malta was made via e-mail and followed up with a face-to-face meeting. The Head of School reviewed all the study documents including the data collection instrument. The same was done in the church boys' secondary school, however, before the Head of School could be contacted permission to conduct the study had to be sought from the Secretariat for Catholic Education (Appendix C). With regards to the direct contact with parents, e-mails were sent directly to parents without the use of a gatekeeper.

Upon obtaining the Heads of School's agreement to participation, invitation letters (each with a unique access code [token]) [Appendix D] were given to the schools to be passed on to the legal guardians of 14 to 16 year old students. In the invitation letter, legal guardians who consented to their son/daughter's participation were instructed to give the study uniform

resource locator (URL) listed in the letter as well as the token (unique access code) to their son/daughter.

Seven adolescents completed the pilot online questionnaire. The data were analysed and the necessary modifications were made based on the results obtained in the pilot study.

3.1.7.1 Changes implemented following pilot study

Since the recruitment rates in the pilot study were low, the recruitment strategy was adapted in order to be able to obtain the required sample size in the main study. To this end, a greater number of schools than was initially planned was contacted for Phase 1 data collection, the researcher carried out telephone and e-mail follow-ups with the schools to ensure that the letters were distributed, and the adolescents were offered an incentive to participate, i.e. participation in a lottery draw. The use of incentives, e.g. lotteries, is a relatively inexpensive strategy used to increase response rates and to mitigate non-response biases (Weber & Bradley 2006; Wright 2005).

The response rates in the pilot study varied greatly and, even though the church school in the pilot study had a very high response rate, the overall response rate was 28%. In view of this, the researcher chose to take a conservative estimated response rate of 20% for the church schools used in Phase 1 data collection. A 20% response rate would mean that, out of 480 letters given out, 96 responses were expected. This is slightly more than the estimated required sample size of 82 participants from the a priori analysis to allow for possible unusable or incomplete questionnaires.

In terms of the data collection instrument per se, only one minor modification was carried out. Some of the respondents in the pilot study seemed to give their waist circumference in inches even though this was specifically requested in centimetres. Another question was added so as to verify whether the waist circumference given was in centimetres or inches – ‘With reference to the previous question, did you enter your waist circumference in centimetres or inches?’

3.1.8 Phase 1 recruitment

Recruitment materials included an invitation letter addressed to the parents/legal guardians (Appendix D) as well as study details addressed to adolescents (Appendix D) which were made available on the initial screen of the online questionnaire. A study logo (Figure 8) was designed and placed on all items associated with the study in order to promote the study's identity among participants. This logo was based on the study acronym *ACES* (acronym for **A**dolescent **C**oping, **E**ating and **S**tress study).



Figure 8: Study logo

The participant population was recruited from 8 secondary and post-secondary church schools in Malta. The recruitment strategy for Phase 1 is outlined in Figure 9 below.

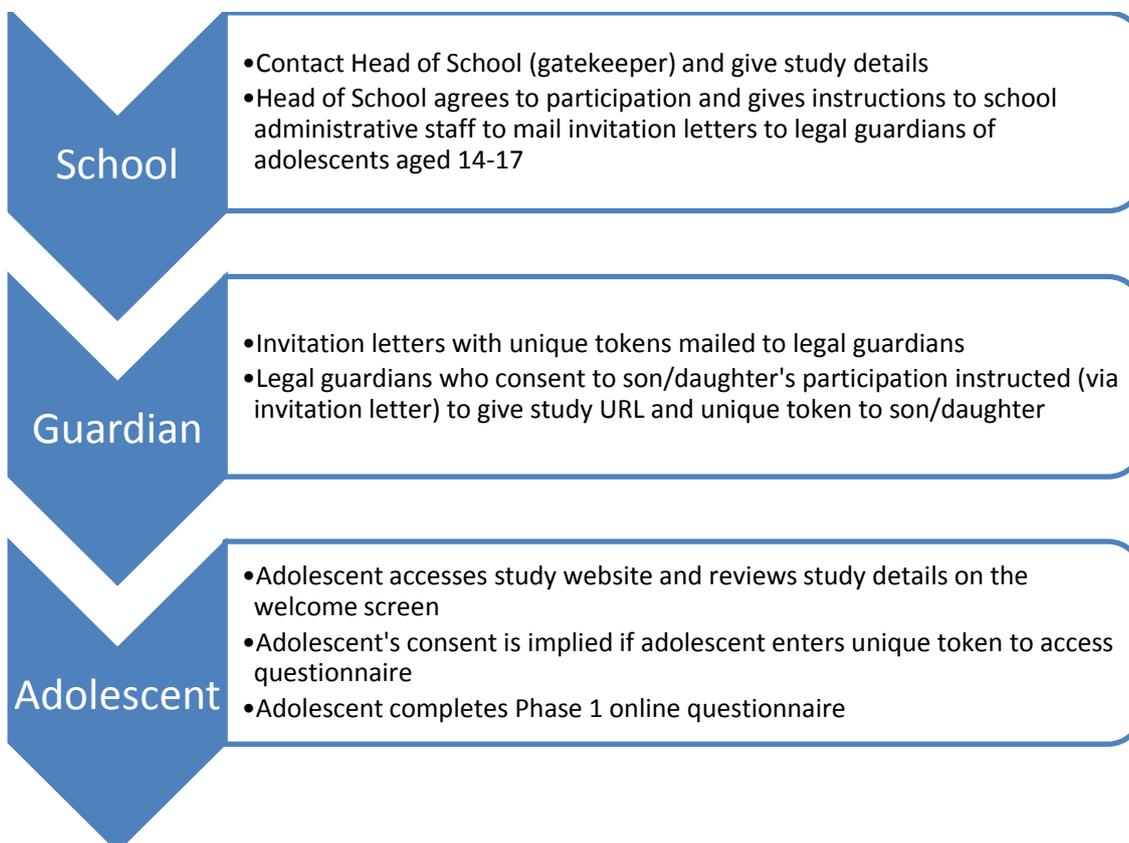


Figure 9: Recruitment strategy

3.1.9 Phase 1 Data Collection

Eleven out of a total of 21 church secondary schools in Malta (6 girls' and 5 boys' secondary schools) and the two church sixth form colleges in Malta were invited to participate in the current study. The large number of schools contacted enabled the recruitment of a sample that was diverse both in gender and in geographical distribution. Eight Heads of School agreed to act as gatekeepers for the current study and 480 sealed envelopes, i.e. 60 envelopes to each school, containing personally signed invitation letters to parents with unique tokens for accessing the online questionnaire were forwarded to the participating educational institutions.

As with the pilot study, legal guardians who consented to their sons/daughters' participation gave their sons/daughters the study URL and unique token. The adolescents were able to access the online questionnaire and review the study details prior to entering their unique token. Adolescents who agreed to participation filled in the online questionnaire which took approximately one hour to complete.

3.1.10 Ethical Considerations

It is wrong to assume that questionnaire-based research is necessarily innocuous and that ethical issues are of no relevance in such research (Evans et al. 2002). Albeit that this study involves no physical or psychological risks and has no sociological or legal implications, this section considers all potential ethical implications of the current research study including issues pertaining to approval, consent and anonymity.

3.1.10.1 Permission and approval

Phase 1 was submitted for consideration, comment, and approval to the Faculty Research Ethics Committee, Faculty of Health, Plymouth University. The protocol was reviewed by the Faculty Research Ethics Committee and ethical approval was granted on the 12th August 2010 (Appendix C). Permission to conduct this study was also given by the Secretariat for Catholic

Education (to be able to contact the Heads of School and conduct the research study in church schools; Appendix C) and by the individual Heads of School of the participating educational institutions who acted as gatekeepers to recruitment.

3.1.10.2 Informed consent

The researcher did not obtain the consent of participants or of their parents/legal guardians in writing. Consent was implied if legal guardians, after reviewing all the study details as described in the invitation letter (Appendix D), agreed to their sons/daughters' participation and gave the study's URL and unique token required for participation to their sons/daughters. Moreover, the initial screen of the online questionnaire, described the following to the participants:

- the nature of the study
- the amount of time required for participation
- the voluntary participation and right to refusal
- an assurance of confidentiality
- that entering the token (unique access code) and completing the online questionnaire constituted informed consent
- the name, address, and telephone number of the researcher, as well as contact details of the research supervisors, to whom questions regarding the study could be addressed.

This is considered to be a common and legitimate way of obtaining informed consent in questionnaire-based research since no unreasonable risks were involved (Stein & Cutler 1996).

3.1.10.3 Confidentiality

Legal guardians and participants were informed that all the data collected were confidential and for research purposes only. The invitation letter to legal guardians and the initial screen of the online questionnaire also gave details that all research measures would be destroyed within ten years after the completion of the study.

3.1.11 Data analyses

Descriptive statistics were generated in order to describe the nature of the sample including the prevalence of overweight and obesity. The internal consistency of the measures used in the current study was calculated using Cronbach's alpha. Correlations were carried out with the aim of finding relationships between the scores obtained on the data collection instruments, thus testing the operational hypotheses in this study and also providing data to enable devising a model to guide the development of an effective Internet-based intervention. Furthermore, an analysis of variance (ANOVA) was carried out to further investigate the existence of significant group differences between the groups shown in the quadrant model (Figure 3). In addition, an independent t-test was carried out in order to examine gender differences in perceived stress scores. The Statistical Package for the Social Sciences (SPSS for Windows®) was used for all of the analyses.

3.1.12 Summary

In this chapter, the hypotheses for Phase 1 and the general overview of the research methodology were provided. The subjects chosen, the instruments used, and the procedures adopted for the study were also presented. The rationale behind opting for an online questionnaire was justified and backed by existing research. Finally, all potential ethical issues as well as details about how the data were analysed in the current study were illustrated. All these aimed to provide a justifiable basis for the current research as well as to enable

replication of this study. The results obtained from the quantitative analyses of the data in the current study are presented in the following section (Section 3.2).

3.2 Phase 1 - Results

“Sometimes, if you stand on the bottom rail of a bridge and lean over to watch the river slipping slowly away beneath you, you will suddenly know everything there is to be known.”

A.A. Milne

3.2.1 Introduction

This chapter gives details about how the data in the current study were analysed. It presents the results obtained in this study by firstly describing the respondents' profile including the prevalence of overweight and obesity in the current sample. The reliability of the measures used in this study is presented. The results pertaining to the operational hypotheses are highlighted, and details of additional findings which were considered relevant are given. This chapter concludes with a summary of the major findings arising from this study.

3.2.2 Respondent profile

Seven secondary schools (4 boys' secondary schools and 3 girls' secondary schools) and 1 sixth form college agreed to participate in this study. A total of 480 invitation letters addressed to parents were given out and overall 79 boys and girls completed all the questionnaires online. The overall response rate was 16.5% (79 students), with the highest response rate being 52% in a boys' secondary school and the lowest being 3.3% in three different educational institutions (a boys' secondary school, a girls' secondary school, and a sixth form college). Out of these respondents, 31 were Form 3 students, 29 were Form 4 students, 17 were Form 5 students and 2 were Sixth Form students. There were nearly twice as many males as females, although 4 boys' schools and 3 girls' schools had been approached. The modal age was 14 (Table 3).

Age	Males	Females	Total
14	34	16	50
15	14	9	23
16	3	1	4
17	1	1	2
Total	52	27	79

Table 3: Respondents' age and gender

All of the respondents used a computer or laptop at home in order to complete the online questionnaire. All but four respondents owned a mobile phone. Nearly two thirds of the respondents owned a mobile phone that could access the Internet (i.e. 44 out of the 75 respondents who owned a mobile phone).

Data about the adolescents' smoking and drinking habits, their beliefs about family and friends' support to improve food choice, their influence on home cooking, how often they sat down at table to eat a main meal with their family, and how often they made their own food choices were also collected and are available in Appendix E. These data are not presented in this section either because the number of subjects in the resultant subcategories was insufficient to allow further analysis or because it did not provide data that correlated significantly with the other measures used in this study. For example, 77 out of 79 respondents said they never smoked and only one respondent smoked to feel better when stressed.

3.2.3 Prevalence of overweight and obesity

BMI values were calculated from reported height and weight (body mass/height²). There was no significant difference between the mean BMI in females (\bar{x} = 21.5, SD = 4.9) and males (\bar{x} = 21.3, SD = 3.5). The BMI values ranged from 14.4 to 29.3 kg/m² in males and from 15.7 to 38.1 kg/m² in females.

The distribution of the BMI values using the IOTF cut-offs are presented in Figure 10. As this figure illustrates, the prevalence rates of overweight and obesity for the total subject pool were 20% and 7%, respectively.

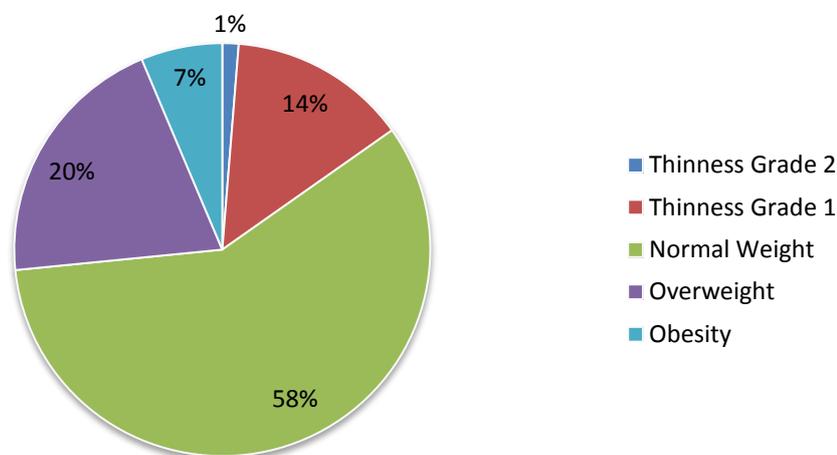


Figure 10: BMI classification of sample using IOTF cut-offs

These results are comparable to those obtained for Maltese 10 to 16-year-olds in the HBSC (Janssen et al. 2005) that reported the prevalence rate for overweight to be 17.5% and that for obesity to be 7.9%. The similarity in the results obtained in the current study to those obtained in the HBSC gives us an indication that, albeit small, the sample used in this study appears to be representative of the adolescent population in Malta. A 95% Confidence Interval was calculated for the prevalence of overweight and obesity in the current study as well as in the HBSC (Table 4 and Figure 11). The range of values obtained for the HBSC lie within the range of values obtained in the current study.

	Sample Size	Prevalence	95% Confidence Interval	Range for the true population proportion
Overweight in current study	79	20%	±8.82	11.18% to 28.82%
Overweight in HBSC	1065	17.5%	±2.28	15.22% to 19.78%
Obesity in current study	79	7%	±5.63	1.37% to 12.63%
Obesity in HBSC	1065	7.9%	±1.62	6.28% to 9.52%

Table 4: 95% Confidence Interval for the prevalence of overweight and obesity in the current study and in the HBSC

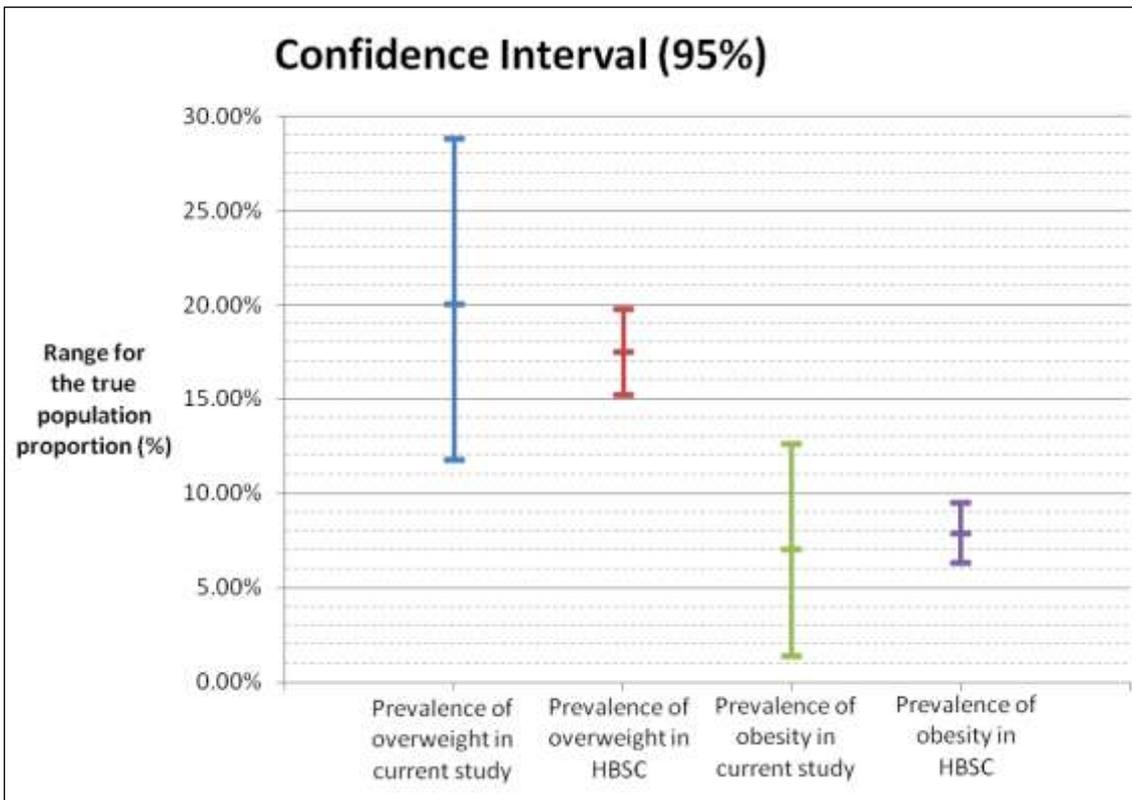


Figure 11: 95% Confidence Interval for the prevalence of overweight and obesity in the current study and in the HBSC

When categorising BMI values according to gender, 25% of all males in the sample were overweight, whilst 5.8% of all males in the sample were obese, and 11.1% of all females in the sample were overweight, whilst 7.4% of all females in the sample were obese. The frequency of BMI IOTF cut-offs by gender is presented in Figure 12. These gender differences were not statistically significant.

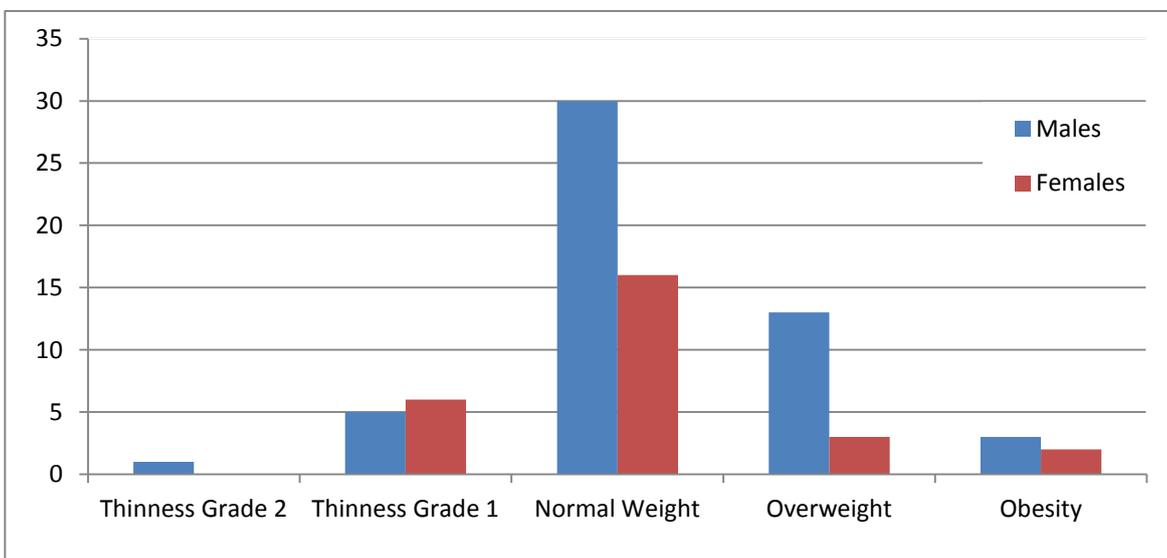


Figure 12: Frequency of BMI IOTF cut-offs by gender of respondents

The minimum, maximum and mean waist circumferences in this sample are presented in Table 5. The waist circumference of 10 respondents was excluded from the analyses (Table 6). Out of these 10, one of the respondents failed to enter the waist circumference (a value of 0 was entered). The other 9 respondents provided waist circumference measurements that ranged between 26cm and 48cm. These values were too small to be credible. It is believed that these 9 respondents might have provided the measurement in inches but erroneously indicated that the measurement they provided was in centimetres. In order to verify whether this was the case, the excluded waist circumference values were multiplied by 2.54. This was done to convert the excluded waist circumference values from inches to centimetres. The new values obtained were then plotted on a scatter plot displaying the excluded waist circumference values as well as the rest of the waist circumference values against BMI (Figure 13). The purpose of this was to check whether the excluded waist circumference data fit the rest of the data. As can be seen in Figure 13, 8 out of the 9 excluded waist circumference values fit the rest of the data, thus, supporting the theory that the wrong unit of measurement (centimetres instead of inches) was indicated by the respondents.

	N	Minimum	Maximum	Mean	Std. Deviation
Waist Circumference (cm) - Total Sample	69	55.8	104.1	76.9	10.36
Waist Circumference (cm) – Males	50	56.0	100.0	77.6	10.27
Waist Circumference (cm) – Females	19	55.8	104.1	75.3	10.69

Table 5: Minimum, Maximum and Mean Waist Circumference (cm)

Weight Status	Excluded Waist Circumference (cm)
Thin (Grade 1)	29.5
Overweight	35
Normal Weight	32
Normal Weight	35
Normal Weight	30
Obese	43
Normal Weight	0
Thin (Grade 1)	26
Overweight	48
Overweight	31

Table 6: Self-reported waist circumference excluded from the analyses (corresponding weight status is presented for clarity)

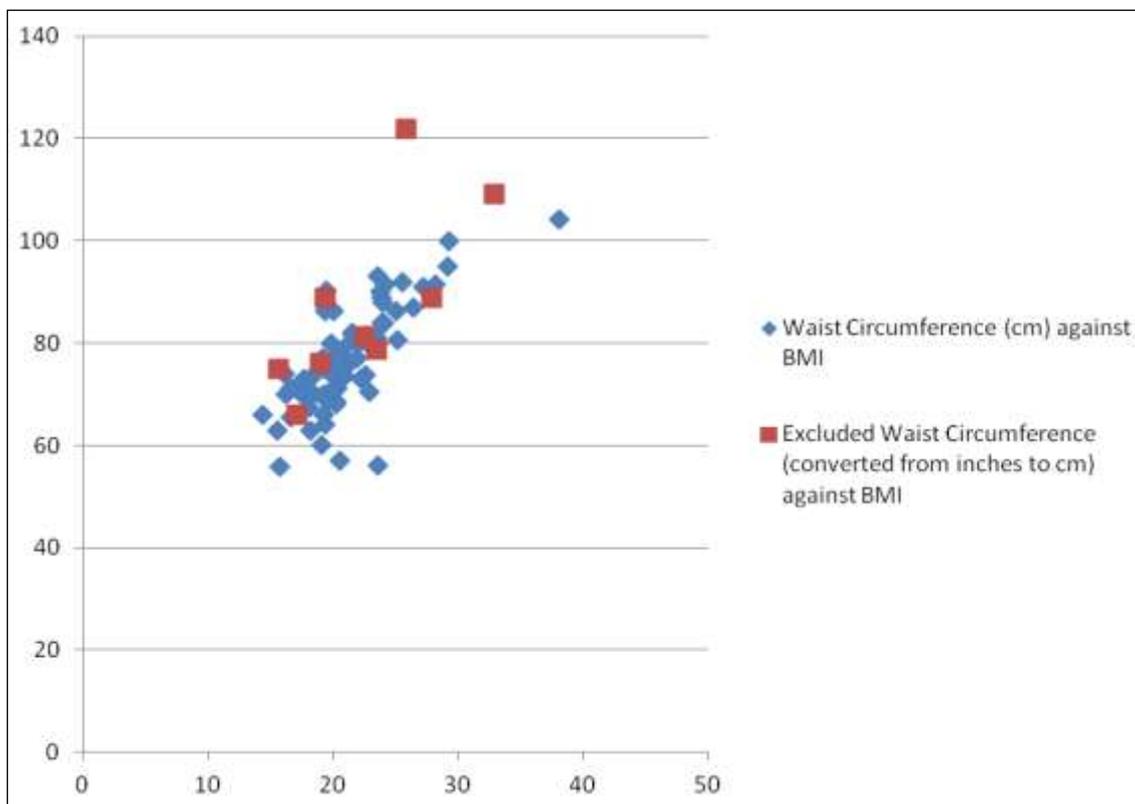


Figure 13: Scatter plot displaying excluded waist circumference against BMI and included waist circumference against BMI

3.2.3.1 Relationship between the measures of weight status

The correlation between the two measures of weight status used in this study, i.e. waist circumference and BMI was positive ($r = .751$, $n = 69$). The relationship was strong and statistically significant ($p < 0.01$). The visual analysis of these data are presented via a scatter plot in Figure 14.

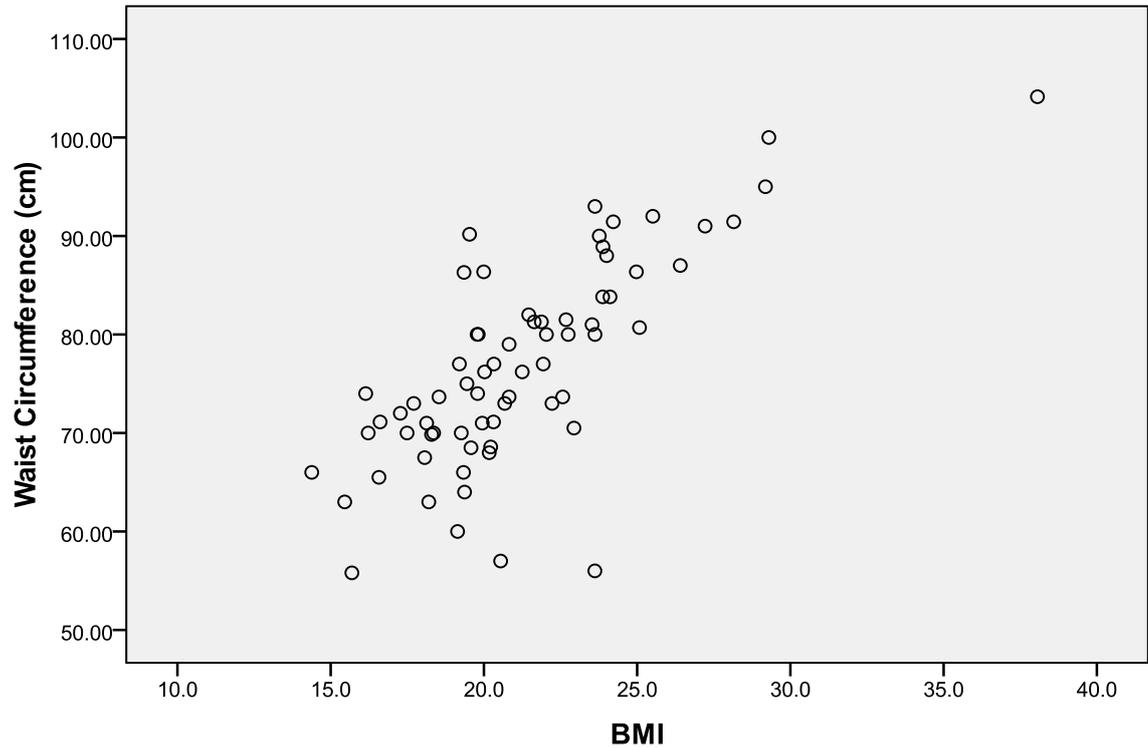


Figure 14: Scatter plot displaying waist circumference against BMI

Twenty-six of the respondents were trying to lose weight, 26 respondents were trying to stay at the same weight, and one respondent was trying to gain weight, whilst 26 respondents were not doing anything about their weight. The dieting status of respondents by weight status is presented in Table 7 and Figure 15. As seen in this cross-tabulation, 1 out of 12 underweight adolescents (Thinness Grade 1 and 2) is trying to lose weight, 14 out of 46 normal weight adolescents reported that they are trying to lose weight, 8 out of 16 overweight adolescents are trying to lose weight, whilst 3 out of 5 obese adolescents are trying to lose weight.

		Dieting Status				Total
		Trying to lose weight	Trying to stay at the same weight	Trying to gain weight	Not doing anything about weight	
Weight Status (BMI IOTF Cut-Offs)	Thinness Grade 2	0	1	0	0	1
	Thinness Grade 1	1	4	1	5	11
	Normal Weight	14	17	0	15	46
	Overweight	8	3	0	5	16
	Obesity	3	1	0	1	5
Total		26	26	1	26	79

Table 7: Dieting status by weight status (BMI IOTF cut-offs)

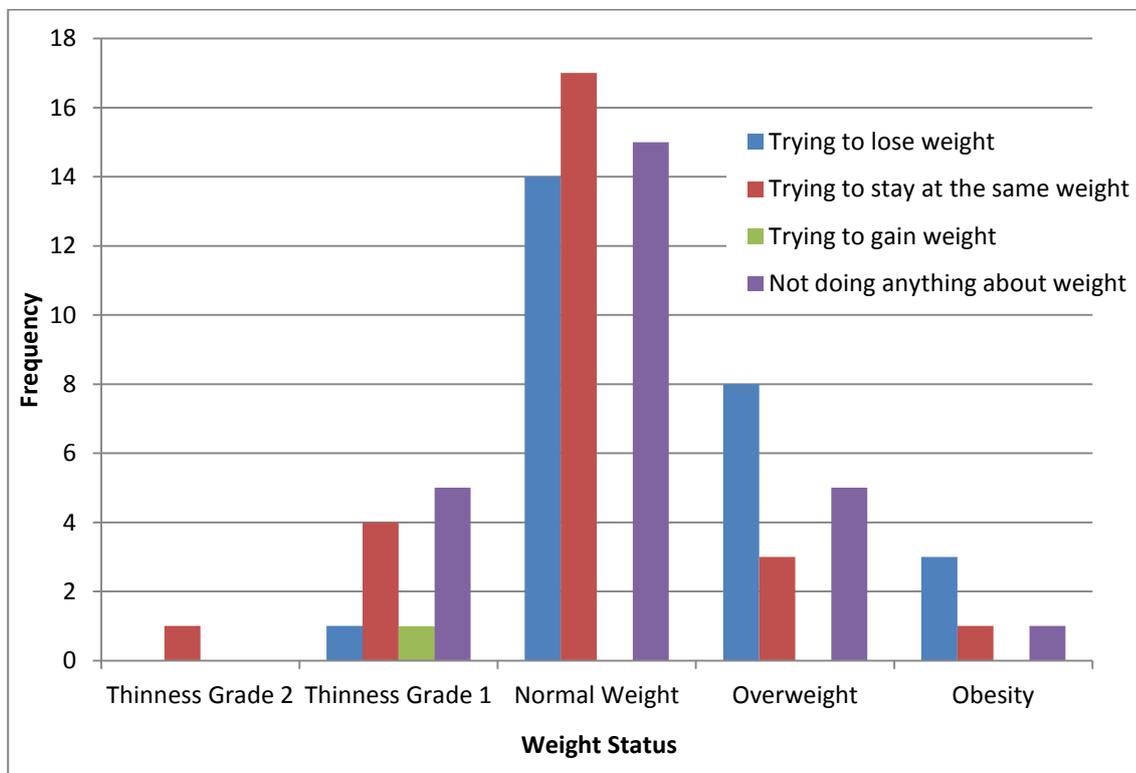


Figure 15: Bar chart depicting dieting status of respondents by weight status (BMI IOTF cut-offs)

3.2.4 Measurement properties - Internal Consistency

The prevalence of overweight and obesity is comparable to a previous study (Janssen et al. 2005) and the correlation between the measures of weight status together provide positive indications as to the sample representativeness (and data quality) in this study. Further confirmation was obtained via a measure of reliability, more specifically, internal consistency. All the scales used within this study demonstrate good to excellent Cronbach's alpha

coefficients ranging between 0.78 for the General Self-Efficacy Scale to 0.93 for the Friends Subscale of the MSPSS as well as for the Emotional Eating Subscale of the DEBQ. Cronbach's alpha values above 0.7 are deemed acceptable (Gliem & Gliem 2003). The Cronbach's alpha values for all the scales used in the current study are put forward in Table 8.

Scale / Subscale	Cronbach's Alpha
PSS	0.84
MSPSS	0.91
<i>MSPSS – Family Subscale</i>	0.90
<i>MSPSS – Friends Subscale</i>	0.93
<i>MSPSS – Significant Other Subscale</i>	0.89
DEBQ	0.89
<i>DEBQ – Emotional Eating</i>	0.93
<i>DEBQ – External Eating</i>	0.85
<i>DEBQ – Restrained Eating</i>	0.92
GSE	0.78
Nutrition Self-Efficacy Scale	0.81
Exercise Self-Efficacy Scale	0.81
Ways of Coping Scale	0.91

Table 8: Cronbach's alpha values for scales and subscales in the study questionnaire

3.2.4.1 Mean and standard deviation for scores on self-report questionnaires

The mean and standard deviation for the scores obtained on the PSS, DEBQ, Ways of Coping Scale, MSPSS, GSE, Nutrition Self-Efficacy Scale and Exercise Self-Efficacy Scale are presented in Table 9.

PSS score	17.29 ± 6.24
Emotional Eating Subscale of the DEBQ scale score	2.30 ± .83
External Eating Subscale of the DEBQ scale score	3.21 ± .73
Restrained Eating Subscale of the DEBQ scale score	2.65 ± .95
Ways of Coping Scale – Confrontive coping relative score	11.22% ± 4.2%
Ways of Coping Scale – Distancing relative score	11.60% ± 4.4%
Ways of Coping Scale – Self-controlling relative score	13.06% ± 4.3%
Ways of Coping Scale – Seeking social support relative score	11.88% ± 5.1%
Ways of Coping Scale – Accepting responsibility relative score	15.16% ± 4.6%
Ways of Coping Scale – Escape-avoidance relative score	10.25% ± 4.2%
Ways of Coping Scale – Planful problem solving relative score	13.96% ± 4.6%
Ways of Coping Scale – Positive reappraisal relative score	12.87% ± 3.6%
MSPSS – Family subscale score	5.65 ± 1.25
MSPSS – Friends subscale score	5.29 ± 1.33
MSPSS – Significant other subscale score	5.76 ± 1.18
MSPSS – Total score	5.57 ± 1.01
General Self-Efficacy Scale sum score	29.27 ± 4.15
Nutrition Self-Efficacy Scale sum score	13.68 ± 2.91
Exercise Self-Efficacy Scale sum score	12.92 ± 3.24

Table 9: Mean and standard deviation for scores on self-report questionnaires

3.2.5 Operational hypotheses

The following sections will present the data related to the operational hypotheses related to the three hypotheses in Phase 1.

3.2.5.1 Relationship between perceived stress and coping responses

The operational hypotheses for Hypothesis 1 were:

- There will be a significant negative correlation between the PSS and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
- There will be a significant positive correlation between the PSS and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms.

The operational hypothesis stating that the PSS would be negatively correlated with the items on the Ways of Coping questionnaire that represent functional coping mechanisms was not confirmed, as no correlation was found between these variables.

On the other hand, the operational hypothesis stating that perceived stress would be positively correlated with dysfunctional coping mechanisms was partly confirmed. Two dysfunctional coping responses were found to be positively related to perceived stress levels. These were *self-controlling* ($r = .247, p < 0.05$) and *escape-avoidance* ($r = .305, p < 0.01$).

Therefore, Hypothesis 1 stating that adolescents using functional coping responses will have lower levels of perceived stress than adolescents using dysfunctional coping responses was not confirmed. The results, however, suggest that adolescents who use *self-controlling* and *escape-avoidance* - two dysfunctional coping responses - exhibit higher levels of stress.

3.2.5.2 Relationship between eating behaviours and coping responses

The operational hypotheses for Hypothesis 2 were:

- There will be a significant negative correlation between emotional eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
- There will be a significant positive correlation between emotional eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms;
- There will be a significant negative correlation between external eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;

- There will be a significant positive correlation between external eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanisms;
- There will be a significant negative correlation between restrained eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
- There will be a significant positive correlation between restrained eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent dysfunctional coping mechanism.

In terms of eating behaviours, the significant correlations with coping responses are summarized in Table 10.

	Pearson's correlation coefficient, r	Significance level
Emotional Eating & Self-Controlling	.264	0.019
Emotional Eating: Diffuse Emotions & Accepting Responsibility	.250	0.026
External Eating & Seeking Social Support	-.234	0.038
External Eating & Accepting Responsibility	.366	0.001
External Eating & Escape-Avoidance	.260	0.021
Restrained Eating & Self-Controlling	.278	0.013

Table 10: Correlations between Coping Responses and Eating Behaviours

Table 11 shows the relationships between coping responses, classed as dysfunctional and functional coping, and emotional, external and restrained eating. As can be seen in Table 11, the following operational hypotheses were rejected:

- There will be a significant negative correlation between emotional eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;

- There will be a significant positive correlation between emotional eating (as measured by the DEBQ) and the items of the Ways of Coping questionnaire that represent dysfunctional mechanisms;
- There will be a significant negative correlation between external eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
- There will be a significant positive correlation between external eating (as measured by the DEBQ) and the items of the Ways of Coping questionnaire that represent dysfunctional coping mechanisms;
- There will be a significant negative correlation between restrained eating (as measured by the DEBQ) and the items on the Ways of Coping questionnaire that represent functional coping mechanisms;
- There will be a significant positive correlation between restrained eating (as measured by the DEBQ) and the items of the Ways of Coping questionnaire that represent dysfunctional coping mechanisms.

		Emotional Eating	External Eating	Restrained Eating
Dysfunctional Coping	Accepting Responsibility	Positive Correlation with Diffuse Emotions Subscale (r = .250, p = 0.026)	Positive Correlation (r = .366, p = 0.001)	No Correlation
	Self-Controlling	Positive Correlation (r = .264, p = 0.019)	No Correlation	Positive Correlation (r = .278, p = 0.013)
	Escape-Avoidance	No Correlation	Positive Correlation (r = .260, p = 0.021)	No Correlation
	Distancing	No Correlation	No Correlation	No Correlation
Functional Coping	Confrontive Coping	No Correlation	No Correlation	No Correlation
	Seeking Social Support	No Correlation	Negative Correlation support (r = -.234, p = 0.038)	No Correlation
	Planful Problem Solving	No Correlation	No Correlation	No Correlation
	Positive Reappraisal	No Correlation	No Correlation	No Correlation

Table 11: Correlations between Coping Responses and Eating Behaviours (Emotional, External and Restrained Eating)

Hypothesis 2 stating that adolescents using functional coping responses will have better eating behaviours (less emotional, external and restrained eating behaviours) than adolescents using dysfunctional coping responses was not confirmed. Nevertheless, it is interesting to note that if each of the eating behaviours is considered separately, the results suggest that adolescents who use:

- self-controlling and accepting responsibility - two dysfunctional coping responses - exhibit higher levels of emotional eating;
- escape-avoidance and accepting responsibility - two dysfunctional coping responses - exhibit higher levels of external eating;
- seeking social support - a functional coping response - exhibit lower levels of external eating; and,

- self-controlling - a dysfunctional coping response - exhibit higher levels of restrained eating.

Overall, particular dysfunctional coping responses appear to relate to higher levels of emotional (namely, accepting responsibility and self-controlling), external (namely, accepting responsibility and escape-avoidance) and restrained eating (namely, self-controlling), whilst, a functional coping response (namely, seeking social support) appears to be related to lower levels of external eating.

3.2.5.3 Relationship between perceived stress and eating behaviours

The operational hypothesis for Hypothesis 3 was:

- There will be significant group differences between the groups put forward in the quadrant model formed by the independent variables (perceived stress and BMI) and the scores on eating behaviours, with the High PSS & Low BMI group exhibiting better eating behaviours (less emotional, external and restrained eating behaviours) than the High PSS & High BMI group.

In order to test this hypothesis, an ANOVA was carried out to find out whether there were significant group differences between the groups put forward in the quadrant model formed by the independent variables (perceived stress and BMI) and the scores on the dependent variables (eating behaviours – emotional, external and restrained eating).

Prior to carrying out the ANOVA, the PSS scores and BMI were converted from continuous variables to categorical variables by performing a median split. Any value below the median was categorised as “Low” and any value above it was categorised as “High.”

No significant differences were found in eating behaviours between groups (High PSS & High BMI group, High PSS & Low BMI group, Low PSS & High BMI group, and Low PSS & Low BMI group), therefore Hypothesis 3 was rejected.

The relationship between perceived stress and eating behaviours was then investigated without taking BMI into account to see whether any relationships existed. The results suggest that perceived stress is positively related to emotional eating ($r = .342, p < 0.01$). Correlations carried out between the PSS and the subscales of the DEBQ provided the evidence for this. The PSS did not correlate with external eating and restrained eating. The results are put forward in Table 12.

	Pearson's correlation coefficient, r
PSS & Emotional Eating	.342 ($p = 0.002$)
PSS & External Eating	-.068
PSS & Restrained Eating	.198

Table 12: Correlation between perceived stress and eating behaviours

3.2.6 Devising a model that outlines the relationship between stress, coping responses and eating behaviours in Maltese adolescents

The second aim of Phase 1 was to devise a model that outlines the relationship between stress, coping responses and eating behaviours in Maltese adolescents. In order to be able to devise this model, an ANOVA was carried out. The lack of group differences between the groups put forward in the quadrant model formed by the independent variables (perceived stress and BMI) and the scores on the dependent variables, namely eating behaviours, has already been presented (in the previous section and Table 12). The ANOVA also included other dependent variables (coping responses, eating behaviours, general self-efficacy, nutrition self-efficacy, exercise self-efficacy, perceived social support) to give a more complete picture.

The significant group differences based on a Tukey's Post Hoc Test are presented in Figure 16. As shown in this figure, the only significant differences between the four groups in the model occur between the High Perceived Stress and High BMI Group and the Low Perceived Stress and Low BMI Group. The results suggest that adolescents in the Low Perceived Stress and Low BMI Group use two functional coping responses, namely seeking social support and playful

problem solving, significantly more than adolescents in the High Perceived Stress and High BMI Group.

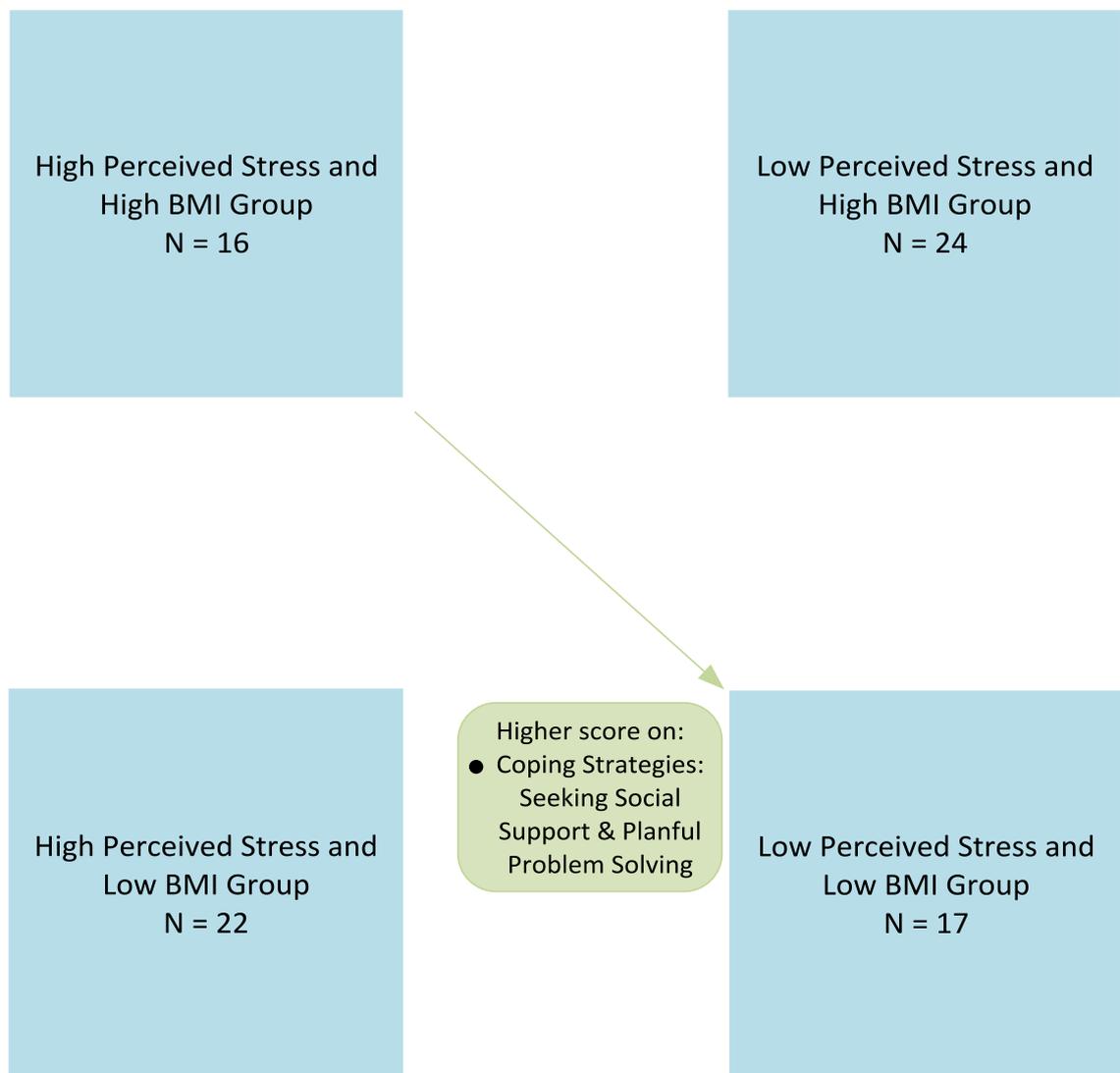


Figure 16: Significant group differences

3.2.6.1 Relationship between perceived stress and weight status

Perceived stress was not related to weight status. This was evidenced by the correlations carried out between the PSS and BMI (Pearson's correlation coefficient, $r = .152$) and also between PSS and waist circumference (Pearson's correlation coefficient, $r = -.036$).

The lack of significant differences in perceived scores between adolescents who are overweight or obese and those who are at a normal weight categorized according to the IOTF

BMI cut-offs, as demonstrated by an independent t-test, gave further confirmation that perceived stress and weight status are not associated. The results are summarized in Table 13.

	High BMI Group - Mean Score	Low BMI Group - Mean Score	t	df	Sig. (2-tailed)
PSS Score	17.71	16.57	-.713	65	.478

Table 13: Effect of Weight Status on Perceived Stress Scores

The following sections present further analysis that was carried out to aid in model development.

3.2.6.2 Relationship between eating behaviours and weight status

Emotional eating and external eating were not related to weight status. This was shown by the correlations carried out between the subscales of the DEBQ and BMI as well as the subscales of the DEBQ and waist circumference. These results were confirmed by an independent t-test. The results are summarized in Table 14.

	BMI	Waist circumference	High BMI group - Mean score	Low BMI group - Mean score	t	df	Sig. (2-tailed)
Emotional Eating Score	r = .120	r = -.042	2.2747	2.2876	.057	65	.955
Emotional Eating: Diffuse Emotions Score	r = .069	r = -.037	2.3571	2.3750	.077	65	.939
Emotional Eating: Clearly Labelled Emotions Score	r = .136	r = -.042	2.2381	2.2488	.046	65	.964
External Eating Score	r = .067	r = .104	3.3619	3.1152	-1.276	65	.207

Table 14: Effect of Weight Status on Emotional Eating and External Eating (r = Pearson's correlation coefficient)

Restrained eating was found to be positively correlated to BMI, however this correlation was weak and was not confirmed by an independent t-test carried out. Restrained eating was not correlated to waist circumference. The results are presented in Table 15.

	BMI	Waist circumference	High BMI group - Mean score	Low BMI group - Mean score	t	df	Sig. (2-tailed)
Restrained Eating Score	r = .257*	r = .016	2.8905	2.6500	-.974	65	.334

Table 15: Effect of Weight Status on Restrained Eating (r = Pearson's correlation coefficient; * Correlation is significant at the 0.05 level [2-tailed])

3.2.6.3 Relationship between coping responses and weight status

No correlations were found between coping responses, as measured by the Ways of Coping Questionnaire, and weight status (BMI and waist circumference).

3.2.6.4 Relationship between perceived stress and self-efficacy

Perceived stress was negatively correlated with self-efficacy. There was a negative correlation between the PSS and the General Self-Efficacy Scale ($r = -.350, p = 0.02$) and also between the PSS and the Exercise Self-Efficacy Scale ($r = -.305, p < 0.06$). The PSS and Nutrition Self-Efficacy Scale were not correlated.

3.2.6.5 Relationship between perceived stress and social support

The relationship between social support and perceived stress was negative. This was evidenced by the correlations carried out between the total scores on the PSS and the MSPSS ($r = -.348, p = 0.02$). With regards to the subscales on the MSPSS, PSS was found to be negatively correlated with the Family Subscale score ($r = -.404, p = 0.000$) and the Friends Subscale score ($r = -.232, p = 0.040$) but not with the Significant Other Subscale score.

3.2.6.6 Relationship between eating behaviours and self-efficacy

Self-efficacy was found to be negatively correlated with emotional eating and external eating. The significant correlations are summarized in Table 16.

	Pearson's correlation coefficient, r (n = 79)	Significance level
Emotional Eating & General Self-Efficacy	-.226	0.045
Emotional Eating & Exercise Self-Efficacy	-.390	0.000
Emotional Eating: Clearly Labelled Emotions & Nutrition Self-Efficacy	-.242	0.032
Emotional Eating: Clearly Labelled Emotions & Exercise Self-Efficacy	-.394	0.000
External Eating & Nutrition Self-Efficacy	-.366	0.001
External Eating & Exercise Self-Efficacy	-.286	0.011

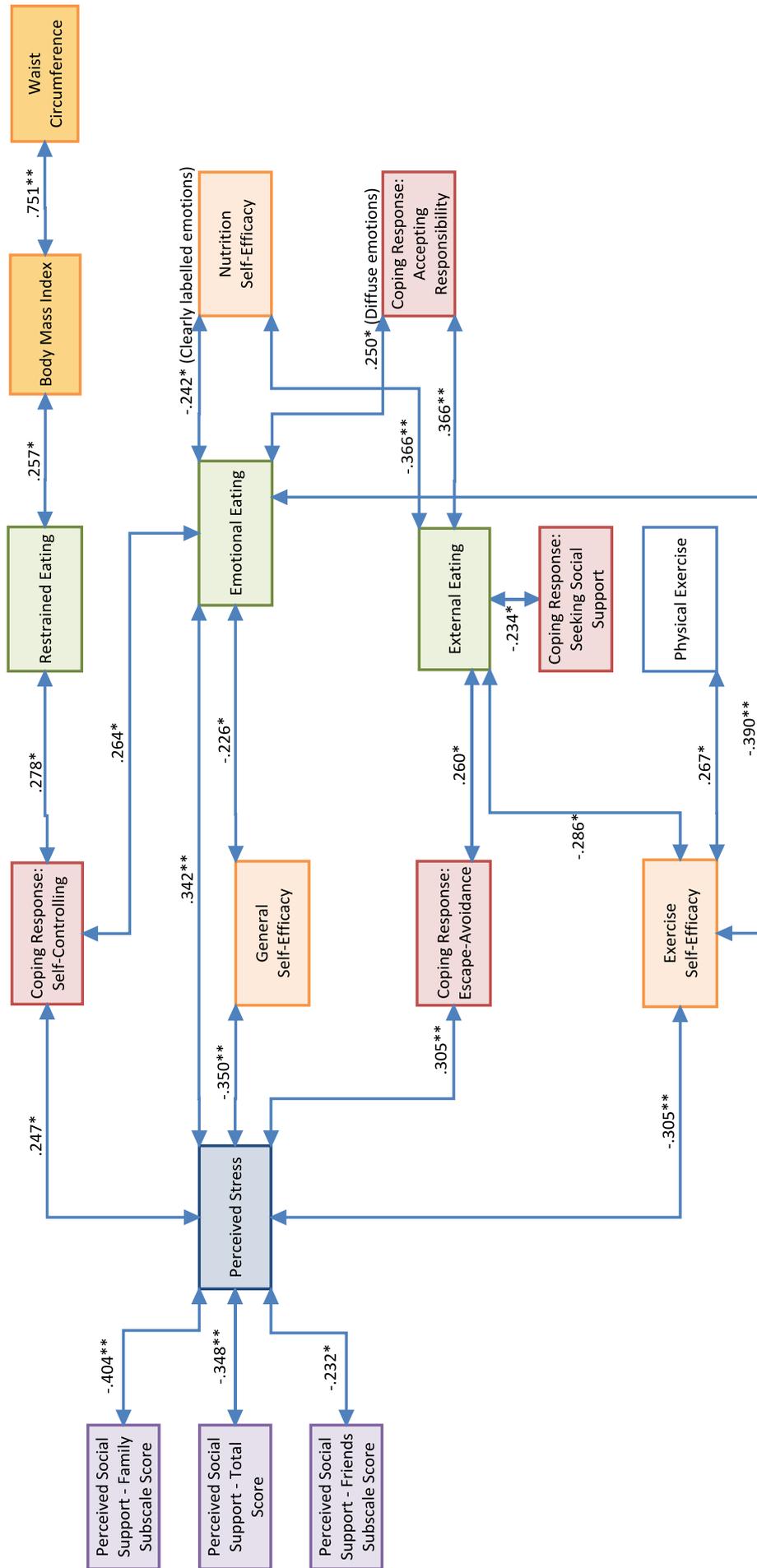
Table 16: Correlations between Self-Efficacy and Eating Behaviours

3.2.6.7 Relationship between self-efficacy and physical exercise

As expected, Exercise Self-Efficacy correlated positively with the level of physical exercise ($r = .267, p = 0.020$).

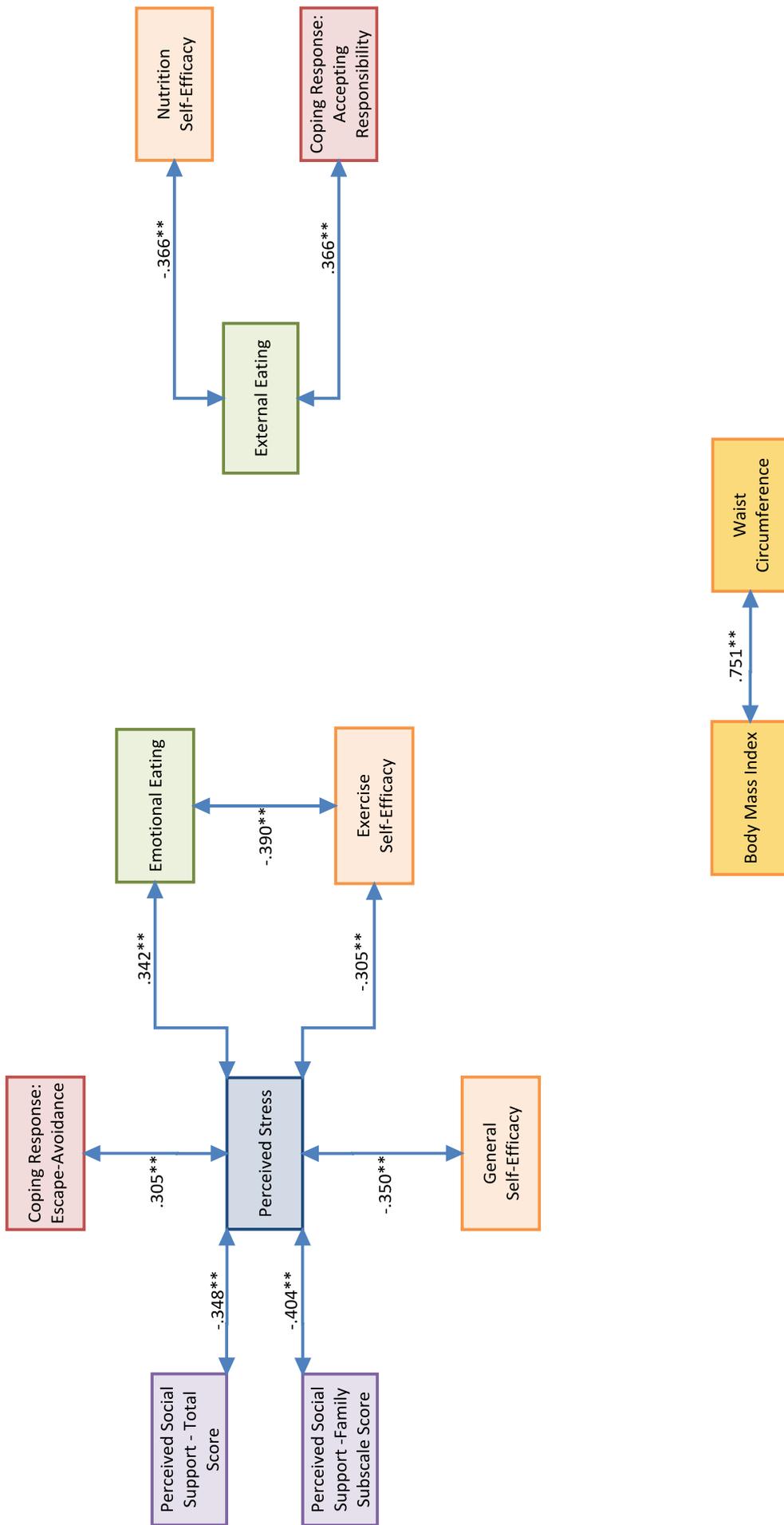
3.2.6.8 Significant and non-significant correlations

All the significant correlations (at the 0.05 level and the 0.01 level) are summarised in Figure 17 and Figure 18. Other correlations were carried out between the variables in this study but no significant results were obtained. The non-significant correlations are summarized in Figure 19.



* Correlation is significant at the 0.05 level (2-tailed)
 ** Correlation is significant at the 0.01 level (2-tailed)

Figure 17: Correlations significant at the 0.05 level and the 0.01 level



** Correlation is significant at the 0.01 level (2-tailed)

Figure 18: Correlations significant at the 0.01 level

3.2.7 Gender Differences in Perceived Stress Scores

There was a significant difference between males and females with regards to the perceived stress scores. Females had higher mean stress scores (i.e. were experiencing higher levels of perceived stress) than males. The results are presented in Table 17.

	Mean score for Males	Mean score for Females	t	df	Sig. (2-tailed)
PSS Score	16.29	19.22	-2.02	77	.047

Table 17: Gender differences in PSS Scores

3.2.8 Conclusions

In summary, these results demonstrate that the prevalence rates of overweight and obesity for the total subject pool were 20% and 7% respectively. As anticipated, the two measures of weight status (i.e. waist circumference and BMI) were strongly correlated. All the scales used in the study demonstrated good internal consistency.

The first aim of the study was to examine the relationship between perceived stress, coping and eating behaviours in a sample of Maltese adolescents. These results do not support the three hypotheses related to this aim, namely:

- Hypothesis 1: Adolescents using functional coping responses will have lower levels of perceived stress than adolescents using dysfunctional coping responses;
- Hypothesis 2: Adolescents using functional coping responses will have better eating behaviours (less emotional, external and restrained eating behaviours) than adolescents using dysfunctional coping responses;
- Hypothesis 3: Non-obese adolescents will exhibit better eating behaviours (less emotional, external and restrained eating behaviours) in relation to stress than obese adolescents.

Interestingly, however, the data suggest the following findings which are deemed to be noteworthy:

- Adolescents who use self-controlling and escape-avoidance (two dysfunctional coping responses) exhibit higher levels of stress.
- Particular dysfunctional coping responses appear to relate to higher levels of emotional, external and restrained eating (for emotional eating: accepting responsibility and self-controlling; for external eating: accepting responsibility and escape-avoidance; for restrained eating: self-controlling).
- A functional coping response (namely, seeking social support) appears to be related to lower levels of external eating.
- Higher levels of perceived stress are related to higher levels of emotional eating.

With regards to the second aim of the study, which was to devise a model that outlines the relationship between stress, coping responses and eating behaviour in overweight and obese Maltese adolescents, the following findings were obtained:

- Adolescents in the Low Perceived Stress and Low BMI Group use two functional coping responses, namely seeking social support and planful problem solving, significantly more than adolescents in the High Perceived Stress and High BMI Group.
- There is no relationship between weight status and:
 - perceived stress
 - emotional eating
 - external eating
 - coping responses.

- Restrained eating is not related to waist circumference but is positively related to BMI (however, this correlation was not confirmed by further testing).
- Higher perceived stress levels are related to:
 - lower general self-efficacy
 - lower exercise self-efficacy
 - lower perceived social support.
- Higher levels of emotional eating are related to:
 - Lower general self-efficacy
 - Lower exercise self-efficacy
 - Lower nutrition self-efficacy.
- Higher levels of external eating are related to:
 - Lower exercise self-efficacy
 - Lower nutrition self-efficacy.
- Exercise self-efficacy is positively related to the level of physical exercise.

Another point worth noting was that statistically significant gender differences were found with regards to the scores achieved on the PSS with females reporting higher perceived stress than males. At this stage, it is important to note that these results should be considered in the context of potentially significant methodological limitations which will be discussed in the next chapter.

3.3 Phase 1 Discussion

“Well,” said Owl, “the customary procedure in such cases is as follows.” “What does Crustimoney Proseedcake mean?” said Pooh. “For I am a Bear of Very Little Brain, and long words Bother me.”

A. A. Milne

3.3.1 Introduction

This chapter provides a discussion of the results obtained in Phase 1. The theoretical implications, based on the current findings, are discussed. This chapter also provides a critical analysis of the current study by addressing the strengths, key concerns and limitations associated.

The purpose of Phase 1 was to examine the relationship between perceived stress, coping responses and eating behaviours in a sample of Maltese adolescents, and to devise a model that would guide the development of an effective Internet-based intervention for the reduction of perceived stress and overeating in Maltese adolescents (Phase 2 of this research).

3.3.2 Prevalence of overweight and obesity

The prevalence rates of overweight and obesity obtained in this study were comparable to those obtained for Maltese 10 to 16-year-olds in the 2001-2002 HBSC (Janssen et al. 2005) indicating that the sample investigated appears to be representative of the adolescent population in Malta. It is important to note that the IOTF/Cole BMI based classification system for childhood obesity (Cole et al., 2000) was used in both studies thus enabling comparison. The findings, namely that 27% of adolescents were either overweight or obese, suggest that the obesity epidemic within the adolescent population has not decreased over the last decade.

There were no gender differences in the prevalence rates for overweight and obesity. This is consistent with the results of Scerri and Savona-Ventura (2010) who found no significant

gender differences in BMI distribution in Maltese children aged five and nine, as well as with other studies conducted in an adolescent population further afield such as Poland (Jodkowska et al. 2010).

3.3.3 Relationship between the measures of weight status

The findings are consistent with previous studies that found a positive relationship between BMI and waist circumference (e.g. Ford et al. 2003; Farin et al. 2005; Vazquez et al. 2007). Even though this study produced results which corroborate the findings of a great deal of the previous work carried out with regard to self-reported height, weight and waist circumference, there is one issue that emerges from these findings that needs to be noted. It is believed that eight out of the 79 respondents in this study provided their waist circumference measurement in inches but erroneously indicated that the measurement they provided was in centimetres. Their results were, therefore, excluded from the analysis.

Despite the precaution taken to avoid the respondents reporting the wrong unit of measurement, by adding a specific question asking the students whether their reported waist circumference was in centimetres or in inches, a substantial amount of respondents (about 10%) still made a mistake. A possible explanation for this might be that the adolescents may not be aware that in spite of the fact that the metric system is used in Malta, imperial units (rather than Continental/European measurements) are used mostly with regard to clothing resulting in their probably knowing their waist circumference in inches. This is because the majority of the high street stores import clothes from the United Kingdom. It is believed that this is an important issue for future research with a Maltese population and that further precautions should be taken to avoid this error repeating itself. Providing the students with possible ranges within which their waist circumference may lie could be a further prompt to recheck the unit of measurement they are using.

3.3.4 Relationship between perceived stress and coping responses

The first hypothesis stated that adolescents using functional coping responses will have lower levels of perceived stress than adolescents using dysfunctional coping responses (i.e. *distancing*, *self-controlling*, *escape-avoidance* and *accepting responsibility*). The results indicate that adolescents who use *self-controlling* and *escape-avoidance* (two dysfunctional coping responses) exhibit higher levels of perceived stress.

Self-controlling refers to the efforts made to regulate one's own feelings and actions (Folkman & Lazarus 1988). Examples of such behaviour include keeping one's feelings to oneself, keeping others from knowing how bad things are and thinking about how a person one would admire would handle a particular situation and use that as a model (Folkman & Lazarus 1988). The finding that adolescents with higher levels of *self-controlling* had higher perceived stress levels is broadly consistent with research about dysfunctional ('emotion-focused') coping that includes *self-controlling* and *escape-avoidance* (Magaya et al. 2005; Chang et al. 2007). Dysfunctional coping ('emotion-focused coping') has been found to be positively related to perceived stress as well as to reduced mental health and greater depressive symptoms (Chang et al. 2007; Horwitz et al. 2011; Magaya et al. 2005).

Escape-avoidance refers to behavioural efforts to escape or avoid a problem, such as wishful thinking, hoping a miracle would happen as well as trying to make oneself feel better by eating, drinking, smoking, using drugs or medication, etc. (Folkman & Lazarus 1988). The current study supports previous research (Austin et al. 2005; Dwyer & Cummings 2001; Lewis & Frydenberg 2002) that found that individuals who use *escape-avoidance* had higher levels of stress. *Escape-avoidance* is believed to be a type of coping strategy that may provide short-term relief from stress but is ineffective at providing long-term relief (Dwyer & Cummings 2001). This may be because this coping strategy does not result in a resolution of the problem causing the stress since the situation remains unchanged (Ghaderi 2001). Moreover, evidence suggests that emotional avoidance has a negative effect on physical and psychological health

(Frydenberg & Lewis 2004). Given the literature to date, it is unlikely that dysfunctional coping strategies ('avoidance strategies') are effective at reducing stress and these strategies are most probably used by the adolescents due to other reasons, such as a tendency to procrastinate and because of previously formed habits (Dwyer & Cummings 2001; Austin et al. 2005; Lewis & Frydenberg 2002).

An implication of these findings is that an online intervention aimed at decreasing perceived stress in Maltese adolescents needs to aim at decreasing the adolescents' use of dysfunctional coping strategies, namely *self-controlling* and *escape-avoidance*. According to Frydenberg and Lewis (2004), two different approaches could be adopted to decrease dysfunctional coping strategies: 1) focus on improving the adolescents' "use of strategies such as social support, work hard and problem solving" (i.e. functional coping strategies) assuming that the use of the strategies that do not work will decrease; 2) "actively discourage the usage of non-productive coping strategies [dysfunctional coping strategies]...on the assumption that the effectiveness of the more productive strategies will automatically improve" (Frydenberg & Lewis 2004, p.34).

The findings, that only two dysfunctional coping strategies (*self-controlling* and *escape-avoidance*) were associated with perceived stress, also seem to indicate that adolescents within this sample use more dysfunctional coping strategies than functional ones. Zimbabwean adolescents have also been found to use more dysfunctional coping than functional coping (Magaya et al. 2005). Magaya et al. (2005) believed that the reason for this was related to the culture. Zimbabwean adolescents differ from adolescents in Western societies who, unlike their Zimbabwean counterparts, are expected to be fully responsible young adults by the age of eighteen. Magaya et al. (2005) state that Zimbabwean adolescents are considered to be the responsibility of their parents until they get married. This, coupled with the cultural norms pertaining to a collectivistic society, where challenging authority or seniors is considered culturally unacceptable or viewed with reproach, is believed to be the

reason why Zimbabwean adolescents have a tendency to use dysfunctional coping strategies such as wishful thinking, distancing and keeping to themselves (Magaya et al. 2005). Similarly, most adolescents in Malta also live with their parents until they are married due to strong links between culture and religion (Roman Catholic faith). Hence, it is conceivable that, as is the case with Zimbabwean adolescents, culture may play a role in coping.

Despite the fact that the results in Phase 1 did not give an indication of which functional coping responses are associated with lower levels of perceived stress within this adolescent population (Figure 17), the results show that adolescents, who exhibit lower perceived stress and have a lower BMI, use two functional coping responses, namely *seeking social support* and *planful problem solving*, significantly more than adolescents with higher perceived stress and a higher BMI as will be discussed in Section 3.3.7. Moreover, adolescents with higher levels of perceived social support, general self-efficacy and exercise self-efficacy have lower levels of perceived stress as will be discussed further on (Sections 3.3.7.4 and 3.3.7.5).

3.3.5 Relationship between coping responses and eating behaviours

It was hypothesised (Hypothesis 2) that adolescents using functional coping responses will have better eating behaviours (less emotional, external and restrained eating behaviours) than adolescents using dysfunctional coping responses.

The results show that particular dysfunctional coping responses appear to relate to higher levels of emotional eating (namely, *accepting responsibility* and *self-controlling*), external eating (namely, *accepting responsibility* and *escape-avoidance*) and restrained eating (namely, *self-controlling*), whilst, a functional coping response (namely, *seeking social support*) appears to be related to lower levels of external eating. In other words:

- adolescents with higher levels of emotional eating use more of *accepting responsibility* and *self-controlling* to cope;

- adolescents with higher levels of external eating use more of *accepting responsibility* and *escape-avoidance* to cope;
- adolescents with higher levels of restrained eating use more *self-controlling* to cope;
- whereas adolescents who use *seeking social support* to cope have lower levels of external eating.

Finding that adolescents who used *self-controlling*, *escape-avoidance* and *accepting responsibility* (i.e. dysfunctional coping strategies) exhibited worse eating behaviours than those who did not is very interesting. This is because previous research also indicates that these dysfunctional coping strategies have been linked to eating disorders and binge eating. According to Russ (1998), binge eaters used dysfunctional ('avoidant') coping strategies significantly more than non binge eaters. This finding was corroborated by other researchers even within the adolescent population (Sierra Baigrie & Lemos Giráldez 2008). Muscat (2002) found significantly higher levels of *escape-avoidance* and lower levels of *seeking social support* and *purposeful problem solving* (two functional coping strategies) amongst participants with past or current eating disorders. The use of *escape-avoidance* coping was found to be one of the risk factors for later development of eating disorders (Ghaderi 2003). In another study by Bywater (2006), binge eaters used three particular coping styles more than the control group. These were *self-controlling*, *escape-avoidance* and *accepting responsibility* - i.e. three dysfunctional coping strategies (Bywater 2006).

According to Bywater (2006), *self-controlling* could include elements of emotional suppression (items that measure *self-controlling* include, e.g. "I tried to keep my feelings to myself" and "kept others from knowing how bad things were" (Folkman & Lazarus 1988)), and that since emotional suppression has a role in binge-eating, an intervention targeting this particular coping mechanism, by emphasising the need of adolescents to express emotions and talking to others about how they are feeling, could reduce binge-eating as well as assist in the

prevention of the development of binge-eating difficulties. *Escape-avoidance* consists of a number of non-productive coping behaviours such as wishful thinking, hoping a miracle would happen as well as trying to make oneself feel better by eating, drinking, smoking, using drugs or medication, etc. (Folkman & Lazarus 1988). Since it was found to be one of the risk factors for the development of eating disorders (Ghaderi 2003), it is important that *escape-avoidance* is targeted in prevention interventions so that more productive coping mechanisms are learnt. *Accepting responsibility* includes behaviours that are related to self-blame (Bywater 2006), e.g. “criticised or lectured myself” and “realised I brought the problem on myself” (Folkman & Lazarus 1988), and self-blame has been found to be the coping strategy most closely linked to the predisposition of eating disorders (anorexia and bulimia) in adolescent boys (García-Grau et al. 2004)

3.3.6 Relationship between perceived stress and eating behaviours depending on weight status

The third hypothesis was that adolescents with a low BMI will exhibit better eating behaviours (less emotional, external and restrained eating behaviours) in relation to stress than adolescents with a high BMI. Since there were no significant differences in eating behaviours between the different sub-groups (High PSS & High BMI group, High PSS & Low BMI group, Low PSS & High BMI group, and Low PSS & Low BMI group), hypothesis 3 was rejected. Weight status did not correlate with perceived stress, eating behaviours or coping responses as will be discussed further on (Sections 3.3.7.1, 3.3.7.2 and 3.3.7.3).

The results do, however, suggest that adolescents with higher levels of perceived stress exhibit higher levels of emotional eating. This result further supports the idea put forward by earlier research that perceived stress is significantly associated with emotional eating (van Strien et al. 1995; Braet et al. 2008; Snoek, Engels, et al. 2007; Michel 2006). A key point in the literature is that if such emotional eating behaviour occurs frequently it may result in weight gain and obesity, even though the findings in the current study did not find a direct relationship

between emotional eating and weight status (possibly because a longitudinal study would be needed to detect the long-term impact of emotional eating on weight gain) (van Strien et al. 2012; van Strien 2010).

This finding has important implications for assessment and intervention in the Maltese adolescent population. This is because when taking the finding that higher levels of perceived stress are related to higher levels of emotional eating, in the Maltese context the following points need to be considered. There already is a very high prevalence of overweight and obesity in Maltese adolescents, as has been noted in the current research as well as in previous research (Janssen et al. 2005). Since emotional eating may lead to weight gain and obesity (van Strien 2010), if nothing is done to help decrease emotional eating, this will further compound the current obesity problem in Malta. Furthermore, it is also important at this point to take into consideration that a high percentage of Maltese adolescents experience school-related stress (Currie et al. 2008). Out of 41 countries surveyed, Maltese adolescents who felt pressured by schoolwork ranked as follows: 5th place in 11-year-olds, 3rd place in 13-year-olds, and 4th place in 15-year olds (Currie et al. 2008). It is, therefore, believed that in terms of developing a prospective intervention for Maltese adolescents the focus should be on decreasing perceived stress and emotional eating. Furthermore, other researchers have reached similar conclusions. For example, Manzoni et al. (2009, p.1431) proposed that “food and nutrition professionals should take into account stress management and coping improvement techniques for the treatment of individuals with obesity who report symptoms of emotional eating or binge eating disorder”. Also, Bennett, Greene and Schwartz-Barcott (2013, p.191) suggested that “a multidisciplinary intervention focusing on time and stress management skills for college students should be developed for those susceptible to emotional eating”.

3.3.7 Devising a model that outlines the relationship between stress, coping responses and eating behaviours in Maltese adolescents

The second aim of Phase 1 was to devise a model outlining the relationship between stress, coping responses, and eating behaviours in Maltese adolescents. Even though Phase 1 did not confirm the existence of any relationship between weight status and perceived stress, coping responses and eating behaviours, it did, however, find that adolescents who exhibit lower perceived stress and have a lower BMI use two functional coping responses, namely *seeking social support* and *planful problem solving*, significantly more than adolescents with higher perceived stress and a higher BMI. *Planful problem solving* describes deliberate problem-focused efforts to alter the situation, coupled with an analytic approach to solving the problem (Folkman & Lazarus 1988). It is believed that this finding has important implications in terms of designing a prospective online intervention. Other researchers have emphasised the importance of “teaching overweight children coping strategies when confronted with food or emotional stress moments” (Braet et al. 2008, p.741). Adding to this body of research, Phase 1 has found that the intervention should aim to assist Maltese adolescents develop two specific coping skills, namely *seeking social support* and *planful problem solving*, in order to manage stress and overeating behaviours. The other findings relating to the second aim of Phase 1 are discussed in the following sections.

3.3.7.1 Relationship between perceived stress and weight status

Phase 1 did not find any evidence for the relationship between perceived stress and weight status. According to van Jaarsveld et al. (2009), many research studies investigating the associations between stress and weight have had mixed results - “effects have been variable, modest in size, and inconsistent across different measures of stress (van Jaarsveld et al. 2009, p.2155). These researchers posit that one of the possible reasons for this inconsistency is related to the fact that many studies have used BMI as the outcome and that, since there are biological hypotheses that link stress specifically to central adiposity, waist circumference

would be a more sensitive outcome measure (van Jaarsveld et al. 2009). Nevertheless, both BMI and waist circumference were used as outcomes in Phase 1 and no relationship with weight status was found in either case. Another possible explanation is that stronger associations between perceived stress and weight status would be obtained if sustained indicators of stress were used instead of one-off indicators as done in this study (van Jaarsveld et al. 2009).

Looking specifically at research carried out within the adolescent age group, the findings of this study are consistent with those of another research study investigating the relationship between perceived stress and BMI in adolescents that found no relationship between the two (Nguyen-Rodriguez et al. 2008). As is the case in Phase 1, the study by Nguyen-Rodriguez et al. (2008) was cross-sectional and used the PSS to measure perceived stress, however the BMI was not from self-report data. Van Jaarsveld et al. (2009, p.2156) state that “to date, there have been no prospective studies of stress and weight in adolescence, although one case-control study in a small sample of Swedish children found that children who had gained weight rapidly were evaluated retrospectively (through medical notes and interviews with teachers) as having had more stressful lives than a matched control group”.

3.3.7.2 Relationship between eating behaviours and weight status

Finding differences in the eating behaviours of individuals depending on their weight status may increase the understanding of the aetiology of overweight and obesity as well as provide new directions for strategies aimed at prevention (Caccialanza et al. 2004). Phase 1 found no relationship between weight status and emotional or external eating, whereas a weak positive correlation between weight status and restrained eating was found. These findings partly support those of Braet et al. (2008) who found significant differences between the scores of overweight and normal-weight youngsters for external and restrained eating but not for emotional eating. The findings in Phase 1, therefore, show that adolescents who were overweight or obese engaged in restrained eating more than adolescents who were not. This

interpretation of the relationship between weight status and restrained eating matches that by Snoek et al. (2008, p.753) who state that “positive associations between restrained eating and BMI should mainly be interpreted in the sense that higher BMI predicted more restrained eating”.

3.3.7.3 Relationship between coping responses and weight status

The results did not show a direct relationship between coping responses and weight status. There appears to be paucity of literature with regards to a direct link between these two variables. As has been previously discussed, dysfunctional coping skills have been linked with overeating and binge eating showing that coping has an impact on eating behaviours. These eating behaviours may, in turn, have an impact on weight status.

3.3.7.4 Relationship between perceived stress and self-efficacy

In keeping with previous research (Rimm & Jerusalem 1999; Dwyer & Cummings 2001), adolescents with higher perceived stress had lower self-efficacy. A higher level of perceived self-efficacy is believed to enable an individual to face stressful demands confidently by acting as a moderator of stress. Researchers state that individuals who have high levels of self-efficacy have a sense of trust in their own abilities to master different kinds of environmental demands and to face stressful situations with confidence. These individuals are able to view demands and problems as challenges rather than threats or events that are out of their control (Rimm & Jerusalem 1999; Dwyer & Cummings 2001). It is, therefore, believed that an online intervention aiming at decreasing perceived stress should increase self-efficacy.

3.3.7.4.1 Exercise Self-Efficacy

The current study found that adolescents with higher perceived stress levels also had lower exercise self-efficacy. This is consistent with findings, within an older adult population, that increases in exercise self-efficacy are associated with enhanced positive well-being as well as decreased psychological distress (McAuley et al. 2000). Also, it provides support for the view

that the mechanism through which physical activity may reduce stress is through psychological processes such as self-esteem (Wijndaele, Matton, Duvigneaud, Lefevre, De Bourdeaudhuij, et al. 2007).

3.3.7.5 Relationship between perceived stress and social support

The finding that adolescents with lower perceived stress had higher levels of perceived social support is in line with a recurrent theme in the literature base of stress that states that social support acts as a stress buffer, therefore eliminating or reducing the effects of stressful experiences (Uchino et al. 1996; McNamara 2000; Cohen 2004; Cohen & Wills 1985; Ryan 2001; Burton et al. 2004). It is believed that social support may promote health by preventing the occurrence of daily hassles and stressful life events, making an individual feel less vulnerable to stress, providing a reduction in the impact, intensity, as well as duration of stress-related symptoms, and also by offering the help, support, and advice needed in order to remove the stressor or strain imposed (Uchino et al. 1996; McNamara 2000; Cohen 2004).

The types of social support resources which have been commonly investigated in adolescents include parent, sibling, extended family, school, friend as well as boy/girlfriend resources (McNamara 2000). It may be stated that, in theory, all supportive social relationships should yield salutary effects. In Phase 1, adolescents with higher levels of perceived social support from family and friends had lower perceived stress. No relationship was found, however, between perceived social support from a significant other and perceived stress. This result indicates that, within the current sample, boy/girlfriends were not envisaged as social support resources. This may be due to a number of reasons. It could be postulated that not many of the adolescents in the current sample had a boy/girlfriend and, therefore, due to this possibly small subsample of adolescents in a relationship no significant correlation could be found. On the other hand, it may be also argued that within the age group investigated relationships with friends may be stronger than relationships with a significant other as romantic relationships tend to become increasingly significant in the lives of adolescents as they grow older (Sorensen

2007). There may also be a possibility that the term 'special person' was not understood by the adolescents as referring to a significant other and that providing a clarification by giving examples using terms more readily understood such as boy/girlfriend should be considered in future research.

The finding that adolescents who had higher levels of perceived social support had lower levels of perceived stress has important implications for intervention. Dwyer and Cummings (2001), believe that these results offer promise for counsellors who work with isolated students exhibiting high levels of perceived stress. Helping students increase their perceived social support by developing more supportive social networks may be one way students can handle their stress (Dwyer & Cummings 2001). It can be assumed that this finding is equally important in terms of a prospective online intervention and that increasing adolescents' perceived social support should result in a reduction of their perceived stress levels.

3.3.7.6 Relationship between eating behaviours and self-efficacy

Another interesting finding was that adolescents with lower general self-efficacy, exercise self-efficacy and nutrition self-efficacy were found to have higher levels of emotional eating, whilst adolescents with lower exercise self-efficacy and nutrition self-efficacy had higher levels of external eating.

These findings are in agreement with those of previous research (e.g. Heaven et al. 2001; Russ 1998), which found that there is a negative correlation between self-efficacy and emotional eating. Other research also found that binge eaters have lower self-efficacy than non binge eaters (e.g. Miller et al. 1999) and "binge eating disorder is closely related to external eating" (Newman 2006, p.11).

An implication of these findings is that if having low levels of self-efficacy is associated with increased overeating behaviours, namely emotional and external eating, as was the case in Phase 1, then finding a way to increase an individual's self-efficacy may be effective in

improving an individual's eating behaviours (Berman 2006). Studies carried out amongst overweight and obese treatment-seeking populations are especially relevant to this point as "self-efficacy beliefs regarding control over eating were predictive of ability to avoid overeating and lose weight" (Berman 2006, p.80).

3.3.7.7 Relationship between exercise self-efficacy and physical exercise

The finding that adolescents with higher exercise self-efficacy had higher levels of physical activity fits in with literature demonstrating that exercise self-efficacy has been consistently linked to physical activity (Correia 2000; Konttinen et al. 2010). Previous research has found a link between a number of psychosocial variables and physical activity (Correia 2000). These variables have included exercise self-efficacy, perceived competence, perceived benefits, perceived barriers, social norms for physical activity, intentions to be physically active, and attitudes towards physical activity and physical education (Correia 2000). Exercise self-efficacy has been put forward as being "the most consistent psychosocial correlate of engaging" in physical activity (Konttinen et al. 2010, p.1031). This positive relationship between physical exercise and exercise self-efficacy has been found to be a major driving force in the formation of intentions to exercise as well as in maintaining a regular physical exercise programme (Schwarzer & Luszczynska 2007). According to Lubans and Sylva (2009), in terms of the practical implications of this finding, an intervention which aims to increase self-efficacy can be successful in increasing short-term physical activity amongst adolescents.

3.3.7.8 Gender differences in perceived stress scores

The findings in Phase 1 tentatively suggest that significant gender differences in perceived stress exist during adolescence, with females having significantly higher mean stress scores than males. This result can be viewed as meshing with previous literature (Olpin 1996; e.g. Magaya et al. 2005; Misra & McKean 2000; Winefield 2003; Smith & Sinclair 1998) which found that females report a higher level of perceived stress than males. It is not certain why females' perceived stress scores were higher than those of males, however possible explanations

include the effect of external pressure put on females to fulfil particular society and/or cultural expectations of their gender role (Smith & Sinclair 1998), a tendency of females to engage in ruminative conversations thus exacerbating distress (McNamara 2000), the existence of an inherent characteristic of males to deny and under-report stress (Smith & Sinclair 1998) and, conversely, the possibility that females might be more willing to admit that they are stressed (Magaya et al. 2005), or that these differences are simply a measurement artefact (Misra & McKean 2000; McNamara 2000). The latter point will be discussed further in the limitations section of this chapter.

3.3.8 Theoretical implications

The quadrant model, illustrating the hypothesised relationship between perceived stress, coping responses, and weight status in adolescents, put forth in the methodology chapter was not supported by the results of Phase 1. Contrary to expectations, there were no significant differences in eating behaviours between the different groups (High PSS & High BMI group, High PSS & Low BMI group, Low PSS & High BMI group, and Low PSS & Low BMI group). Furthermore, weight status did not correlate with perceived stress, eating behaviours or coping responses. Thus modifications to the model that will be used to guide Phase 2 needed to be made.

Since emotional eating was the only eating behaviour that was directly related to perceived stress in this study, it was decided that Phase 2 would focus on emotional eating. Moreover, since no differences were found in eating behaviours on the basis of weight status the intervention will not be limited to overweight and obese adolescents in Malta, as initially planned, but will be aimed at all Maltese adolescents between the ages of 14 and 16 (only two 17-year-olds participated in Phase 1 so this age group will not be included in Phase 2). This change in target group for the prospective online intervention is viewed as important from a health promotion and disease prevention point of view for two reasons. This is because firstly, as previously discussed, engaging in emotional eating may lead to weight gain and obesity and

secondly because the dysfunctional coping strategies exhibited in the population under study have been linked not only to higher levels of stress but also to eating disorders and binge eating.

The results suggest that when planning an intervention aimed at decreasing emotional eating the following need to be considered: decreasing perceived stress, increasing exercise self-efficacy, increasing general self-efficacy, increasing perceived social support, decreasing dysfunctional coping strategies (namely, *self-controlling* and *escape avoidance*) as well as increasing functional coping strategies (namely, *seeking social support* and *planful problem solving*). The revised diagram is presented in Figure 20 and includes the variables that were selected as viable targets for the prospective online intervention.

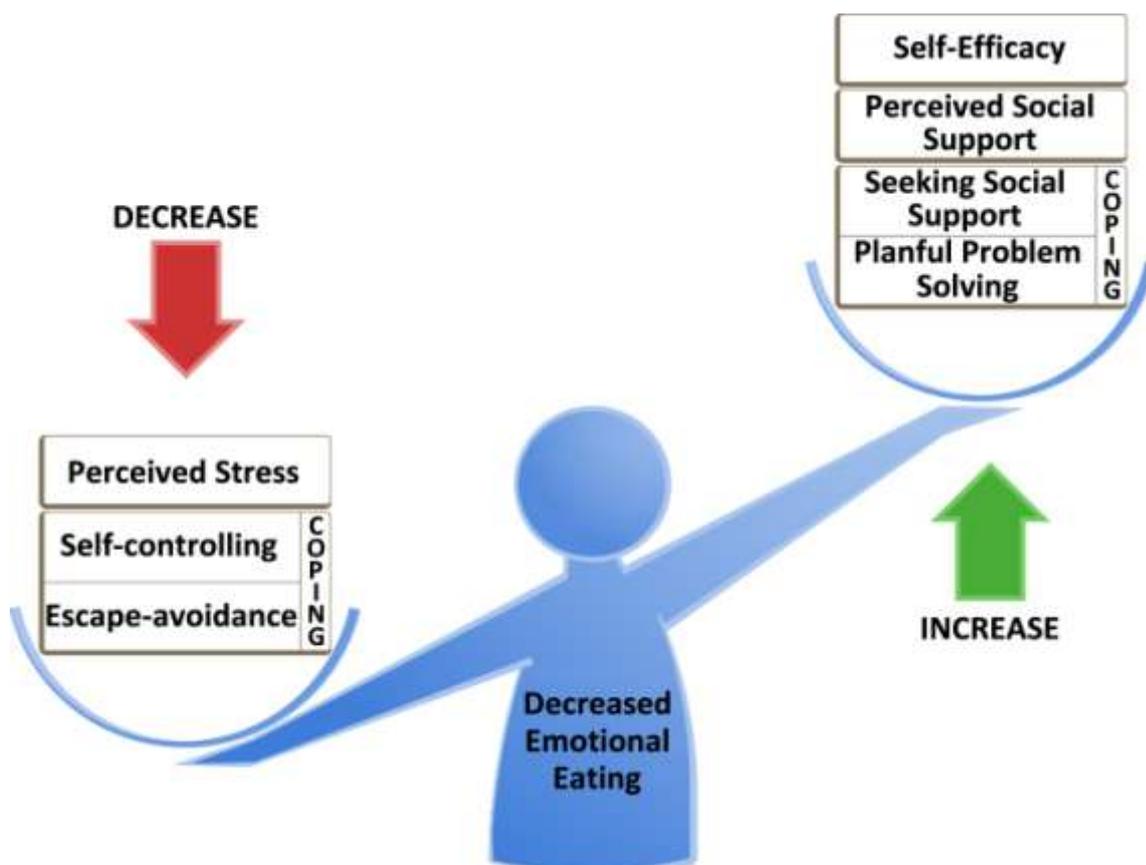


Figure 20: Revised diagram showing variables that have an effect on emotional eating that will be used to guide development of prospective online intervention

3.3.9 Strengths and limitations

The following section presents the strengths and limitations of Phase 1 and includes the methodological issues that may have had an impact on the results.

This study contributes to the existing literature by expanding the understanding of the relationship between perceived stress, coping and eating behaviours in adolescents. Moreover, it is the first to examine these associations in adolescents in Malta, and with the purpose of designing an online intervention targeted towards this group.

The strengths include the use of standardised data collection procedures and analysis techniques that aimed to minimise bias and enhance internal validity, as well as the ability to ensure confidentiality. As previously stated in the section regarding the rationale for the methodology employed in Phase 1, multiple responses from a single participant and the receipt of unsolicited responses are two limitations related to Web-based survey methodologies that were avoided through the use of tokens (unique access codes). Moreover, the use of an Internet-based questionnaire eliminated the possibility of item non-response since all questions need to be answered in order to progress through the questionnaire.

A number of conceptual limitations and methodological shortcomings may have weakened the validity and should be noted. Firstly, Phase 1 was designed to examine a single data collection point. This cross-sectional study, therefore, fails to consider the temporal effects and seasonal influences on weight (Bowling 2002) as well as on the other variables under investigation such as perceived stress levels. Moreover, cross-sectional studies cannot establish causality but only point to statistical associations present between variables (Bowling 2002). Phase 1 cannot, therefore, prove or disprove the cause-and-effect relationship which may exist between the variables and does not permit any conclusions about the direction of the relationships between perceived stress, coping strategies and eating behaviours.

A point of concern is the reliance on a self-report data collection tool. Self-report instruments are convenient as well as time and cost-effective (Ackard et al. 2003), however the use of a self-report format can be associated with systematic biases in terms of response distortions including extreme responding, negative affectivity bias and socially desirable responding (Razavi 2001; McNamara 2000). The difficulties associated with recording waist circumferences in this study also show some difficulties in self reporting. Then again, it should be noted that a comprehensive survey tool that covered a wide range of domains and included well-established and validated measures was used. Furthermore, the internal consistency of all the questionnaires used in this study was found to be excellent or good. Another point worth noting is that ensuring that confidentiality was maintained throughout this study, as well as the fact that the data collection tool was not completed within the school environment, also contributed to the self-report validity of the research (Siqueira et al. 2000) by reducing the possibility of social desirability bias since respondents' behaviour would be less affected by their concerns of the impression they are conveying (van Strien et al. 2009; Bowling 2005).

In terms of overweight/obese status, the heights and body mass values used to calculate BMI were derived from self-reports. Even though this raises questions regarding the validity of the BMI values due to the possibility of social desirability bias or recall, previous research has shown that self-reported height and weight values are fair (Strauss 1999; Brener, McManus, et al. 2003; Janssen et al. 2004). Also, the comparability of the obtained prevalence rates with those in previous research added to the researcher's confidence in the validity of the results.

With regards to stress, one of the biases which may have come into play is negative affectivity, a personality trait that is also known as 'neuroticism' (Razavi 2001; McNamara 2000). Negative affectivity is an important confounding factor in stress research as high levels of neuroticism may have an influence on the reporting of stress-related symptoms and not essentially reflect higher stress levels per se (Razavi 2001; McNamara 2000). Furthermore, although further

research needs to be carried out, there is a possibility of bias in the PSS-10. This is test level bias towards women in reporting higher levels of perceived stress (Cole 1999).

The use of a convenience sample of students in Malta, which may not necessarily be representative of the entire youth population in Malta, is a further limitation of this study in terms of the generalisability of the findings. Phase 1 did not involve private and government schools, but only church schools, and therefore, cannot be considered as a national study, however there is no reason to believe that the study population is systematically different from other Maltese adolescents.

Since participation in the study was voluntary, there may have also been self-selection bias. This sample was limited by the church schools' willingness to participate, the parents' willingness to let their sons/daughters participate in the study and by the students' voluntary decision to participate. Also, due to the fact that the questionnaire relied on the availability of Internet, generalisability is further limited. This use of Web-based data collection tools was, however, purposeful, since the aim was to collect data that would guide the development of an online intervention.

Despite being a convenience sample, the study population was diverse in terms of gender and age (provided that the study was delimited to adolescents aged 14 to 17). The prevalence rates of overweight and obesity were comparable to those obtained in the HBSC (Janssen et al. 2005). Furthermore, the a priori sample size calculation carried out ensured that adequate statistical power was obtained.

3.3.10 Conclusion

In conclusion, Phase 1 examined the relationship between perceived stress, coping responses and eating behaviours in a sample of Maltese adolescents in order to devise a model that will guide the development of an effective Internet-based intervention for the reduction of

perceived stress and emotional eating in Maltese adolescents. Despite its limitations, such as the cross-sectional design employed and the sole reliance on self-report measures for data collection, Phase 1 produced some credible and significant findings that have corroborated the findings of previous research as well as provided new insights into the characteristics of the population under study. Specific coping mechanisms that could be incorporated into an online intervention aimed at decreasing perceived stress and emotional eating in Maltese adolescents were identified. The findings provide new insights into the relationship between perceived stress, coping responses and eating behaviours in Maltese adolescents providing an evidence base for the development of an online intervention targeting this population. Based on these findings, the online intervention in Phase 2 will aim to increase certain functional coping skills (namely, *seeking social support* and *planful problem solving*), decrease dysfunctional coping skills (namely, *self-controlling* and *escape-avoidance*) and increase self-efficacy and perceived social support in order to decrease perceived stress and emotional eating in Maltese adolescents.

Chapter 4: Phase 2 Part 1

“So he started to climb out of the hole. He pulled with his front paws, and pushed with his back paws, and in a little while his nose was in the open again ... and then his ears ... and then his front paws ... and then his shoulders ... and then-‘Oh, help!’ said Pooh, ‘I’d better go back,’ ‘Oh bother!’ said Pooh, ‘I shall have to go on.’ ‘I can’t do either!’ said Pooh, ‘Oh help and bother!’”

A.A. Milne

4.1 Introduction

4.1.1 Aims

The aim of Phase 2 was to develop an Internet-based intervention aimed at reducing perceived stress and overeating in Maltese adolescents and assess its feasibility. Based on the findings in Phase 1, the Internet-based intervention focused on one eating behaviour, namely emotional eating, because this eating behaviour was directly related to perceived stress.

The first part of Phase 2 focused on developing the Internet-based intervention by developing both its content, incorporating behaviour change techniques, and its mode of delivery. The second part of Phase 2, on the other hand, focused on assessing the feasibility of the Internet-based intervention. Different aspects were investigated to establish its feasibility, including the functionality, usability, perceived utility and acceptability, the feasibility and appropriateness of recruitment methods, recruitment and drop-out rates, the validity of outcome measures and their suitability to measure change, as well as the estimated effect size.

4.1.2 Background

Phase 2 is based on the findings of Phase 1 as well as extant literature in the field. The results of Phase 1 provided a model that was used to guide the development of the Internet-based intervention that was developed in Phase 2. Phase 1 results indicated that, when planning an

intervention aimed at decreasing emotional eating, the following should be considered: decreasing perceived stress, increasing self-efficacy, increasing perceived social support, decreasing dysfunctional coping strategies (namely, *self-controlling* and *escape-avoidance*) as well as increasing functional coping strategies (namely, *seeking social support* and *planful problem solving*).

As has been previously discussed, the prevalence rates of overweight and obesity in Maltese adolescents are high (Janssen et al. 2005). Obesity is a contributing factor to life-threatening illness and is associated with high healthcare costs (e.g. Cole et al. 2000; Larrañaga et al. 2007; Grech & Farrugia Sant'Angelo 2009). Moreover, emotional eating may lead to weight gain and obesity (van Strien 2010; Michel 2006) and, if nothing is done to help decrease emotional eating, this will further compound the current obesity problem in Malta. Stress, dysfunctional coping strategies, and low levels of social support have also been linked to unhealthy eating behaviours and obesity (Martyn-Nemeth et al. 2009; Wallis & Hetherington 2009). Therefore, it is believed that more effective and specific strategies aimed at the prevention and management of obesity are needed and that the development of an intervention targeting perceived stress and emotional eating in this study was warranted.

The relationship between stress and emotional eating is supported by a growing body of evidence (van Strien et al. 1995; Braet et al. 2008; Snoek, Engels, et al. 2007; Michel 2006; Michels et al. 2012). Furthermore, other researchers have suggested that interventions for emotional eating should focus on stress management and improving coping skills (Manzoni et al. 2009; Bennett et al. 2013; Nguyen-Rodriguez et al. 2009). However, no Internet-based interventions aimed at decreasing perceived stress and emotional eating in adolescents were located. This meant that the development of a novel Internet-based intervention was required.

The use of the Internet for health is envisaged as the key to providing cost-effective, higher quality, more efficacious and more accessible healthcare for all citizens. Furthermore, it is believed to be an effective tool for reaching the adolescent population (Whiteley et al. 2008; Skinner et al. 2006). Casazza and Ciccazzo (2007) found that a computer-based intervention was more effective than traditional education methods in changing adolescents' health behaviour since this interactive delivery method encouraged the adolescents to be actively involved in the learning process.

Even though the Internet-based intervention in Phase 2 aims to decrease perceived stress and emotional eating, i.e. it aims for what Ritterband et al. (2009) describe as "symptom improvement", behaviour change is generally required for this symptom improvement to happen. The Internet-based intervention developed in Phase 2 did not only encourage behaviour change through its mode of delivery and by teaching functional coping skills, but also by incorporating behaviour change techniques as will be described in Section 4.2.

4.2 Phase 2 Part 1 Methodology 1 - Content Development

“When you are a Bear of Very Little Brain, and you Think of Things, you find sometimes that a Thing which seemed very Thingish inside you is quite different when it gets out into the open and has other people looking at it.”

A.A. Milne

4.2.1 Introduction

This chapter presents the methodology relating to the content development of the Internet-based intervention used in Phase 2. The purpose of Phase 2 was to develop an Internet-based support intervention for the reduction of perceived stress and emotional eating in Maltese adolescents and to evaluate its feasibility and acceptability.

The current chapter gives details of how the content of the online intervention was developed based on the results of Phase 1 and on previous literature. Moreover, the behaviour change techniques incorporated into the intervention are presented.

4.2.2 Content development

At the time of writing, and to the knowledge of the researcher, no Internet-based intervention that aimed at decreasing perceived stress and emotional eating in adolescents existed. Hence, *ACES*, an Internet-based stress management intervention, was developed as part of the current study. In Phase 2, the term *ACES* was used as an acronym for ‘*Adolescents Coping with Emotional Eating and Stress*’, and the intervention was developed over a 6-month period.

The material that was included in *ACES* is based on established literature about stress-management in adolescents (McNamara 2000) and:

- the results of Phase 1, namely that, when planning an intervention aimed at decreasing emotional eating the following needed to be considered:

- decreasing perceived stress, increasing exercise self-efficacy, increasing general self-efficacy, increasing perceived social support, decreasing self-controlling and escape-avoidance as well as increasing seeking social support and planful problem solving;
- effective stress-management interventions that were currently in use (Appendix F) namely:
 - ‘SNAKE-Online’, an online stress prevention program for adolescents (Fridrici et al. 2009; Fridrici & Lohaus 2009; SNAKE is an acronym for “Stress Nicht Als Katastrophe Erleben”; www.snake-training.de) - 8 lessons;
 - The ‘Coping For Success’ Program, a computer-based coping skills program for young people aged 12-18 (Frydenberg 2007) - 10 modules;
 - And ‘Think Positively!': A course for developing coping skills in adolescents’ (Frydenberg 2010) - 12 modules.

The content of ACES, ‘SNAKE-Online’, ‘Coping For Success’, and ‘Think Positively!’ is compared in Table 18. As can be seen from this table, ACES and the three interventions have a number of topics in common including information about coping, non-productive coping strategies (dysfunctional coping strategies), problem-solving, positive thinking, seeking social support, and time management. The key points covered in each of these topics in the three stress management interventions were used to write the content for ACES. Emotional eating was only covered in ACES. The last four topics listed in Table 18 (i.e. Decision-making, Getting along with others, Coping with conflict and Coping in cyberworld) were not included in ACES. This was purposeful since these topics were not relevant to the aims of ACES on the basis of the results obtained in Phase 1 and the literature concerning emotional eating (Figure 20). Moreover, adding these topics would have lengthened the duration of the intervention.

Topic	ACES (5 modules and 3 additional resource sections)	SNAKE-Online (8 lessons)	Coping for Success (10 modules)	Think Positively! (12 modules)
Introduction to stress and coping	✓	✓	✓	✓
Non-productive coping strategies	✓	✓	✓	✓
Emotional eating	✓	✗	✗	✗
Problem-solving	✓	✓	✓	✓
Seeking social support	✓	✓	✓	✓
Goal setting	✓	✗	✓	✓
Positive thinking	✓	✓	✓	✓
Time management	✓	✓	✓	✓
Relaxation and physical exercise	✓	✓	✗	✗
Decision-making	✗	✗	✓	✓
Getting along with others	✗	✗	✓	✓
Coping with conflict	✗	✗	✗	✓
Coping in cyberworld	✗	✗	✗	✓

Table 18: Comparison of content of ACES and the stress-management interventions used to guide its development

4.2.3 Content included in ACES

ACES consisted of five weekly modules and three additional resource sections. Five weeks were deemed suitable for the current intervention for a number of reasons:

- Firstly, the core material that needed to be covered (based on the results of Phase 1) fit within a five-week framework and the additional resource sections enabled the inclusion of supportive material without the need of lengthening the duration of the intervention;

- In addition, previous research about Internet-based interventions states that interventions should be short to minimise unnecessary burden, premature withdrawal and poor outcomes (Fridrici et al. 2009; Ritterband & Tate 2009);
- Furthermore, a recent study about an Internet coping skills training program for adolescents with Type 1 Diabetes demonstrated that a 5-week program was sufficient to decrease perceived stress levels in adolescents (Whittemore et al. 2010).

The content covered in ACES included knowledge about stress and coping, emotional eating, problem-solving, seeking social support, goal setting, relaxation and physical activity, time management and, positive thinking. Table 19 shows how the content was subdivided along with a brief description of each section.

Module name	Topics covered
Module 1 - Stress	Stress, effects of stress, and different coping mechanisms (productive coping, non-productive coping, and reference to others [i.e. functional and dysfunctional coping strategies])
Module 2 - Coping	Coping strategies that are not helpful (non-productive coping strategies) including a section on emotional eating
Module 3 - Problem-Solving	Six steps of problem-solving
Module 4 - Social Support	Seeking social support from family, friends and professionals, and identifying social support network
Module 5 - Goal Setting	Steps involved in setting a goal that is specific, measurable, achievable, realistic, and time-based, as well as reflecting on emotions felt when achieving a goal and reward to be given
Additional Resources 1 - Time Management	Time management, prioritizing tasks, and creating a timetable
Additional Resources 2 - Positive Thinking	Changing negative thoughts into positive ones, and finding positive qualities in oneself
Additional Resources 3 - Relaxation and Physical Exercise	Relaxation and physical exercise, deep breathing, progressive muscle relaxation

Table 19: ACES modules and additional resource sections

The modules (Appendix G) had the same format, and age-appropriate language was used throughout. The participants first read through a comic which presented a scenario involving

two or more of the teenage cartoon characters created for ACES – Alex, Chrissy, Emma and Sam. The next step involved an interactive activity or printable worksheet which aimed to reinforce the knowledge and skills covered in the comic. Then there was a second comic followed by another related activity. The content to be covered in each module was purposively split into two comics so that the participants would not need to read and understand a lot of material at once. At the end of the module participants were required to complete a quiz consisting of three multiple-choice questions related to the content covered in the module.

Module 5 differed slightly from the other modules because the second activity and quiz were replaced by a longer quiz that asked about the material covered in all the modules and the additional resource sections. This longer quiz served two purposes. The first was to help adolescents rethink about all the material covered in ACES as a form of revision, whereas the second reason was to serve as an indicator of compliance with the intervention, i.e. whether the adolescents had read the material or just clicked through.

The additional resource sections, on the other hand, consisted of one comic and:

- two printable worksheets for Time Management
- one printable worksheet for Positive Thinking
- one printable handout for Relaxation and Physical Exercise.

The information in ACES was presented in comic format using characters which the adolescents could relate to. This was done so that the intervention would be attractive and enjoyable, include visual materials, and use a tone of voice that would be appealing to adolescents, i.e. incorporate factors which have been found to be very important for a user to stay on an intervention (Crutzen et al. 2008). Moreover, previous research found that online interventions can “improve self-efficacy and health behavior by providing appealing role-

model characters who demonstrate skills, decisions, and consequences of decisions in a virtual world very similar to that of the participant” (Whittemore et al. 2010, p.3). Adolescents have been found to be very attentive to characters which they feel are targeted both to their age and their life context and find the use of a cartoon format appealing (Whittemore et al. 2010; Van Vliet & Andrews 2009).

4.2.4 Behaviour Change Techniques

A number of behaviour change techniques were incorporated into ACES. A 40-item taxonomy of behaviour change techniques (Michie, Ashford, et al. 2011) was used to identify the techniques used in ACES ensuring that standardised terminology was used. This would, in turn, enable comparisons with other interventions incorporating behaviour change techniques (Michie, Ashford, et al. 2011). The behaviour change techniques used, along with examples of how they were incorporated into ACES, are shown in Table 20.

Behaviour change technique	Example of its use in ACES
Provide information on consequences of behaviour in general	Module 1 Activity 1 - Stress Effects Indicator: This activity shows the effect of stress on the mind, body, feelings, and behaviours.
Provide information on consequences of behaviour to the individual	Module 3 Activity 1 - Emma has a problem - Part 1: This activity breaks down the steps involved in problem-solving. As part of this activity, the adolescents need to identify the pros and cons of different courses of action when attempting to solve a problem. The adolescents are presented with a case scenario, they are asked to examine possible solutions and then correctly label the pros and cons of each solution.
Action planning	Module 5 - Goal Setting: This module teaches adolescents about how to set goals. The activity breaks down goal setting into different steps and helps adolescents set goals that are specific, measurable, achievable, realistic and time-based. It also prompts adolescents to reflect on how they would feel once they achieved their goal and decide what reward they would give themselves if they achieved it.
Barrier identification/ problem solving	Module 3 - Problem-Solving: This module breaks down problem-solving into six steps and provides detailed instructions about how to accomplish each step. The activities in this module provide an opportunity for adolescents to practise the steps involved.
Prompt rewards contingent on effort or progress towards behaviour	Module 5 Activity 1 - SMARTER goal PATHS: As part of the activity which breaks down goal setting into simple steps, one of the steps prompts adolescents to identify a reward they will give themselves for achieving a goal.
Provide instruction on how to perform the behaviour	Additional Resources - Relaxation and Physical Exercise Handout: A very detailed handout about progressive muscle relaxation is provided.
Teach to use prompts/cues	Module 2 Comic 2 - Emma and Chrissy in...Emotional Eating!: This comic helps adolescents identify cues about whether they were eating because they were hungry or whether they were eating because of a particular mood or feeling such as feeling stressed, angry, bored, etc.
Plan social support/ social change	Module 4 - Social Support: The first part of this module helps adolescents identify the people (e.g. friends and family members) who are in their social support network. The second part provides information about the different professionals (e.g. psychologists, doctors, teachers, school counsellors, and a telephone helpline) who could provide social support. The adolescents are encouraged to fill in a handout and identify the people who could help with specific problem areas such as problems with health, money, studies, bullying, friends, violence, parents, and boy/girlfriend.
Prompt self talk	Additional Resources - Positive Thinking: This module prompts adolescents to reframe negative thoughts into positive ones.
Stress management/ emotional control training	Additional Resources - Relaxation and Physical Exercise: This module consists of a comic about different ways to relax such as listening to music, exercising, and deep breathing as well as a handout about progressive muscle relaxation.
Time management	Additional Resources - Time Management: This module is about time management and consists of a comic that explains how to prioritise tasks and

	prepare a timetable as well as two handouts (a 'To Do List Handout' and a 'Timetable Handout').
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Table 20: Behaviour change techniques (Michie, van Stralen, et al. 2011) used in ACES

4.2.5 Summary

This chapter presents the content development of ACES. Details of the content included in the online intervention are given and the reason why a comic format was considered appropriate for ACES is provided. The behaviour change techniques which were incorporated into ACES, such as action planning, problem-solving and time management, were presented at the end of the chapter.

4.3 Phase 2 Part 1 Methodology 2 - Web Design and Development

“Pay attention to where you are going because without meaning you might get nowhere.”

A.A. Milne

4.3.1 Introduction

The current chapter presents the methodology relating to the web design and development of ACES. A description of ACES, as well as its features, is given, including the information architecture, the different sections in ACES and its content management system. The facilitators and barriers encountered in developing the online intervention are presented towards the end of the chapter.

4.3.2 ACES - Description and features

4.3.2.1 Uniform resource locator, web hosting and accessing the intervention

The URL for this Internet intervention was www.aces.org.mt. This URL was chosen because it is short and easy to remember. The ACES website was hosted on a secure server and could be used without the need to download any special software (e.g. plug-ins). It could be used with all types of Internet connection (e.g. dial-up, cable, etc.) and web browsers (e.g. Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, etc.).

4.3.2.2 Information architecture and overall presentation

The term information architecture refers to “the structure of information space to facilitate intuitive access to content and task completion” (Danaher et al. 2005, p.2). A hybrid information architecture design, incorporating different components from matrix and tunnel information architecture designs, was used for ACES. A matrix design is one where users are offered the opportunity to view the maximum amount of content through the use of multiple links which take the users to many different pages, whereas a tunnel design is one where users go through a series of sequential steps (Danaher et al. 2005).

The matrix design was used to enable the user to have free access to different areas of ACES such as the home page, modules section, additional resource section, about page, etc. As is the case with most e-learning courses, the tunnel design was used for all the comics and some of the interactive activities (Danaher et al. 2005), for example, participants could progress through the comics by clicking arrows to advance or go back.

The hybrid information architecture design resulted in a website that was easy to navigate (navigation structure was easy to use at first sight). The page layout was kept simple throughout ACES. Furthermore, there was a consistent use of colours, fonts and illustrations.

4.3.2.3 Home page

Users entering ACES would do so via the home page (Figure 21). As can be seen from Figure 21, at the top of the home page there was a toolbar with links to the other pages that could be viewed. Users could access the following pages from this toolbar:

- *About ACES*
- *Login*
- *Prizes*
- *Contact us*

Users were given the opportunity to change the font size in order to improve the accessibility of the website. Three different font size options were given.

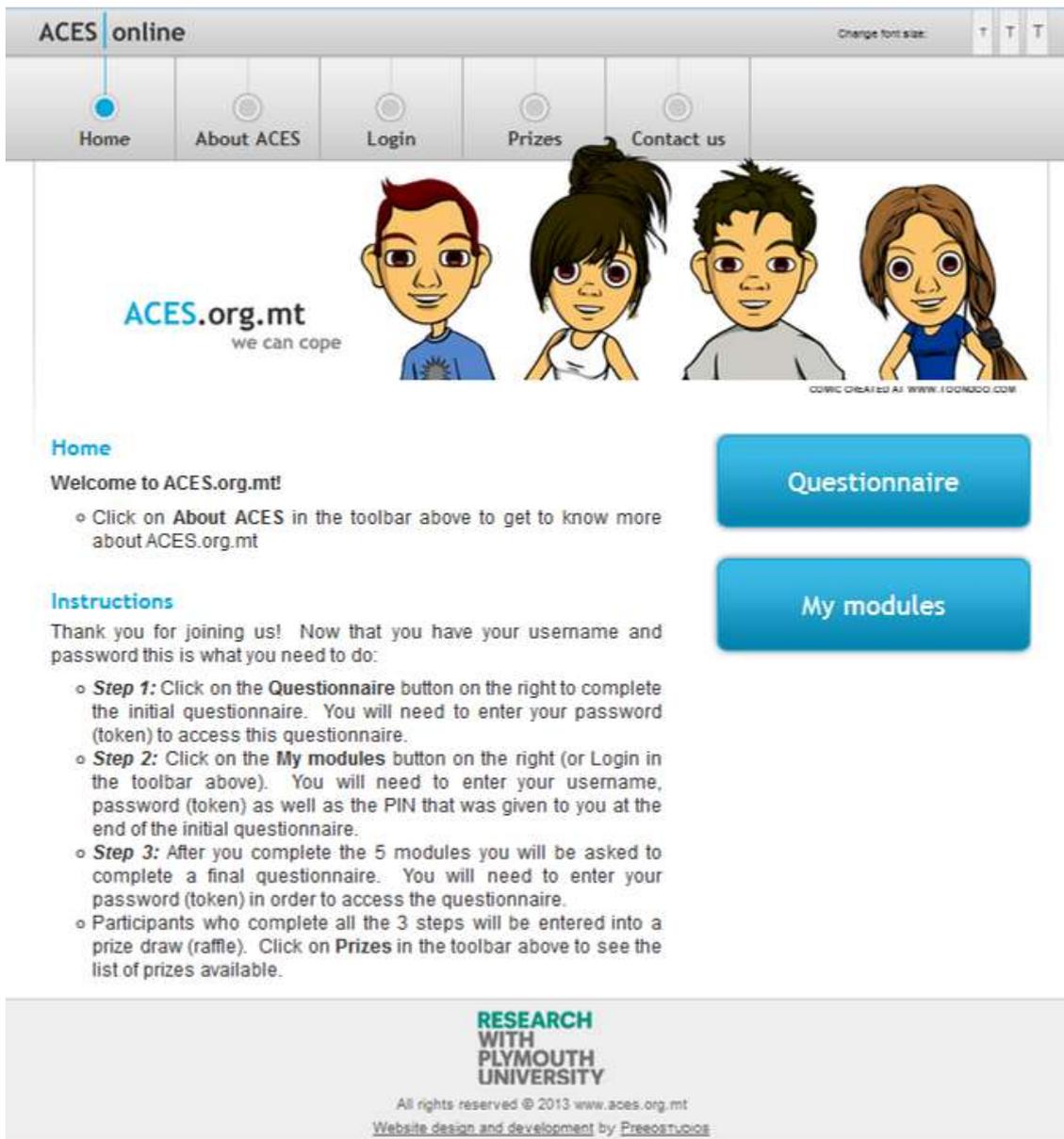


Figure 21: ACES - home page

The website banner was placed below the toolbar (Figure 22). It included the four cartoon characters that were created for the purpose of intervention, the URL, and a tagline. The cartoon characters were included in the website banner to make the interface attractive at first sight and also to make it appear user-friendly. Having an attractive interface at first sight is a very important factor for online interventions aimed at adolescents (Crutzen et al. 2008). The tagline chosen for ACES was “we can cope” - a tagline that reflects the purpose of the intervention.

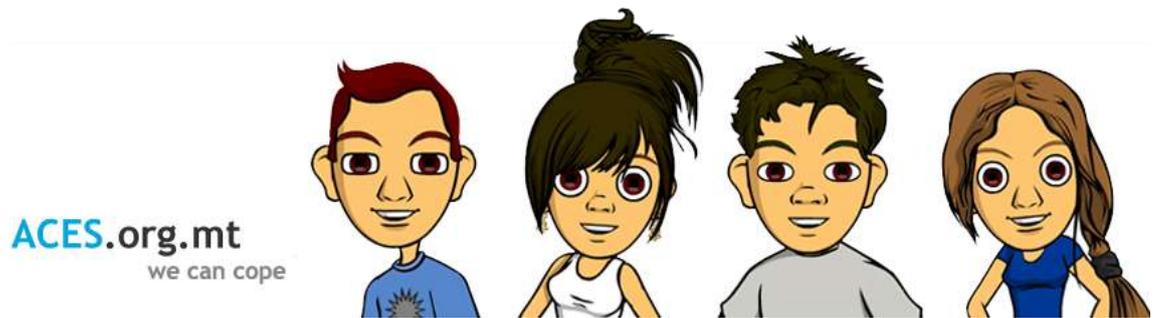


Figure 22: Website banner with tagline and characters on ACES homepage

The amount of text on the homepage was kept to a minimum. Users would be able to follow the step-by-step instructions given on the homepage in order to participate in ACES. Two big buttons were created to simplify navigating through ACES as much as possible – one button ('Questionnaire' button) took a user to the initial questionnaire that needed to be completed prior to the first login (this was hosted on an external website), whereas the other button ('My modules') took a user to the Login page. Users had another option to access the Login page by clicking on 'Login' in the toolbar at the top of the home page.

The source of the online intervention (i.e. the organisation providing the online intervention) is easily identifiable since the logo of Plymouth University was provided at the bottom of the home page (as shown in Figure 21) (clicking on logo redirected participants to the University website - www.plymouth.ac.uk). This was important for the trustworthiness of ACES as previous research has found that having a trustworthy organization (such as a well-known university) author or sponsor of an online intervention would help establish its trustworthiness (Kerr et al. 2006).

4.3.2.4 About page and prizes page

The 'About ACES' page included an information letter aimed at participants as well as further information about the online intervention. The information letter briefed participants about the study and what it would involve. The 'Further information' section gave details about the background of the study. It specified that ACES was part of a Ph.D. research study which was funded by the University of Plymouth and that it was supported by the Health Promotion and

Disease Prevention Directorate, Malta. The 'Prizes' page gave details of the raffle prizes that the users could win if they took part in ACES.

4.3.2.5 Login page

The 'Login' page (Figure 23) had three entry fields which a user would need to fill in: the username, password and personal identification number (PIN). Users were then given the option of two buttons. The first button was the 'Login' button which would take a user to password-protected content, i.e. the modules, additional resources and discussion board. The second button was the 'Forgot Password or PIN' which a returning user could click on in the case s/he forgot or misplaced his/her password or PIN. Once a user clicked on this button, the user would be asked for his/her email address and the following automated email would be sent:

Dear [nickname],

You can change your ACES profile password by following the link below.

<http://www.aces.org.mt/resetpassword/7f4e5384fb140860c15e5bef7f466171>

Remember that your PIN is **1604**

If you did not request a password change, please ignore this e-mail.

Thanks,

The ACES team

Once a user logged into ACES, new options appeared on the toolbar enabling the user to access the password-protect portion of ACES (Figure 24). Users would be automatically logged off after 30 minutes of inactivity on the website.

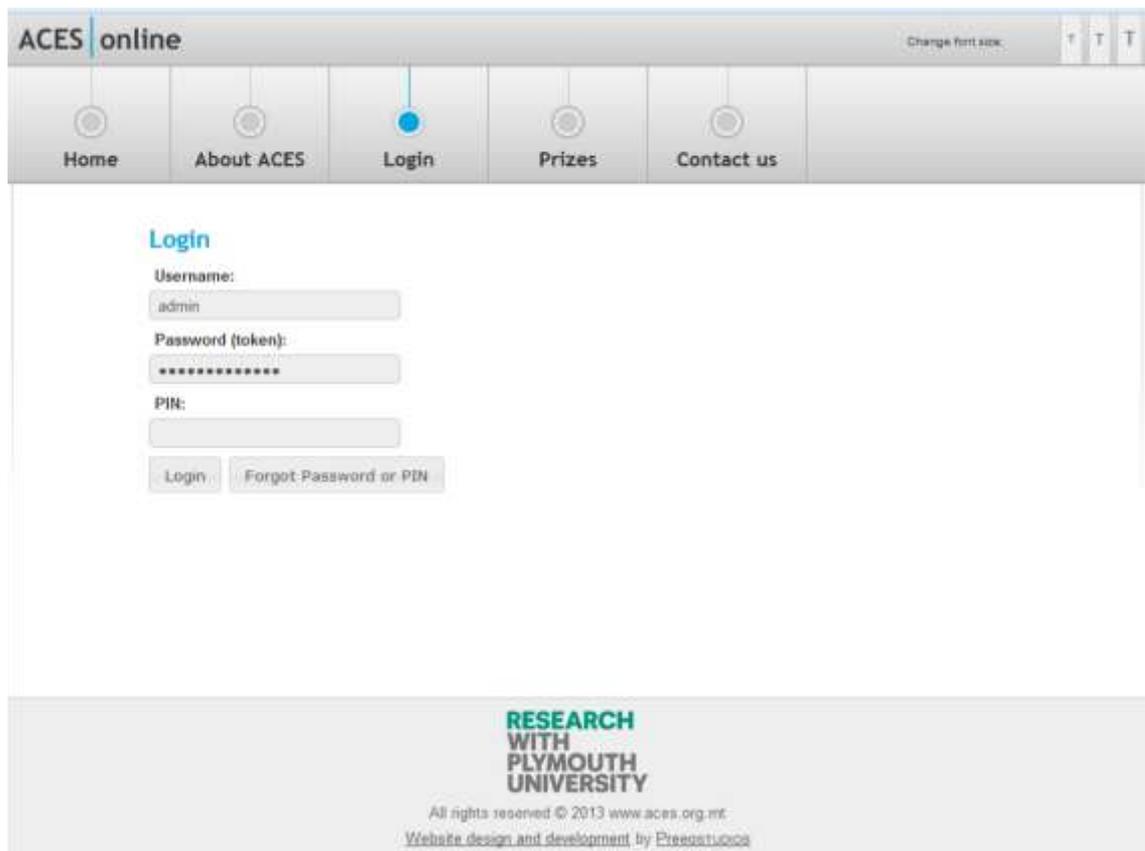


Figure 23: ACES - login page

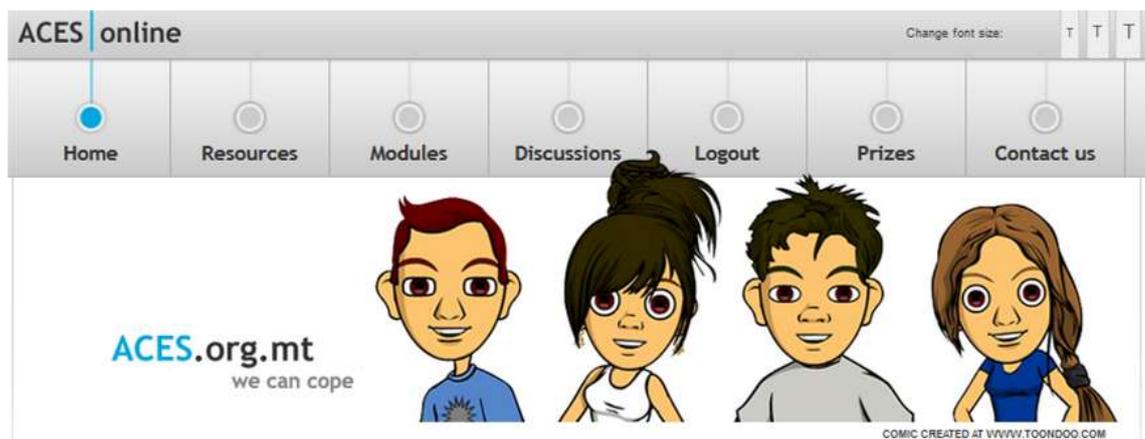


Figure 24: New options available on toolbar after login

4.3.2.6 Contact page

A contact form (Figure 25) was made available for existing or potential users of ACES. Four fields were provided to fill in the name, email address, message, and a verification code. The verification code was required to prevent automated spam to the website.

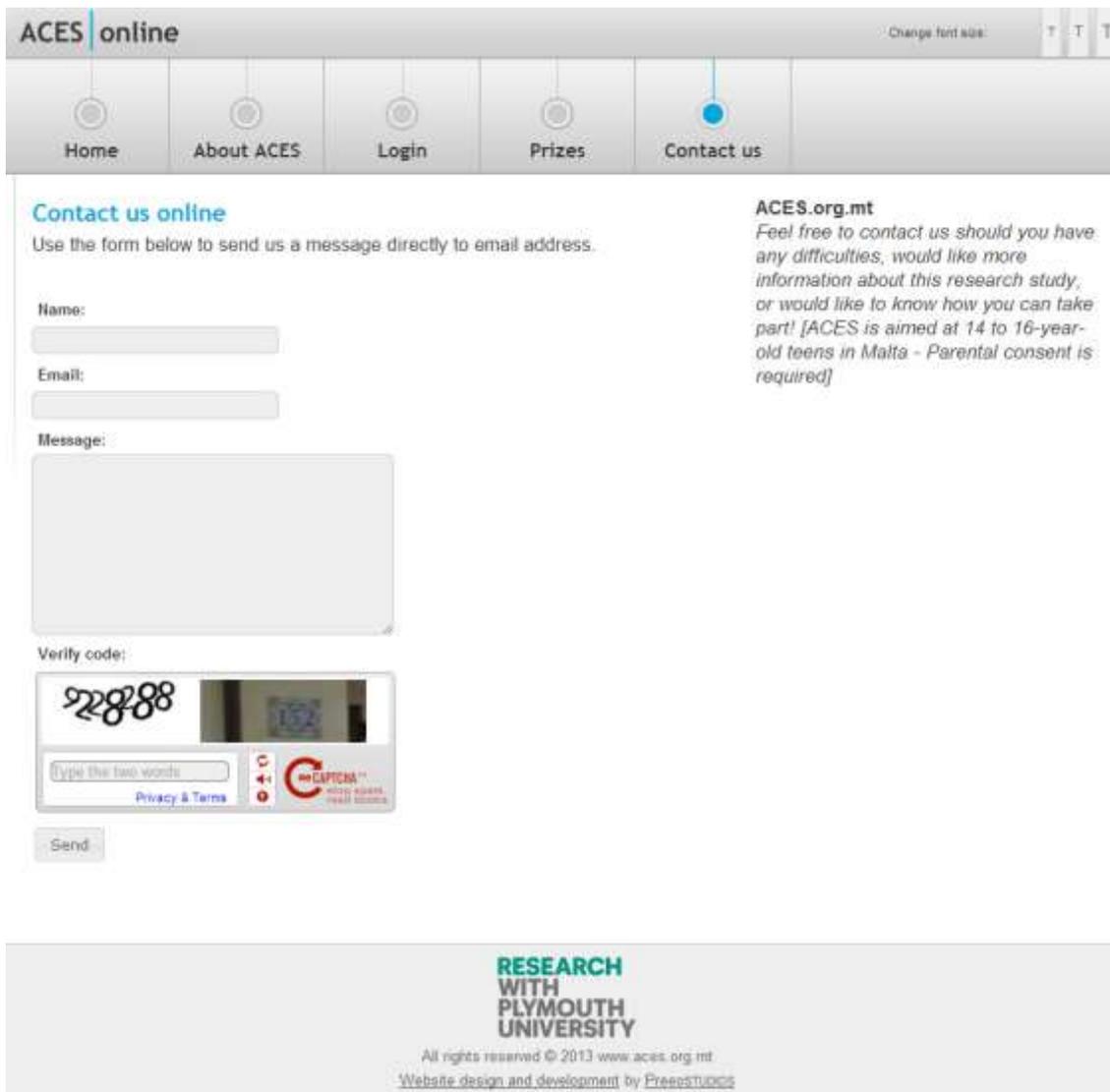


Figure 25: ACES - contact page

4.3.2.7 Modules

When accessing the Modules page, users were able to view the list of modules at a glance via the menu (Figure 26). Users were able to complete the first module on first login and each subsequent module was set to be unlocked and released weekly after a user's first login. This was done to ensure that the user would not be overloaded with information on first login but would be able to view and process one module per week as would be the case with a face-to-face intervention. Automated weekly email reminder prompts were set to inform users when a new module was unlocked. These automated notifications serve to maintain engagement in the study as forgetfulness is one of the barriers to persisting with an online intervention

(Donkin & Glozier 2012). Moreover, the automated email notifications were set to greet a participant by the 'nickname' chosen on first log-in.

Once a module was unlocked users would have unlimited access (upon login) to it. Automated check marks indicated any completed sections enabling participants to track their personal progress through the modules.

The screenshot shows the ACES online interface. At the top, there is a navigation bar with buttons for Home, Resources, Modules (selected), Discussions, Logout, Prizes, and Contact us. Below the navigation bar, the 'Modules' section is displayed. It includes a welcome message and a note that new modules are unlocked each week. Five modules are listed in a grid, each with a description and a list of completed items marked with green checkmarks.

Module 1 - Stress	Module 2 - Coping	Module 3 - Problem-Solving
In this module we will get to know about stress, its effects, and all the different things we do to try to cope with stress.	In this module we will be having a closer look at the different coping strategies and figuring out what works and what doesn't!	In this module we will cover all the steps involved in solving a problem!
The ACES team in...Stress Grrrr!!!! ✓	Emma and Chrissy in...Non-Productive Coping Strategies ✓	Emma and Sam in...Problems! ✓
Stress Effects Indicator ✓	Helpful or not? ✓	Emma has a problem - Part 1 ✓
Emma and Chrissy in...Coping with Stress ✓	Emma and Chrissy in...Emotional Eating! ✓	Emma and Sam in...More Steps in the Right Direction! ✓
Coping Sorter ✓	To eat or not to eat? ✓	Emma has a problem - Part 2 ✓
Quiz ✓	Quiz ✓	Quiz ✓
Module 4 - Social Support	Module 5 - Goal Setting	
This module is about asking for help...seeking social support!	In this module we will cover the steps involved in setting goals.	
Alex and Chrissy in...The Social Support Network ✓	The ACES team in...Looking Ahead! ✓	
My Social Support Network ✓	SMARTER goal PATHS ✓	
Chrissy in...Help from a Pro! ✓	The ACES team in...Good Luck! ✓	
Who can help? ✓	Quiz: Who wants to be Stress Free? ✓	
Quiz ✓		

Figure 26: ACES - modules section

The comics were presented one slide at a time with clearly visible navigation buttons to move forward or backward through the comic (Figure 27). The script of the comics was provided below each comic slide (Figure 27) to accommodate participants with limited bandwidth, thus

avoiding a possible barrier to participant use (i.e. the comic slide not loading or taking a long time to load due to bandwidth limitations).



Figure 27: Screenshot of a comic slide

The different options available for the interactive activities were discussed with the web development team and a variety of interactive features were included. Figure 28 to Figure 32 show the range of interactive features incorporated such as activities that required clicking on buttons, drag-and-drop activities, activities within which the user had to select the correct option, downloadable worksheets or handouts, and activities within which the user had to enter text and which resulted in a personalized, printable record.

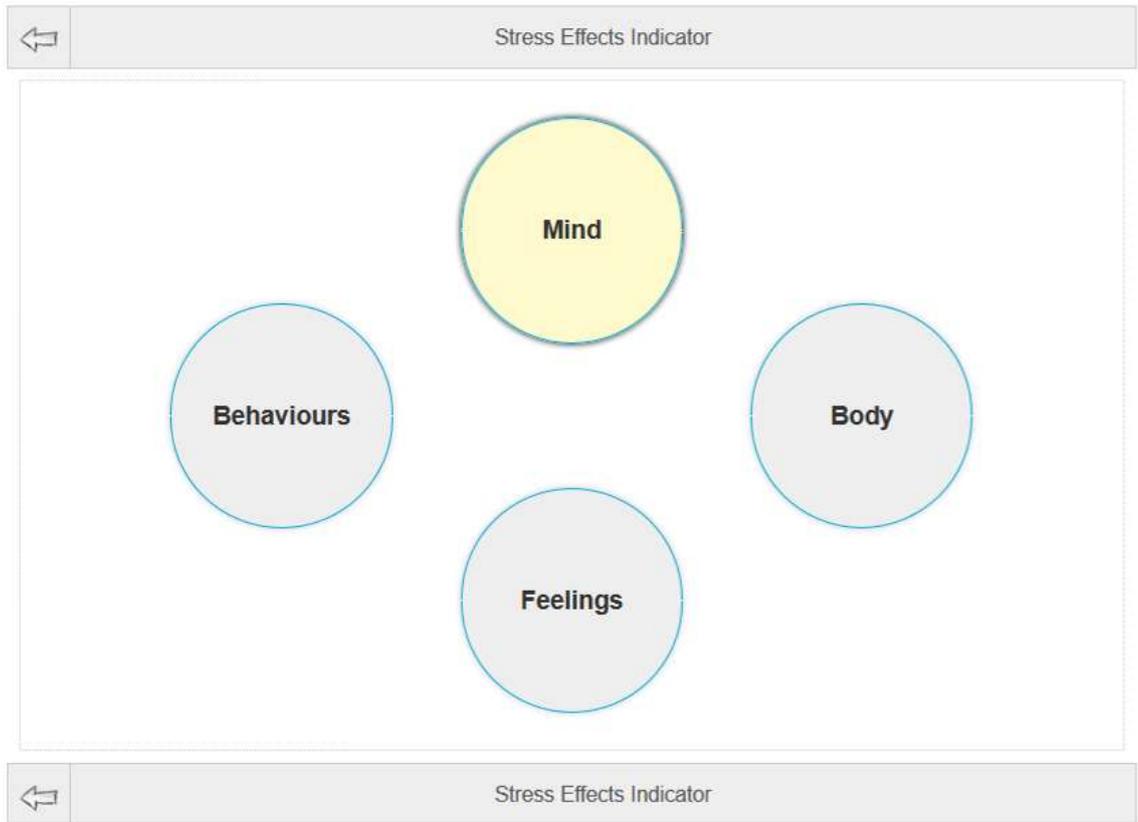


Figure 28: Example of an activity that required clicking on buttons to view different information

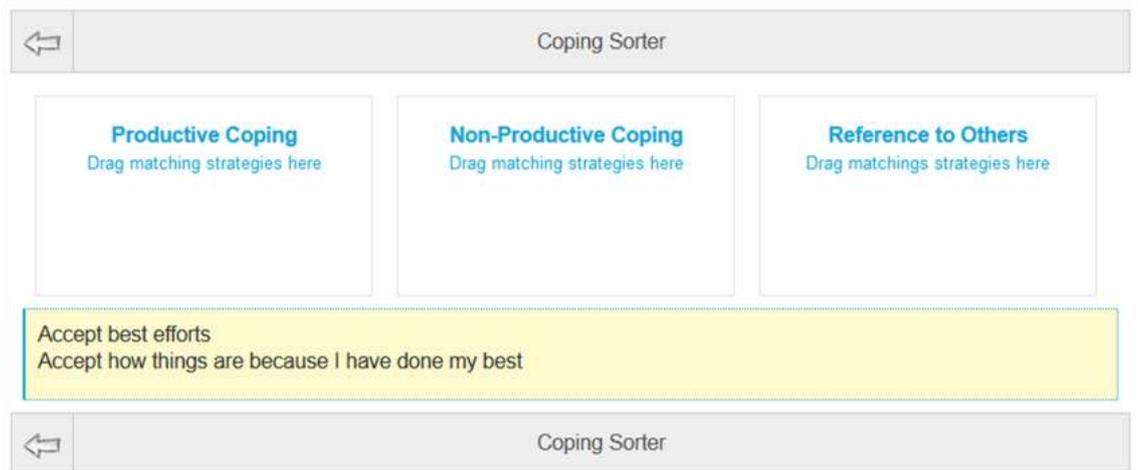


Figure 29: Example of a drag-and-drop activity

Helpful or not?

Scenario 1

Chrissy has been invited to audition for a leading role in a play. It is soon her turn on stage. She is really excited and is feeling her heart pounding in her chest.

Chrissy tries to reduce the tension by eating a chocolate bar and a packet of crisps.	Not Helpful	✓
Chrissy starts worrying that she is going to forget her lines. She thinks she is going to make a fool of herself.	Not Helpful	✓
Chrissy takes a seat and tries to relax by breathing deeply.	Helpful	✓
Chrissy phones her mum to ask for some encouragement.	Select	

Helpful or not?

Select
Helpful
Not Helpful

Figure 30: Example of an activity where a user needed to select the correct option

My Social Support Network

You now need to identify the people (such as friends and family members) who are in your social support network. Write down their names in the circles. You can leave some circles blank or add more circles if you need to.

PDF - [My Social Support Network](#)

My Social Support Network

Figure 31: Example of an activity with a downloadable worksheet

SMARTER goal PATHS

sMarter: Measurable

You need to be able to track your goal and figure out when you have achieved it. Thinking back to the previous example, 'I want to get fitter by running' is still too vague. Refining this goal to 'I will get fitter by running for twenty minutes, 4 times a week' gives us a goal we can keep track of.

Write down your measurable goal here:

Next

SMARTER goal PATHS

Figure 32: Example of an activity within which the user was required to enter text

The end-of-module quizzes (Figure 33) consisted of three multiple choice questions and were set to advance to the next question if the answer chosen was correct but to prompt a participant to retry if the answer chosen was wrong. Once all the questions were answered correctly, the quiz was completed and participants would not be able to retake it. The number of tries required to complete the quiz (i.e. answer the questions correctly) was recorded in the web logs as an indicator of comprehension and compliance.

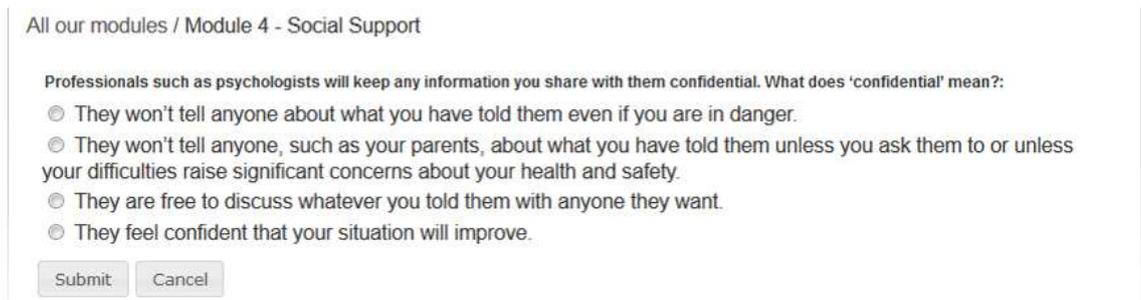


Figure 33: Screenshot of sample end-of-module quiz question

The quiz at the end of module 5 ('Who wants to be Stress Free?'; Figure 34) consisted of 13 multiple-choice questions. The 13 questions were set to be selected randomly from a bank of 38 questions (The question bank included 5 to 6 questions per module and ten questions about the additional resource sections - each random-generated quiz was set to include questions from each part of ACES). Participants were able to retake this quiz as many times as they liked and were presented with a different randomly generated quiz every time. The score (out of 130) for this quiz and the number of times the participant took the quiz were recorded in the web logs.

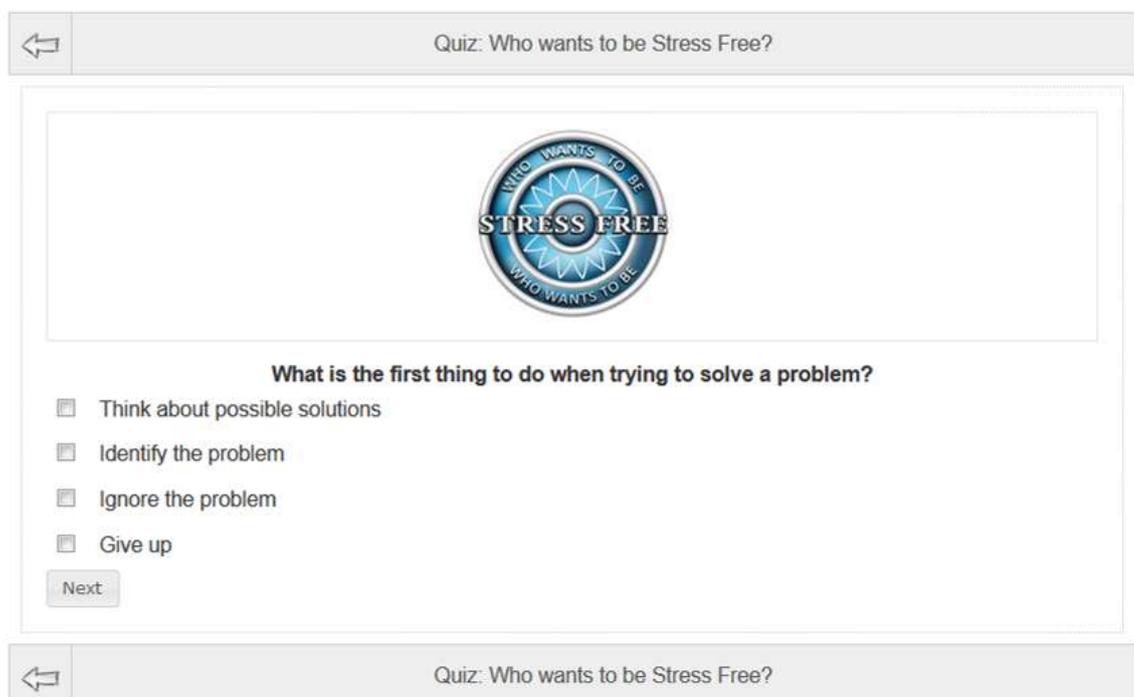


Figure 34: Screenshot of 'Who wants to be Stress Free' Quiz sample question

4.3.2.8 Resources and discussions

The 'Resources page' provided a menu with the additional resource sections that could be accessed (Figure 35). This section consisted of comics, and downloadable handouts and worksheets. The moderated peer-to-peer discussion board was divided into different sections with different threads for each module covered in ACES. There was unlimited access to the content in the additional resource section and discussion board. The researcher acted as the moderator and reviewed all postings within 24 hours. This was done to ensure that posts included appropriate content and language, and also to be able to identify any potential indicators of participant distress (Whittemore et al. 2010).

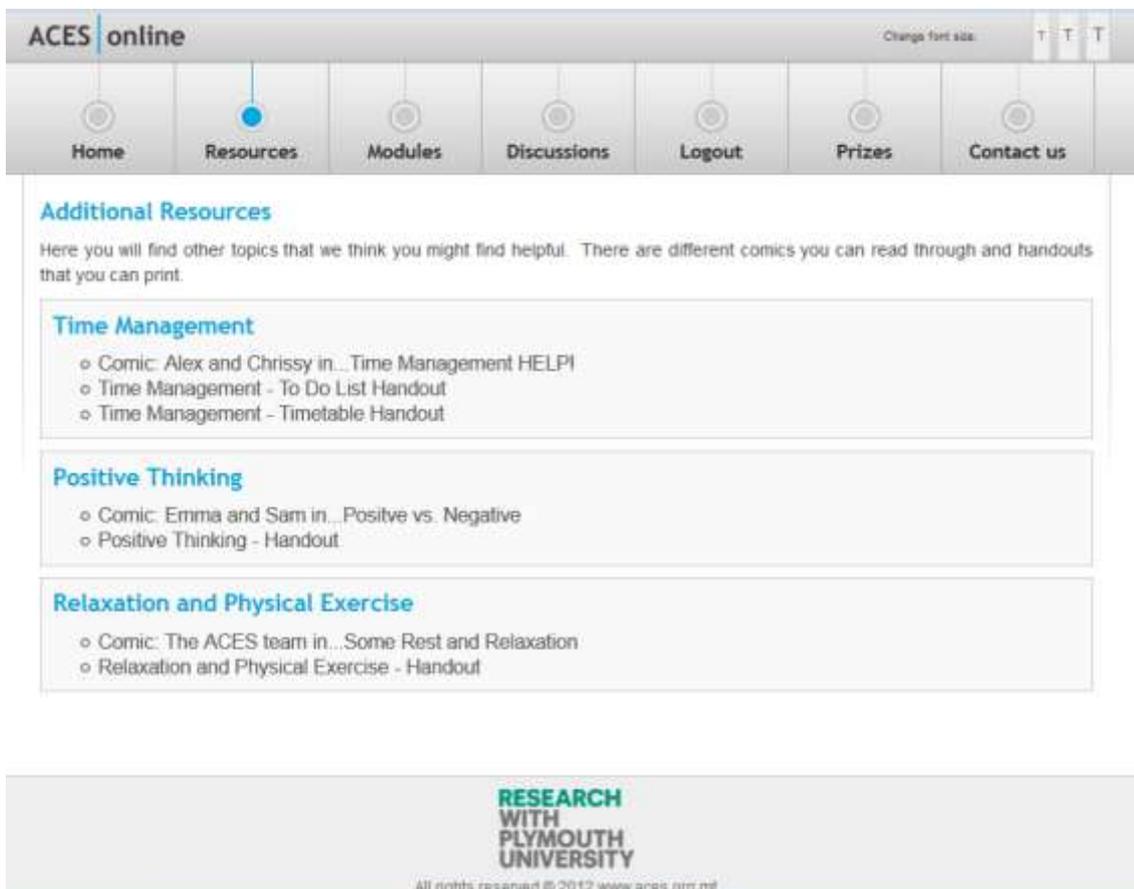


Figure 35: ACES - Additional Resources Section

4.3.2.9 Unobtrusive Measures of Participant Exposure

Unobtrusive measures of participant exposure were incorporated into ACES. The participants' individual use of the online intervention could be tracked unobtrusively and objectively.

Server log files recorded data related to module completion such as the number of modules completed, the date and time when each section (comic or activity) of a module was accessed, the number of tries to successfully answer multiple choice tests, etc. This data would be helpful in assessing the usage of ACES, investigating attrition patterns, and would also give an indication of compliance with the intervention.

4.3.3 Content management system

The website was based on the web developers' content management system (PreeoCMS; Figure 36 and Figure 37). This content management system (CMS) was modified and tailored specifically for ACES' requirements. The CMS is user-friendly and enabled the modification of the content of the website without the need of relying on the web developers. The CMS made a number of changes to the website possible such as:

- editing the text content of the pages
- managing the slides in the comics (uploading new slides, deleting existing slides and changing the slide order)
- adding or deleting questions to the quizzes at the end of a module
- replacing existing printable handouts by uploading new ones
- changing the text in the automated emails sent when a new module is unlocked
- adding usernames and passwords
- reviewing the list of users including details such as the username, nickname, email address, and the date and time of first login
- managing (editing or deleting) comments on the discussion board
- editing contact details including the email address that would receive any messages from the contact form.

The scalability of the website was also taken into consideration when developing ACES. In the future, ACES can grow with the addition of other modules and additional resource sections and it can also take on new users. (Details of the software used by the web development team to create ACES are provided in Appendix H).



Figure 36: ACES' content management system



Figure 37: Detail of part of the CMS

4.3.4 Facilitators and barriers for development

Developing ACES evidenced a number of key issues regarding facilitators and barriers to developing an online intervention. These facilitators and barriers could provide useful pointers for future Internet-based interventions.

Facilitators included:

- having a clear overall purpose for the online intervention and basing the intervention on a model outlining the variables specific to the target population;
- keeping the target population in mind when taking decisions related to aesthetics, language and content, e.g. getting ideas of what is age-appropriate by reviewing any other available effective online interventions targeting the same age group (and also paper-based interventions for age-appropriate language and content);
- creating a paper prototype of the online intervention prior to any web development to minimise the need for costly modifications and rework during the web development phase;
- involving the web development team in the paper prototype stage to be able to discuss different options available in terms of creating an engaging and interactive intervention whilst at the same time keeping usability (e.g. simplicity and clarity) in mind;
- creating an online intervention that can be easily updated and modified by the researcher without the need of relying on the web development team.

Barriers included:

- the high initial cost for web development;

- the length of time required to develop an online intervention (6 months were needed to develop ACES).

4.3.5 Summary

This chapter gave details of the web design and the features that were incorporated into ACES in order to create an online intervention that would be appropriate to the target population in terms of its overall presentation and aesthetic design, ease-of-use and navigation, and trustworthiness. These included the hybrid information architecture design, the inclusion of cartoon characters, the simple layout of the different pages and the variety of interactive features included. A description of the CMS and its functions was provided. Finally, the facilitators and barriers encountered in the development of ACES were illustrated.

Chapter 5: Phase 2 Part 2 - Feasibility Study

5.1 Phase 2 Part 2 Methodology – Feasibility Study

“You can't stay in your corner of the Forest waiting for others to come to you. You have to go to them sometimes.”

A. A. Milne

5.1.1 Introduction

This chapter presents the methodology relating to the second part of Phase 2, i.e. the feasibility study. It outlines the purpose of this study as well as the study design. It then illustrates the data collection instruments. The procedures, ranging from recruitment to data collection, are presented and any ethical issues pertinent to the study are highlighted. Details about how the data in the current study were analyzed are included towards the end of the chapter.

5.1.2 Purpose of study

The purpose of the current study was to evaluate the feasibility and acceptability of ACES, a novel Internet-based support intervention for the reduction of perceived stress and emotional eating in Maltese adolescents.

Specifically, this study was carried out to:

- assess the functionality, usability, perceived utility and acceptability of the Internet-based intervention in order to further develop and adapt the intervention with a view to a full RCT;
- check the feasibility and appropriateness of recruitment methods;
- estimate recruitment and drop-out rates;

- check the validity of outcome measures and whether they are suitable to measure change over the proposed period of study;
- determine an estimated effect size to help in sample size calculation for a larger RCT (Chan 2003).

5.1.3 Conceptual Framework

This feasibility study is conceptualised in the context of research on the Transtheoretical Model of Health Behaviour Change (Prochaska & DiClemente 1983; Prochaska & Velicer 1997; Prochaska et al. 1992). The TTM posits that an individual makes behavioural improvements by progressing through a series of stages (precontemplation, contemplation, preparation, action, and maintenance) which correspond to that individual's readiness to change (Park et al. 2008). This model will be used to assess participants' readiness to change their behaviour at the start (baseline) and at the end of the intervention (follow-up). This will be done in order to ensure that the participants recruited for the study are ready to make a change in their behaviour and also to verify whether the intervention enables participants to progress through the stages corresponding to their readiness to change.

5.1.4 Research design

The current study is a feasibility study carried out to test the design of a definitive RCT which would aim to determine the effectiveness of an Internet-based support intervention in the reduction of perceived stress and emotional eating in Maltese adolescents between the ages of 14 and 16.

In this feasibility study a one-group pretest-posttest design was used. A control group was not required in this study because it was a feasibility study "to estimate important parameters that are needed to design the main study" (Arain et al. 2010, p.4) and its purpose was not to determine the effectiveness of the intervention developed in the current study.

Data from online self-report questionnaires were collected at baseline (i.e. at the beginning of a 5-week intervention) and at follow-up (i.e. following a 5-week intervention). Participants who satisfied the inclusion criteria were allocated to an intervention group (i.e. Internet-based stress management intervention).

5.1.4.1 Primary and secondary outcomes for the definitive trial

The primary outcome for the definitive trial is perceived stress. A decrease in perceived stress levels will be expected from baseline to follow-up. The secondary outcomes will be indices of emotional eating and readiness to change. In terms of emotional eating, a decrease is expected from baseline to follow-up. It is also expected that participants make behavioural improvements by progressing through the series of stages corresponding to their readiness to change (progressing from contemplation to preparation, to action, and to maintenance). This pilot study will give some evidence to the likelihood of this in the definitive trial.

5.1.5 Participants

5.1.5.1 Inclusion Criteria

In order to be included in this study, participants needed to satisfy all of the following inclusion criteria:

- 14 to 16 years-of-age, inclusive;
- obtained informed consent from a legal guardian to take part in the study;
- have access to the Internet and be able to use a computer (to complete the pretest and posttest tool as well as the weekly online stress management modules);
- able to read and write in English.

Adolescents who did not meet these criteria at baseline, but who wanted to participate in the stress management intervention, were not prohibited from participating in the online

intervention but their data were not analysed for the purposes of this study since they did not fit the requirements of the target population for this study.

5.1.5.2 Sample Size

Since this study is a feasibility study of a novel intervention and not a hypothesis testing study, “no inferential statistical tests should be proposed...power analyses should not be presented in an application for a pilot study that does not propose inferential tests. A pilot sample size is instead based on the pragmatics of recruitment and the necessities for examining feasibility.” (Leon et al. 2011, p.3)

The target sample size for recruitment in this feasibility study was 150, with the aim of recruiting at least 45 participants who completed all the 5 modules as well as the necessary questionnaires. This estimate was based on a complete participation rate of 30.8% obtained in a study of an online stress prevention program for adolescents i.e. ‘SNAKE - Online’ (Fridrici & Lohaus 2009).

5.1.6 Materials

5.1.6.1 Online baseline (pretest) and follow-up (posttest) questionnaires

An online questionnaire package that addressed key variables at the beginning and at the end of the five-week Internet-based intervention was developed. The length of the questionnaire was kept to a minimum so as not to burden participants. It included measures of perceived stress (PSS-10; Cohen et al. 1983), emotional eating (Emotional Eating Subscale of the DEBQ (van Strien 2010)), readiness to change (Custom-adapted version of the Motivational Stages of Change for Adolescents Recovering from an Eating Disorder (MSCARED; Gusella, Bird, et al. 2003)), as well as demographic information namely, age, gender, self-reported current height (in cm) and weight (in kg). Height and weight were required to calculate the BMI. The follow-up questionnaire also included a custom-designed evaluation questionnaire. It was considered

that a qualitative element provided by the open-ended questions in the evaluation questionnaire would usefully supplement and extend the quantitative analysis.

It was estimated that the baseline questionnaire took approximately 10 to 15 minutes to complete and that the follow-up questionnaire took approximately 30 minutes to complete. These estimates were based on a pilot test of the baseline questionnaire carried out with two adolescents prior to carrying out the study.

A summary of the measures included in the baseline questionnaire and the follow-up questionnaire is presented in Table 21. A print copy of the baseline (pretest) and the follow-up (posttest) questionnaire is included in Appendix I. Those measures unique to Phase 2 are described in detail below (The PSS-10 and DEBQ have been described in Phase 1).

Baseline (Pretest) Questionnaire	10-item Perceived Stress Scale (PSS-10; Cohen et al. 1983)
	Emotional Eating Subscale of the Dutch Eating Behaviour Questionnaire (DEBQ; van Strien 2010)
	Custom-adapted version of the Motivational Stages of Change for Adolescents Recovering from an Eating Disorder (MSCARED; Gusella, Bird, et al. 2003)
	Demographic questions (age, gender, self-reported current height in cm and weight in kg)
Follow-up (Posttest) Questionnaire	10-item Perceived Stress Scale (PSS-10; Cohen et al. 1983)
	Emotional Eating Subscale of the Dutch Eating Behaviour Questionnaire (DEBQ; van Strien 2010)
	Custom-adapted version of the Motivational Stages of Change for Adolescents Recovering from an Eating Disorder (MSCARED; Gusella, Bird, et al. 2003)
	Demographic questions (age, gender, self-reported current height in cm and weight in kg)
	Custom-designed evaluation questionnaire

Table 21: Summary of Measures used in Initial and Final Questionnaire

5.1.6.1.1 Custom-adapted version of the Motivational Stages of Change for Adolescents Recovering from an Eating Disorder

A custom-adapted version of the Motivational Stages of Change for Adolescents Recovering from an Eating Disorder (MSCARED; Gusella, Bird, et al. 2003) was used to give an indication of participants' readiness to change their emotional eating behaviours. No tool that specifically measured readiness to change emotional eating behaviours was located.

This tool was selected because it is brief, the language used to describe the stages of change is simple, it is straightforward to complete and aimed at adolescents (Gusella, Butler, et al. 2003). For the purposes of this study, the term 'eating disorder' in the custom-adapted MSCARED was replaced by 'emotional eating' and a definition of 'emotional eating' was given at the beginning of the tool (Table 22).

The term 'emotional eating' refers to eating in response to negative emotions such as stress. Where are you in this process? (Tick the stage that best describes you)
<i>Precontemplation: Other people think I engage in emotional eating, but I don't;</i>
<i>Contemplation: I realize I engage in emotional eating but I'm not sure I'm ready to change;</i>
<i>Preparation: I'm planning to "take action" against my emotional eating in the next 1 to 6 months;</i>
<i>Action: I have taken definite actions against my emotional eating within the past 6 months;</i>
<i>Maintenance: I am working to maintain the changes I have made to "take action" against my emotional eating.</i>

Table 22: Custom-adapted version of the MSCARED

MSCARED was based on "Prochaska's concept of the staging algorithm where stage is determined by self-reported response to 4-5 simple statements relating to readiness to change the problem behavior" (Gusella, Butler, et al. 2003, p.110). A 5-Choice response format is effective in assessing the stage of change (Reed et al. 1997). The custom-adapted version, whilst making use of the language aimed at adolescents used in MSCARED, is also based on the concept of the staging algorithm but the problem behaviour investigated is emotional eating rather than an eating disorder. Since the algorithm method of identifying stage of change and the wording used to describe the different stages of change has not been altered, but only the problem behaviour in question has been changed, it is believed that the custom-adapted

version of MSCARED should give an adequate indication of participants' readiness to change their emotional eating behaviours.

5.1.6.1.2 Custom-designed online evaluation questionnaire

A custom-designed online evaluation questionnaire was developed for the purposes of this feasibility study. This evaluation questionnaire assessed the functionality, usability, perceived utility and acceptability of the Internet-based intervention in order to further develop and adapt the intervention. When evaluating the implementation of a new technology, user acceptability is a key component that must be considered (Kaltenthaler et al. 2008). This questionnaire also aimed at collecting data about user satisfaction with the Internet-based intervention. Moreover, it served to assess the face validity of the outcome measures used in this study by asking participants whether they believed that their perceived stress levels and/or their emotional eating had decreased and by comparing their responses to their change in scores on the PSS and Emotional Eating Subscale of the DEBQ from the baseline to the follow-up questionnaire.

This questionnaire consisted of fifteen open-ended questions about:

- satisfaction with overall presentation;
- ease of navigation;
- language and tone;
- visual appeal;
- trustworthiness;
- perceived relevance;
- level of interest of content;
- perceived gain in knowledge;

- whether participants would recommend the intervention to friends or other adolescents;
- whether participants believed that their perceived stress levels had decreased;
- whether participants believed that their emotional eating had decreased;
- perceived usefulness in decreasing emotional eating;
- whether there were any external factors that may have affected their stress levels during the intervention period (e.g. examinations);
- whether there were any external factors that may have affected their emotional eating levels during the intervention period (e.g. examinations); and
- whether participants completed all the modules and why.

These questions were based on previous studies that researched user acceptability and satisfaction with Internet-based interventions (Borzekowski & Rickert 2001; Papadaki & Scott 2008; Papadaki & Scott 2006; Kaltenthaler et al. 2008; Fridrici et al. 2009; Whittemore et al. 2010). The questions were open-ended so as to elicit qualitative data which could be used to further develop and improve the Internet-based intervention or, as stated in the idealized framework for evaluating emergent e-Health resources at different stages of development and implementation (Pagliari 2007), “to inform system development”.

As was the case in Phase 1, the online questionnaire was produced using *LimeSurvey*, an open source survey application, and it was hosted on the University of Plymouth server (i.e. external to the ACES website). Details of the advantages and features associated with the online questionnaire are available in Section 3.

5.1.7 Procedure

5.1.7.1 Ethical Considerations

The following section will present the ethical considerations related to this study such as the permissions and approvals obtained to conduct the study, the informed consent procedure and confidentiality.

5.1.7.1.1 *Permission and approval*

Phase 2 was submitted for consideration, comment, and approval to the Faculty Research Ethics Committee, Faculty of Health, Plymouth University. The protocol was reviewed by the Faculty Research Ethics Committee and ethical approval was granted on the 12th June 2012 (Appendix J). Permission to conduct this study was also sought and given by the:

- Secretariat for Education, Archbishop's Curia to be able to conduct research in Church Schools (Appendix J)
- Directorate for Quality Standards in Education to be able to conduct research in State Schools (Appendix J)
- Heads of school of the participating educational institutions who acted as gatekeepers to recruitment through schools.

Eleven out of a total of 21 church secondary schools (6 boys' and 5 girls' secondary schools) as well as 11 state secondary schools (6 boys' and 5 girls' secondary schools which form part of 5 out of 10 state colleges) were invited to participate in the study. Out of the schools contacted, six church secondary schools (3 boys' and 3 girls' secondary schools) and 7 state schools (3 boys' and 4 girls' secondary schools) agreed to participate. As was the case with Phase 1, the variety of schools selected ensured a sample from a wide geographical mix.

5.1.7.1.2 *Informed Consent*

The researcher did not obtain the consent of participants or of their legal guardians in writing. Consent was implied if legal guardians, after reviewing all the study details as described in the

invitation letter (Appendix K), agreed to their son/daughter's participation and gave the study's URL and login details required for participation to their son/daughter. Moreover, the 'About ACES' page of the Internet-based intervention, described the following to the participants:

- the nature of the study
- the amount of time required for participation
- the voluntary participation and right of refusal
- an assurance of confidentiality
- instructions about how to contact the researcher.

This is considered to be a common and legitimate way of obtaining informed consent in questionnaire-based research since no unreasonable risks were involved (Stein & Cutler 1996).

5.1.7.1.3 Confidentiality

Legal guardians and participants were informed that all the data collected were confidential and for research purposes only. The invitation letter to legal guardians also gave details that all research measures would be destroyed within ten years after the completion of the study.

5.1.7.2 Recruitment

5.1.7.2.1 Recruitment strategies and modalities

The recruitment procedures of this study were greatly influenced by the results of Phase 1. A number of strategies and modalities were used to improve recruitment in the current study in addition to using the strategies that were used in Phase 1 (such as incentives and a study logo).

Previous research has shown that linking the study to a "trusted and respected institution or individual already known to potential participants" can result in improved recruitment and retention rates (Cooney et al. 2007, p.2). Meetings were, therefore, held with the Health

Promotion and Disease Prevention Directorate in Malta and the Director agreed to support the study. The recruitment materials and the ACES website specified that the study was supported by the Health Promotion and Disease Prevention Directorate.

In order to obtain better recruitment rates within a suitable time frame in this study, participants were recruited via multiple channels. The use of multiple channels for recruitment should enhance study exposure and website visibility which should result in greater recruitment (Danaher & Seeley 2009).

The different recruitment modalities used included the following:

- Announcements from educational institutions (secondary schools) and youth groups (scout groups, youth group, gymnastics group)
- Paid targeted advertising via a social network site (Facebook) (Appendix L)
- Unpaid (earned media) announcements via online resources (e-mail, online communities – Facebook groups, Twitter)
- Announcements on local newspapers – Two articles describing the study and inviting legal guardians to contact the researcher were published. The two leading, national, English language newspapers were selected (Appendix L)
- Presentations at four obesity road shows.

A video walk-through and guest username and password were provided to Heads of School and youth group leaders to give them a clear idea of what the study involved.

Recruitment started one week before the end of the academic year (June) due to a delay in receiving the necessary approvals. This meant that a number of adolescents could not be reached, either because they had already started their summer holidays (summer holidays in Malta are approximately 3 months long) or because they were completing their examinations.

A number of Heads of School contacted, asked whether recruitment could be postponed to the start of the following academic year. Recruitment over the summer months was problematic as only a few youth groups that had 14 to 16-year-old adolescents were located. Moreover, the marketing techniques used (advertisements, newspaper articles, etc.) did not yield the desired recruitment numbers.

Due to these reasons, it was decided to have a second recruitment period at the start of the following academic year. The initial results were analysed prior to the second recruitment period to verify whether there were any potential modifications that could be incorporated into the second recruitment period to improve recruitment and retention rates. From the analysis of the initial results it was evident that:

- the overall recruitment rate was poor,
- the recruitment rate and retention rate was higher in the case where the researcher was able to brief the adolescents (youth group) or the legal guardians (e-mail) directly, and
- the greatest drop-out rate occurred after the adolescents completed the first module in ACES.

In the light of these preliminary findings, it was decided that in the second recruitment period (October to December):

- the invitation letter would also include a leaflet aimed at adolescents (Appendix K). This leaflet gave details about what the study involved, the incentives for taking part in the study (raffle prizes) as well as quotes from adolescents in the first recruitment period highlighting what they thought about ACES;
- the researcher would request permission and visit the schools to brief all potential participants directly;

- the unlocking of the five modules in ACES would be modified slightly so that participants would be able to complete Modules 1 and 2 on their first login. This meant that the intervention would take four weeks instead of five. Enabling participants to complete the first two modules in Week 1 was considered suitable because these two modules provide information about stress and coping rather than teach a specific coping skill which may require more time to take up.

5.1.7.2.2 Recruitment Process

The recruitment processes depending on the different modalities are outlined below.

Recruitment from educational institutions:

- researcher contacted Head of Schools (gatekeeper) and gave study details
- head of School agreed to participation and gave instructions to school administrative staff to mail invitation letters to parents/legal guardians of adolescents aged 14-16
- invitation letters with details of study, URL and unique tokens (password) were mailed to legal guardians
- legal guardians who consented to son/daughter's participation were instructed (via invitation letter) to give study URL and unique token to son/daughter
- adolescent accessed website and reviewed study details and instructions on website
- adolescent's assent was implied if adolescent entered unique password and token to access study website
- (in the second recruitment period, the adolescents were briefed by the researcher and given the invitation letter with instructions to hand it to their legal guardians).

Recruitment through advertisements:

- details of the study were made available on newspapers and social network sites
- interested parents/legal guardians were invited to contact the researcher for further information about son/daughter's possible participation. Invitation letters with details of study, URL and unique tokens (password) were mailed to legal guardians
- legal guardians who consented to son/daughter's participation were instructed (via invitation letter) to give study URL and unique token to son/daughter
- adolescent accessed website and reviewed study details and instructions on website
- adolescent's assent was implied if adolescent entered unique password and token to access study website.

5.1.7.3 Intervention

The adolescents who met the eligibility criteria, and for whom parental consent was obtained, were asked to:

- access the ACES website
- fill in the online baseline (pretest) tool at Week 1
- complete 5 weekly modules
- fill in the online follow-up (posttest) tool at Week 5.

The participants could also access the additional resource sections and take part in the discussion forum if they wished to. Participants were each given a unique username and password. The login process to access the modules in ACES required three things – the username, password and a 4-digit PIN. The username and password were given in the invitation letter. The participants were given the PIN on the last screen of the baseline questionnaire to avoid the possibility of participants accessing the modules prior to or without

completing the baseline questionnaire. In this way participants were obliged to complete the questionnaire before they could log into ACES.

Participants were informed that they would be entered into a raffle draw if they completed all the steps required (i.e. the baseline questionnaire, the 5 modules in ACES, and the follow-up questionnaire). As previously stated in Phase 1, using an incentive such as a lottery is a relatively inexpensive way of increasing response rates (Weber & Bradley 2006; Wright 2005).

5.1.7.4 Incentive

Since the budget for acquiring suitable raffle prizes was limited, sponsorship was sought from a number of local companies. A number of companies, such as gyms, travel agents, health food shops, clothes shops, jewellery shops and mobile phone companies, were sent a letter requesting their sponsorship (Appendix M). The sponsorship letters detailed a number of sponsorship opportunities that a potential sponsor could choose from, along with details of what the sponsor would be getting in return (e.g. listing of company name next to raffle prize on all print and online material, acknowledgement of support on intervention website, etc.) The sponsorship opportunities ranged from being the major sponsor of ACES (cost €500 - €1000) to providing one page advert that would be inserted in every invitation letter distributed (cost €50).

A main raffle prize was obtained through this sponsorship request. A travel agent kindly offered two participants the opportunity to win two flight tickets to Corfu each to be redeemed in the summer months (i.e. this prize was only available for participants enrolled in the first recruitment period and the draw was held after the participants from the first recruitment period completed the study). The researcher provided additional raffle prizes: 15 watches (a particular brand which was very popular with adolescents at the time of data collection with a local retail price of around €60; these were purchased online and in bulk for a cheaper price), one €30 gift voucher redeemable from a large number of local retail outlets,

and three universal serial bus (USB) hubs (these are used to convert one computer USB port into more, e.g. four; cost €5 each). The prize draw for these additional prizes was carried out after participants recruited in the second recruitment period completed the study (completers from both recruitment periods were eligible for this draw). Considering that the study aimed to recruit 45 completers and 21 prizes were offered, the odds of winning a prize were high.

5.1.7.5 Participant Engagement

Even though participants enrolled in the study were encouraged to complete the five modules in ACES, they were able to decide how much of the program to complete. Participants were free to decide how long and how often they accessed the online intervention. They could also decide whether to complete the three modules in the additional resources section, whether to take part in the discussion forum, and how many times they consolidated what they learnt by taking part in the interactive activities. For these reasons, measures of program engagement were included (previously described unobtrusive measures of participant exposure in Section 4.3.2.9 - server log files recorded data related to, for example, module completion such as the number of modules completed, etc.). Measuring engagement has numerous benefits “including ensuring program usability, determining what participants use in the context of what they are offered, and identifying active ingredients that help to explain any observed treatment effect” (Danaher & Seeley 2009, p.33). In addition to the server log files, the intervention website was linked to Google Analytics - an online service which enables the collection of additional data such as tracking the number of visitors to the website, the traffic sources (i.e. how the visitors got to the website), etc.

5.1.8 Data Analyses

Both quantitative and qualitative data (from open-ended questions) were collected in this study. Data analyses involved the following:

- checking the feasibility and appropriateness of recruitment methods;

- assessing attrition rates;
- checking validity of outcome measures and their suitability to measure change over the proposed period of study (e.g. floor and ceiling effects; face validity of outcome measures by assessing agreement between responses about decrease in perceived stress and emotional eating obtained in the evaluation questionnaire and changes in the PSS and the emotional eating subscale of the DEBQ);
- determining an estimated effect size;
- analysing qualitative data from the evaluation questionnaire by a content analysis method.

5.1.9 Summary

The methodology relating to the feasibility study in Phase 2 was detailed in this chapter. The conceptual framework, i.e. the Transtheoretical Model of Health Behaviour Change, was outlined. The research design as well as the primary and secondary outcomes of the study were presented. Details of the sample, study materials, and ethical considerations were given. The recruitment strategies and the procedures involved for participating in the study were provided. The chapter concludes by giving details of how the data were analysed.

5.2 Phase 2 Part 2 Results

“Rivers know this: there is no hurry. We shall get there some day.”

Pooh's Little Instruction Book, inspired by A. A. Milne

5.2.1 Introduction

The results of the second part of Phase 2 (feasibility study) are put forward in this section along with details about how the data analyses were carried out. The respondents' profile, recruitment and attrition rates as well as the feasibility and appropriateness of recruitment methods are put forward. The feasibility and appropriateness as well as the validity of outcome measures and their suitability to measure change over the proposed period of study are highlighted. This chapter then presents the functionality, usability, perceived utility and acceptability of ACES. The estimated effect size for this study is calculated. A summary of the major findings in this study is presented at the end of the chapter.

5.2.2 Respondent profile

Descriptive statistics were generated to describe the nature of the sample. One hundred twenty-five adolescents completed the initial questionnaire (Table 23). Of these respondents, 66 were female while the remaining 59 were male. The ages of the respondents ranged from 14 to 16 with the majority (n= 69) being 14-years-of-age (36 males, 33 females), 45 being 15-years-of-age (18 males, 27 females), and 11 being 16 years old (5 males, 6 females).

Characteristics	Number of Participants (n= 125)
Male	59 (47.2%)
Female	66 (52.8%)
Age (years) - 14	69 (55.2%)
Age (years) - 15	45 (36%)
Age (years) - 16	11 (8.8%)

Table 23: Gender and age of participants

5.2.2.1 The prevalence of overweight and obesity

Reported height and weight at baseline were used to calculate BMI values (body mass/height²). Figure 38 presents the distribution of the BMI values using the IOTF cut-offs. Interestingly, this study attracted a large proportion of obese adolescents (19%) compared to Phase 1 (7%).

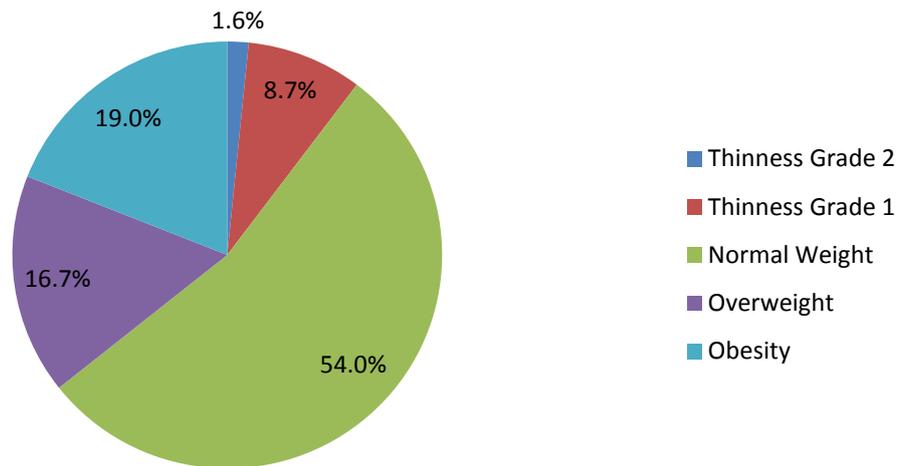


Figure 38: BMI classification of total sample at baseline using IOTF cut-offs

When categorising BMI values according to gender, 13.3% of all males in the sample were overweight, whilst 23.3% of all males in the sample were obese, and 19.7% of all females in the sample were overweight, whilst 15.2% of all females in the sample were obese. The frequency of BMI IOTF cut-offs by gender is presented in Figure 39.

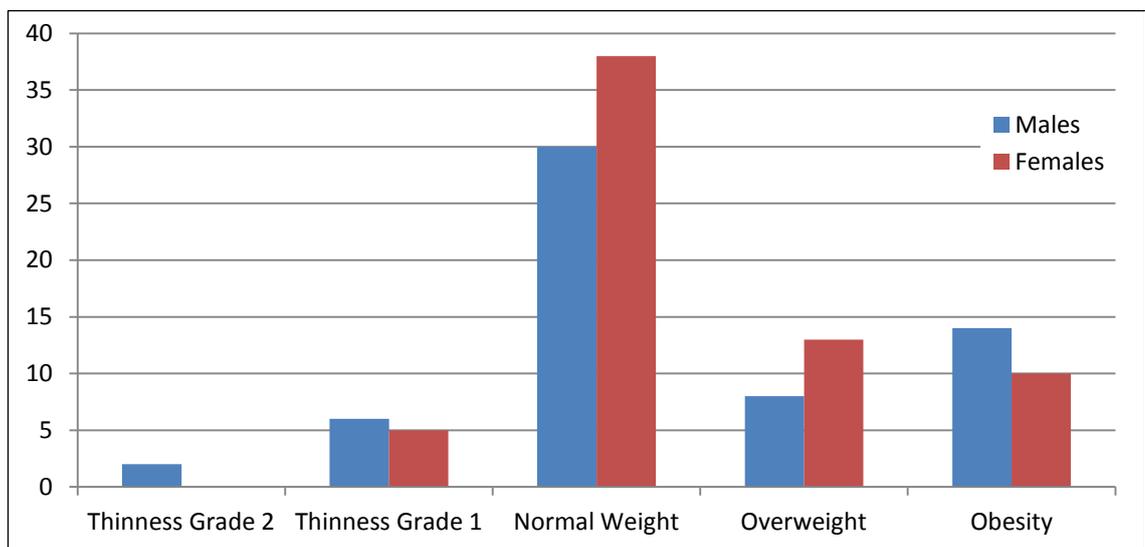


Figure 39: Frequency of BMI IOTF cut-offs by gender of respondents at baseline

5.2.3 Recruitment

A total of 873 invitation letters were distributed. During the first recruitment period 493 invitation letters were given out, and a response rate and completion rate of 14.2% and 6.3% respectively were obtained. Three hundred and eighty letters were distributed in the second recruitment period (October to December). The response rate (16.6%) was greater than in the first recruitment period (June to September), however the completion rate (3.9%) was smaller. The recruitment and participation flow chart can be seen in Figure 40.

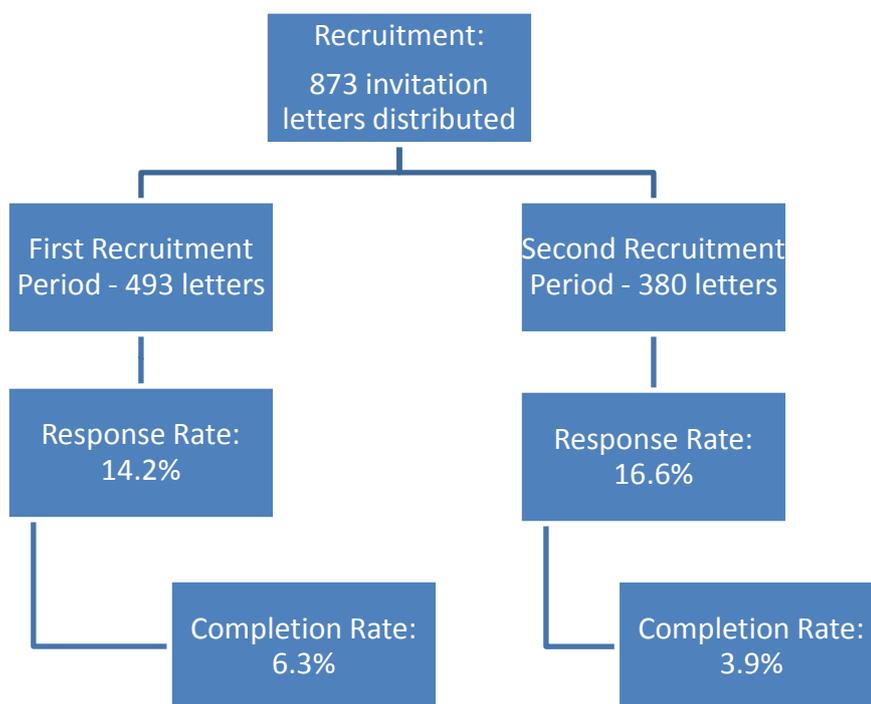


Figure 40: Recruitment and participation flow chart

5.2.3.1 Feasibility of Recruitment Modalities

The results pertaining to the feasibility of the different recruitment modalities, namely their impact on the number of visits to the site as well as their effect on response and completion rates, will be put forward in this section.

5.2.3.1.1 Traffic Sources

This section describes visits to the ACES website until 8 months after its release (June 2012 – January 2013). This timeframe was selected because it includes both data collection periods

(i.e. first and second recruitment periods) in this study. The data presented were obtained from Google Analytics (for Malta only).

The majority of visits (523 visits) were via direct traffic, i.e. from people who typed in the website address. The data in the first four rows in Table 24, reflect the behaviour of visitors who got to know about ACES via invitation letters (printed or email).

The study advertisements via newspapers and social networks resulted in 65 and 154 visits respectively. As can be seen in Table 24, these sources resulted in a lower number of pages viewed per visit, shorter visits, and a greater bounce rate than in the case of visits carried out by visitors who got to know about the ACES website through the invitation letter distributed in print or via email. This is not surprising since no participants were recruited via these sources.

The least number of pages viewed per visit and the shortest average visit durations were from visitors who clicked on the ACES link from the online portfolio of the web developers as it is more likely that these visitors accessed the ACES website to see the web developers' abilities rather than because they were interested in the study.

Source	Unique Visitors	Visits	Pages / Visit	Average Visit Duration (minutes:seconds)	% New Visits	Bounce Rate (%)
Direct traffic	249	523	12.4	11:22	47.6%	29.6%
Referral from Study Questionnaire Webpage	3	28	15.7	13:01	10.7%	17.8%
Search engines	60	218	11.5	9:23	27.5%	13.8%
Email	1	11	9.7	5:29	9.1%	9.1%
Newspapers	43	65	4.1	3:01	66.2%	35.4%
Social networks (e.g. Facebook, Twitter, LinkedIn)	98	154	4.4	3:57	63.6%	44.2%
Web developers' website portfolio	37	42	2.6	0:32	88.1%	33.3%

Table 24: Visitors' behaviour depending on source

5.2.3.1.2 Response rates and completion rates

The response rates and completion rates for each of the different recruitment modalities employed in this study are presented in Table 25. This table is quite revealing in several ways. Firstly, it shows that newspaper articles, paid targeted advertisements, unpaid announcements via online resources, as well as presentations during the obesity road show, did not result in any recruits and, thus, appear not to be feasible recruitment modalities despite attracting a number of visitors to the ACES website. Secondly, looking at the first recruitment period, the highest completion rates were obtained through modalities where the researcher briefed the parents/legal guardians (via direct email invitations) or the adolescents (youth group) directly. This direct contact with potential participants did not, however, result in improved completion rates from adolescents recruited via schools in the second recruitment period. Another point worth noting is that, even though response and completion rates were quite low in secondary schools, the schools provided access to a large number of adolescents and resulted in the greatest number of recruits in the study.

Recruitment Modality	Number of invitation letters distributed (n=873)	Number of subjects joining the study (n = 133)	Response Rate	Number of subjects completing the study (n = 46)	Completion Rate
1st Recruitment Period – June to September 2012					
Boys' Secondary Schools via head of school	310	34	11%	16	5.2%
Girls' Secondary Schools via head of school	120	12	10%	4	3.3%
Scout Groups via group scout leader	32	10	31.3%	2	6.3%
Youth Group directly from researcher following briefing about study	20	7	35%	5	25%
Gymnastics Group via coach	7	3	43%	1	14.3%
Newspaper articles	-	0	-	0	-
Paid targeted advertisements on social network site	-	0	-	0	-
Direct email invitations	4	4	100%	3	75%
Unpaid (earned media) announcements via online resources	-	0	-	0	-
Presentations at obesity road show	-	0	-	0	-
2nd Recruitment Period – November to December 2012					
Boys' Secondary Schools directly from researcher following briefing about study	155	21	13.5%	6	3.9%
Girls' Secondary Schools directly from researcher following briefing about study	225	42	18.7%	9	4%

Table 25: Recruitment and completion rates based on different recruitment modalities (response rates and completion rates are out of the number of invitation letters distributed per recruitment modality)

5.2.4 Retention and attrition

Retention and attrition patterns were examined during the intervention. At the conclusion of the intervention, 79 of the 125 participants who had completed the initial questionnaire had stopped using ACES. The greatest amount of drop-out/non-usage attrition occurred after logging on to ACES without completing any modules (17.5%, n=22) and after the first module (17.5%, n=22) as can be seen in Figure 41 below. The attrition rates decreased as more

modules were completed with only one participant dropping out after Module 4 and with three participants completing all the modules but not the final questionnaires.

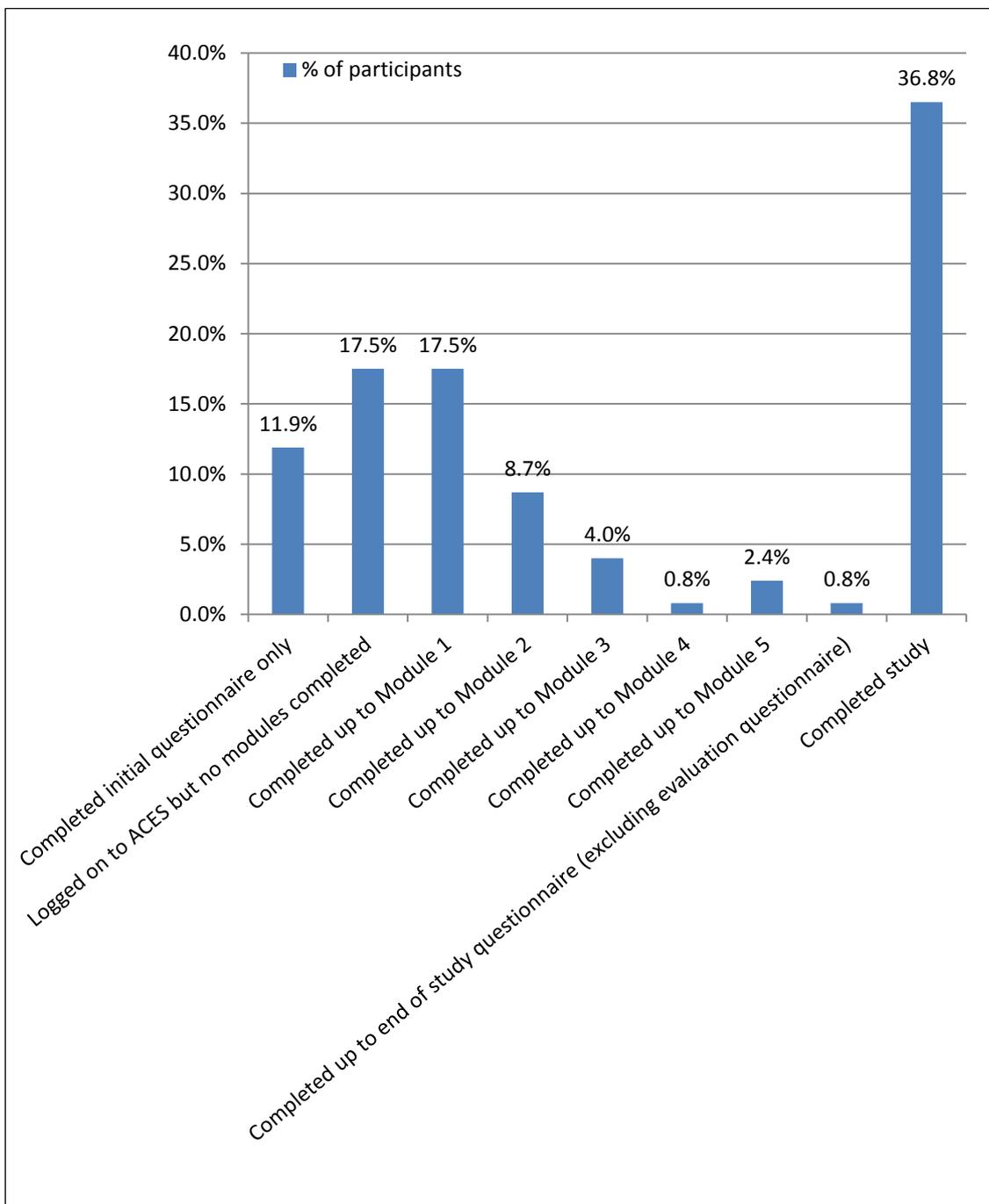


Figure 41: Attrition rates

Forty-six out of 125 participants completed ACES, including the final questionnaires, giving a completion rate of 36.8%. This is slightly better than the completion rate of 30.8% obtained in another study of an online stress-prevention intervention with adolescents (Fridrici & Lohaus 2009).

5.2.5 Perceived stress, emotional eating and stage of change at baseline

The mean and standard deviation for the score obtained at baseline on the PSS and the Emotional Eating Subscale of the DEBQ are presented in Table 26. The number of participants at each stage of change is also put forward in this table.

Characteristics	Number of participants (n= 125)
PSS Score (mean ± s.d)	19.25 ± 6.49
Emotional Eating Subscale (DEBQ) Score (mean ± s.d)	2.45 ± .79
Stage of Change: Precontemplation (Customised MSCARED)	33 (26.4%)
Stage of Change: Contemplation (Customised MSCARED)	22 (17.6%)
Stage of Change: Preparation (Customised MSCARED)	20 (16%)
Stage of Change: Action (Customised MSCARED)	22 (17.6%)
Stage of Change: Maintenance (Customised MSCARED)	28 (22.4%)

Table 26: Participants' mean PSS and Emotional Eating scores and stage of change at baseline

5.2.6 Baseline characteristics of completers versus non-completers

The baseline characteristics, namely gender, age, weight status, PSS and Emotional Eating Subscale scores as well as stage of change, of completers versus non-completers were explored to find out whether there were any significant differences.

The gender and age of completers as well as non-completers are presented in Table 27. By comparing the gender of completers and non-completers in this table, it can be seen that a greater proportion of males than females completed ACES. A chi-square test was carried out and this confirmed that there was a relationship between gender and completion status ($\chi^2=5.457$, $df=1$, $p=0.019$) with males being more likely to complete ACES than females.

The majority of completers ($n=23$) were 15-years-of-age, 21 completers were 14-years-of-age, whilst 3 were 16 years old. A chi-square test confirmed that there was relationship between age and completion status ($\chi^2=6.804$, $df=2$, $p=0.033$) with 15-year-old adolescents being more likely to complete ACES than those who were 14 or 16-years-of-age.

Characteristics	Completers (n= 46)	Non-Completers (n= 79)
Male	28 (60.9%)	31 (39.2%)
Female	18 (39.1%)	48 (60.8%)
Age (years) - 14	21 (45.7%)	48 (60.8%)
Age (years) - 15	23 (50%)	22 (27.8%)
Age (years) - 16	2 (4.3%)	9 (11.4%)

Table 27: Gender and age of completers and non-completers

The weight status at baseline for completers and non-completers is presented in Table 28.

There was no relationship between weight status and completion status ($\chi^2=0.047$, $df=1$, $p=0.829$).

Characteristics	Completers (n= 46)	Non-Completers (n= 79)
Normal Weight	30 (65.2%)	50 (63.3%)
Overweight	16 (34.8%)	29 (36.7%)

Table 28: Weight status (at baseline) of completers and non-completers

Significant differences in PSS scores between completers and non-completers at baseline were found following an Independent Samples T-Test ($t = -2.135$, $df = 124$, $p = 0.035$, two-tailed), with completers exhibiting significantly lower perceived stress scores at baseline. No differences were found between completers and non-completers in terms of their baseline emotional eating subscale score and stage of change (Table 29).

Characteristics	Completers (n= 46)	Non-Completers (n= 79)
PSS Score (mean \pm s.d)	17.77 \pm 6.03	20.33 \pm 6.79
Emotional Eating Subscale (DEBQ) Score (mean \pm s.d)	2.28 \pm 0.67	2.55 \pm 0.84
Stage of Change: Precontemplation (Customised MSCARED)	13	20
Stage of Change: Contemplation (Customised MSCARED)	7	15
Stage of Change: Preparation (Customised MSCARED)	5	15
Stage of Change: Action (Customised MSCARED)	11	12
Stage of Change: Maintenance (Customised MSCARED)	11	17

Table 29: PSS Scores, Emotional Eating Subscale Scores and Stage of Change at baseline for completers and non-completers

5.2.7 Reasons for completing ACES

As part of the evaluation questionnaire at the end of the study, participants were asked whether they completed ACES and why this was so. All the participants (n = 46) who responded were completers. No responses were obtained from non-completers despite sending reminder emails prompting for completion of the final questionnaire (including the evaluation questionnaire). Participants gave different reasons as to why they completed all the modules in ACES, the most popular being that ACES was interesting (Table 30 – all quotations presented verbatim).

Reasons	Number of Participants	Sample Quotations
Interesting	18	<i>"Yes, because they were very interesting and I loved them"</i> <i>"Yes, because they were very interesting and I was very curious to know all the 'secrets' to coping"</i>
Helpful	12	<i>"I did complete them all because I believed that they will help me"</i> <i>"Yes I did, because I think they may help me in my future, and also provide me information by which to help my friends. Thanks for that :)"</i>
Educational	10	<i>"Yes I did. Because I thought that I would learn something from them and I actually did"</i> <i>"yes because I wanted to learn more how to cope with my life"</i> <i>"Yes because it is good and I have learnt from it and I feel better with less stress"</i>
Looked forward	4	<i>"Yes, as each module had a different scope to be tackled and so, that made me look forward to completing each module"</i> <i>"Yes, because I found every single module interesting and every week when I finish my module I just couldn't wait for the following week to arrive for the new module"</i>
Engaging/fun	4	<i>"Yes, I have completed all the 5 modules, because they are fun and one can easily learn new skills out of them"</i>
To help researcher	3	<i>"yes I did complete all modules as I with the completion of these modules I a help to Daniela"</i> <i>"yes, because it helped a university student and it was engaging"</i>
To reduce stress	2	<i>"yes to reduce my stress"</i>
Easy	1	<i>"Yes, I always passed them. I paid attention to the "lessons" presented by the four teenagers of the site and found the modules easy to do"</i>

Table 30: Reasons for completing ACES

5.2.8 Outcome measures

The results pertaining to the feasibility and appropriateness of outcome measures, namely their internal consistency, floor and ceiling effects, face validity, and their suitability to measure change over the proposed period of study, are presented in this section.

5.2.8.1 Measurement properties - Internal Consistency

Both the PSS and the Emotional Eating Subscale of the DEBQ demonstrated good internal consistency as shown by the Cronbach's alpha coefficients obtained. The values were calculated for the scales at the two data collection points in the study, i.e. the initial questionnaire and the final questionnaire, and ranged from 0.79 for the PSS (final questionnaire) to 0.93 for the Emotional Eating Subscale of the DEBQ (final questionnaire). The Cronbach's alpha values are put forward in Table 31.

Scale/Subscale	Cronbach's Alpha – Initial Questionnaire	Cronbach's Alpha – Final Questionnaire
PSS	0.85	0.79
Emotional Eating Subscale of the DEBQ	0.91	0.93

Table 31: Cronbach's alpha values for PSS and Emotional Eating Subscale at both data collection points

5.2.8.2 Floor and ceiling effects

The perceived stress and emotional eating scores of completers at the beginning and at the end of the study were investigated for potential floor and ceiling effects. The mean and standard deviation for the scores obtained for the PSS and the Emotional Eating Subscale of the DEBQ were analysed (Table 32). According to Carlson and Schmidt (1999), floor or ceiling effects would be present if the mean (average) dependent variables (i.e. perceived stress and emotional eating) scores were less than 1.5 standard deviations from the minimum or maximum possible dependent variable score, i.e. 0 and 40 for the PSS and 1 and 5 for the Emotional Eating Subscale of the DEBQ. Using this method, no floor or ceiling effects were found (Table 32).

Scale	Mean	Standard deviation	Standard deviation x 1.5	Minimum possible score + 1.5 standard deviations	Maximum possible score – 1.5 standard deviations	Possible floor effects	Possible ceiling effects
PSS – Initial Questionnaire	19.25	6.49	9.74	9.74	30.26	No	No
Emotional Eating Subscale of DEBQ – Initial Questionnaire	2.45	0.79	1.19	2.19	3.81	No	No

Table 32: Floor and ceiling effects

5.2.8.3 Face validity

The face validity of the PSS and the Emotional Eating Subscale of the DEBQ was examined by assessing the agreement between changes in these outcome measures and participants' responses, in the evaluation questionnaire, as to whether they believed that their stress and emotional eating had decreased. The results are presented in Table 33.

Face Validity	Number of participants (n=46)
Agreement between quantitative and qualitative data for both scales	22
Disagreement between quantitative and qualitative data for PSS only	8
Disagreement between quantitative and qualitative data for Emotional Eating Subscale of DEBQ only	8
Disagreement between quantitative and qualitative data for both scales	8

Table 33: Face validity of outcome measures

As can be seen in this table, 22 participants had an agreement between their change in scores and their responses as to whether they believed that their scores had changed. There was no agreement in the data for 8 participants with regards to the PSS, another 8 participants had no agreement in the data for the Emotional Eating Subscale of the DEBQ, whereas a further 8 participants had disagreements in the data for both outcome measures. This means that in the case of 30 participants out of 46, PSS demonstrated good face validity, and that in the case

of 30 participants out of 46, the Emotional Eating Subscale of the DEBQ demonstrated good face validity.

The data were examined further in order to find out whether there were any variables, such as age, gender, weight status, and stage of change, that had an impact on the face validity of the outcome measures. Data obtained from the ACES website logfiles were also used to verify whether there was a relationship between the face validity and indicators of participants' compliance to the intervention, such as the time spent on the modules, the order of completion of the modules, the number of days that elapsed between the completion of the different modules, the number of quiz attempts at the end of Modules 1 to 4, and the average score on the comprehensive quiz at the end of Module 5.

With regards to the face validity of PSS, a relationship was found with two variables, as presented in Table 34. From this table it can be seen that the face validity of PSS was related to the total time spent on the modules ($\chi^2=9.081$, $df=1$, $p=0.003$). There was greater face validity in the case of participants who spent more total time than average on the modules. The face validity of PSS was also related to whether there was a change in PSS from the beginning to the end of the study ($\chi^2=17.011$, $df=1$, $p=0.000$). There was greater face validity of PSS in the case of participants whose PSS scores had decreased.

	Face validity of PSS		Total
	Agreement between quantitative and qualitative data for PSS	Disagreement between quantitative and qualitative data for PSS	
More total time than average spent on modules	15	1	16
Less total time than average spent on modules	12	13	25
PSS score decreased	27	5	32
PSS score increased	3	11	14

Table 34: Variables related to the face validity of PSS

With regards to the face validity of the Emotional Eating Subscale of the DEBQ, a relationship was found with two variables which are presented in Table 35. From this table, it can be seen that the face validity of the Emotional Eating Subscale of the DEBQ was related to the total number of quiz attempts at the end of Modules 1 to 4 ($\chi^2=4.305$, $df=1$, $p=0.038$). There was greater face validity in the case of participants who had 17 or more quiz attempts rather than in those who had 12 to 16 quiz attempts. This finding was not expected since a greater number of quiz attempts in Modules 1 to 4 signifies that the students either did not understand the material correctly or clicked on the quiz options randomly (a score of 12 would have meant that the participants got all answers correct on the first try – 3 questions per module for 4 modules). The face validity of the Emotional Eating Subscale of the DEBQ was also related to whether there was a change in emotional eating from the beginning to the end of the study ($\chi^2=20.659$, $df=1$, $p=0.000$). There was greater face validity of the Emotional Eating Subscale of the DEBQ in the case of participants whose emotional eating scores had decreased.

	Face validity of the Emotional Eating Subscale of the DEBQ		Total
	Agreement between quantitative and qualitative data for Emotional Eating Subscale of DEBQ	Disagreement between quantitative and qualitative data for Emotional Eating Subscale of DEBQ	
Total Number of Quiz Attempts for Modules 1 to 4 – 17 or more attempts	19	5	24
Total Number of Quiz Attempts for Modules 1 to 4 – 12 to 16 attempts	11	11	22
Emotional eating score decreased	26	3	29
Emotional eating score did not decrease	4	13	17

Table 35: Variables related to the face validity of the Emotional Eating Subscale of the DEBQ

5.2.8.4 Change in perceived stress and emotional eating scores

Paired samples t-tests were carried out in order to investigate whether completers' baseline and end of study scores on perceived stress and emotional eating were significantly different (Table 36). This was done to verify whether the measures chosen were suitable to measure change over the proposed period of study. Both perceived stress scores and emotional eating subscale scores were found to be significantly different from the beginning to the end of the study and, overall, both decreased. Participants were asked whether there were any external factors that may have affected their perceived stress or emotional eating levels during their participation in ACES (Appendix N). Twelve participants stated that there were external factors that may have affected their perceived stress (e.g. examinations, friends, family illness), whereas 11 participants stated that there were external factors that may have affected their emotional eating (e.g. examinations, boredom, sadness). These external factors did not, however, have an impact on their change in perceived stress and emotional eating scores from baseline to follow-up (Appendix N).

	Mean score – Initial Questionnaire (n=46)	Mean score - Final Questionnaire (n=46)	t	df	Sig. (2- tailed)
PSS score	17.61	15	2.8	45	0.008
Emotional eating subscale (scale) score	2.29	2	3.06	45	0.004

Table 36: Differences in PSS and Emotional Eating Subscale scores from baseline to end of study

5.2.8.5 The relationship between perceived stress and emotional eating

Correlations were carried out between the PSS and the Emotional Eating Subscale of the DEBQ to investigate the relationship between perceived stress and emotional eating. The results corroborate the findings in Phase 1, i.e. that there is a positive correlation between perceived stress and emotional eating. The results are presented in Table 37.

	Pearson's correlation coefficient, r
PSS & Emotional Eating Subscale of DEBQ – Initial Questionnaire (n = 125)	.407 (p = 0.000)
PSS & Emotional Eating Subscale of DEBQ – Final Questionnaire (n = 46)	.318 (p = 0.031)

Table 37: Correlation between perceived stress and emotional eating

5.2.8.6 Change in readiness to change

A paired samples t-test was carried out to investigate whether completers' baseline and end of study scores on readiness to change were significantly different (Table 38). This was done to verify whether the online intervention enabled participants to move forward and progress through the stages corresponding to their readiness to change over the proposed period of study. The scores obtained by completers on the customised MSCARED were found to be significantly different from the beginning to the end of the study. The scores obtained in the final questionnaire were significantly higher and higher scores on the customised MSCARED indicate an increased readiness to change emotional eating behaviours. The individual participants' changes on the customised MSCARED scores were categorised into three groups - 'improved' (signifying that a participant had moved forward through the stages), 'same' (signifying that no change in stage of change occurred from baseline to follow-up) and 'worsened' (signifying that a participant had regressed from baseline to follow-up). Out of the completers, 22 participants (47.8%) had improved, 16 (34.8%) had stayed the same, whilst 8 (17.4%) had worsened. It is important to note that six participants out of the 16 whose stage of change was the same at baseline and follow-up had a score of 5 at baseline (signifying they were already in the maintenance stage at baseline and, therefore, could not have made any further improvements).

	Mean score – Initial Questionnaire (n=46)	Mean score - Final Questionnaire (n=46)	t	df	Sig. (2-tailed)
Customised MSCARED score	3.04	3.65	-2.458	45	0.018

Table 38: Differences in customised MSCARED scores from baseline to end of study

5.2.9 Functionality, usability, perceived utility and acceptability of ACES

Forty-six participants filled in the custom-designed online evaluation questionnaire at the end of the study (posttest) which provided data regarding the functionality, usability, perceived utility and acceptability of ACES. The results obtained from the content analysis of the open-ended questions are presented in this section. All quotations are presented verbatim including erroneous spelling and grammar.

5.2.9.1 Functionality

To assess the functionality of ACES, participants were asked about whether they were satisfied with the overall presentation of ACES and whether they had any suggestions for improvement, as well as whether they found ACES visually appealing. These results are presented in this section.

5.2.9.1.1 *Satisfaction with overall presentation and suggestions for improvement*

All participants (n = 46) stated that they were satisfied with the overall look and content presented in ACES. Participants gave different reasons as to why they were satisfied (Table 39).

Reasons	Number of Participants	Sample Quotations
Enjoyable/fun	6	<i>"it was very well done .. and i enjoyed taking part in it"</i>
Helpful	6	<i>"Yes, it has been heaps of help, especially to my emotional eating and decision making"</i> <i>"I was very, very satisfied and it will help me a lot with problems happening to me now and in the future. In my opinion, the content can't be any better"</i>
Well organised/ planned	4	<i>"yes, I was satisfied and it is well organised to leave a difference in who ever is going through this material"</i>
Educational	4	<i>"Yes, i was really satisfied and learned a lot"</i>
Interesting	3	<i>"The ACES program was very interesting and I don't see any points of improvement for the program. I can honestly say that it really helped me understand ways of coping and what you should do in particular situations"</i>
Liked look/style	2	<i>"yes satisfied about the look – nice idea of including comics"</i>
Impressed	2	<i>"Yes, i was even impressed by all the information available and this really helped me think more about how to cope with stress"</i>
Perfect/great	2	<i>"Yes i was satisfied, everything was perfect"</i>
User-friendly	1	<i>"it was very user-friendly and well-planned"</i>
Researcher was helpful	1	<i>"Yes I enjoyed it and was satisfied. I did actually learn some new things. I once sent an email to you because of a problem I had and you were very helpful :)"</i>

Table 39: Satisfaction with overall presentation - Reasons

Interestingly only five participants gave suggestions for improvement. These were, namely, providing videos instead of comics, the inclusion of more graphics, decreasing or summarising the number of questions, making the modules and questionnaires shorter, and improving the look of the final questionnaire:

- *"it's ok, but I think it would have been better if it was videos instead of comic style."*
- *"yes,i was satisfied. more graphics would make it more likeable though."*
- *"I was impressed. If there were less questions or summarized questions it would be better"*
- *"yes i was satisfied. maybe something that can be improved is that the the modules and quisioner will be a little bit shorter"*
- *"I like the style of the website :) The final survey's look could have been better though..."*

5.2.9.1.2 Visual appeal

Forty-two out of 46 participants liked the way the ACES website looked. The other four participants did not overtly state that they did not like the way it looked but gave suggestions for improvement mainly with regards to colour and graphics.

When asked what they liked about the way it looks, participants gave a number of reasons (Table 40):

Positive Comments	Number of Participants	Sample Quotations
Aesthetics	12	<i>"I loved the website, it was brilliant"</i> <i>"Perfect look"</i> <i>"Yes, I liked how it looked because it had a clean and modern feel and it didn't look boring because of the characters"</i>
Characters	11	<i>"I really like how it looks, and I also like the characters, which are really cool".</i> <i>"I liked how the characters where cartoon-ized"</i>
Layout	5	<i>"The layout is good and there wasn't anything that bothered me"</i>
Age-appropriate	2	<i>"yes i liked the way it looks. i think it is very suitable for adolocents like me. it is colourful and nice layout"</i> <i>"I liked because the way it i4s desgined for teenagers are age"</i>
Colours	2	<i>"yes i like the way the website looks the colours and the layout of the website"</i>
Simple	2	<i>"It actually looks great - it is not complicated and it is not dull or boring. I would leave it as it is"</i>
User-friendly	2	<i>"It looks very calming and user-friendly"</i> <i>"I really liked the use of comics, great organisation and easy to use"</i>
Could change font size	1	<i>"I liked the way it looked. I liked the Font size option"</i>
Original	1	<i>"Yes, it is original and simple to find"</i>

Table 40: Visual appeal - Positive comments

One participant mentioned things that were not directly related to visual appeal but still related to functionality:

- *"It is very nice. I liked that you could change password and that it was informing me of new modules."*

Table 41 lists the visual aspects that participants did not like.

Negative Comments	Number of Participants	Sample Quotations
Needs more colours	5	<i>"It looks good but in my opinion I think it must be more colourful since it is for young people"</i>
Needs more graphics	1	<i>"Its easy to go around and surf through it but it can have more graphics, i think that it is important for the website to be more colourful and approachable to teenagers"</i>
Characters have creepy eyes	1	<i>"The ACES website has a cool design, but the characters have really 'creepy' eyes. I feel like they're staring through my soul. I'm not kidding!"</i>
Too much white hurts eyes	1	<i>"I like it's layout, what I don't like is the much use of the white colour which hurts my eyes staring at it"</i>
Need to highlight important things	1	<i>"could do with more colouring for the important things"</i>

Table 41: Visual appeal - Negative comments

5.2.9.2 Usability

This section presents the results pertaining to the usability of ACES, namely the ease of navigation as well as the language and tone used in ACES.

5.2.9.2.1 Ease of navigation

Almost all participants (n = 43) stated that they had no difficulties finding their way around ACES. Some participants commented that the website was *"very organised"* (n=1), *"very user friendly"* (n=1), and that *"the layout of the website was strait forward and easy to move around the site"* (n=8).

Three participants had issues with ease of navigation, namely:

- difficulties with the initial questionnaire
 - *"at the beginning though that i had to do questionnaire all the 5 times"*
- initial difficulties to, for example, start the first few modules
 - *"At some points like starting the first few modules may be hard to find, but the directions are great and help is very quick so it wasnt that difficult on the whole"*
- difficulties with navigation arrows within the modules

- *“At first it was hard with the arrows, when i wanted to look at the previous questions i kept on pressing the arrow that took me to the start of the module. it was annoying and i suggest that you clearly indicaye which arrow is which.”*

5.2.9.2.2 Language and tone

Most participants (39/46) felt that the language and tone used in ACES was appropriate and easy. Six participants used the word ‘simple’ to describe the language used, e.g.:

- *“Yes, the language was simple English that is easy to understand.”*
- *“It was very simple to understand and it was totally appropriate.”*
- *“it was very easy to read and the english was very simple and clear.”*

One of the participants pointed out that difficult terms were explained:

- *“The language used was fine. If there was any language which was hard to understand there was an explanation in brackets”*

Even though the majority of those who responded felt that the language used was appropriate, seven participants (15%) had difficulties, with some commenting that it was hard at times and others having difficulties with particular phrases used:

- *“There were some words which I needed help to understand such as "feeling cross", I think it would have been better to use easier words such as "angry".”*
- *“sometime had to ask parent to explain”*
- *“sometimes it was hard”*
- *“yes ifound it hard the english language”*
- *“I wasn't sure if 'desire to eat' meant the hunger to eat normally or to eat more in the situation.”*
- *“it had some words which were a bit difficult to understnad but overall it was straight forward.”*
- *“it was a bit hard”*

5.2.9.3 Perceived utility

This section presents the results pertaining to the perceived utility of ACES. Respondents were asked about their perceived gain in knowledge with regards to stress management, whether they believed that their stress levels and emotional eating had decreased and also their perceived usefulness of ACES in decreasing emotional eating.

5.2.9.3.1 Perceived gain in knowledge

All participants (n = 46) felt they knew more about stress-management after taking part in ACES and provided comments such as *“Yes, the program revealed to me many ways of stress management”*, *“Yes, it is of great help when finding yourself stressed out to remember the steps learned here”*, *“Yes, I learnt various methods on how to manage stress”* and *“Yes and I have to thank you a lot because you have no idea how much you've helped me”*. One participant, however, hinted at the possibility of still getting stressed:

- *“Yes, it did make me feel a bit better sort of. I still could become like I was because maybe now I'm not seeing any of my friends so I'm not feeling like I need friends, though I wish I had friends to go out with.”*

5.2.9.3.2 Belief that perceived stress levels had decreased

Thirty-eight participants believed/felt that they were less stressed after taking part in ACES e.g.

- *“yes i feel less stressed as maybe i know how to tackle better my stress”*
- *“Yes because now I've learned how to cope with it.”*
- *“Yes, I believe that I am more capable of handling stressful situations.”*

One participant stated that he felt that his stress levels have remained the same, another said that he still feels stressed, whilst yet another participant stated that she was not stressed in the first place. It is interesting to note, however, that these three participants stated that they felt that they are better prepared to deal with stress after taking part in ACES:

- *“I feel the same, actually. But I feel more prepared to take on stress.”*

- *"I do have stress but now I know how to control it"*
- *"I wasn't stressed before taking part in ACES. But now i know what i should do when i feel stressed"*

One participant stated that he feels "normal" suggesting that ACES did not have any impact on his stress levels whilst 4 participants stated that they were not less stressed after taking part in ACES.

5.2.9.3.3 Belief that emotional eating had decreased

Forty participants believed/felt that they engaged in emotional eating less after taking part in ACES. Three participants stated that ACES has increased their awareness:

- *"Yes, it has made me aware"*
- *"yes, since i took part in ACES i became more conscious about this eating habit and now when i go to eat something while i am not so hungry i try to stop myself. it is going well and ive been able to take control of this habit"*
- *"Before ACES, I hadn't realised that I was engaging in emotional eating. Now that I have realised, I try to engage less in emotional eating".*

Another three participants highlighted a change in behaviour, e.g. *"Yes, when i feel bored or stressed i try to read a book or go for a jog"* and *"Yes I tend to use other methods to reduce stress"*. One of the participants stated that he was dieting because he was obese and that he was making sure that he does not *"also go on emotional eating."*

Two participants did not believe that their emotional eating had decreased, whereas four participants said that they never engaged in emotional eating (neither before nor after participating in ACES), e.g. *"I do not engage in emotional eating, neither before nor after taking part in ACES."*

5.2.9.3.4 Perceived usefulness in decreasing emotional eating

Participants were also asked whether they thought that ACES was useful in decreasing emotional eating and why. Forty-two participants believed that ACES was useful in decreasing emotional eating. One participant was unsure and answered *"maybe"*, whereas three

participants did not think ACES was useful in decreasing emotional eating. Out of these three participants, one participant stated that s/he did not believe that emotional eating exists – *“Not really because in my opinion, I don't think emotional eating exists, it's either you want to eat or not.”* (The other two participants did not give a reason.) The reasons as to why participants believed ACES was useful in decreasing emotional eating are presented in Table 42.

Reasons	Number of Participants	Sample Quotations
Gives tips/solutions & provides information	18	<i>“yes because it makes you think twice about eating when you are emotionally upset - these modules not only negative effects of emotional eating but they tell you what can be done instead “</i> <i>“yes, because it gives you tips which are really helpful when encountering emotional eating”</i> <i>“yes because it makes you realise that there are better solutions”</i> <i>“Yes as there is a lot of information, regarding how to tackle emotional eating”</i> <i>“yes, it helps you find different ways of dealing with the problem, like going for a jog instead of eating”</i>
Increased awareness	8	<i>“yes because it made me concious of it”</i> <i>“Yes because it made me realise that I shouldn't do it, so it's useful”</i> <i>“It shows you how to cope with things and identify wheather you are eating because you are hungry, or doing emotional eating”</i> <i>“Because it makes one aware of their habits and shows that it is unhealthy”</i>
Shows that emotional eating is unhealthy/not helpful	8	<i>“Because it makes one aware of their habits and shows that it is unhealthy”</i> <i>“Yes because it tells you that emotional eating is not helpful”</i> <i>“Because it teaches that emotional eating isn't good for us. We should try the six steps”</i> <i>“I think it helps you to understand that it is not good for your health and that it does not help you with dealing with your problems and emotions”</i>
Helpful	4	<i>“yes, because it helps you”</i> <i>“Yes, because it can help many people”</i>
Convincing	1	<i>“yes cause it's convincing”</i>
Interesting	1	<i>“yes because the website is interesting”</i>
Learnt self-control	1	<i>“Yes cause I learned how to control myself”</i>

Table 42: Perceived usefulness in decreasing emotional eating - Reasons

5.2.9.4 Acceptability

The acceptability of ACES is presented in this section. To evaluate acceptability, respondents were asked about the trustworthiness and perceived relevance of the material presented, whether they found the material of interest, as well as their likelihood of recommending ACES to their peers.

5.2.9.4.1 Trustworthiness

All participants but one (n = 45) believed that they could trust the information presented in ACES. One participant was unsure and replied "*think so*". The wide range of reasons given (Table 43) is very interesting to note.

Trustworthiness - Reasons	Number of Participants	Sample Quotations
Confidentiality	7	<i>"I think that the researcher will keep everything to herself"</i> <i>"Yes, due to that we were told that all information is going to be confidential and since this is about teenagers and coping with stress, it has to be confidential"</i>
Helpful	5	<i>"Yes because I found it helpful"</i> <i>"i think the information on this site was helpful and from my experiance i think it was trustable since i think the information given looks like it can really help you in situations with stress and other problems"</i>
Can relate to information and it makes sense	3	<i>"Yes because I can relate to the information given and it makes sense"</i> <i>"yes because it was put in to terms that teenagers could understand so it was very believable because the problem of emotional eating was put in to every day life situations that opened our eyes to what was happening"</i> <i>"Yes, its very nicely presented in problems that teenagers experience and so it makes you believe it"</i>
Made intelligently/ talented people made it	3	<i>"Yes it is made intelligently to help people take away stress from their life"</i> <i>"Yes, because the people of the website are very talented"</i> <i>"Yes because I'm sure that it presented by individuals who studied about this"</i>
Secure	3	<i>"Yes, because i believe this is a secure site which knows about stress"</i> <i>"Becuase i think it was very secure"</i>
Seems to be a well trusted website	3	<i>"yes because ACES website seems to be a well trusted website"</i>
Very serious	2	<i>"Yes because it is very serious"</i> <i>"Yes as i believe it is a serious study"</i>
Dependable and reliable	2	<i>"yes , it dependable and reliable"</i>
Needed permission to access website	1	<i>"yes ,sure had to pass true others to be put on this site"</i>
Well-organized	1	<i>"Yes I trust ACES, it seems well organized"</i>
Effective	1	<i>"Yes, because even after thinking about it and trying the several coping methods, they were a success"</i>
Met researcher in person	1	<i>"yes, because i trust them from when one of them came to my school"</i>
Anonymity	1	<i>"Yeh, since we were given the chance to give a nickname and not our name"</i>
Good cause	1	<i>"Yes, I do trust the information presented because its cause is a good one"</i>
Very informative	1	<i>"yes because it was very informative"</i>
A lot of effort was put into it	1	<i>"Yes as i don't believe that someone would go through all this effort for nothing"</i>

Table 43: Trustworthiness – Reasons

5.2.9.4.2 Perceived relevance

Forty-five participants found the material presented in ACES relevant giving a number of different reasons (Table 44) whilst only one participant seemed to not find it relevant answering “no”.

Perceived Relevance - Comments	Number of Participants	Sample Quotations
Helpful	10	<p><i>“Yes, the information presented was quite relevant and helpful. I have learned how to cope with problems better etc.”</i></p> <p><i>“I really needed the information presented because I never really 'sat down and thought about coping methods'. Yes, the information was quite relevant to me”</i></p> <p><i>“i found it very suitable .. especially the social (module 4) and the problem solving (module 3) as it helped me and made me understand what to do when i am in an argument with my friends”</i></p> <p><i>“Yes, I felt like the material was aimed directly at me and it helped me”</i></p>
Age-appropriate	4	<p><i>“Yes it was relevant and suitable for me because all of it was the kind of thing that teenagers go through”</i></p> <p><i>“Yes I think the information was very suitable for students my age”</i></p>
Educational	3	<p><i>“Most of the material was relevant, and I had learned new things from the modules”</i></p> <p><i>“The information given was great and I have learned a lot and improved my life style thanks to ACES”</i></p>
Reasons related to stress	3	<p><i>“Yes, the information presented was relevant to me as before i didn't know how to tackle stress”</i></p> <p><i>“Yes the material was relevant as when i feel stressed i didn't really know how to deal with it - ACES has given me some useful tips and information“</i></p> <p><i>“I think it was needed because a lot of students my age pass from a lot of stress especially during exams”</i></p>
Reasons related to emotional eating	3	<p><i>“Yes, I didn't know I was [not] the only one who ate food just because i'm bored”</i></p> <p><i>“It was relevant to me, especially the eating part”</i></p>
Interesting	2	<p><i>“interesting”</i></p>
Self-improvement	2	<p><i>“There were stuff which were relevant to you. I was going through a lot of hard times and feeling alone, and this site made me realise more about how you can try to make yourself better”</i></p>
To cope with stress and emotional eating	2	<p><i>“It was relevant because I also had problems coping with stress and eating”</i></p>

Table 44: Perceived relevance: Comments

It is noteworthy that one participant suggested that ACES should also cover topics such as anorexia:

- *“I think it was very helpful but one could also include some information on the opposite- anorexia and lack of eating.”*

One participant stated that he/she had already covered similar material in another setting:

- *“It is needed information but personally, i had learned such steps and information before from different groups in my local town.”*

5.2.9.4.3 Level of interest of content

All participants (n = 46) found the material presented in ACES interesting, with one participant stating that he/she thought it would be *“even interesting to adults”*. The parts of ACES which participants found least interesting are listed in Table 45.

Least interesting content	Number of Participants	Sample Quotations
Quizzes	3	<i>“Least interesting were the quizzes”</i>
Questionnaire	3	<i>“the least intristings are the questioners”</i>
Module 2 – Coping	2	<i>“least interesting was coping (module 2)”</i>
Module 4 – Social Support	2	<i>“I found social support least interesting”</i>
Some comics were lengthy	2	<i>“i think that the ACES material was interesting but some of the comics were a bit long and it took some time to read”</i>
Last quiz (Module 5)	1	<i>“the least interesting part was that of the last quiz”</i>
Emotional Eating section (Module 2)	1	<i>“The least interesting was emotional eating”</i>
Productive & non-productive coping mechanisms section (Module 2)	1	<i>“I found the first part where you learn about Productive and Non-Productive Coping least interesting”</i>
Some of the comments made by the characters	1	<i>“The least interesting was some of the comments by the characters”</i>

Table 45: Level of interest of content - Least interesting content

Participants were also asked which part of ACES they found most interesting (Table 46). (As can be seen in Table 46, one of the participants mentioned the Discussion Forum. This, however, was a feature that was used only by 11 participants as can be seen in Appendix O.)

Most interesting content	Number of Participants	Sample Quotations
All	14	<p><i>"I enjoyed the modules because they are very interactive. I don't know which part is the least interesting because it was all interesting in a way or another"</i></p> <p><i>"Well, it was quite interesting, especially the fact that the information was presented from an adolescent's point of view. I can't decide which was the most or least interesting - the modules were all VERY interesting"</i></p> <p><i>"Yes it is very interesting. The conversations were very interesting and so were the concluding mini-games, thus I think it was equally interesting all throughout"</i></p>
Comics	7	<p><i>"the most interesting were the 4 teenagers"</i></p> <p><i>"Most interesting – Dialogue"</i></p>
Module 3 - Problem-Solving	5	<i>"... and problem solving most interesting"</i>
Quizzes	4	<i>"Yes, the quizzes were the most interesting as they presented me a chance to test what I had learnt"</i>
Activities	2	<i>"The most interesting were the exercises which helped me learn more"</i>
Modules	1	<i>"most interesting:modules"</i>
Module 2 - Coping	1	<i>"the most interesting was the emotions module"</i>
Module 4 - Social Support	1	<i>"... the part where Alex needs social support the most interesting"</i>
Module 5 - Goal Setting	1	<i>"The most interesting was setting goals"</i>
Emotional Eating section (Module 2)	1	<i>"I found the very most interesting part was about the less weight and the emotional eating"</i>
Activity about Emotional Eating ('To eat or not to eat' Module 2 Activity 2)	1	<i>"Yes it was interesting being the most when there were the 'to eat or not to eat' situations in module 2"</i>
Discussion	1	<i>"It was interesting. I liked the discussion best"</i>
Questionnaires	1	<i>"The most interesting part was that of the questionnaires because you have to reflect"</i>

Table 46: Level of interest of content - Most interesting content

A comparison of Table 45 and Table 46 reveals that some parts of ACES were mentioned both as least interesting and as most interesting by different users (Table 47).

ACES Content	Number of participants indication section as least interesting	Number of participants indication section as most interesting
Quizzes	3	4
Questionnaire	3	1
Module 2 – Coping	2	1
Module 4 – Social Support	2	1
Emotional Eating section (Module 2)	1	1

Table 47: Comparison of least interesting and most interesting sections of ACES

5.2.9.4.4 Likelihood of recommending ACES to peers

All the participants (n = 46) stated that they would recommend ACES to their friends or to other people their age. The participants gave a number of reasons why they would recommend ACES (Table 48).

Interestingly, one participant commented that he had already recommended ACES – *“I already did because if they are also exposed to emotional eating, I think they need help like I did.”* – whereas another participant pointed out a possible barrier to recommending ACES – *“I would but I would find it hard because not all teenagers may find it “cool”.”*

Perceived Relevance - Comments	Number of Participants	Sample Quotations
Helpful	25	<i>"Yes, so it would help them too, just as it helped me"</i> <i>"Yes I will definitely recommend it because I found it useful and so it can help others"</i> <i>"yes because it can give you useful tips and information how to feel better"</i> <i>"i think that people my age would find this site helpful while going through a year with alot of studying and stress about their future career and future education or work these modules will help them and make it possible for them to look at thing in a positive way and find help when it is needed"</i>
To learn about stress and coping	10	<i>"Yes, as there are a lot of children who still do not know how to manage their stress levels and with this course, i believe that they will learn how to manage stress"</i> <i>"yes so they can cope better with their life problems"</i> <i>"yes they could learn how to be not be stressed"</i>
Know people who engage in emotional eating	2	<i>"Yes, because I know a few who emotionally eat"</i>
Stress is a universal problem/ everyone should take a look at it	2	<i>"Of course. First of all, this problem exists all around the world, second, people need to learn about stress because its a big problem and part of everyone's life that needs solving"</i>
Very good website/ good information	2	<i>"yes beacuse it has really good information"</i>
Interesting and fun	1	<i>"to try this because it is interseting and fun too"</i>
Increases confidence	1	<i>"yes you would feel more confident"</i>
Liked it	1	<i>"yes because i liked it"</i>

Table 48: Likelihood of recommending ACES to peers - Reasons

5.2.10 Estimated effect size

The mean and standard deviation for the scores obtained on the PSS and the Emotional Eating Subscale of the DEBQ (Table 49) were used to calculate an estimated effect size for perceived stress and emotional eating. The following equation for calculating the effect size for single group pretest/posttest designs (Carlson & Schmidt 1999) was used:

$$d = (T_2 - T_1)/S_{T1}$$

where T represents the group means of dependent variables, the subscripts 1 and 2 represent the initial questionnaire and the final questionnaire respectively, and S_{T1} represents the dependent variable's standard deviation in the initial questionnaire.

The estimated effect size for perceived stress was -0.46 whilst that for emotional eating was -0.42. Thus, in both cases, the estimated effect size may be described as small.

Scores for Completers:	N	Mean	Standard Deviation	Variance
PSS - Initial Questionnaire	47	17.77	6.026	36.314
PSS - Final Questionnaire	47	14.98	5.643	31.847
DEBQ: Emotional Eating - Initial Questionnaire	47	2.2834	0.66667	0.444
DEBQ: Emotional Eating - Final Questionnaire	47	2.0032	0.67777	0.459

Table 49: Mean, standard deviation and variance for the PSS and Emotional Eating Subscale of the DEBQ at both data collection points

5.2.11 Conclusion

This study set out to determine the feasibility of ACES in terms of recruitment, outcome measures used, as well as its functionality, usability, perceived utility and acceptability. It also aimed to determine an estimated effect size.

One hundred twenty-five adolescents completed the initial questionnaire whereas 46 adolescents completed all the modules in ACES including the final questionnaire. The complete participation rate was 36.8%, and males were more likely to complete ACES than females. An interesting finding that emerged is that this study attracted a larger proportion of obese adolescents (19%) when compared to Phase 1 (7%).

The response rates were 14.2% in the first recruitment period, and 16.6% in the second recruitment period, whilst the completion rates were 6.3% and 3.9% respectively. Response and completion rates varied depending on the recruitment modality employed with no adolescents joining the study via adverts but a large number joining via schools despite the poor response rates. When investigating the baseline differences between completers and non-completers, it was found that males, 15-year-old adolescents, and those with lower PSS scores were more likely to complete ACES.

The outcome measures used in this study demonstrated good internal consistency, no floor and ceiling effects, and good face validity. The face validity of the PSS was related to the total time spent on the modules in ACES and to the change in the PSS score from the beginning to the end of the study, whereas the face validity of the Emotional Eating Subscale of the DEBQ was related to the total number of quiz attempts for modules 1 to 4 and to the change in the emotional eating score from the beginning to the end of the study.

Both perceived stress scores and emotional eating subscale scores were found to be significantly different from the beginning to the end of the study and, overall, both decreased. The results also corroborate the findings in Phase 1, i.e. that there is a positive correlation between perceived stress and emotional eating. Moreover, participants' readiness to change was also significantly different from the beginning to the end of the study showing an improvement and progression through the stages of change.

This study has shown that the overall response regarding the functionality, usability, perceived utility and acceptability of ACES was very positive and encouraging. One of the most salient points to emerge was that 15% of completers had some difficulties with the language used in ACES.

The estimated effect size with regards to both perceived stress and emotional eating was small, i.e. -0.46 and -0.42 respectively.

5.3 Phase 2 Discussion

*"What do you say, Pooh?"
Pooh opened his eyes with a jerk and said, "Extremely."
"Extremely what?" asked Rabbit.
"What you were saying," said Pooh. "Undoubtedly."*

A.A. Milne

5.3.1 Introduction

This section provides a discussion of the findings obtained in Phase 2 by reflecting on the aims set out for this study and comparing the findings to previous literature. It explores the implications of the findings on the feasibility of ACES highlighting potential areas for improvement. The strengths and limitations, implications for practice and avenues for further research are also reviewed.

Phase 2 aimed to develop ACES, a novel online intervention based on the results of Phase 1, and to assess its feasibility. Different aspects were investigated to establish its feasibility including the functionality, usability, perceived utility and acceptability of ACES, the feasibility and appropriateness of recruitment methods, recruitment and drop-out rates, the validity of outcome measures and their suitability to measure change, as well as the estimated effect size.

5.3.2 Development of ACES

The first aim of Phase 2 was to develop the Internet-based intervention by developing both its content, incorporating behaviour change techniques, and developing its mode of delivery. As stated in the methodology chapter, a number of facilitators and barriers to development were identified during the development of ACES. These facilitators and barriers are important because they could provide useful pointers for future Internet-based interventions.

The facilitators presented included the importance of paper prototyping, a step that has been discussed in previous research (Stevens et al. 2008). This step minimises the need for costly modifications and rework during the web development phase. Other facilitators included addressing variables specific to the target population and keeping the target population in mind when taking decisions related to aesthetics, language and content. Focussing on including factors that would increase use and acceptance in the development stage is very important (Peng & Schoech 2008). In this study, these factors have resulted in an online intervention that was very well received by the target population as will be discussed further on.

The development of ACES was costly and time-consuming. These barriers are, however, not unique to ACES, as both of these factors have been reported in previous research about online interventions (Linke et al. 2008; Whittemore et al. 2010). Even though online interventions have high initial development costs in terms of time and money, it is important to note that they are still considered cost-effective because they are less expensive to deliver than most traditional face-to-face interventions due to their potential reach and economies of scale (Whittemore et al. 2010; Whiteley et al. 2008).

During the content development of ACES, a number of behaviour change techniques (Table 20) were incorporated into the online intervention. Preliminary findings into the effectiveness of ACES showing that perceived stress levels and emotional eating levels decreased (including qualitative data from the evaluation questionnaire as will be discussed further on), suggest that these behaviour change techniques were successful. Other research (e.g. three systematic reviews and meta-analyses - Williams & French 2011; Olander et al. 2013; Webb et al. 2010) provides support for the effectiveness of many of the behaviour change techniques used in ACES. For example, action planning, providing instruction on how to perform a behaviour, planning social support/social change and time management were found to be significantly associated with higher self-efficacy (Williams & French 2011; Olander et al. 2013)

and in ACES all of these techniques along with others (Table 20) resulted in a significant decrease in both perceived stress and emotional eating. Additionally, online interventions that provided stress management, as was the case in ACES, (or general communication skill training - a technique not used in ACES) resulted in the greatest changes in behaviour (Webb et al. 2010). Furthermore, it appears that online interventions that incorporated more behaviour change techniques tended to have greater effects on behaviour than those which used fewer (Webb et al. 2010).

5.3.3 Feasibility study

Overall the feasibility study has found good evidence in support of ACES demonstrating that this novel intervention works. The sample was based on the same inclusion and exclusion criteria that will be used in a prospective RCT. Moreover, the target sample size (section 5.1.5.2) was reached resulting in useful information pertaining to all the different aspects considered in assessing the feasibility of ACES (Thabane et al. 2010). This study has not only provided preliminary findings related to the effectiveness of ACES by showing that it led to significant decreases in perceived stress and emotional eating, but it has also demonstrated that ACES is acceptable and appealing to participants. The latter point is very important because it demonstrates what Nelson and Steele (2006, p.391) describe as consumer satisfaction – one of the “four core facets of treatment evaluation” in the multifaceted approach to treatment (intervention in the case of ACES) evaluation. This approach is a more comprehensive method of evaluating interventions that goes beyond exclusively determining an intervention’s success through efficacy studies. The findings from the feasibility study will be discussed in the following sections.

5.3.4 Recruitment

One of the aims of Phase 2 was to check the feasibility and appropriateness of recruitment methods as well as to estimate recruitment rates. As anticipated, due to the effort required to recruit adolescents in Phase 1 and due to the fact that recruiting adolescents is notoriously

difficult (Nguyen et al. 2012; Morrison et al. 2012; Ladin L'Engle et al. 2004), the recruitment of adolescents for Phase 2 was challenging and time intensive. In fact, two recruitment periods were needed in order to recruit the desired number of completers in the study.

The percentage of adolescents recruited in both recruitment periods was low - 14.2% in the first recruitment period and 16.6% in the second recruitment period. The changes in the recruitment strategy due to the low recruitment rates in Phase 1 (i.e. the use of multiple channels for recruitment and obtaining the support of the Health Promotion and Disease Prevention Directorate in Malta) did not result in improved recruitment rates in Phase 2. However, the increased time commitment required from the participants in Phase 2 compared to Phase 1 (i.e. a five week intervention instead of a 1 hour questionnaire) may have had a negative impact on recruitment rates. The changes that were incorporated into the second recruitment period of Phase 2, which were based on the preliminary analysis of the first recruitment period (e.g. briefing all potential participants directly), resulted in a marginal improvement of the recruitment rates. This, however, did not translate into an improvement in completion rates even though the duration of the intervention was decreased by one week and a leaflet explaining what the study would involve was included.

The time of the year when data collection was carried out may have been a factor in the poor recruitment. The first recruitment period was at the start of the adolescents' summer holidays whereas the second recruitment period was in the first term of school. It is, therefore, possible that, at these points during the academic year, many adolescents may not have been motivated enough to participate. "It may, for example, be possible that the motivation to use an online stress management program is higher if adolescents are currently experiencing increased levels of stress or stress symptoms" (Fridrici et al. 2009, p.673).

Drawing parallels with research about smoking cessation interventions (Dalum et al. 2010), another plausible explanation for the low recruitment rates is that a number of adolescents

may not perceive themselves as being stressed or as emotional eaters or view this stress or eating behaviour as a problem. As a consequence, these adolescents are not likely to enrol in an online intervention. If this is the case, when planning recruitment in future research on ACES, efforts need to be made to find ways of convincing these adolescents that participating in ACES is relevant to them, as well as effectively communicating the benefits they could gain from participation (Dalum et al. 2010).

Considering the difficulties associated with recruitment, identifying successful recruitment modalities is imperative and would be helpful in making informed decisions for planning recruitment in future research studies on ACES. To this end, the feasibility of the different recruitment modalities used in ACES was assessed.

As shown in Table 24, participants who most probably got to know about ACES via the invitation letters and, therefore, knew the URL of ACES were those with:

- the greatest number of pages viewed per visit,
- the longest average visit duration, and
- the lowest bounce rate (The term bounce rate refers to the percentage of visits where the visitor views only one page before exiting a website.)

This is not surprising since the other sources listed are newspapers, social networks and the web developers' website portfolio i.e. sources from which no adolescents were recruited, as will be discussed further on, and, hence, visitors from these sources would not have logged into ACES and would, therefore, only have been able to view a very small portion of it.

Further insight into the feasibility of the different recruitment modalities employed can be obtained by looking at the response rates and completion rates based on the different recruitment modalities (Table 25). It is interesting to note that greater response and completion rates were obtained from the various groups (scouts, youth group, gymnastics

group) than from the secondary schools. However, the secondary schools gave access to a large number of adolescents and are, therefore, still considered an important recruitment modality for this study. Furthermore, even though previous research has found that enhancing a website's exposure and visibility through advertisements usually results in greater recruitment (Danaher & Seeley 2009), this was not the case in the current study. No adolescents were recruited via these modalities in this study.

These findings echo those of research studies pertaining to recruiting young people to smoking cessation interventions (Dalum et al. 2010). The recruitment modalities used in Phase 2 can be split into two different types of recruitment strategies. These are a passive and an active recruitment strategy. A passive recruitment strategy is one in which there is minimal contact between potential participants and persons responsible for recruitment (Dalum et al. 2010). Therefore, in the case of Phase 2, these are newspaper articles, paid targeted advertisements on a social network site, unpaid announcements via online resources, and presentations to the general public at obesity road shows. Conversely, an active recruitment strategy is one which involves maximum contact between potential participants and persons responsible for recruitment (Dalum et al. 2010). For Phase 2, the active recruitment strategies would be the recruitment of adolescents through groups and secondary schools where potential participants were briefed about the study directly by the researcher or by a gatekeeper. As is the case with research about young people recruited to smoking cessation interventions, the findings of the current study show that active recruitment strategies were considerably more effective than passive recruitment strategies (Dalum et al. 2010). Other research has shown that passive methods are not effective recruitment methods (Jones et al. 2012).

The findings, therefore, indicate that active recruitment strategies are more feasible and appropriate for any future studies on ACES than passive recruitment strategies. For this reason, it is recommended that future efforts should be concentrated on active recruitment strategies, namely briefing potential participants through groups they may attend as well as

schools, and that ways of motivating more adolescents to participate need to be found. Additionally, passive recruitment strategies should only be considered for increasing the visibility and exposure of ACES and not as a sole means to recruit participants. It is, however, important to keep in mind that the recruitment rates obtained are still low. Ways to improve recruitment rates in any future research or service delivery will be discussed further on.

5.3.5 Retention and attrition

Another aim of Phase 2 was to estimate drop-out rates. The drop-out rate for ACES was 63.2%. Drop-out and poor treatment adherence are recurrent issues highlighted in the literature about Internet interventions (e.g. Folvolden et al. 2005) with, for example, a reported drop-out rate of 74% in an unsupported program for symptoms of depression in a student population (Sharry et al. 2013). Moreover, interventions that are fully automated, as is the case with ACES, are more prone to drop-outs than those that are clinician-guided (Donkin & Glozier 2012). Eysenbach (2005, p.1) states that “high dropout rates may be a natural and typical feature” of online interventions and that high drop-out rates in eHealth studies “are a fact of life” and that the studies are still “worth reporting”.

Retention and attrition patterns were examined and the greatest amount of attrition occurred after logging on to ACES without completing any modules (17.5%, n=22) and after completing the first module (17.5%, n=22). Even though adolescents were made aware of what the program involved through the recruitment material prior to commencing the program, there is a possibility that the drop-outs that occurred at the start of the program were an artefact of “window shopping” (i.e. potential users logging into the program to find out what it is like) as is the case with open access trials (Donkin & Glozier 2012). For this reason it may be useful to make a taster session (e.g. Module 1) available to adolescents prior to login so that they can get a clearer idea of what the online intervention will involve.

Attrition rates decreased as the adolescents completed more modules with, for example, only one participant dropping out after Module 4. There may be different explanations for this finding. The first is that possibly only participants who were highly motivated to participate completed the study, whereas the others gave up either upon seeing the amount of commitment involved or because they did not like ACES or else did not find it relevant. Equally possible is the chance that as the adolescents completed more modules they became increasingly engaged in the program since from Module 3 onwards the focus of the modules was to learn specific coping skills. At the end of the study (as part of the evaluation questionnaire), all the participants were asked whether they had completed ACES and why this was so, however, despite the fact that a number of reminder e-mails were sent, only completers responded. This means that only data about motivating factors for study completion is available for this study (Section 5.2.7). Therefore, more research needs to be undertaken before the reasons for drop-out are more clearly understood and the barriers for study completion can be explored.

Previous research (e.g. Donkin & Glozier 2012) has investigated the motivating factors as well as barriers to persisting with an online intervention. Donkin and Glozier (2012) found that barriers include both personal factors, such as forgetfulness or lack of time, as well as issues with reduced engagement either due to lack of perceived benefit or due to the online intervention not being viewed as a priority. Motivating factors include issues such as perceived benefit and also altruistic reasons such as an obligation to help the researchers or the belief that the online intervention may be of help to others (Donkin & Glozier 2012). In the current study, similar motivating factors were found (Table 30) with participants stating that they found ACES to be interesting, helpful, educational, something they looked forward to and engaging, and with three participants stating that the reason for completion was to help the researcher.

The completion rate for Phase 2 (36.8%) was slightly better than the 30.8% found in 'SNAKE – Online'. There are several possible explanations for this result. Firstly participation was free and there were no negative consequences associated with drop-out (Fridrici et al. 2009). Secondly, the probability to drop-out was also increased by the anonymity of the participants (Fridrici et al. 2009; Fridrici & Lohaus 2009). Anonymity is both a strength and a limitation in this study. On the one hand, it aids recruitment because it removes perceived barriers and lowers the threshold for participation, but, on the other hand, this low threshold for participation is a possible cause of drop-out (Fridrici et al. 2009; Fridrici & Lohaus 2009). Another reason for high drop-out rates in online interventions cited in the literature is that there is vigorous competition for attention in the World Wide Web and adolescents can get very easily distracted and shift from the online intervention into "the world of entertainment" (Fridrici et al. 2009, p.664).

5.3.5.1 Completers versus non-completers

The baseline characteristics of completers versus those of non-completers were explored. The findings suggest that:

- males were more likely (almost twice as likely) to complete ACES than females,
- 15-year-old adolescents were more likely to complete than 14 or 16-year-olds,
- adolescents who had lower perceived stress scores at baseline (mean baseline PSS score: 17.8 ± 6.0) were more likely to complete than those who had higher perceived stress scores (mean baseline PSS score: 20.3 ± 6.8),
- weight status, emotional eating subscale scores, and stage of change at baseline did not determine completion.

These findings have important implications for the future iterations of ACES as well as for further research that needs to be carried out. The reasons for these findings are not clear

since the stated reasons for completion from completers of ACES are known but there are no data for reasons for non-completion from non-completers (non-completers did not respond to the final questionnaire despite reminder e-mails sent; Table 30). Further research is needed to see whether ACES can be improved in ways to make it more attractive to females so that the intervention's reach potential is maximised. It is not known whether the aesthetics, content and language have any bearing on these findings. In other words, the findings do not explain whether certain characteristics of ACES affected completion rates (e.g. whether the predominant use of blue and grey appeared more appealing to boys rather than girls or whether such gender stereotypes are irrelevant to intervention completion) or whether there are other factors playing a part such as individual characteristics related to the likelihood of seeking help. It is interesting to note, however, that research in the field of web design has found gender differences in aesthetic preferences and choices, including differences in colour preferences. Males prefer darker colours such as black and blue whereas females prefer lighter colours (Djamasbi et al. 2007), and in website design, females have a significant tendency "to employ more colours and particular colours" (Moss & Gunn 2007, p.41). This gender difference in colour preference may, therefore, explain why significantly more males completed ACES in the current study. An implication of this is that ACES should be modified by providing an option for users to customise the look of ACES by changing the background colour and/or the colour of the toolbars to accommodate different colour preferences (and to automatically load user preferences on subsequent logins). Making the website more colourful was also recommended by five respondents (3 females and 2 males) when asked about the website's visual appeal (Table 41). Despite there being almost twice as many males than females completing ACES, it is not believed that this had a negative impact on the data collected. On the contrary, a greater number of females than males might have possibly skewed the data in terms of the perceived stress scores. This would have been due to the tendency of females to report a higher level of perceived stress than males as discussed in sections 3.3.7.8 and 3.3.9.

With regards to the PSS scores, even though completers were less stressed (had lower mean PSS scores at baseline) than non-completers, their scores (i.e. a mean of 17.77) were still high when compared to published norms e.g. a mean of 14.2 for 18 to 29 year olds (Cohen & Williamson 1988). It is conceivable that, for adolescents experiencing even higher levels of stress (i.e. a mean of 20.33), ACES was not viewed as a suitable medium for learning about coping with stress and that they might have other preferences such as face-to-face support.

5.3.6 Outcome measures

Phase 2 also aimed to assess the feasibility and appropriateness of outcome measures via the web-based tool and the validity of outcome measures and whether these are suitable to measure change over the proposed period of study. The results show that the PSS and the Emotional Eating Subscale of the DEBQ had good internal consistency, face validity and, furthermore, no floor and ceiling effects were observed. The present study, therefore, confirms previous research into the reliability and validity of the outcome measures used (Olpin 1996; Siqueira et al. 2000; Goldfield et al. 2010; van Strien et al. 2009; Halvarsson & Sjöden 1998), and contributes additional evidence to that found in Phase 1 that suggests that they can be used successfully using an Internet-based format and with Maltese adolescents.

The results also indicate that both the PSS and the Emotional Eating Subscale of the DEBQ were able to detect change over the duration of the online intervention. The finding that perceived stress decreased confirms the results obtained by Whittemore et al. (2010) who found that a 5-week Internet coping skills training program for adolescents with Type 1 Diabetes was sufficient to decrease perceived stress levels. Other researchers have detected decreases in emotional eating over a short period of time, for example a significant decrease in emotional eating was found in an 8-week mindfulness-based intervention for problematic eating behaviour in women with disordered eating behaviour (Alberts et al. 2012).

Preliminary effectiveness findings show that both PSS scores and Emotional Eating Subscale scores were found to have decreased significantly from the beginning to the end of the study. Therefore, these findings also provide preliminary data showing ACES' potential as an effective intervention. However, the current study was not designed to evaluate the effectiveness of ACES and an RCT would be needed to prove that the decreased perceived stress and emotional eating were the direct result of participating in ACES and not due to external factors such as temporal influences (Krusche et al. 2012) or placebo effect.

5.3.7 Functionality, usability, perceived utility and acceptability of ACES

Another aim of Phase 2 was to assess the functionality, usability, perceived utility and acceptability of the Internet-based intervention in order to further develop and refine the intervention with a view to a full RCT. Participants' positive responses demonstrate that ACES was very well received. Satisfaction with the intervention was very high (100% of completers), it was considered visually appealing (91% of completers), easy to use (93% of completers), perceived as useful (91% of completers) and relevant (98% of completers), interesting (100% of completers) and trustworthy (98% of completers). Furthermore, all the participants stated that they would recommend ACES to their peers. An important point to note is that these responses were received from the completers of ACES and since they were the more adherent participants it is more likely that these adolescents were the ones who perceived ACES as beneficial (Donkin & Glozier 2012) [None of the non-completers (63.2%) filled in the final questionnaire despite e-mail reminders sent].

The following important issues and suggestions for improving ACES emerged from these findings:

- Seven participants (i.e. 15% of completers) had difficulties with the language. Simplifying the language used or providing further explanations (and possibly

supplementing with Maltese text to accommodate for language preference) should be one of the priorities in revising ACES.

- Notably, all the participants stated that they would recommend ACES to their peers with the majority stating that they would do so because it was helpful. This finding has important implications, not only because it is yet another indicator of how well ACES has been received, but also because word-of-mouth recommendations could potentially help improve recruitment rates in future research on ACES. Previous research has found that word-of-mouth was the most popular recruitment strategy in smoking cessation trials (Dalum et al. 2010) and it is one of the most successful approaches for motivating adolescents to visit online interventions (Crutzen et al. 2008; Crutzen et al. 2009). Providing a ‘tell-a-friend’ (‘virtual word of mouth’) option in ACES may, therefore, increase its reach (Crutzen et al. 2008).

All the adolescents agreed that their knowledge about stress management had increased by taking part in ACES. This is another positive finding supporting the feasibility of ACES. However, “knowledge in and of itself does not always result in changed behavior” (Bushy et al. 2004, p.52). All but four respondents believed their stress levels had decreased and all but two respondents believed their emotional eating had decreased. These positive findings confirm the preliminary effectiveness findings as both perceived stress and emotional eating were found to have decreased significantly from the beginning to the end of ACES. These findings also provide support for the model obtained in Phase 1, the suitability of the content included and the behaviour change techniques used in ACES.

5.3.8 Estimated effect size

The final aim of Phase 2 was to determine an estimated effect size to help in sample size calculation for a larger RCT. The estimated effect size (an estimate based on the pre and post-intervention scores of the one group enrolled in the study) for both perceived stress ($d=-0.46$)

and emotional eating ($d=-0.42$) was small. Notwithstanding, “even a small effect size of an intervention that reduces a prevalent problem ... can have a meaningful public health impact” (Cousineau et al., 2008, p. 564; Webb et al., 2010). Small effect sizes can have “substantial practical value” especially if an intervention is “relatively inexpensive, is easy to execute, is politically feasible, and can be employed on a large scale, thereby affecting large numbers of individuals” (Litschge et al. 2009, p.22). This is applicable to ACES because since it is an online intervention it is cost-effective and can reach a large number of people (Whiteley et al. 2008; Whittemore et al. 2010).

Not all research studies report effect size, however, it is helpful to compare these findings to the effect sizes obtained in other online interventions (even though these studies were conducted with different populations and the interventions targeted different areas). An effect size of 0.30 was obtained in an online, self-directed (like ACES) cognitive-behavioural therapy program for the prevention and reduction of the symptoms of anxiety in adolescents (Calear et al. 2009). Whereas, an individually-tailored Internet-based treatment for anxiety disorders that included therapist guidance had an effect size of 0.69 (Carlbring et al. 2011 - the mean age of participants was 39.3).

Since the primary outcome for the current study was perceived stress and the outcome measure used was the PSS, it is interesting to compare the effect size obtained in ACES to those in other studies using the same outcome measure. In a meta-analysis by Van Daele et al. (2012), which evaluated the effectiveness of psychoeducational interventions in reducing stress, the ten studies which used the PSS as the outcome measure had an effect size which ranged from 0.13 to 0.79 with a mean effect size of 0.43. “An advantage of meta-analysis is that one can arrive at a common metric of the magnitude of treatment effect, which has useful interpretive value” (Litschge et al., 2009, p. 22). The fact that the mean effect size in the studies in the meta-analysis is comparable to the result obtained in the current study provides

further support for the practical significance of ACES and its feasibility as an intervention for stress in Maltese adolescents.

5.3.9 Strengths and limitations

A major strength of this study is that the development of ACES was driven by the results obtained in Phase 1 and, therefore, targeted the specific variables relevant to the population under study. The findings show that the intervention was very well received by the adolescents in the study and the adolescents gave positive feedback about the intervention. Developing a population-specific model (Figure 20) on which to base the intervention appears to be a key step in developing Internet-based interventions that are both acceptable and effective – a concept similar to the screening phase (i.e. identifying which components should be included in an intervention and which should be neglected) in a method for building and evaluating eHealth interventions known as multiphase optimization strategy (Collins et al. 2007).

Any additional helpful material (such as resources about time management) was not part of the five core modules in ACES but was placed in a separate ‘Additional Resources’ section (Appendix G). This was purposeful since other researchers have reported issues with program adherence and engagement associated with increased requirements (Danaher & Seeley 2009).

Another important strength of this study is that the number of participants obtained via the different recruitment modalities was tracked systematically through the usernames provided. This enabled the discussion about the feasibility of the recruitment modalities used. Moreover, the target sample size of completers in the study was met. However, the study would have been strengthened if the non-completers answered the final questionnaire as their reasons for non-completion would have given further insight into how ACES could be improved.

Additional strengths that relate to the way ACES was developed include the website's scalability and also the ease with which any material can be edited. Furthermore, possible bandwidth limitations of potential users were taken into consideration during the planning stage. ACES, therefore, is devoid of features, such as videos and music, that would be problematic to those with limited bandwidth (Stevens et al. 2008).

As was the case in Phase 1, other strengths include using standardised data collection procedures and analyses techniques, the avoidance of multiple responses from a single participant and the receipt of unsolicited responses, and the elimination of the possibility of item non-response in the questionnaires thus avoiding incomplete questionnaires (Further detail of how these were achieved using the web-based data collection tool is provided in the discussion of the strengths and limitations of Phase 1). Moreover, as in Phase 1, the self-report questionnaires used had good internal consistency.

The results of this study must be interpreted in the light of its limitations. A one-group pretest-posttest design was used. Since this was a feasibility study and the aim was not to assess the effectiveness of the intervention, this study design was appropriate and a control group was not required. However, the findings about ACES' effectiveness can only be viewed as preliminary, and an RCT would be needed to prove that these findings were a direct result of the online intervention and not due to, for example, temporal influences (Krusche et al. 2012). The preliminary effectiveness findings together with the positive comments about the perceived utility of ACES do, nevertheless, suggest that it is reasonable to expect a confirmation of ACES' effectiveness in a future RCT.

As is the case with other studies involving an online intervention (e.g. Fridrici & Lohaus 2009), the percentage of adolescents completing the study was low. As already discussed, possible reasons for this include the fact that participation was free, anonymous and that there is vigorous competition for attention in the World Wide Web (Fridrici et al. 2009). Even though

the target number of completers was obtained, two recruitment periods were required. The length of time required for the recruitment of adolescents in studies investigating online interventions needs to be taken into account when planning future studies.

5.3.10 Implications for practice and further research

The findings from this study have demonstrated that ACES is feasible, accepted by participants, and preliminary findings have indicated that it led to significant decreases in perceived stress and emotional eating. The implementation of some minor revisions suggested by this study (such as simplifying the language/providing a Maltese text alternative and providing an option to change the background/toolbar colour) is required.

An important next step is to carry out an RCT to provide further support for the effectiveness of ACES in decreasing perceived stress and emotional eating. The RCT should also determine whether the decrease in perceived stress and emotional eating is maintained in the long-term (e.g. at a three-month follow-up) or whether any booster sessions would be required. Further work needs to be done to establish ways to decrease attrition rates by assessing barriers and motivators for intervention completion (Powell et al. 2013) since none of the non-completers in the current study completed the evaluation questionnaire despite the fact that reminder e-mails were sent.

Given that ACES was found to be helpful and that it is not harmful, it is suggested that ACES may be made available to Maltese adolescents as an online intervention and that the RCT can be carried out concurrently. This can be done by randomising adolescents after completing the baseline questionnaire using an automated Internet-based randomisation system. The adolescents would be automatically randomly assigned to one of two groups – the immediate intervention group (intervention arm) and the wait-list control group (control arm). At the end of the intervention period all adolescents (from both arms of the study) would be required to

fill-in the follow-up questionnaire. Subsequently, adolescents in the wait-list control group would be given the opportunity to complete the program.

ACES may be a viable means for the Health Promotion and Disease Prevention Directorate (Malta) to liaise with secondary schools and reach adolescents. This is because online self-directed interventions such as ACES are able to overcome logistical barriers such as staff availability as well as any possible resistance from school administrators or teachers as the online intervention would not encroach upon lesson time and can be accessed by the adolescents after school. Moreover, ACES can serve as a curriculum resource for Personal and Social Development (PSD) lessons since the stress management topics covered in ACES complement the current PSD syllabus for secondary schools set out by the Curriculum Management and eLearning Department (Malta). Making ACES a curriculum resource supported by the Health Promotion and Disease Prevention Directorate would facilitate the widespread reach of ACES.

5.3.11 Summary

Collectively, the results of Phase 2 are very promising, suggesting the feasibility and acceptability of ACES for Maltese adolescents. Considerable time and financial resources were required for the development of ACES, but this study revealed strong indications that ACES was well received by its target users and also demonstrated its potential for decreasing perceived stress and emotional eating in Maltese adolescents. Preliminary effectiveness findings, together with the participants' belief that their perceived stress and emotional eating levels had decreased after taking part in ACES, indicate the potential of ACES to improve the targeted health outcomes, namely perceived stress and emotional eating. The findings suggest that ACES can be feasibly implemented in Malta following some minor revisions, thus filling an important gap in the available services for adolescents - a gap which is of particular significance to the country's public health since emotional eating is a possible risk factor for obesity and prevalence rates for overweight and obesity in Maltese adolescents are high.

As expected, there were difficulties with the recruitment and retention of participants, however, a number of recommendations, such as the importance of focusing on active recruitment strategies in future studies and incorporating virtual word-of-mouth recommendations, were made based on the findings in this study. Moreover, offering ACES as a curriculum resource for PSD would increase its reach.

The outcome measures used were found to be feasible, appropriate and able to detect change over the duration of the intervention. The web-based questionnaire can, therefore, be used successfully in a future RCT carried out in a naturalistic setting.

The responses about the functionality, usability, perceived utility and acceptability of ACES were positive. Participants provided excellent feedback as well as valuable suggestions for improving ACES, such as simplifying the language further and including options for different website colour preferences, that need to be incorporated into the intervention. The comic-based nature and interactive activities were appealing to adolescents, whereas the content was found to be helpful.

Taken together, the results demonstrate that the content development and web development of the online intervention was suitable to achieve a change in behaviour and appropriate to the target population. Moreover, elucidating participants' opinions and recommendations regarding the functionality, usability, perceived utility and acceptability of ACES during this stage of research appears critical in ensuring the development of an intervention that is helpful, easy to use and well-liked.

Chapter 6: Overall conclusions

“Well, said Pooh, “we keep looking for Home and not finding it, so I thought that if we looked for this Pit, we’d be sure not to find it, which would be a Good Thing, because then we might find something that we weren’t looking for, which might be just what we were looking for, really.”

“I don’t see much sense in that,” said Rabbit.

“No,” said Pooh humbly, “there isn’t.” But there was going to be when I began it. It’s just that something happened to it on the way.”

A.A.Milne

6.1 Introduction

This study set out to determine the relationship between perceived stress, coping responses and eating behaviours in Maltese adolescents with the purpose of developing an effective Internet-based intervention for the reduction of perceived stress and overeating in Maltese adolescents.

It was undertaken in two phases. The aims for Phase 1 were to examine the relationship between perceived stress, coping and eating behaviours in Maltese adolescents, and to devise a model that would guide the development of an effective Internet-based intervention for the reduction of perceived stress and overeating in Maltese adolescents. Based on the results of Phase 1, Phase 2 aimed to develop ACES - a novel online intervention for the reduction of perceived stress and emotional eating in Maltese adolescents - and to assess its feasibility.

6.2 Findings and contributions to knowledge

Phase 1 has found that adolescents who use *self-controlling* and *escape-avoidance* (two dysfunctional coping strategies) exhibit higher levels of perceived stress. Moreover, particular

dysfunctional coping strategies were related to higher levels of emotional, external and restrained eating:

- adolescents with higher levels of emotional eating use more of *accepting responsibility* and *self-controlling* to cope;
- adolescents with higher levels of external eating use more of *accepting responsibility* and *escape-avoidance* to cope;
- adolescents with higher levels of restrained eating use more *self-controlling* to cope;
- whereas adolescents who use *seeking social support*, a functional coping strategy, have lower levels of external eating.

Another interesting finding to emerge from Phase 1 is that adolescents who exhibit lower perceived stress and a lower BMI use two functional coping strategies, namely *seeking social support* and *planful problem solving* more than adolescents with higher perceived stress and a higher BMI.

Since weight status did not correlate with perceived stress, eating behaviours or coping responses, it was decided that the online intervention developed in Phase 2 would not be limited to overweight and obese adolescents. It was also decided that Phase 2 would only focus on one eating behaviour out of the three eating behaviours investigated, namely emotional eating. This eating behaviour was the one that was directly related to perceived stress, with adolescents who had higher stress levels having higher emotional eating levels.

Phase 1 was the first study to investigate the relationship between perceived stress, coping responses and eating behaviours in Malta. The variables that have been identified, such as the specific functional and dysfunctional coping strategies, assist in the understanding of how emotional eating can be decreased in the adolescent population. The results suggest that, when planning an intervention aimed at decreasing emotional eating, the following need to be

considered: decreasing perceived stress, increasing exercise self-efficacy, increasing general self-efficacy, increasing perceived social support, decreasing dysfunctional coping strategies (namely, *self-controlling* and *escape-avoidance*) as well as increasing functional coping strategies (namely, *seeking social support* and *planful problem solving*).

In Phase 2, ACES - a novel intervention for the reduction of perceived stress and emotional eating - was developed. The findings of Phase 2 suggest the feasibility of ACES. Moreover, findings related to user satisfaction and perceived utility, as well as preliminary findings related to its effectiveness in decreasing perceived stress and emotional eating, demonstrated that this novel intervention works. The findings add to a growing and very current body of literature that suggests that stress management and coping skills training interventions for emotional eating need to be developed (Manzoni et al. 2009; Bennett et al. 2013; Nguyen-Rodriguez et al. 2009).

The novel online intervention developed in the current study will serve as a base for future studies. Moreover, ACES has the potential to fill an important gap in the available services for adolescents, as the findings suggest that ACES can be feasibly implemented in Malta following some minor revisions (such as simplifying the language/providing a Maltese text alternative and providing the option to change the background colour).

The methods and tools used in Phase 2 were found to be appropriate for use in a prospective RCT with the aim of providing further support for the effectiveness of ACES. Furthermore, taken together, the methods used in Phase 1 and Phase 2 may be applied to the development of other online interventions targeted at potential users.

6.3 Policy Implications

A number of implications for theory and practice have been discussed in this dissertation. This study also produced a number of findings that may influence policy development.

The results of this study support the idea that emotional eating behaviours in Maltese adolescents can be decreased by decreasing perceived stress and dysfunctional coping strategies and increasing self-efficacy and functional coping strategies. It is, therefore, recommended that future public health policies concerning health and nutrition in Malta include recommendations about stress management and coping skills training for adolescents.

Furthermore, the positive feedback about the online intervention developed in the current research suggests that the Internet is a viable medium for reaching the adolescent population in Malta. Future policies and health promotion strategies should consider the inclusion of Internet-based interventions and make use of their currently untapped potential to offer cost-effective solutions with a wide reach. For example, Malta's obesity strategy for 2012-2020 (Superintendence of Public Health 2012) does not include any initiative regarding eHealth services such as offering online interventions. The results of this study suggest, however, that e-health services would be well-received by adolescents and may play an important part in health promotion and disease prevention.

6.4 Recommendations

This study has made significant contributions to the literature. It has further elucidated the literature on emotional eating and identified a feasible avenue for obesity prevention through the development of a novel Internet-based intervention. A number of limitations need to be acknowledged. These include the cross-sectional nature of Phase 1 and the fact that, since Phase 2 was designed to assess the feasibility of ACES and the study methods employed (such as recruitment), the findings about its effectiveness are preliminary in nature. Avenues for future research have been identified. Further research needs to be done:

- to establish ways to decrease attrition rates,
- to confirm findings related to the effectiveness of ACES, and

- to determine whether the decrease in perceived stress and emotional eating is maintained in the long-term.
-

*"I don't feel very much like Pooh today," said Pooh.
"There there," said Piglet. "I'll bring you tea and honey until you do."*

A.A.Milne

Appendix A - Publications

ECO 2012 Abstract

T5:PS3 – MOTIVATIONAL, BEHAVIOURAL AND COGNITIVE APPROACHES IN TREATMENT

(n=584) aged 29±5 (mean±SD) years were recruited at 16±2 weeks gestation. GWG intentions and knowledge; perceived risk for defined health conditions, risk associated with weight status and GWG; and demographics were assessed by questionnaire. Height measured at baseline and self report pre-pregnancy weight was used to calculate BMI. Results: Mean knowledge score was lower for Owt women (1.8±1.3 vs 2.1±1.4, p=0.013) and only 6% of all participants achieved the maximum score of 5. The majority perceived a low personal risk for developing a medical condition (81% Hwt, 74% Owt, p<0.0001) or have a large for gestational age baby (83% Hwt, 72% Owt, p=0.003). One quarter (25%) Hwt and 54% Owt women thought it likely they would gain more weight than recommended (p<0.0001). Amongst Owt women 14% and 33% reported their pre-pregnancy weight status would cause health problems for their baby and themselves respectively. The majority were aware excess GWG would cause health problems for themselves (65% Hwt, 77% Owt, p=0.003) and their baby (55% Hwt, 57% Owt, p=0.586). Conclusions: Improving knowledge and perceived risk regarding weight status and GWG may improve engagement with weight management interventions and positively influence health outcomes in pregnancy.

Conflict of Interest: None disclosed

Funding: Study funding provided by the Royal Brisbane and Women's Hospital Foundation, PhD Scholarship funding provided by the National Health and Medical Research Council and the Royal Brisbane and Women's Hospital Research Advisory Committee

725 accepted poster

SELF-EFFICACY AND THE 6 MINUTES WALKING TEST IN OBESITY

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Abstract Text: Background: Self-efficacy is defined as people's judgment of their capabilities to organize and execute courses of action required to attain designated type of performance. The six-minute walk test (6MWT) is an inexpensive, quick and safe tool that has been shown to be highly reproducible in obese subjects and thus can be used as a fitness indicator in this population. In this study, we aimed to evaluate whether the 6MWT could be a useful tool to increase self-efficacy of obese subjects. Method: 28 participants (20F/8M, 47.45 ± 15.57 years old, 37.87 ± 4.75 kg/m²) performed two 6MWT separated by a rest period of 45 minutes and completed 3 questionnaires on self-efficacy (SE): 1 on increasing distance to the 6MWT (SEDist), another on increasing number of daily steps (SEInc) and the last one on self-efficacy barriers (SEBarr) to physical activity. Each questionnaire was completed 3 times: before the 1st 6MWT, during the rest period and after the 2nd 6MWT. Results: Cronbach's alpha ranged from 0.79 to 0.90 reflecting a good to excellent internal consistency. SEDist increased through the 3 measures [F(2, 52)=14.93, p=0.0001, $\eta^2_p = 0.36$] as well as SEInc [F(2, 52)=5.47, p=0.00697, $\eta^2_p = 0.17$] and SEBarr [F(2, 46)=5.23, p=0.00898, $\eta^2_p = 0.18$]. Conclusion: The 6MWT could be a useful tool to increase SE of obese subjects, at least in the short term. The increase of SEBarr showed that the 6MWT allowed an increase of expectations to others situations related to daily life as assumed by the self-efficacy theory.

Conflict of Interest: no conflict of interest to disclose

Funding:

726 accepted poster

STRESS, COPING AND EATING BEHAVIOURS IN MALTESE ADOLESCENTS: DEVELOPING A MODEL FOR AN EFFECTIVE ONLINE INTERVENTION

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Abstract Text: Introduction: Stress-induced eating and inadequate coping skills have been linked to overeating and obesity (Fryer et al. 1997; Nguyen-Rodriguez et al. 2008). The 2001-2002 Health Behaviour in School-Aged Children Study (Janssen et al. 2005) places Malta second only to the USA in prevalence of overweight (17.5%) and obese (7.9%) youth. A model amongst Maltese adolescents linking stress, coping responses and eating behaviours has been established to produce an effective Internet-based, person-centred intervention for the reduction of stress and overeating. **Methods:** Cross-sectional data were gathered from seventy-nine 14 to 17-year-old Maltese adolescents, from 7 schools, using an online questionnaire which included 6 self-report measures:

perceived stress, coping responses, eating behaviours, self-efficacy, physical exercise and social support. **Results:** The prevalence rates of overweight and obesity in this sample were 20% (95%CI: ±6.82) and 7% (95%CI: ±5.63) respectively. Higher emotional eating related to higher perceived stress and lower exercise self-efficacy. Higher perceived stress was also associated with lower perceived social support, lower general self-efficacy, and a greater use of escape-avoidance and self-controlling coping responses. No relationships with weight status were found. **Conclusion:** Associations suggest it should be possible to develop an intervention to decrease emotional eating by considering the following: decreasing perceived stress, increasing self-efficacy, increasing perceived social support, and decreasing escape-avoidance and self-controlling coping responses.

Conflict of Interest: None disclosed

Funding: Daniela Cassola is partially funded by a Plymouth University PhD studentship

727 accepted poster

SUBSTANCE DEPENDENCE (PROBLEM FOOD) APPROACH TO CHILDHOOD OBESITY, IMPLEMENTED AS A SMARTPHONE APP: A PILOT STUDY

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Abstract Text: Introduction: Current interventions for obese youth are only marginally successful, with generally poor long term results. Emerging evidence points to dependence on highly pleasurable foods (addiction) as a significant cause of childhood obesity [1,2]. Incorporating substance dependence methods may improve intervention success rates. **Methods:** An iPhone app intervention was developed using substance dependence treatment methods and included: 1) listing and photographing the user's problem foods, with sequential withdrawal from each food, 2) self esteem, motivation, and coping skills augmentation, and 3) buddy and online community support. A two month pilot study was carried out with 12 obese youth, ages 8-21. Mentors provided 24/7 wireless support. **Results:** The app was felt to be understandable by all participants, except those under age 10. The personal nature of information typed into the app was substantial. 63% lost at least 3 kg. The buddy feature was heavily utilized, although mentors were under-utilized. Participants carried the app wherever they went, thus it was available "in the moment" for cravings or impending binges. As today's youth typically use cell phones, participants were not self-conscious about using the app. Mentors, likewise, were able to effect support on the go, as any smart phone could be used. Call center mentors were an option. **Conclusion:** The efficacy of the app's approach may be superior to current interventions for childhood obesity. The app could be used indefinitely to avoid relapse. An RCT will follow. **References:** 1. Prettow, R., Eating Disorders. 2011;19(4):295-307.2. Gearhardt, et al., Arch Gen Psychiatry. 2011;68(8):808-816.

Conflict of Interest:

Funding:

728 accepted poster

THE INSATISFACTION TOWARD BODY IMAGE IS ASSOCIATED WITH COGNITIVE RESTRAINT IN A POPULATION OF WOMEN

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Abstract Text: Background: cognitive restraint (CR) is often associated with periods of disinhibition leading to an overconsumption of calories what is predictive of weight gain and frustration. Several behavioral strategies are identified to decrease cognitive restraint including workshop on feelings and body image. In this study, we aimed to analyse correlations of cognitive restraint with attitude toward food and body image. **Methods:** A sample of 50 women (aged of 45 ± 17 years old) completed the Dutch Eating Behavior Questionnaire to obtain CR, the body image scale and answered to 3 questions based on determinants of a meal cessation with a visual analogue scale. These questions were 1) Do you enjoy eating? (Q1); 2) When you eat, do you leave food on your plate? (Q2); 3) When you eat, are you more likely to start or finish in what you prefer? Q3. **Results:** As expected, there is a high correlation between perceived body image and BMI (r=0.88, p<0.001) It appeared that CR is correlated with dissatisfaction score (IS; perceived body image minus desired body image) (r=0.69; p<0.0001) and with Q3 (r=0.51, p<0.001). IS was correlated with Q3. BMI was only correlated with Q1

Appendix B - Phase 1 Questionnaire

Document A

Note regarding order of questions:

Kindly note that since the data collection tool is quite long (and, therefore, some adolescents may decide not to answer all the questions), the questions have been put in order of importance (that is why the most important demographic questions have been placed before the Multidimensional Scale of Perceived Social Support)



Adolescents' Coping, Eating & Stress Study

Phase 1 Questionnaire
(Online Data Collection Tool) –



University of Plymouth

Perceived Stress Scale (Cohen, Kamarck et al. 1983)

The following questions ask you about your feelings and thoughts during the last month.

In each case, please indicate by circling one of the numbers, how often you felt or thought a certain way. For example if your reply to the first item is 'almost never', you would circle 2:

1	②	3	4	5
never	almost never	sometimes	fairly often	very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

3. In the last month, how often have you felt nervous and 'stressed'?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

5. In the last month, how often have you felt that things were going your way?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

7. In the last month, how often have you been able to control irritations in your life?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

8. In the last month, how often have you felt that you were on top of things?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

9. In the last month, how often have you been angered because of things that were outside of your control?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

Ways of Coping Questionnaire (Folkman & Lazarus, 1988) [applied for permission to put questionnaire online]

Please read each item below and indicate, by using the following rating scale, to what extent you used it when stressed.

Not Used	Used Somewhat	Used Quite A Bit	Used A great deal
0	1	2	3

- ____ 1. Just concentrated on what I had to do next – the next step.
- ____ 2. I tried to analyze the problem in order to understand it better.
- ____ 3. Turned to work or substitute activity to take my mind off things.
- ____ 4. I felt that time would make a difference – the only thing to do was to wait.

- ____ 5. Bargained or compromised to get something positive from the situation.
- ____ 6. I did something which I didn't think would work, but at least I was doing something.
- ____ 7. Tried to get the person responsible to change his or her mind.
- ____ 8. Talked to someone to find out more about the situation.
- ____ 9. Criticized or lectured myself.
- ____ 10. Tried not to burn my bridges, but leave things open somewhat.
- ____ 11. Hoped a miracle would happen.
- ____ 12. Went along with fate; sometimes I just have bad luck.
- ____ 13. Went on as if nothing had happened.
- ____ 14. I tried to keep my feelings to myself.
- ____ 15. Looked for the silver lining, so to speak; tried to look on the bright side of things.
- ____ 16. Slept more than usual.
- ____ 17. I expressed anger to the person(s) who caused the problem.
- ____ 18. Accepted sympathy and understanding from someone.
- ____ 19. I told myself things that helped me to feel better.
- ____ 20. I was inspired to do something creative.
- ____ 21. Tried to forget the whole thing.
- ____ 22. I got professional help.
- ____ 23. Changed or grew as a person in a good way.
- ____ 24. I waited to see what would happen before doing anything.
- ____ 25. I apologized or did something to make up.
- ____ 26. I made a plan of action and followed it.
- ____ 27. I accepted the next best thing to what I wanted.
- ____ 28. I let my feelings out somehow.
- ____ 29. Realized I brought the problem on myself.
- ____ 30. I came out of the experience better than when I went in.
- ____ 31. Talked to someone who could do something concrete about the problem.
- ____ 32. Got away from it for a while; tried to rest or take a vacation.
- ____ 33. Tried to make myself feel better by eating, drinking, smoking, using drugs or medication, etc.
- ____ 34. Took a big chance or did something very risky.
- ____ 35. I tried not to act too hastily or follow my first hunch.
- ____ 36. Found new faith.
- ____ 37. Maintained my pride and kept a stiff upper lip.

- ____ 38. Rediscovered what is important in life.
- ____ 39. Changed something so things would turn out all right.
- ____ 40. Avoided being with people in general.
- ____ 41. Didn't let it get to me; refused to think too much about it.
- ____ 42. I asked a relative or friend I respected for advice.
- ____ 43. Kept others from knowing how bad things were.
- ____ 44. Made light of the situation; refused to get too serious about it.
- ____ 45. Talked to someone about how I was feeling.
- ____ 46. Stood my ground and fought for what I wanted.
- ____ 47. Took it out on other people.
- ____ 48. Drew on my past experiences; I was in a similar situation before.
- ____ 49. I knew what had to be done, so I doubled my efforts to make things work.
- ____ 50. Refused to believe that it had happened.
- ____ 51. I made a promise to myself that things would be different next time.
- ____ 52. Came up with a couple of different solutions to the problem.
- ____ 53. Accepted it, since nothing could be done.
- ____ 54. I tried to keep my feelings from interfering with other things too much.
- ____ 55. Wished that I could change what had happened or how I felt.
- ____ 56. I changed something about myself.
- ____ 57. I daydreamed or imagined a better time or place than the one I was in.
- ____ 58. Wished that the situation would go away or somehow be over with.
- ____ 59. Had fantasies or wishes about how things might turn out.
- ____ 60. I prayed.
- ____ 61. I prepared myself for the worst.
- ____ 62. I went over in my mind what I would say or do.
- ____ 63. I thought about how a person I admire would handle this situation and used that as a model.
- ____ 64. I tried to see things from the other person's point of view.
- ____ 65. I reminded myself how much worse things could be.
- ____ 66. I jogged or exercised.
-

Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien 2002) [applied for permission to put questionnaire online]

The following questions relate to how you may react around food and what you would do in situations related to food.

In each case, please indicate by circling one of the numbers, how often you felt or thought a certain way. For example if your reply to the first item is 'rarely', you would circle 2:

1	2	3	4	5
never	rarely	sometimes	often	very often

1. Do you have the desire to eat when you are irritated?

1	2	3	4	5
never	rarely	sometimes	often	very often

2. If food tastes good to you, do you eat more than usual?

1	2	3	4	5
never	rarely	sometimes	often	very often

3. Do you have a desire to eat when you have nothing to do?

1	2	3	4	5
never	rarely	sometimes	often	very often

4. If you have put on weight, do you eat less than you usually do?

1	2	3	4	5
never	rarely	sometimes	often	very often

5. Do you have a desire to eat when you are depressed or discouraged?

1	2	3	4	5
never	rarely	sometimes	often	very often

6. If food smells and looks good, do you eat more than usual?

1	2	3	4	5
never	rarely	sometimes	often	very often

7. How often do you refuse food or drink offered because you are concerned about your weight?

1	2	3	4	5
never	rarely	sometimes	often	very often

8. Do you have a desire to eat when you are feeling lonely?

1	2	3	4	5
never	rarely	sometimes	often	very often

9. If you see or smell something delicious, do you have a desire to eat it?

1	2	3	4	5
never	rarely	sometimes	often	very often

10. Do you have a desire to eat when somebody lets you down?

1	2	3	4	5
never	rarely	sometimes	often	very often

11. Do you try to eat less at mealtimes than you would like to eat?

1	2	3	4	5
never	rarely	sometimes	often	very often

12. If you have something delicious to eat, do you eat it straight away?

1	2	3	4	5
never	rarely	sometimes	often	very often

13. Do you have a desire to eat when you are cross?

1	2	3	4	5
never	rarely	sometimes	often	very often

14. Do you watch exactly what you eat?

1	2	3	4	5
never	rarely	sometimes	often	very often

15. If you walk past the baker do you have the desire to buy something delicious?

1	2	3	4	5
never	rarely	sometimes	often	very often

16. Do you have a desire to eat when you are approaching something unpleasant to happen?

1	2	3	4	5
never	rarely	sometimes	often	very often

17. Do you deliberately eat foods that are slimming?

1	2	3	4	5
never	rarely	sometimes	often	very often

18. If you see others eating do you also have the desire to eat?

1	2	3	4	5
never	rarely	sometimes	often	very often

19. When you have eaten too much, do you eat less than usual the following days?

1	2	3	4	5
never	rarely	sometimes	often	very often

20. Do you get the desire to eat when you are anxious, worried or tense?

1	2	3	4	5
never	rarely	sometimes	often	very often

21. Do you find it hard to resist eating delicious foods?

1	2	3	4	5
never	rarely	sometimes	often	very often

22. Do you deliberately eat less in order not to become heavier?

1	2	3	4	5
---	---	---	---	---

never rarely sometimes often very often

23. Do you have a desire to eat when things are going against you or when things have gone wrong?

1 2 3 4 5
never rarely sometimes often very often

24. If you walk past a snack bar or café, do you have the desire to buy something delicious?

1 2 3 4 5
never rarely sometimes often very often

25. Do you have the desire to eat when you are emotionally upset?

1 2 3 4 5
never rarely sometimes often very often

26. How often do you try not to eat between meals because you are watching your weight?

1 2 3 4 5
never rarely sometimes often very often

27. Do you eat more than usual, when you see others eating?

1 2 3 4 5
never rarely sometimes often very often

28. Do you have a desire to eat when you are bored or restless?

1 2 3 4 5
never rarely sometimes often very often

29. How often in the evening do you try not to eat because you are watching your weight?

1 2 3 4 5
never rarely sometimes often very often

30. Do you have a desire to eat when you are frightened?

1 2 3 4 5
never rarely sometimes often very often

31. Do you take into account your weight with what you eat?

1 2 3 4 5
never rarely sometimes often very often

32. Do you have a desire to eat when you are disappointed?

1 2 3 4 5
never rarely sometimes often very often

33. When you are preparing a meal are you inclined to eat something?

1 2 3 4 5
never rarely sometimes often very often

Demographic Questionnaire

The following questions relate to your personal background and will help the researcher classify your answers. Remember that all the answers you give are confidential – No one will see your answers apart from the researcher.

Unless otherwise specified, please indicate your answer by ticking the relevant box

1. Age: 14 15 16 17

2. Current Email Address (please specify): _____

3. Gender: Male Female

4. What class/grade are you in school?

Form 3/Grade 10 Form4/Grade 11 Form 5/Grade 12 Sixth Form

5. How would you describe your ethnic background?

- Maltese
 Other (please specify): _____

6. Are you using a computer or laptop at home to answer this questionnaire?

Yes No

7. If no, where (e.g. school, library, youth club, Internet cafe) are you completing this questionnaire? Why? (e.g. no internet access at home)

Please specify where you are completing questionnaire: _____

Please specify why: _____

8. Do you have your own mobile phone? Yes No 9. Does it have Internet access? Yes No Do not know

10. Please weigh yourself without clothes.

What is your weight in kilograms? (please specify) _____

11. Please measure your height without shoes.

What is your height in centimetres? (please specify) _____

12. Stand up straight and place a tape measure around your bare tummy, just above your hip-bone (approximately at the level of your belly button). Make sure that the tape is parallel to the floor all the way round. The tape should be taut, but not pressing into the skin. Breathe out normally and take the measurement (in centimetres) at the end of this breath.

What is your waist circumference in centimetres? (please specify) _____

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you Very Strongly Disagree

Circle the "2" if you Strongly Disagree

Circle the "3" if you Mildly Disagree

Circle the "4" if you are Neutral

Circle the "5" if you Mildly Agree

Circle the "6" if you Strongly Agree

Circle the "7" if you Very Strongly Agree

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 1. | There is a special person who is around when I am in need. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | There is a special person with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | My family really tries to help me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | I get the emotional help and support I need from my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I have a special person who is a real source of comfort to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | My friends really try to help me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | I can count on my friends when things go wrong. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I can talk about my problems with my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | I have friends with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | There is a special person in my life who cares about my feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | My family is willing to help me make decisions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. | I can talk about my problems with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
-

14	When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
15	I can manage to stick to healthful foods, even if I do not receive a great deal of support from others when making my first attempts.	1	2	3	4
16	If I am in trouble, I can usually think of a solution.	1	2	3	4
17	I can manage to carry out my exercise intentions, even when I am tired.	1	2	3	4
18	I can usually handle whatever comes my way.	1	2	3	4
19	I can manage to stick to healthful foods, even if I have to make a detailed plan.	1	2	3	4
20	I can manage to carry out my exercise intentions, even when I am busy.	1	2	3	4

Background Information Questionnaire

The following questions relate to your personal background and will help the researcher classify your answers. Remember that all the answers you give are confidential – No one will see your answers apart from the researcher.

Unless otherwise specified, please indicate your answer by ticking the relevant box

1. How often do you sit down at the table with other members of your family to eat a main meal?

- Never
 Some days
 Most days
 Every day

2. Do your parents let you make your own choices about the foods you eat?

- 1 2 3 4 5 6
 never almost never sometimes fairly often very often do not know

3. Do you have an influence on cooking food at home?

1 2 3 4 5 6
 never almost never sometimes fairly often very often do not know

4. Do you think that your family would support your efforts in improving your food choice?

Yes
 No
 Do not know

5. Do you think that your friends would support your efforts in improving your food choice?

Yes
 No
 Do not know

6. Are you currently...

trying to lose weight
 trying to stay at the same weight
 trying to gain weight
 not doing anything about your weight

The following questions relate to smoking and drinking habits. Remember that all the answers you give are confidential – No one will see your answers apart from the researcher.

Unless otherwise specified, please indicate your answer by ticking the relevant box

7. Which of the following best describes your smoking status?

I smoke daily
 I smoke occasionally
 I don't smoke now, but I used to
 I have tried it a few times but never smoke regularly
 I have never smoked

8. When you feel stressed, do you smoke to make yourself feel better?

Yes
 No
 Do not know

9. How often do you have an alcoholic drink of any kind?

- Every day
- 5-6 days a week
- 3-4 days a week
- 1-2 days a week
- Fortnightly or less
- Monthly or less
- I don't drink alcohol

10. When you feel stressed, do you have an alcoholic drink to make yourself feel better?

- Yes
- No
- Do not know

International Physical Activity Questionnaire

The following questions relate to the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at school, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

No vigorous physical activities. → *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities → *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking → *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at school, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

8. Compared to your physical activity over the past 3 months, was last week's physical activity more, less, or about the same?

More

Less

About the same

Do not know

This is the end of the questionnaire, thank you for participating.

Appendix C - Permissions to carry out Phase 1 Study

C.1 Ethics approval for Phase 1

MS/ab

12th August 2010

CONFIDENTIAL

Daniela Cassola
University of Plymouth
FF15, Peninsula Allied Health Centre
Derriford Road
Plymouth
PL6 8BH



Faculty of Health
University of Plymouth
Drake Circus
Plymouth PL4 8AA

Professor Michael Sheppard
CQSW BSc MA PhD, AcSS
Chair of Research Ethics Committee

Dear Daniela

Application for Approval by Faculty Research Ethics Committee

Application Title: Stress, coping and eating behaviours in Maltese overweight and obese adolescents - working towards an effective online support intervention

I am pleased to inform you that the Committee has granted approval to you to conduct this research.

Please note that this approval is for three years, after which you will be required to seek extension of existing approval.

Please note that should any MAJOR changes to your research design occur which effect the ethics of procedures involved you must inform the Committee. Please contact Alison Bendall on (01752) 586703 or by email alison.bendall@plymouth.ac.uk

Yours sincerely

Professor Michael Sheppard, PhD, AcSS,
Chair, Research Ethics Committee
Faculty of Health
University of Plymouth

C.2 Phase 1 approval from the Maltese Episcopal Conference - Secretariat for Catholic Education



MALTESE EPISCOPAL CONFERENCE
Secretariat for Catholic Education

The Head

Archbishop's Seminary, Virtu
St Aloysius College, B'kara
De La Salle College SNR, Kottonera
Savio College, Dingli
Saint Elias College, St Venera
St Dorothy's School SNR, Zebbug
St Joseph School SNR, Blata l-Bajda
St Joseph School SNR, Sliema
Convent of the Sacred Heart SNR, St Julians
Our Lady Immaculate School, Hamrun
St Monica School, Gzira

St Aloysius College Sixth Form, B'kara
De La Salle College Sixth Form, Kottonera

19th November, 2010

Ms Daniela Cassola, currently reading for a Ph.D. in Health Studies (Nutrition & E-Health) at the University of Plymouth, requests permission to observe and conduct e-interviews with students in Forms 3, 4 & 5 (ages 14-16) and Post Secondary school students (ages 16-17).

The Secretariat for Catholic Education finds no objection for Ms Daniela Cassola to carry out the stated exercise subject to adhering to the policies and directives of the schools concerned.

fr Dominic V Scerri OP
Archbishop's Delegate for Church Schools

Appendix D - Phase 1 invitation letter and further information

D.1 Phase 1 Invitation letter sent to parents/legal guardians



Study Title: A.C.E.S. Study – Adolescents' coping, eating & stress

Dear Parent/Guardian,

I am currently doing a research degree at the University of Plymouth in the UK and would like to invite your son/daughter to participate voluntarily in a research study. The purpose of this study is to find out whether there are links between stress, coping responses and eating behaviours in young people. This information will help in the design of an online intervention that will support positive coping responses in young people so that stress levels can be reduced and eating behaviours can be improved if any link between stress and eating behaviours is found.

Before you decide if you want son/daughter to join in, it is important to understand what it will involve for your son/daughter. So please consider this information letter carefully.

The study will involve the following:

- your son/daughter will be asked to complete an online questionnaire (Phase 1 questionnaire). This questionnaire will include six (6) self-report measures that will collect information about perceived stress, coping responses, eating behaviours, self-efficacy, physical exercise and social support. He/she will also be asked to fill out a background questionnaire that will include questions about anthropometric measurements e.g. current height (in cm) and weight (in kg) as well as current waist circumference (in cm), personal background (demographics) e.g. gender and access to internet at home. His/her involvement in this stage of the study will take about an hour.

This project has been approved by the University of Plymouth Research Ethics Committee as well as by your son/daughter's Head of School. There are no foreseeable risks to those participating in this research study. There may be no direct benefit to your son/daughter; however, indirectly your son/daughter may benefit because the information obtained will help in the development of effective intervention for young people who have problems coping with stress and/or exhibit problematic eating behaviours.

Participation in this study is of course voluntary. Your son/daughter is free to stop taking part at any time during the research without giving a reason. Participation is not associated with your son/daughter's class grade. All data from this project are confidential and will only be used for the purposes of this research and destroyed within ten (10) years after the completion of the study.

Should you consent to your son/daughter's participation in this study (i.e. if you give permission for your son/daughter to take part), please ask your son/daughter to access the following website [Study website address goes here] and enter the following unique access code [Unique access code goes here].



Once your son/daughter accesses the study website he/she will be able to review information about the study and details about what his/her involvement would entail. If, after reviewing the study information, your son/daughter agrees to participate in the study, he/she will then be able to complete the online questionnaire (Phase 1 questionnaire).

Thank you for reading this – please feel free to ask any questions (see contact details below) should you need to do so now or during the study.

I would like to thank you in advance for your assistance.

Yours faithfully,

Daniela Cassola

Contact Details:

<p>Daniela Cassola School of Health Professions Faculty of Health University of Plymouth Mobile: + 44 (0) 75 1608 5122 Email: daniela.cassola@plymouth.ac.uk</p>	<p>Professor Anne de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth Email: adelooy@plymouth.ac.uk</p>	<p>Professor Ray Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth Email: R.Jones-5@plymouth.ac.uk</p>
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D.2 Information Letter for Adolescents (made available on the study website in written form)



Study Title: A.C.E.S. Study – Adolescents' coping, eating & stress

I am currently doing a research degree at the University of Plymouth in the UK. I am a Maltese student and am very interested in young people in Malta. I would like to find out if there are links between stress, coping responses and eating behaviours.

In order to find young people in Malta to help with my study, I first approached your Head of School who provided me with contact details of students' parents. I then contacted your parents who have kindly given their permission for me to explain the study to you. Your participation in this project will provide important information on this topic.

Before you decide if you want to join in, it is important to understand why the research is being done and what it will involve for you. So please consider this information letter carefully.

If you decide to participate, you will be asked to complete an online questionnaire (Phase 1 questionnaire) that will take about 1 hour. This questionnaire will include six (6) self-report measures that will collect information about:

- situations in your life that you see as stressful (known as perceived stress),
- the way you react to difficult situations in your life (known as coping responses)
- what makes you eat (known as eating behaviours),
- how confident think you are and how much in control you feel of your life (known as self-efficacy),
- physical activity and
- the support your family and friends give to you (known as social support).

It will also contain a background questionnaire that will include questions about you e.g. your current height (in cm) and weight (in kg) as well as your current waist circumference (in cm), personal background (known as demographics) e.g. gender, and access to internet at home.

Instructions about how you should measure your height, weight and waist circumference are given. Any responses you give will be confidential, however, if you feel questions of this type would upset you, please feel free to contact me (see contact details below) to discuss it further or decline from participation at any point in this study. There are no foreseeable risks to those participating in this research study.

The purpose of this questionnaire (Phase 1 questionnaire) is to collect information that will be used to examine the links between stress, coping responses and eating behaviours. This information will help in the design of an online intervention that will support positive coping responses in young



people so that stress levels can be reduced if necessary and eating behaviours can be improved if any link between stress and eating behaviours is found.

Participation in this study is of course voluntary. You are free to stop taking part at any time during the research without giving a reason. Participation is not associated with your class grade. All data from this project are confidential and will only be used by me for my research and will be destroyed within ten (10) years after the completion of the study. No one else will see your answers.

Before any research goes ahead it has to be checked by a Research Ethics Committee to make sure that the research is fair. This project has been approved by the University of Plymouth Research Ethics Committee.

If you agree to participate as a subject in this research study, kindly enter your personal, unique access code which your parents have given you to be able to complete the online questionnaire. Please keep your unique access code safe – do not share this code with anyone else.

Thank you for reading this – please ask any questions (see contact details below) if you need to, now or during the study. If you wish to receive a summary of the results please send an email to daniela.cassola@plymouth.ac.uk.

I would like to thank you in advance for your assistance.

Daniela Cassola

Contact Details:

<p>Daniela Cassola School of Health Professions Faculty of Health University of Plymouth Mobile: + 44 (0) 75 1608 5122 Email: daniela.cassola@plymouth.ac.uk</p>	<p>Professor Anne de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth Email: adelooy@plymouth.ac.uk</p>	<p>Professor Ray Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth Email: R.Jones-5@plymouth.ac.uk</p>
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Appendix E - Background information data

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sits down at table with family to eat main meal * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Makes own food choices * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Has influence on home cooking * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Thinks that family would support efforts to improve food choice * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Thinks that friends would support efforts to improve food choice * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Smoking Status * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Smokes to feel better when stressed * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Drinking frequency * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%
Takes an alcoholic drink to feel better when stressed * Gender of Respondents	79	100.0%	0	0.0%	79	100.0%

Sits down at table with family to eat main meal * Gender of Respondents
Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Sits down at table with family to eat main meal	Never	2	0	2
	Some Days	6	6	12
	Most Days	9	5	14
	Every Day	35	16	51
Total		52	27	79

Makes own food choices * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Makes own food choices	Never	2	2	4
	Almost Never	7	4	11
	Sometimes	16	4	20
	Fairly Often	10	6	16
	Very Often	15	10	25
	Do Not Know	2	1	3
Total		52	27	79

Has influence on home cooking * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Has influence on home cooking	Never	5	1	6
	Almost Never	7	7	14
	Sometimes	21	8	29
	Fairly Often	8	3	11
	Very Often	9	8	17
	Do Not Know	2	0	2
Total		52	27	79

Thinks that family would support efforts to improve food choice * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Thinks that family would support efforts to improve food choice	Yes	40	23	63
	No	4	1	5
	Do Not Know	8	3	11
Total		52	27	79

Thinks that friends would support efforts to improve food choice * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Thinks that friends would support efforts to improve food choice	Yes	10	12	22
	No	12	4	16
	Do Not Know	30	11	41
Total		52	27	79

Smoking Status * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Smoking Status	I smoke occasionally	0	1	1
	I don't smoke now but I used to	1	0	1
	I have never smoked	51	26	77
Total		52	27	79

Smokes to feel better when stressed * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Smokes to feel better when stressed	Yes	0	1	1
	No	47	26	73
	Do Not Know	5	0	5
Total		52	27	79

Drinking frequency * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Drinking frequency	1-2 days a week	3	2	5
	Fortnightly or less	5	3	8
	Monthly or less	10	4	14
	I don't drink alcohol	34	18	52
Total		52	27	79

Takes an alcoholic drink to feel better when stressed * Gender of Respondents Crosstabulation

Count

		Gender of Respondents		Total
		Male	Female	
Takes an alcoholic drink to feel better when stressed	Yes	4	0	4
	No	45	25	70
	Do Not Know	3	2	5
Total		52	27	79

Appendix F - Resources used to guide the development of ACES

As described in section 4.2.2, no Internet-based intervention that aimed at decreasing both perceived stress and emotional eating in adolescents existed. Therefore, this meant that the development of a novel Internet-based intervention that focussed on both perceived stress and emotional eating was required.

In order to guide the development of ACES, research into existing programmes for stress management/coping skills training aimed at adolescents was carried out and the following programs were identified:

- ‘SNAKE-Online’ (Fridrici, Lohaus, & Glass, 2009; Fridrici & Lohaus, 2009) - 8 lessons (German; self-help online intervention; permission use intervention as a guide and access to the password protected website granted);
- ‘Coping For Success’ Program, (Frydenberg 2007) - 10 modules (English; self-help computer based program; resource purchased);
- ‘Think Positively!: A course for developing coping skills in adolescents’ (Frydenberg 2010) - 12 modules (English; book detailing group sessions; resource purchased).
- ‘Managing Stress’ (CRUFAD 2011) – 6 lessons (English; self-help online intervention)

‘Managing Stress’ (CRUFAD 2011) was considered for use in the current research, however, it was deemed unfeasible due to the cost associated with purchasing the program. This course consists of six online lessons over a six week period with each lesson lasting approximately 30 minutes. ‘Managing Stress’ (an Australian program) “was designed to develop knowledge

about stress and effective coping strategies, increase use of effective coping strategies and decrease less-effective coping strategies and produce improved mental well-being and improved perceptions of competence to cope with stress.” (Vliet & Andrews, 2009 p.306). ‘Managing Stress’ has been evaluated and found to be a feasible and efficacious intervention (Van Vliet & Andrews 2009). The results achieved by this brief intervention (Van Vliet & Andrews 2009) are relevant to the current study, particularly:

- a significant decrease in psychological distress,
- a significant increase in support-seeking coping,
- a significant decrease in avoidant coping, and
- a significant increase in participants’ well-being over the study period.

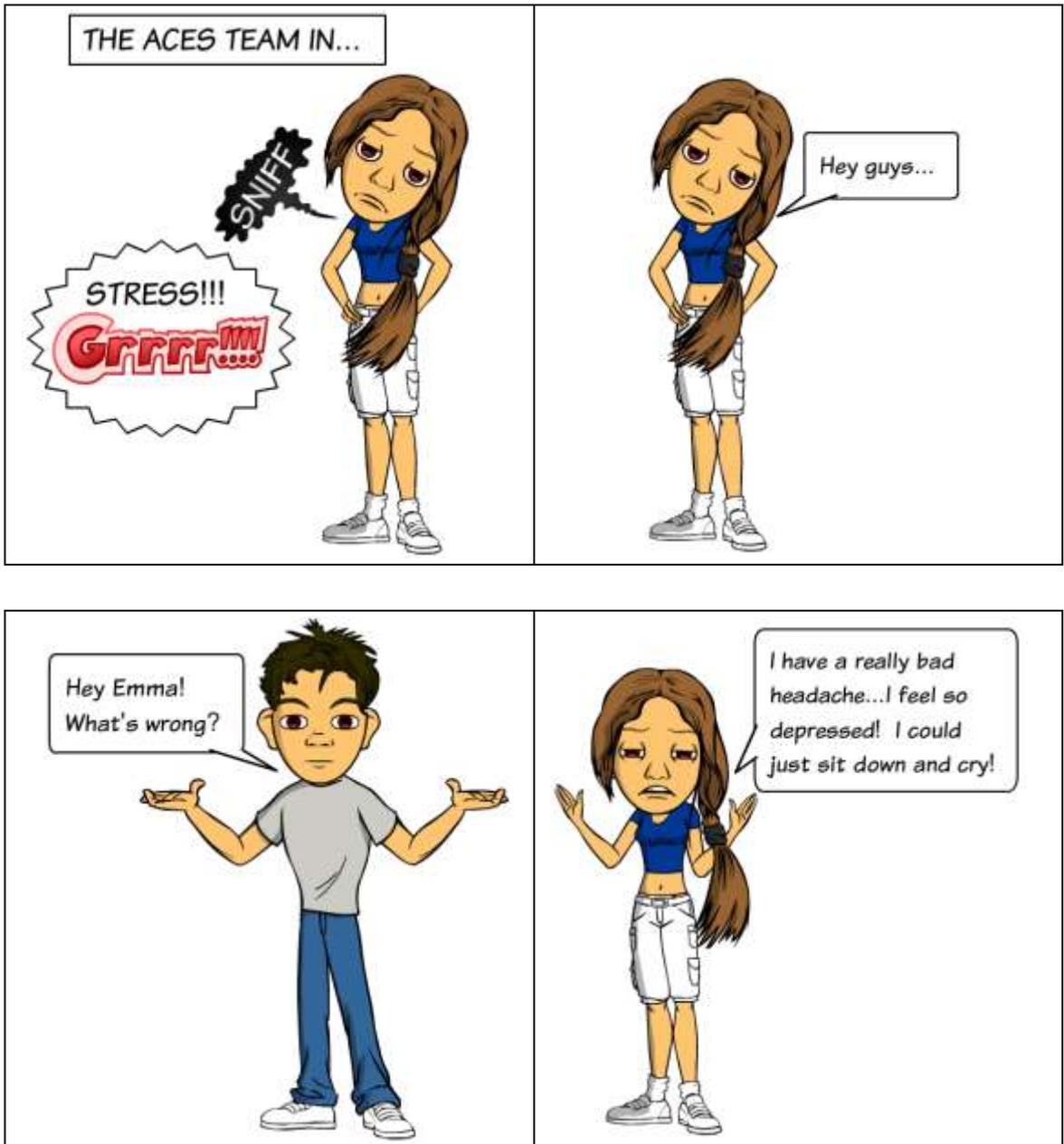
This intervention was, however, deemed unfeasible for use in the current pilot study due to the cost associated with purchasing the program:

- Cost to purchase Operating System: AUD\$100,000;
- Cost to purchase ‘Managing Stress’ program: AUD\$60,000;
- Total Cost: AUD\$160,000 equivalent to £101,260.14.

Appendix G - ACES modules & additional resources

G.1 Module 1 - Stress

Part 1 - The ACES team in...Stress Grrrr!!!!



Is there anything on your mind?



Oh...loads! My Granny is back in hospital...I need to hand in a project by tomorrow...and I have a test next week...AND if I fail again my mum said I'll be grounded for 2 months!!



Oh no! That's awful! You must be feeling so stressed out!



Yeah...all this sucks Emma! I hope your Gran gets better soon! I'm sure you'll be fine with the rest!

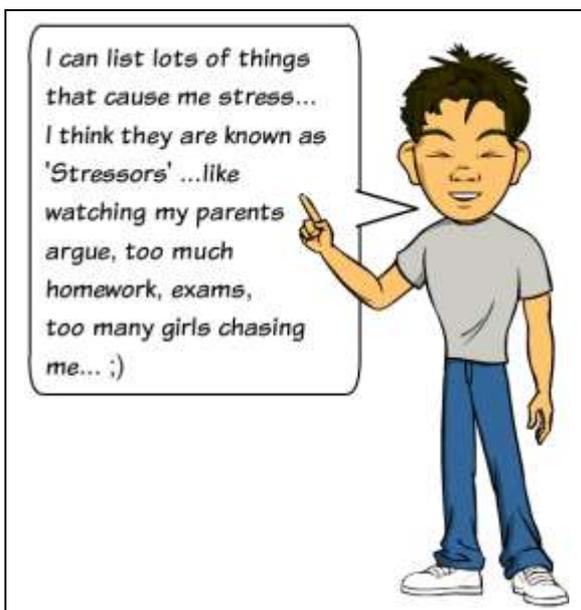
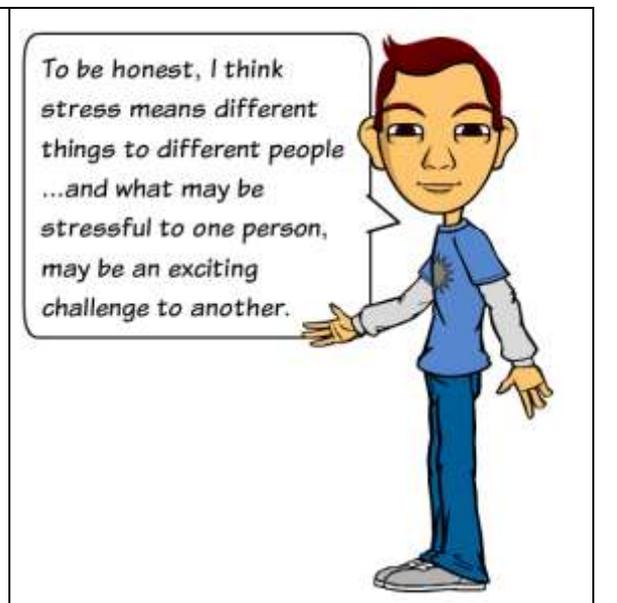
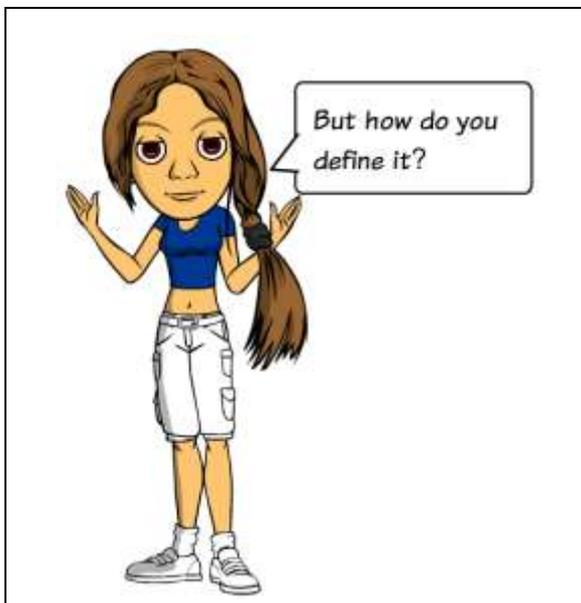
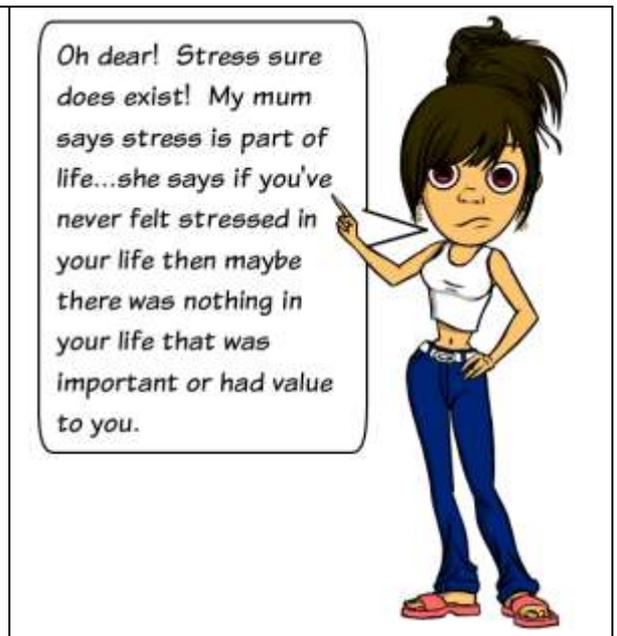


Maybe it's the stress that is making you feel so unwell! When I'm stressed out, all sorts of things happen to me!



Yes, Emma! It must be the stress! I can help you revise for your test if that makes you feel better.





Try imagining weighing scales...with demands on one side and resources on the other...you need to find a balance. Otherwise, if you think that the demands or pressures are greater than your resources or coping skills, the balance is lost and you'll feel stressed out!



I think a little bit of stress is OK ...it kind of helps us get things done ...it's a good motivator! That little bit of stress always seems to help me when I'm competing in sports.



One thing is for sure... too much stress isn't good for anyone and it has an effect on our mind ...our body...how we feel ...and how we act.



I think it would be really helpful if I got to know the effects that stress can have on us. That way, I'll be able to recognise my own reactions to stress and then I could do something to feel less stressed... something to cope with the stress!



Why don't you click on the Stress Effects Indicator to find out about the effects of stress on our mind, body, feelings and behaviours?



Activity 1 - Stress Effects Indicator



The section is titled "Behaviours" and includes a "Back" link. It lists 13 behavioral symptoms of stress. To the right, there is an illustration of a girl with a thought bubble containing a brain and a heart, and a speech bubble that says "BEHAVIOURS". The diagram is framed by a grey border with a back arrow icon in the top-left and bottom-left corners.

Behaviours
[Back](#)

- Worse at managing time and at organizing oneself
- Sleeping a lot more or less than usual
- Eating a lot more than or less than usual
- Doing things in a hurry
- Losing touch with friends
- Blaming others for the problem
- Taking out on others
- Feel the need of an alcoholic drink
- Turning to drugs
- Over-reacting
- Fidgeting
- Smoking
- Not going to school

BEHAVIOURS



Stress Effects Indicator

Mind

[Back](#)

- Having poor concentration
- Having difficulty remembering things
- Being in a hurry all the time
- Being indecisive (unable to make a choice)
- Having no confidence
- Over-reacting to things
- Feeling really tired
- Feeling confused
- Making more mistakes than usual
- Always putting things off
- Fearing that the worst is going to happen
- Worrying instead of trying to solve problems
- Becoming hard-headed and controlling



Stress Effects Indicator

Body

[Back](#)

- Muscle pains
- Headaches
- Aching neck, shoulders and back
- Stomach pains
- Feeling sick
- Choking feeling in throat
- Twitch in eye or lips
- Shakiness
- Clenched teeth or fists
- Faster heartbeat than usual
- Sweaty palms
- Dry mouth
- Frequent urination
- Feeling dizzy
- Irregular breathing
- Diarrhoea or constipation
- Allergies, asthma or skin problems becoming worse



Stress Effects Indicator

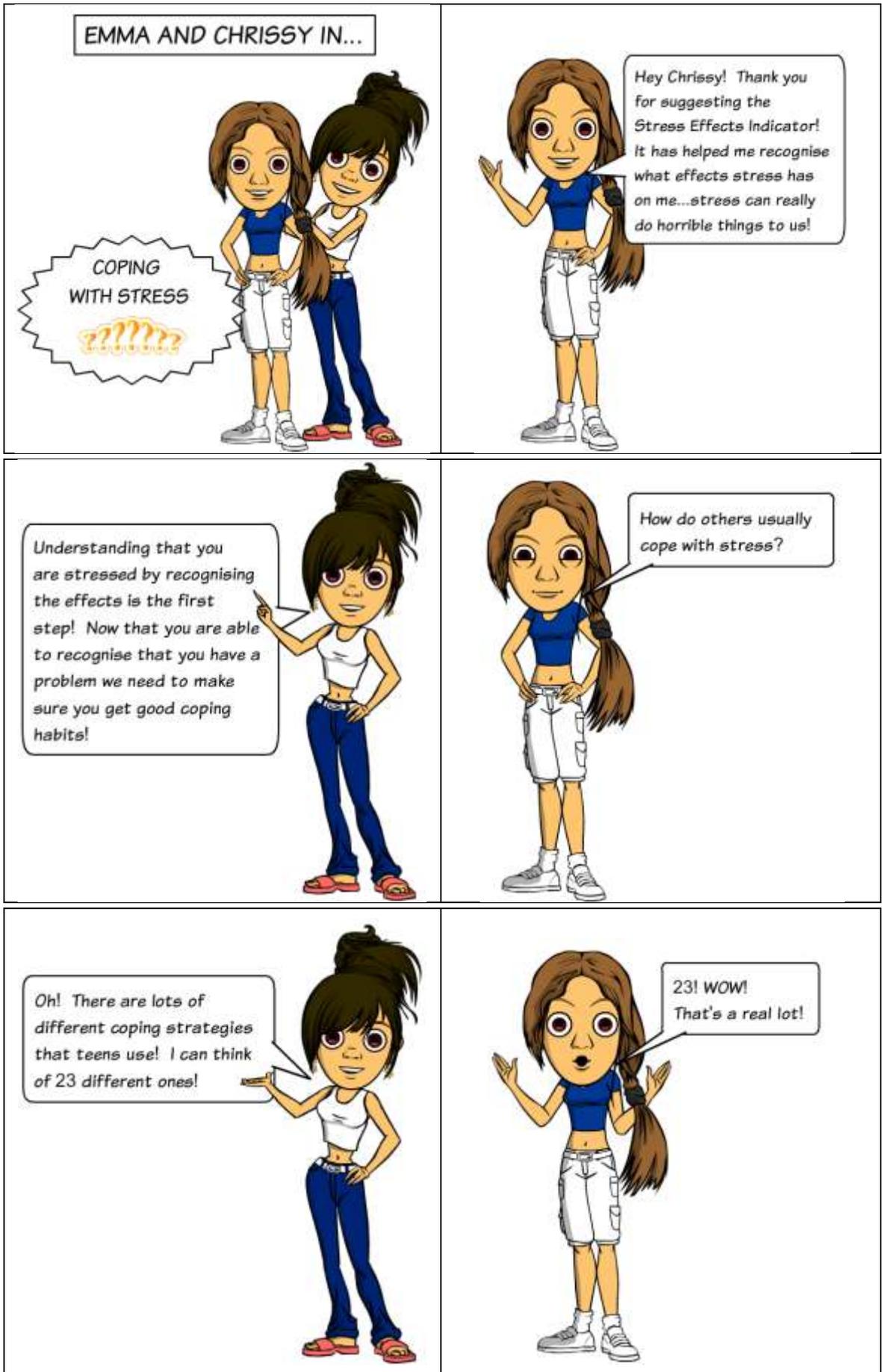
Feelings

[Back](#)

- Easily upset
- Aggressive
- Withdrawn
- Moody
- Guilty
- Anxious or feelings of panic
- Depressed
- Oversensitive to criticism
- Edgy
- Angry
- Hopeless
- Worried
- Miserable
- Feel like crying



Part 2 - Emma and Chrissy in...Coping with Stress



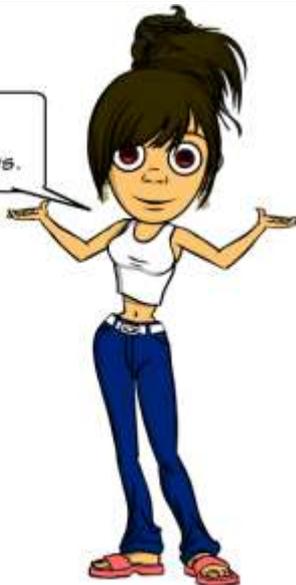
Yes, but not all 23 coping strategies help you solve your problems! Take 'worrying' for instance... if you choose to try to cope by worrying, it won't solve your problem and you'll still feel stressed!



Right! So are there different kinds of coping strategies?



Exactly! ...and we all cope in different ways.



The 23 coping strategies can be divided into 3 different styles of coping. These are 'Productive Coping', 'Non-Productive Coping', and 'Reference to Others'.

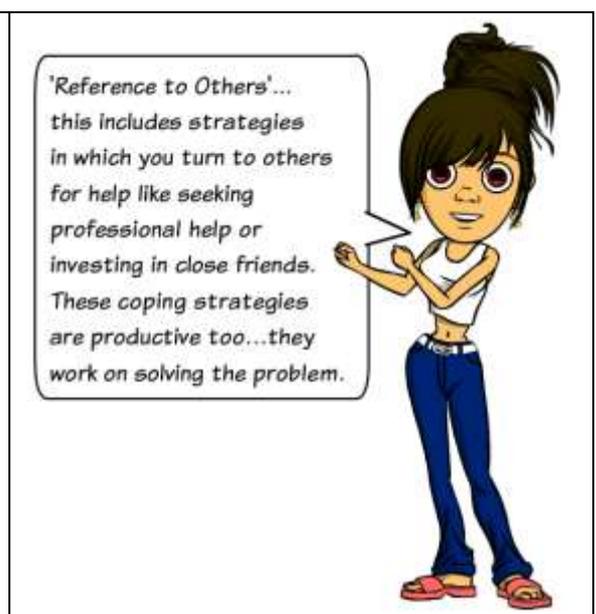
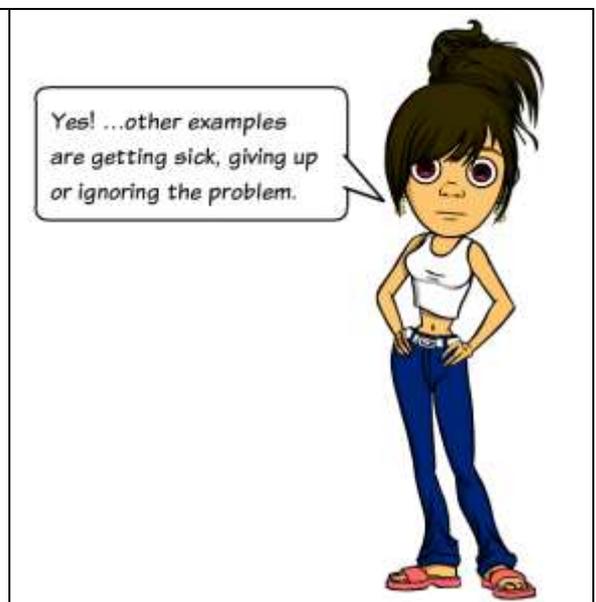


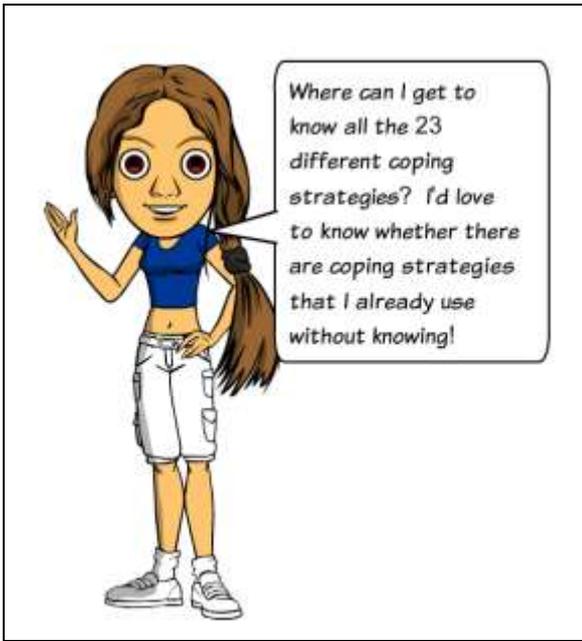
Big words, Chrissy! Please explain!



Hehe! Yes, but quite straightforward really! 'Productive Coping' refers to strategies that work on solving the problem. They are generally the kind of coping strategy that allows you to remain optimistic, fit, relaxed and socially connected such as focusing on solving the problem, relaxing, and playing sport.









The 23 Coping Skills (divided into PRODUCTIVE, NON-PRODUCTIVE & REFERENCE TO OTHERS) which need to be sorted in this activity are:

PRODUCTIVE COPING (Solving the Problem)

- Focus on solving the problem - Tackling the problem by learning about it and taking into account different points of view or options
- Work hard and achieve - Applying yourself and putting in all your efforts to succeed
- Focus on the positive - Having a cheerful or positive outlook about the situation
- Seek relaxing diversions - Doing things to relax (other than sport), such as reading, painting or listening to music
- Physical recreation - Playing sport, keeping fit
- Accept best efforts - Accept how things are because I have done my best

NON-PRODUCTIVE COPING

- Not coping - Not doing anything that helps deal with the problem
- Worry - Being concerned about the future
- Ignore the problem - Trying to block out the problem
- Wishful thinking - Hoping that things will turn out well
- Tension reduction - Trying to make yourself feel better by doing something to release tension, such as eating or drinking too much

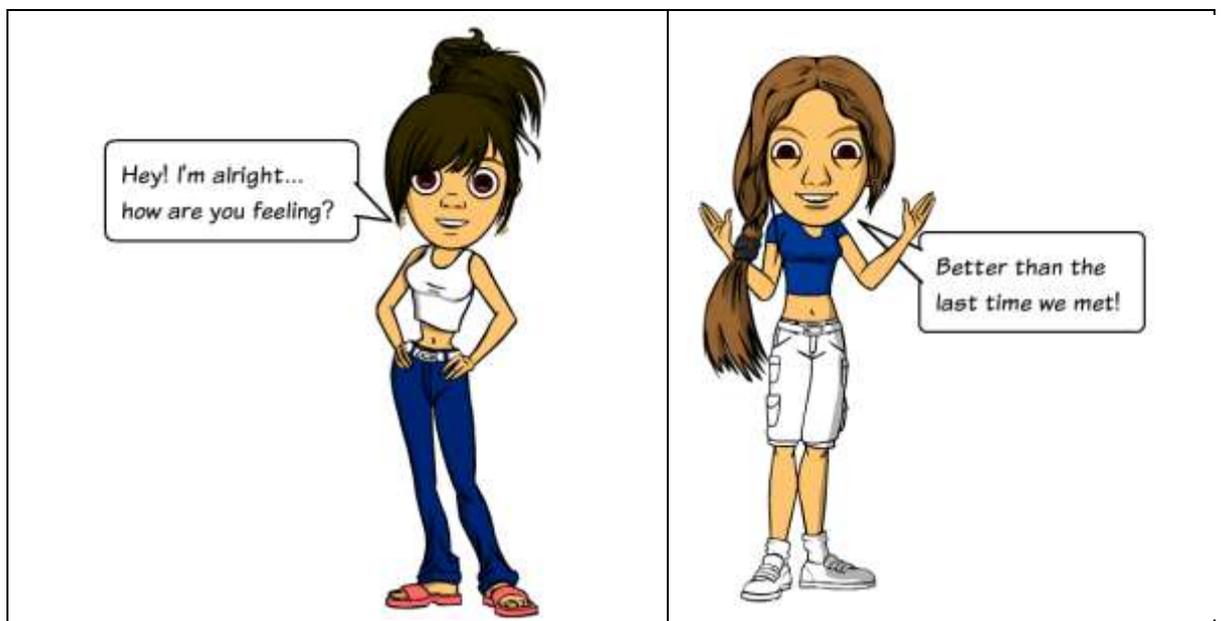
- Self-blame - When you see yourself as responsible for the problem or worry
- Getting sick - I just get sick
- Giving up - I just give up
- Keep to self - Withdrawing from others and trying to keep them from knowing about your concerns
- Acting up - Act up and make life difficult for those around me

REFERENCE TO OTHERS

- Invest in close friends - Relying on a close friend or relationship
- Seek social support - Sharing your problem with relatives or friends so that they can listen and /or help you deal with it
- Seek professional help - Going to a qualified person for help, like a teacher or counsellor
- Trying to be funny - Try to be funny
- Seek spiritual support - Praying and/or believing in assistance from God or a spiritual leader
- Seek to belong - Caring or being concerned about what others think
- Social action - Letting others know about the concern and getting support by writing petitions or organising a meeting

G.2 Module 2 - Coping

Part 1 - Emma and Chrissy in...Non-Productive Coping Strategies





Yes, we can all learn coping skills that are more helpful. I had a habit of worrying about each problem that cropped up.



So what did you do?



I learnt a few coping strategies. Now, when a problem crops up, I either try to solve it or speak to someone about it, and if there is nothing I can do, I try to take my mind off it by exercising, doing something I enjoy or relaxing.



Oh that sounds great! Do you think that there is anything I can do instead of blaming myself when things go wrong?



You really need to reflect back on what happened and check whether something was really your fault or whether you are just being unfair on yourself by thinking it was. If it was your fault, you'll gain nothing with self blame. You need to look ahead, learn from any mistakes you have made, and figure out how you'd do things differently next time.



You're right! It is a habit I need to break.



There are times, however, when a Non-Productive Strategy like ignoring the problem, needs to be used.



Really? How can something like ignoring the problem be of any use?



It depends on the situation. Ignoring the problem might be the best option when things cannot be changed, when something is not that important, or else, when we are challenged to a fight.



Oh, I see...Yes, I understand - some things are just not worth hassling about.



Exactly! It is good that you've realised that there are Non-Productive Coping Strategies that you use. What you need to do now is find suitable alternatives!



Activity 1 - Helpful or not?

← Helpful or not?

Scenario 1

Chrissy has been invited to audition for a leading role in a play. It is soon her turn on stage. She is really excited and is feeling her heart pounding in her chest.

Chrissy tries to reduce the tension by eating a chocolate bar and a packet of crisps.	Not Helpful	✓
Chrissy starts worrying that she is going to forget her lines. She thinks she is going to make a fool of herself.	Not Helpful	✓
Chrissy takes a seat and tries to relax by breathing deeply.	Helpful	✓
Chrissy phones her mum to ask for some encouragement.	Select	

← Helpful or not?

Select
Helpful
Not Helpful

← Helpful or not?

Scenario 2

Emma starts exams in one week's time. She has not started studying yet. She doesn't know what to do.

Emma starts worrying that she is going to fail all her exams. She cries herself to sleep.	Select	
Emma looks at her exam time table and prepares a study plan.	Select	
Emma gives up. She thinks that she should not even bother studying because she won't pass her exams anyway.	Select	
Emma doesn't know where to start from. She is feeling upset, so decides to go to a fast food outlet to eat a burger, chips and an ice-cream.	Select	

← Helpful or not?

Scenario 3

Sam is the captain of his school's football team. His team just lost an important match.

Sam blames himself for what happened. He thinks he should quit the football team.	Select	
Sam gets really upset and starts swearing at the referee as soon as the match ends.	Select	
Sam decides to invite his team mates to his house so that they can relax together and discuss what they could do to improve their skills.	Select	
Sam decides to have a long shower and spend some time with friends and maybe watch a movie.	Select	

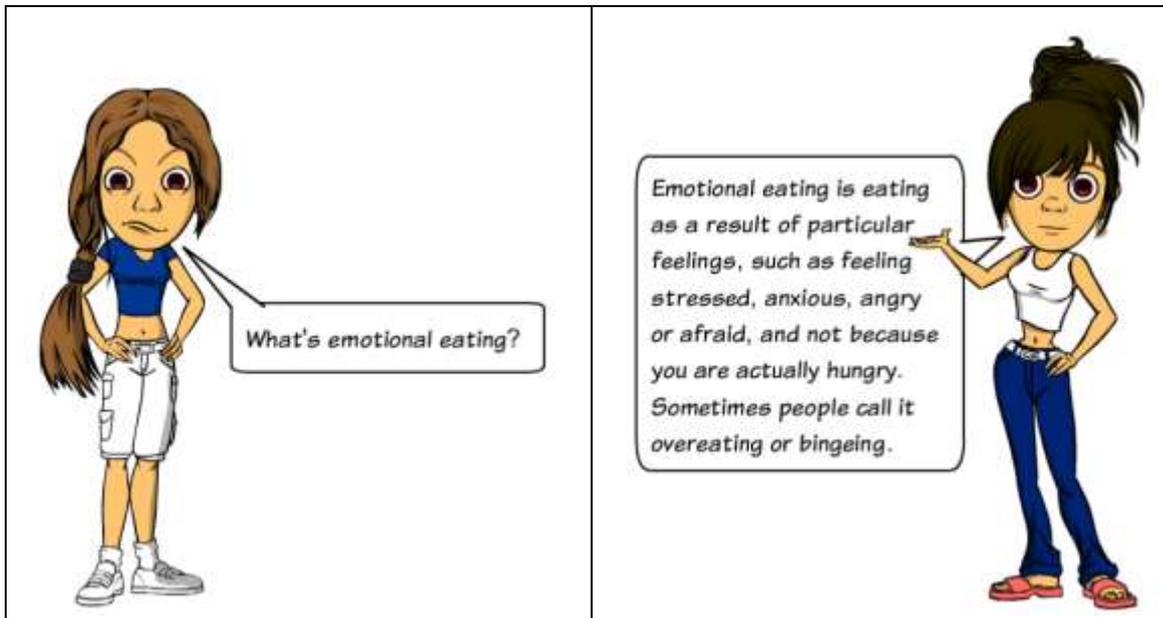
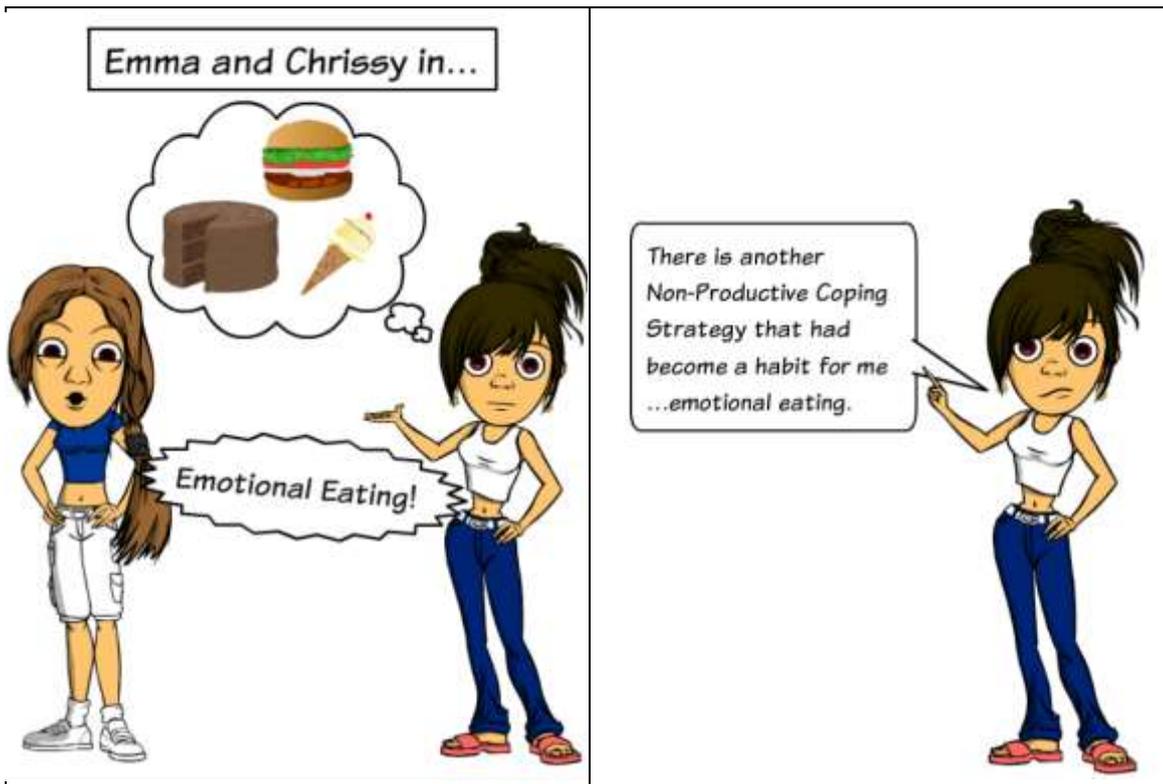
← Helpful or not?

Scenario 4

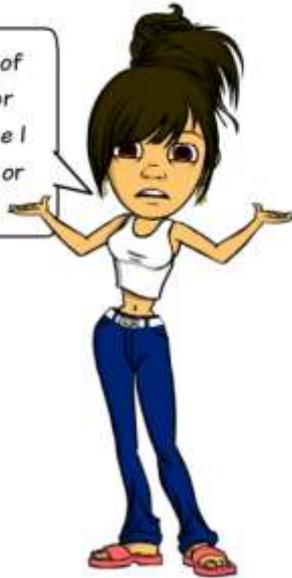
Alex caught someone in his class stealing from someone else's bag during break time. This guy threatened Alex and told him that he would beat Alex's sister up if he told anyone about what happened.

Alex decides that he should not tell anyone about what happened and about his concerns.	Select	
Alex feels very tense, cannot believe that someone is threatening his sister, and decides to try to reduce his tension by taking an alcoholic drink from his parents' drinks cabinet.	Select	
Alex explains the situation to his parents when he gets home. His parents phone the school to sort the matter out.	Select	
Alex walks out of the class, explains all that happened to his teacher, including the fact that this guy is threatening to hurt his sister. The teacher takes matters into his own hands.	Select	

Part 2 - Emma and Chrissy in...Emotional Eating!



I had a bad habit of turning to food for comfort every time I felt stressed out or had a problem.



Oh, I know what you mean! I do that too! When I feel stressed out I end up eating lots of chocolate and ice-cream...and sometimes I start craving "junk" food...burgers...chips...



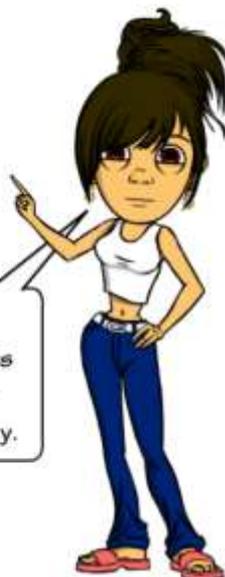
Yes, that is just what I used to do. I used to stuff my face, feel satisfied for a short time and then feel bad and guilty about all the rubbish I ate. Plus, emotional eating did not help with any of my problems – especially my stress levels.



And it can't possibly be good for our health...



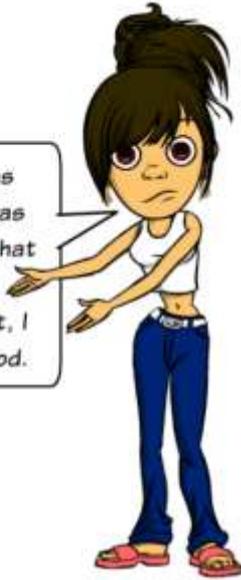
You're right...it isn't. In fact, if someone does it often, it can lead to weight gain and obesity.



Oh, that doesn't sound good at all! So how did you manage to break your habit? How did you stop overeating or bingeing because of your emotions?



The first step was realising what I was doing. I realised that every time I felt stressed or upset, I was turning to food.



But how did you stop?



Every time I felt stressed and felt the need to eat something, I stopped to think about why I was hungry. I needed to learn to distinguish between actual hunger and whether I wanted to eat because I was stressed out or in a particular mood, like angry, sad, worried, bored, anxious or lonely.



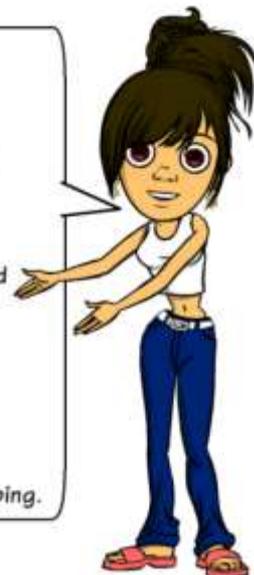
I asked myself about whether I had eaten enough that day or what time I had eaten last. You know, sometimes you feel hungry because it is close to lunch or dinner time or because you've been quite busy and active and need a snack. That's perfectly OK!



If, however, it didn't seem to be actual hunger and I was craving something specific like chocolate or junk food, I asked myself whether there was something stressing me out or whether I was in a particular negative mood such as anxious, worried, bored, lonely, disappointed, depressed, cross...

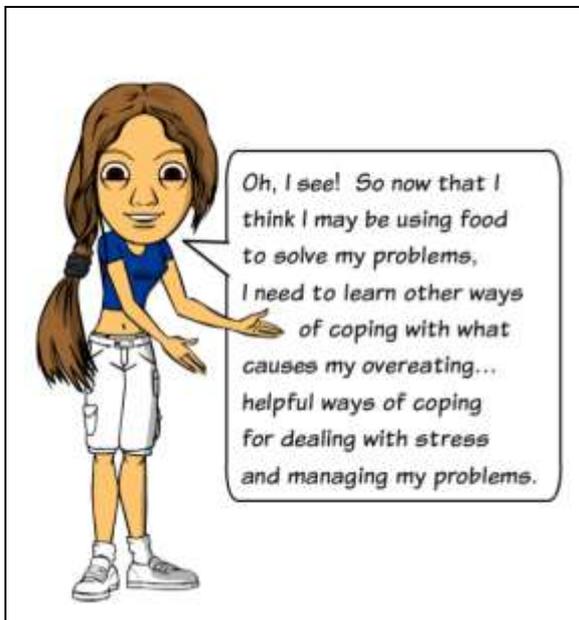


Once I managed to identify that stress or a particular mood was making me want to eat, I made an effort to find something else I could do to cope with my stress or negative emotions. I learnt alternatives to emotional eating... different ways of coping.





The ones that worked best for me were learning how to solve problems instead of hoping eating would make them go away, seeking support, such as talking to others, physical exercise, relaxation, and doing something I enjoyed like drawing or dancing.



Exactly...and until you learn how to problem-solve and how to ask others for help, you can try doing something that relaxes you like having a long bath, getting physically active, or doing something you really enjoy like dancing, watching your favourite TV series, or reading a book each time you realise you are going to eat food for comfort.



Activity 2 - To eat or not to eat?

 To eat or not to eat?

Scenario 1

Emma has too much to do and just wants to eat ice cream because she thinks it will make her feel better. What should she do? Tick all the ones that apply

Go ahead and eat ice cream	<input type="checkbox"/>
Make a plan about how she'll manage her work instead of eating ice cream	<input checked="" type="checkbox"/>
Take a few deep breaths to relax before she starts working instead of eating ice cream	<input checked="" type="checkbox"/>
Ask someone she trusts to help her with her work instead of eating ice cream	<input checked="" type="checkbox"/>

Next Scenario

 To eat or not to eat?

 To eat or not to eat?

Scenario 1

Emma has too much to do and just wants to eat ice cream because she thinks it will make her feel better. What should she do? Tick all the ones that apply

Go ahead and eat ice cream	<input type="checkbox"/>
Make a plan about how she'll manage her work instead of eating ice cream	<input checked="" type="checkbox"/>
Take a few deep breaths to relax before she starts working instead of eating ice cream	<input checked="" type="checkbox"/>
Ask someone she trusts to help her with her work instead of eating ice cream	<input checked="" type="checkbox"/>

Next Scenario

 To eat or not to eat?

 To eat or not to eat?

Scenario 3

Sam just came back home from football training. He feels really hungry. He opens his fridge and spots a nice plate of pasta. What should he do? Tick all the ones that apply.

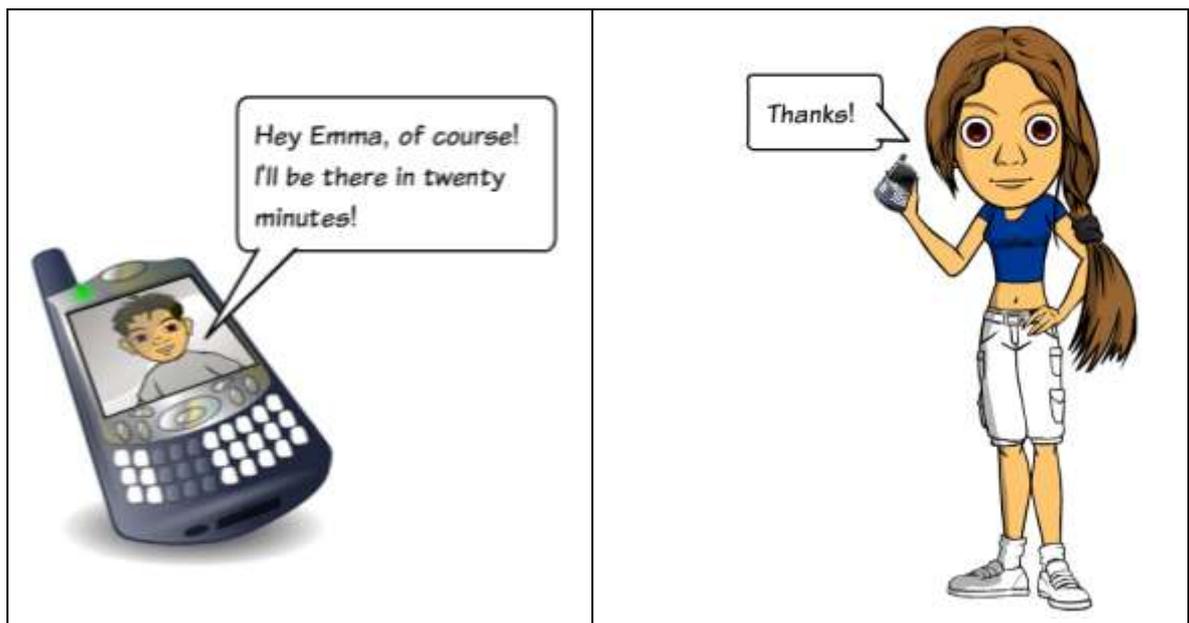
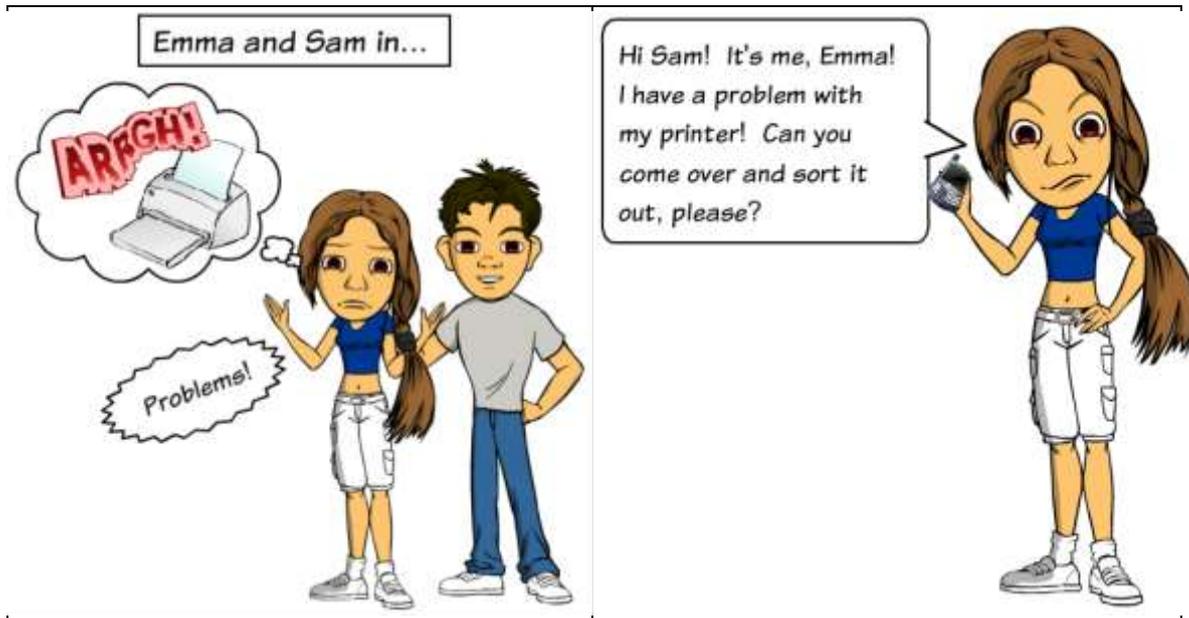
Go out for a jog instead of eating the pasta	<input type="checkbox"/>
Take a long shower to relax instead of eating the pasta	<input type="checkbox"/>
Watch a movie instead of eating the pasta	<input type="checkbox"/>
Go ahead and eat the pasta because he is really hungry and this is not a case of emotional eating.	<input type="checkbox"/>

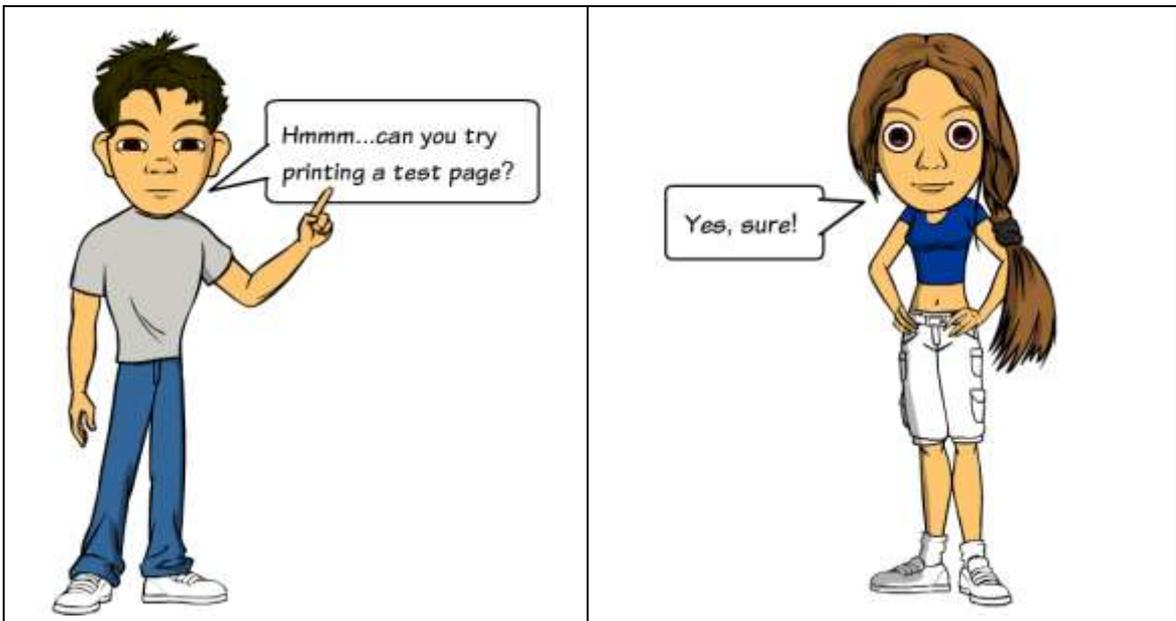
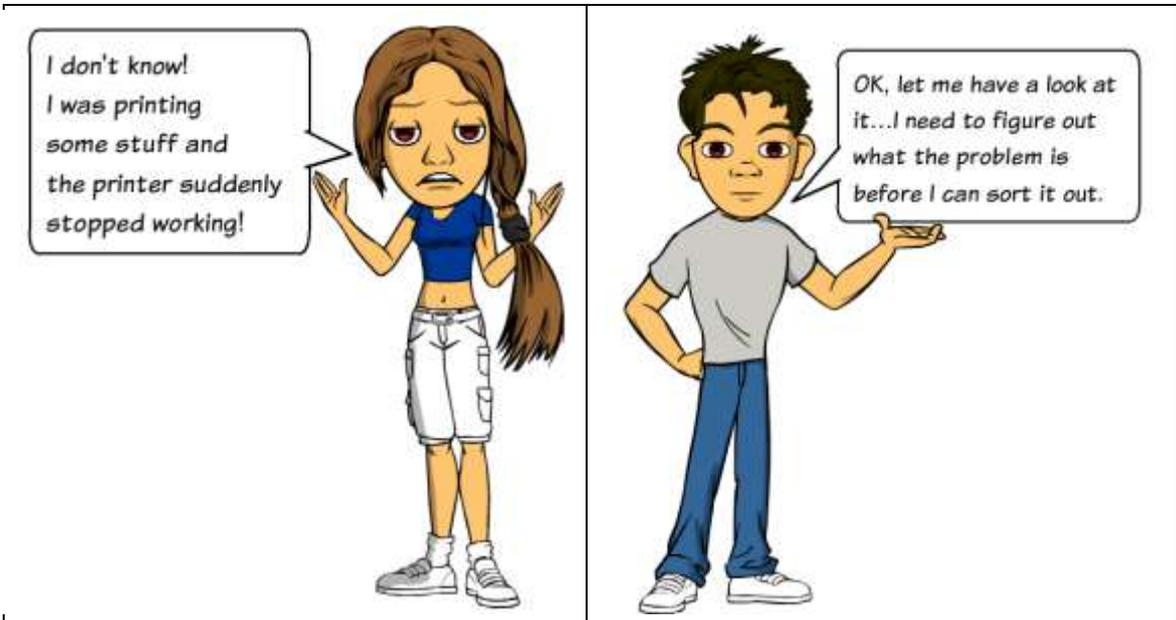
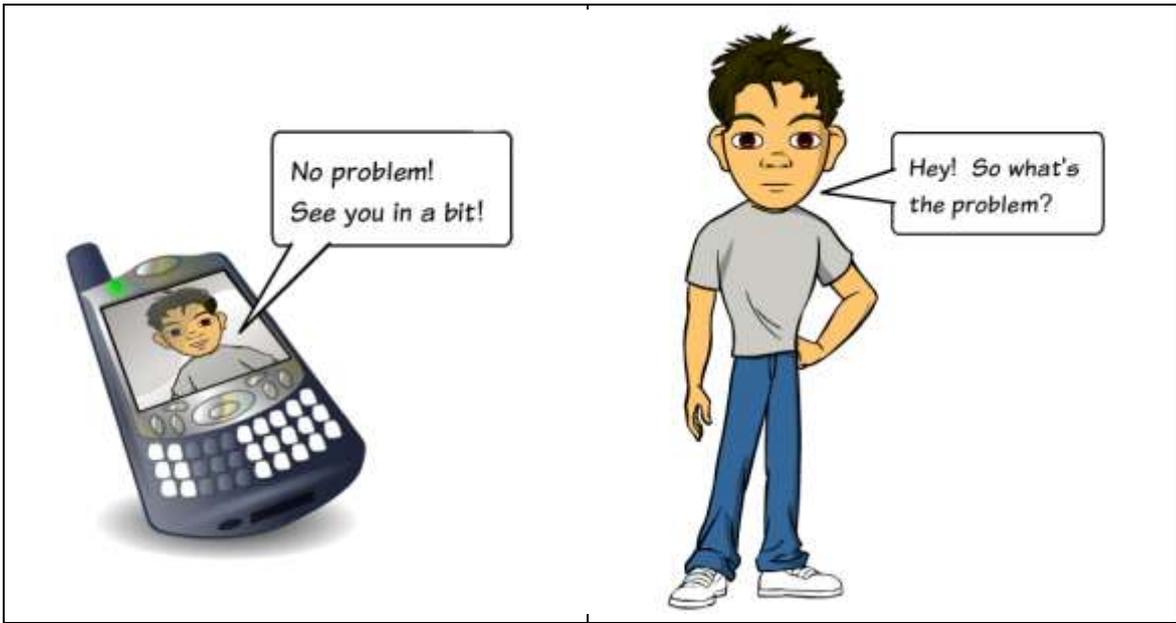
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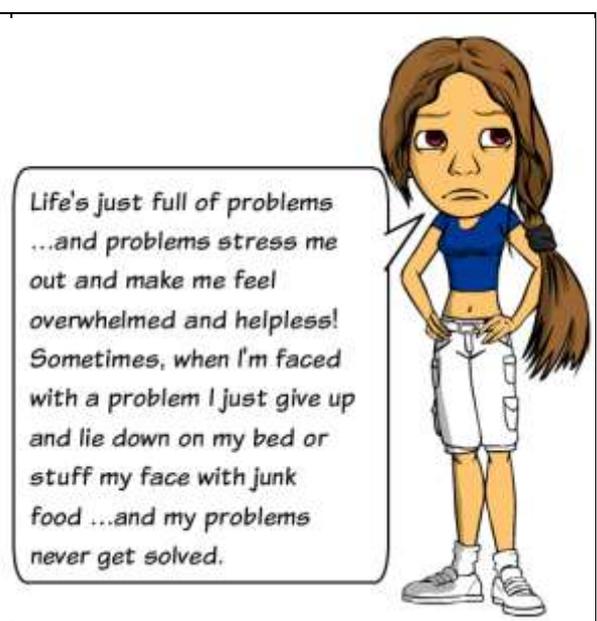
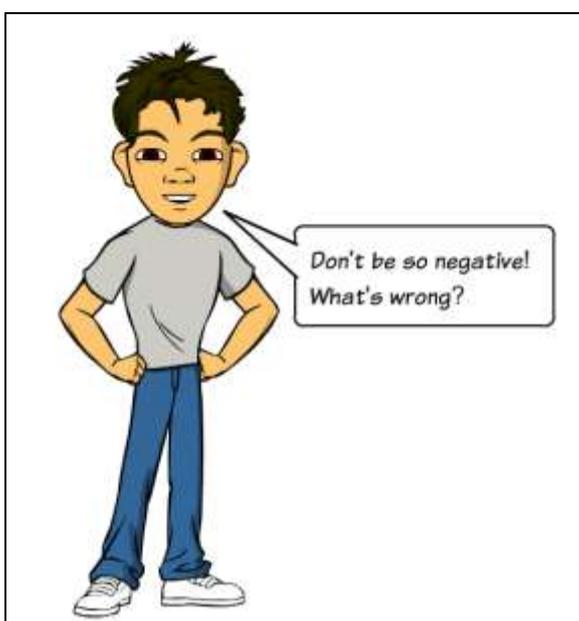
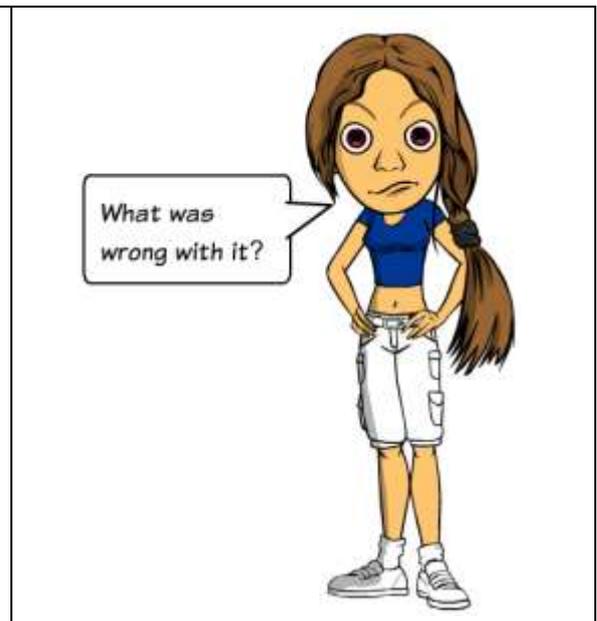
 To eat or not to eat?

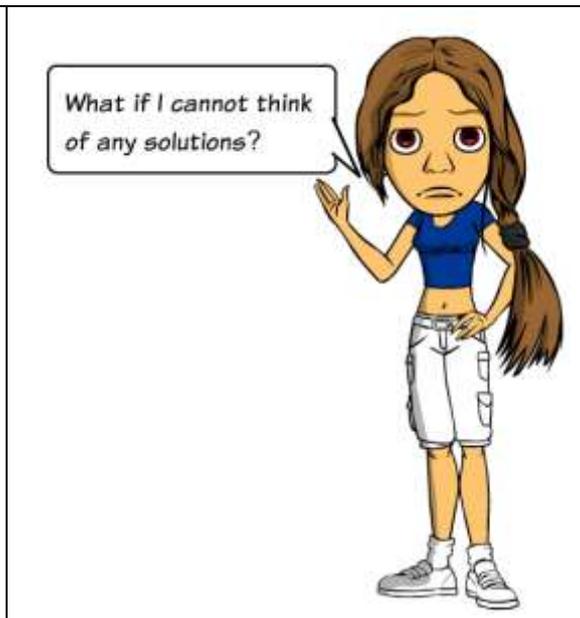
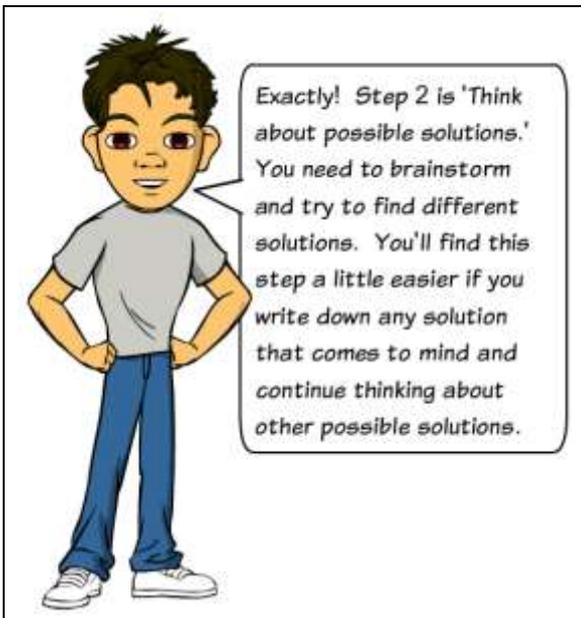
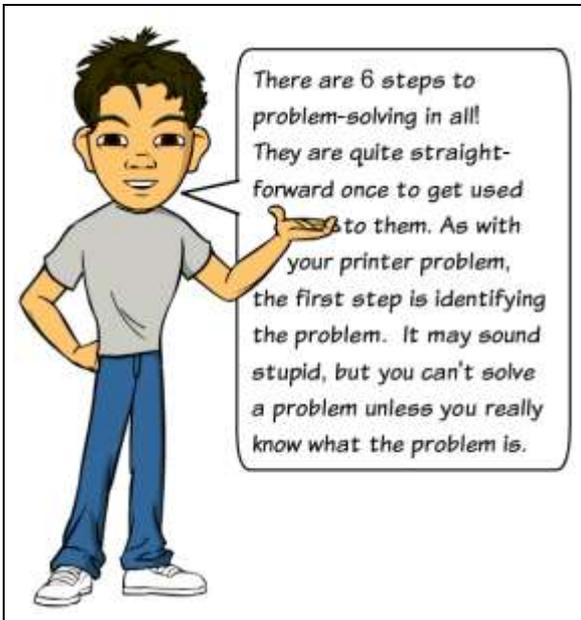
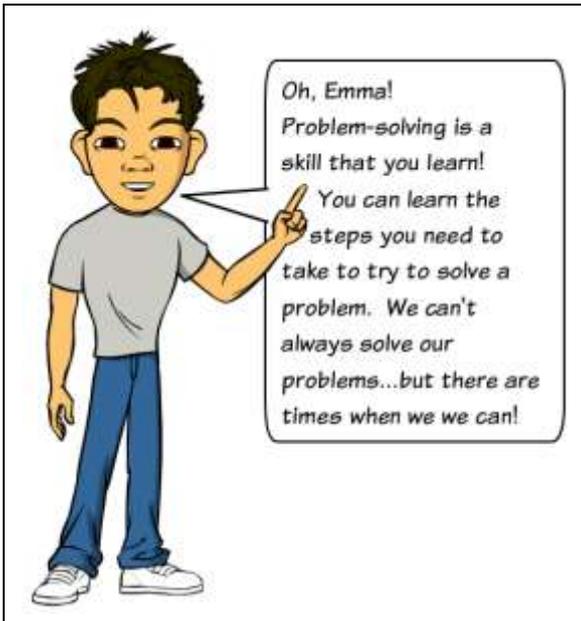
G.3 Module 3 - Problem-Solving

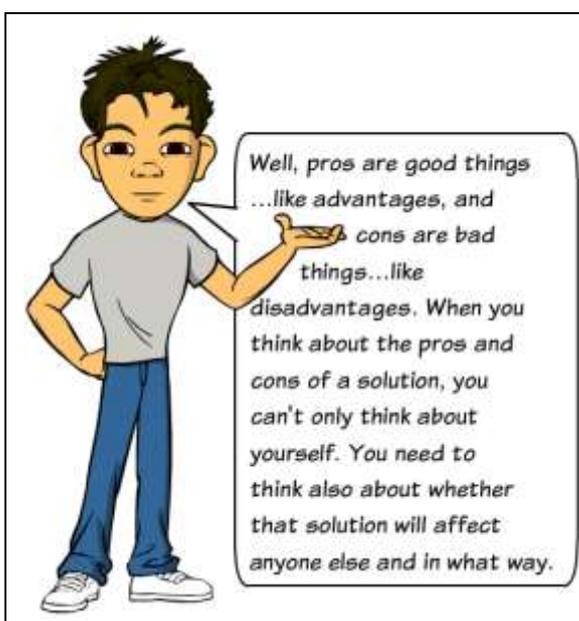
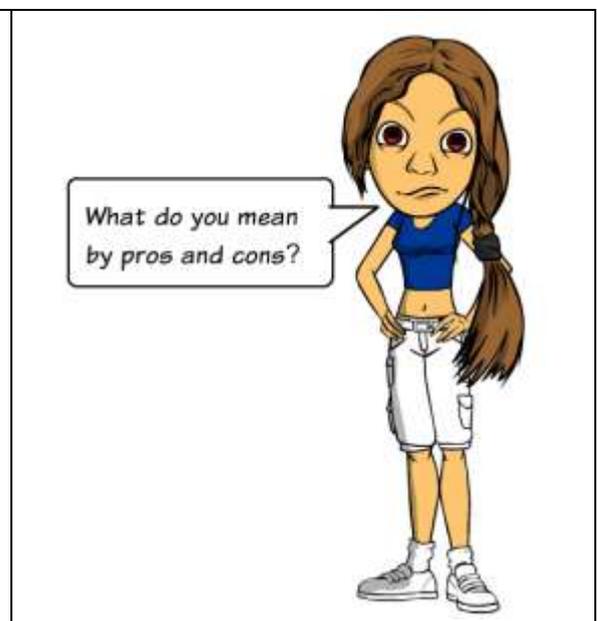
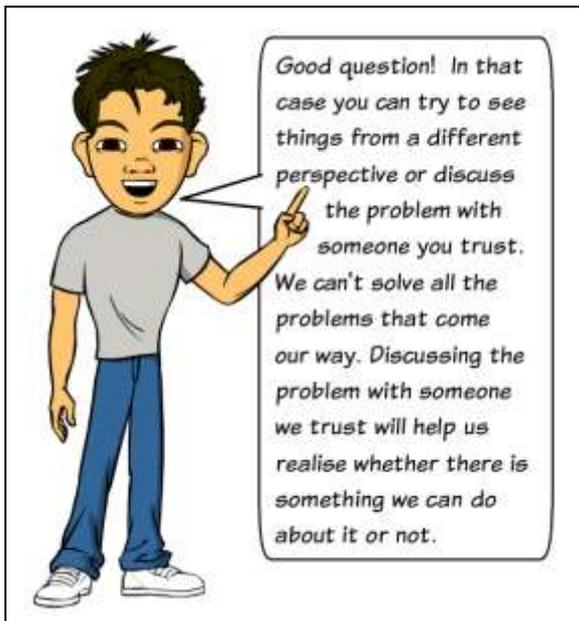
Part 1 - Emma and Sam in...Problems!

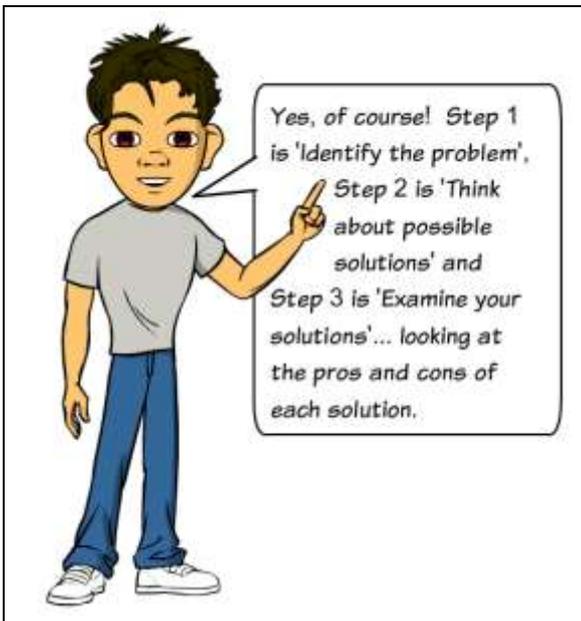
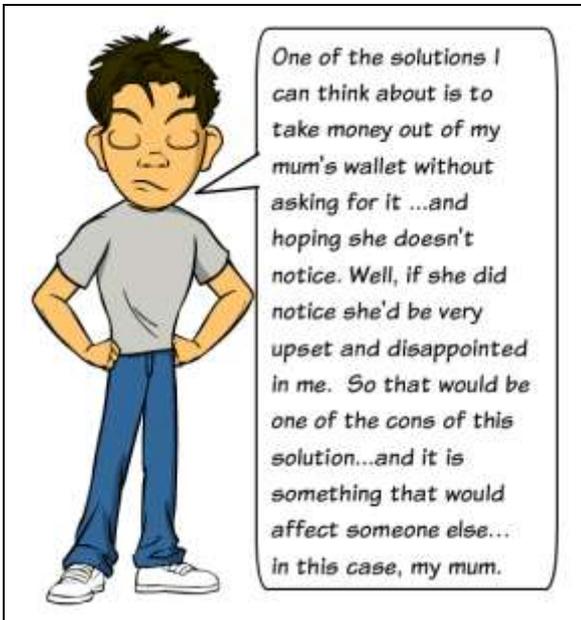
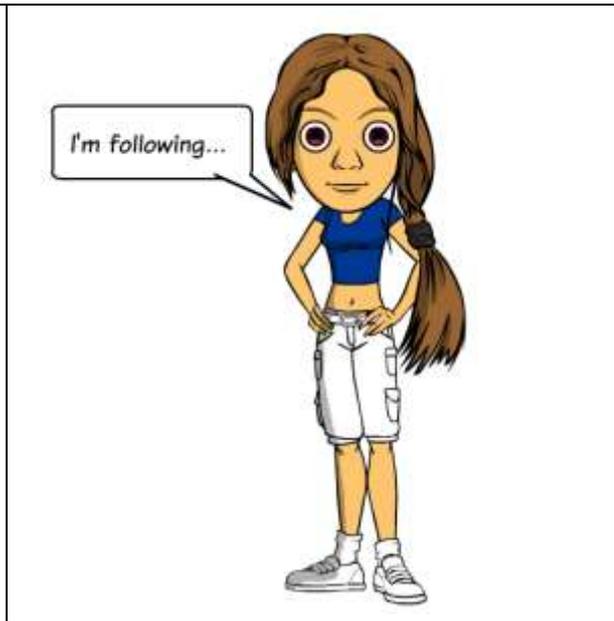












Activity 1 - Emma has a problem - Part 1

Emma has a problem - Part 1

I have a problem, what would you do?

Get stressed out and eat something to make me feel better.

Try to solve the problem.

Emma has a problem - Part 1

Emma has a problem - Part 1

I feel awful now! I feel so bad for stuffing my face with junk food again! ...AND I still have a problem!

Go Back.

Emma has a problem - Part 1

Emma has a problem - Part 1

OK! I want to try to solve the problem! What should I do first?

Think about possible solutions.

Identify the problem.

Emma has a problem - Part 1

Emma has a problem - Part 1

Great! ...OK so I need an answer to the question "What is the problem?"

It is Saturday evening and my best friend, Chrissy, has invited me to spend a day by the pool on Sunday. All my friends are going but my parents won't let me go because I still have to finish my Maths homework and write an English essay for Monday. I really want to go!
What should I do now?

Think about possible solutions.

Examine your solutions.

Emma has a problem - Part 1

Emma has a problem - Part 1

Hmmm, I need to find a way to go to the pool with my friends. Let me see, I could:

- Lie to my parents, tell them my homework is ready and go to the pool
- Turn the stereo in my room on, lock my room and sneak out of the house without doing my homework and go to the pool... I will be back before my parents realise
- Decide to finish my Maths homework before going to bed and set the alarm for Sunday morning so that I can wake up, write my English essay and meet the others as soon as I'm ready.
- Argue with my parents about how they always interfere and spoil the fun. I will insist that I have to go to the pool.

What do I do know?

Examine your solutions

Give up! There is nothing you can really do!

Emma has a problem - Part 1

Emma has a problem - Part 1

If I give up my problem won't get solved and I will still feel stressed and upset!

Go Back.

Emma has a problem - Part 1

Emma has a problem - Part 1

OK, let's have a look at the solutions I came up with. I need to stop and think what the pros and cons of each one are. Help me decide between pros (advantages) and cons (disadvantages)!

Lie to my parents, tell them my homework is ready and go to the pool:

I will go to the pool	Pro	✓
My homework won't be done	Con	✓
My parents will be hurt if they get to know I lied	Con	✓
I don't like lying to my parents	Select	

Emma has a problem - Part 1

OK, let's have a look at the solutions I came up with. I need to stop and think what the pros and cons of each one are. Help me decide between pros (advantages) and cons (disadvantages)!

Turn the stereo in my room on, lock my room and sneak out of the house without doing my homework and go to the pool...I will be back before my parents realise:

I will go to the pool	Select	
My homework won't be done	Select	
My parents will be hurt if they get to know I lied	Select	
I don't like lying to my parents	Select	
I don't think I'll be able to enjoy myself at the pool because I will be thinking about whether I'll get caught when I try to get back in the house	Select	

Emma has a problem - Part 1



Emma has a problem - Part 1

OK, let's have a look at the solutions I came up with. I need to stop and think what the pros and cons of each one are. Help me decide between pros (advantages) and cons (disadvantages)!

Decide to finish my Maths homework before going to bed and set the alarm for Sunday morning so that I can wake up, write my English essay and meet the others as soon as I'm ready:

I will go to the pool

Select ▾

My homework will be done

Select ▾

My parents will be happy about letting me go to the pool since my work is done

Select ▾

I will have to wake up early on a Sunday

Select ▾

I might get to the pool a bit after my friends and miss some of the fun

Select ▾



Emma has a problem - Part 1

OK, let's have a look at the solutions I came up with. I need to stop and think what the pros and cons of each one are. Help me decide between pros (advantages) and cons (disadvantages)!

Argue with my parents about how they always interfere and spoil the fun. I will insist that I have to go to the pool:

I will go to the pool only if I win the argument

Select ▾

My homework won't be done

Select ▾

My parents might get upset with what I tell them

Select ▾



Emma has a problem - Part 1

OK, let's have a look at the solutions I came up with. I need to stop and think what the pros and cons of each one are. Help me decide between pros (advantages) and cons (disadvantages)!

Lie to my parents, tell them my homework is ready and go to the pool

- Pros: 1 - I will go to the pool
- Cons: 3 - My homework won't be done; My parents will be hurt if they get to know I lied; I don't like lying to my parents

Turn the stereo in my room on, lock my room and sneak out of the house without doing my homework and go to the pool...I will be back before my parents realise

- Pros: 1 - I will go to the pool
- Cons: 4 - My homework won't be done; My parents will be hurt if they get to know; I don't like lying to my parents; I don't think I'll be able to enjoy myself at the pool because I will be thinking about whether I'll get caught when I try to get back in the house

Decide to finish my Maths homework before going to bed and set the alarm for Sunday morning so that I can wake up, write my English essay and meet the others as soon as I'm ready.

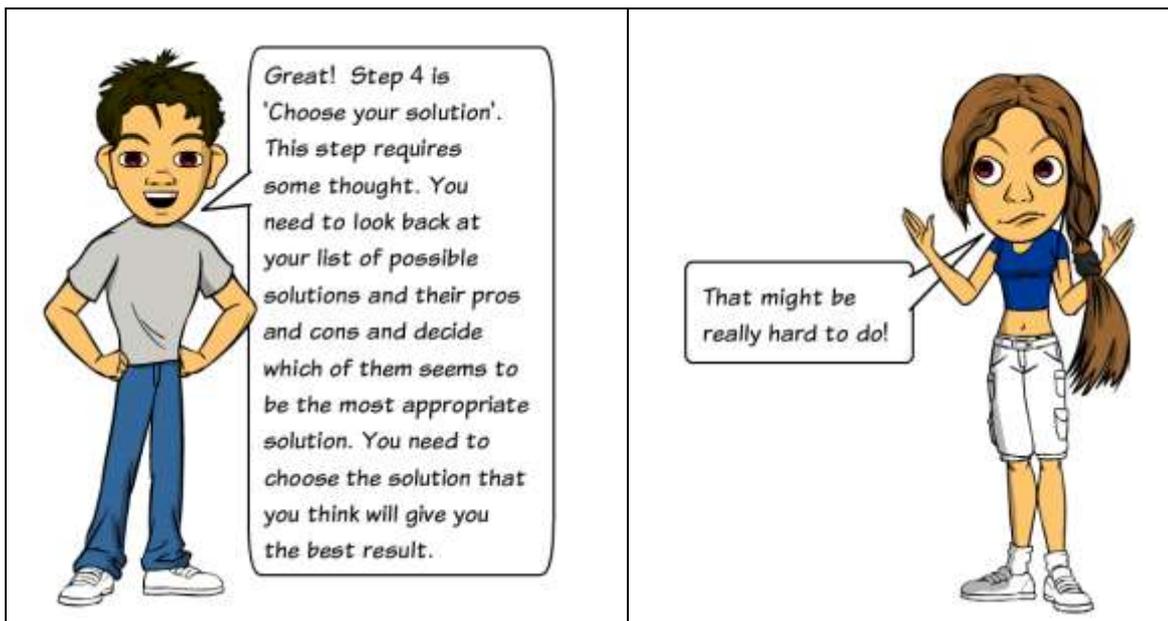
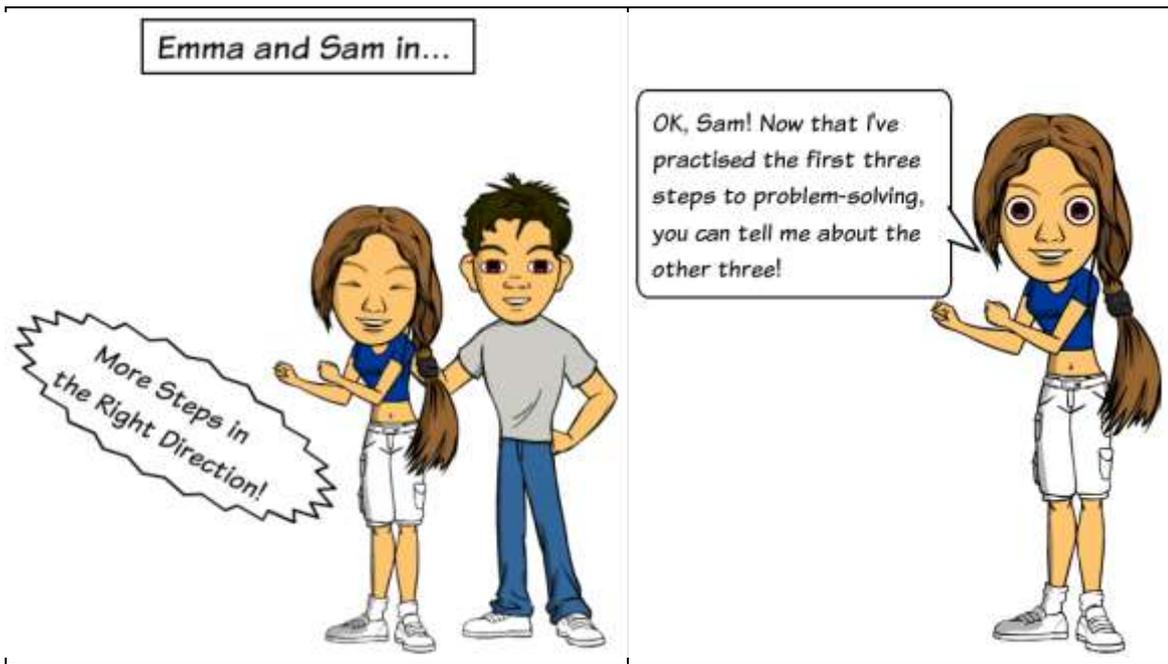
- Pros: 3 - I will go to the pool; My homework will be done; My parents will be happy about letting me go to the pool since my work is done
- Cons: 2 - I will have to wake up early on a Sunday; I might get to the pool a bit after my friends and miss some of the fun

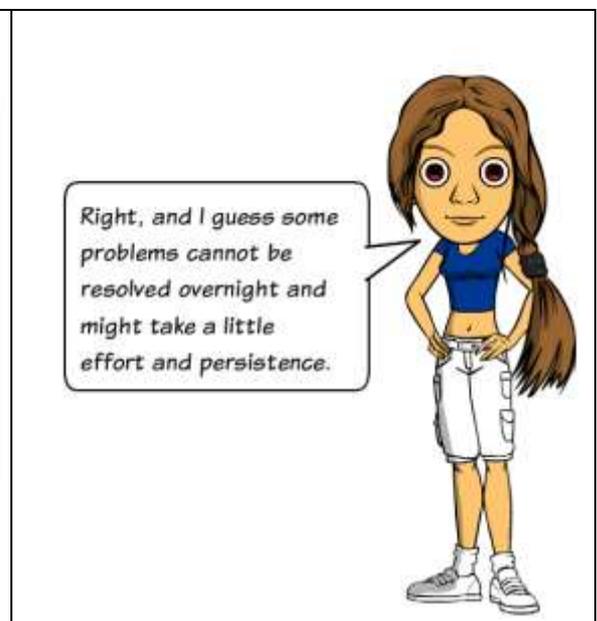
Argue with my parents about how they always interfere and spoil the fun. I will insist that I have to go to the pool.

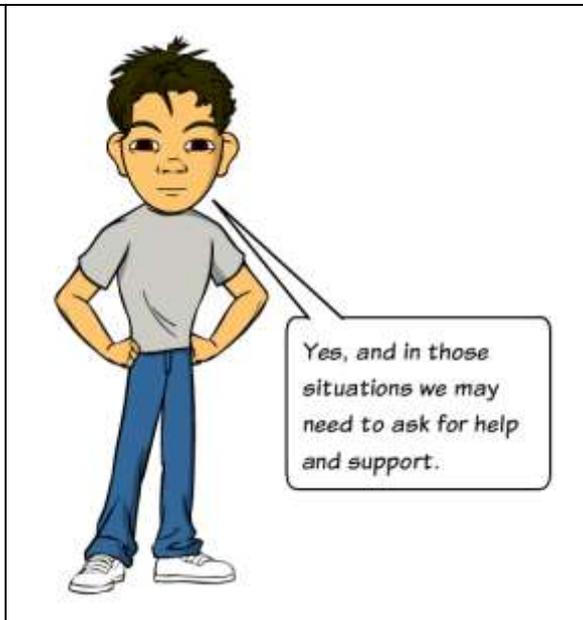
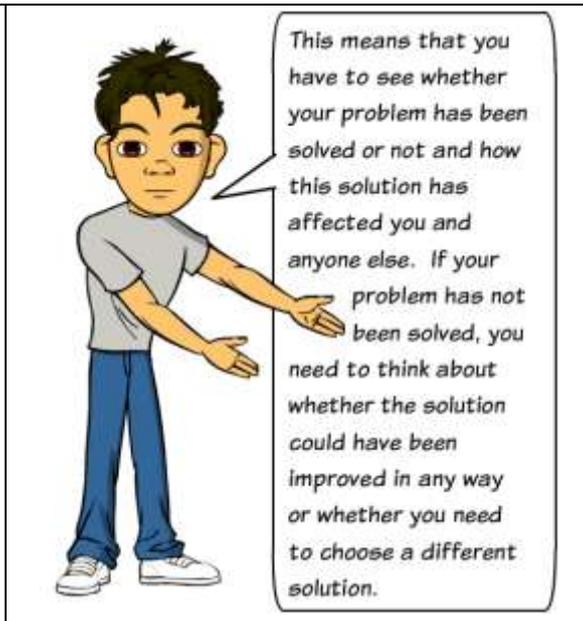
- Pros: 0
- Cons: 3 - I will go to the pool only if I win the argument; My homework won't be done; My parents might get upset with what I tell them

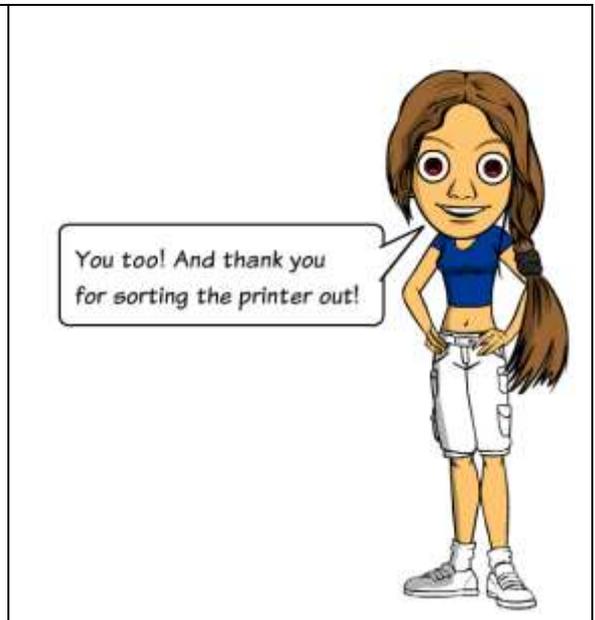
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Part 2 - Emma and Sam in...More Steps in the Right Direction!









Activity 2 - Emma has a problem - Part 2

So far I have identified my problem, thought about possible solutions and examined my solutions. I now need to choose a solution! Which one would you choose?

Lie to my parents, tell them my homework is ready and go to the pool (Pros: 1, Cons: 3)

Turn the stereo in my room on, lock my room and sneak out of the house without doing my homework and go to the pool... I will be back before my parents realise (Pros: 1, Cons: 4)

Decide to finish my Maths homework before going to bed and set the alarm for Sunday morning so that I can wake up, write my English essay and meet the others as soon as I'm ready. (Pros: 3, Cons: 4)

Argue with my parents about how they always interfere and spoil the fun. I will insist that I have to go to the pool. (Pros: 0, Cons: 3)

Choose

I tried this solution: 'Lie to my parents, tell them my homework is ready and go to the pool'

Let's check the outcome: I didn't really enjoy myself at the pool because I felt bad for lying to my parents. The next day I had no Maths and English homework to hand in. I was given an 'after school' because it wasn't the first homework I had missed in the last few weeks. When my parents got to know they got really upset and said that I had disappointed them and that they couldn't really trust me now. They said that I was grounded for a month. I am really upset and I feel really stressed out. I don't think this was the right solution to my problem.

Click Back to choose another solution.

Back

I tried this solution: 'Turn the stereo in my room on, lock my room and sneak out of the house without doing my homework and go to the pool... I will be back before my parents realise'

Let's check the outcome: While I was at the pool I kept worrying about whether my parents had already found out I wasn't in my room and whether they would catch me as I try to sneak back into the house. When I got back home I tried to be as quiet as possible but my dad caught me. My parents were really angry. I had never seen them so upset. I couldn't stop myself from crying. My parents said I was grounded for a month and that my camping trip was cancelled. It was too late for me to do my homework so I got in trouble at school too. I was given an 'after school' because it wasn't the first homework I had missed in the last few weeks. I feel so miserable and I have never felt so stressed out. Sneaking out of the house was definitely not the right solution to my problem. It just made things worse!

Click Back to choose another solution.

Back

I tried this solution: 'Decide to finish my Maths homework before going to bed and set the alarm for Sunday morning so that I can wake up, write my English essay and meet the others as soon as I'm ready.'

Let's check the outcome: I worked hard on Saturday night to finish my Maths homework. Before I went to bed I checked the title of my English essay so that I could start thinking about it in bed before going to sleep. As soon as the alarm rang on Sunday morning I got out of bed and had a shower. I had breakfast and then got to work on my essay. I pretended I was writing an essay during an exam and had to finish the essay within an hour. I set a timer and focussed really hard to get it done. As soon as I finished it, I showed my parents my work and asked whether they could give me a lift to the pool so that I could get there as quickly as possible. My dad said he was proud of me for working hard and took me to the pool. I actually arrived before some of my friends so I hadn't missed much! I had so much fun and I could relax as I knew I had no stuff to do once I got home. This was a fantastic solution to my problem.

Well done for choosing the best solution! Click Back if you want to see the outcome of another solution.

Back

I tried this solution: 'Argue with my parents about how they always interfere and spoil the fun. I will insist that I have to go to the pool.'

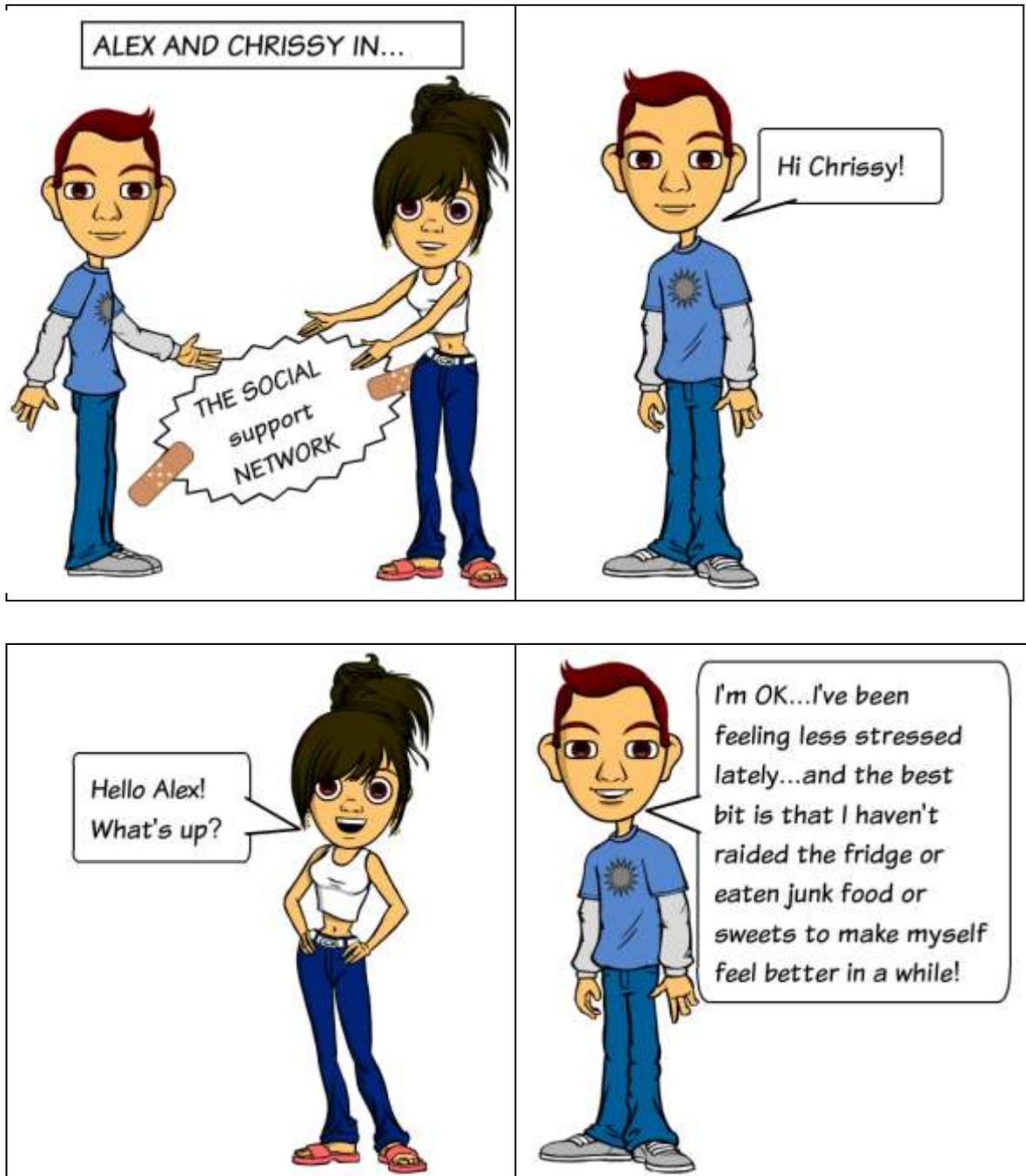
Let's check the outcome: I told my parents that they always try to make my life miserable by interfering and spoiling the fun. I told them that I didn't care about not finishing my homework and that I was going to the pool whether they liked it or not. My parents got really angry and said they were very disappointed in me for speaking to them that way. They said that I had to go to my room and work and that they would not let me go to the pool even if I finished my work early. They also said that I was grounded for a month. This solution only made my problem worse and now I am even more stressed out and all I want to do is cry.

Click Back to choose another solution.

Back

G.4 Module 4 - Social Support

Part 1 - Alex and Chrissy in...The Social Support Network



I'm really happy for you! I'm so pleased that you're finding better ways to cope! One of my favourite ways of coping with stress is asking for help...seeking social support!



Hehe! I like that saying...but sharing one's problems and asking for help isn't always easy!



I agree...but keep in mind that it is much easier to solve our problems with the help of someone we trust rather than struggling alone... so taking that hard first step to ask for help really pays off!



My philosophy is that 'a problem shared is a problem halved!'

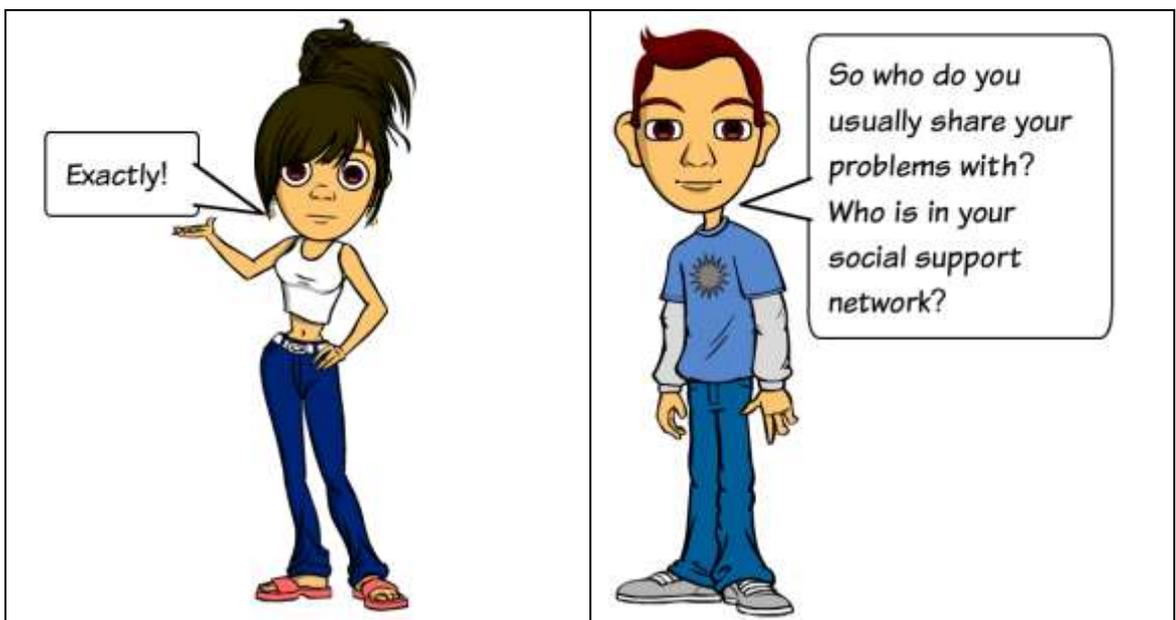
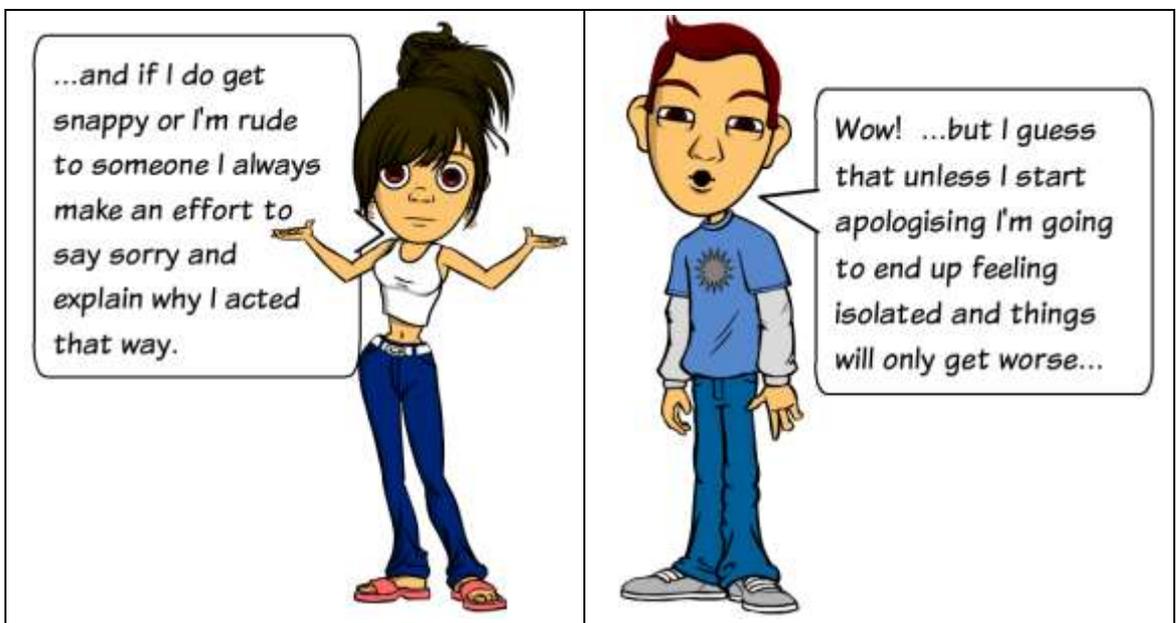
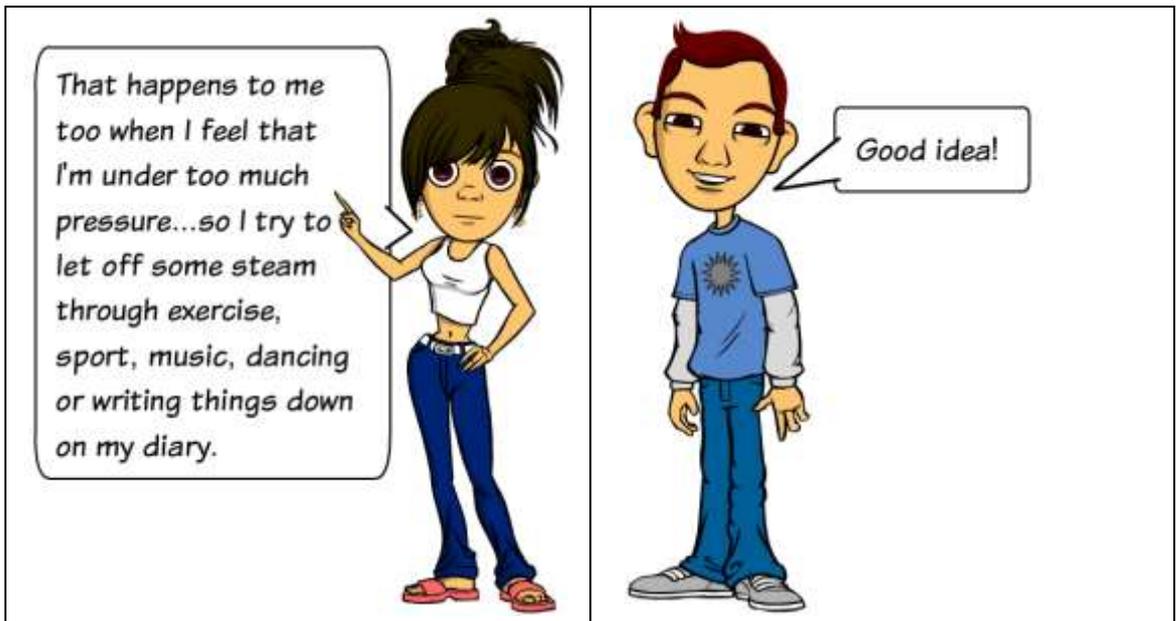


Plus, we can't expect other people to guess that we need help... we need to be active and ask for help when we need it...we need to reach out!

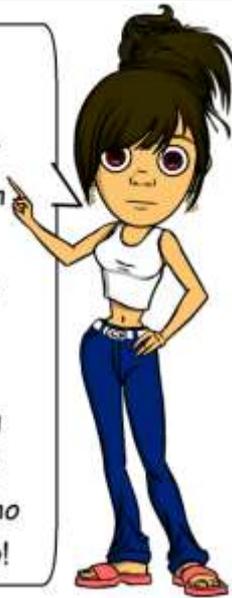


My problem is that when I feel stressed I tend to be a bit aggressive...I end up taking it out on the people closest to me! ...so I doubt that anyone would want to help me...





It depends on the problem...sometimes I speak to my mum or dad, sometimes I turn to my elder sister, sometimes I go to my grandmother...and sometimes I prefer discussing something with my friends. You should think about who you could ask for help!



Yes, I need to figure out my own social support network! ...But what if it's something too embarrassing or something I just don't want to share with family or friends?



In those situations I usually speak to my school counsellor. She's always really helpful!!



Do you think that speaking to my school counsellor would be my only option?



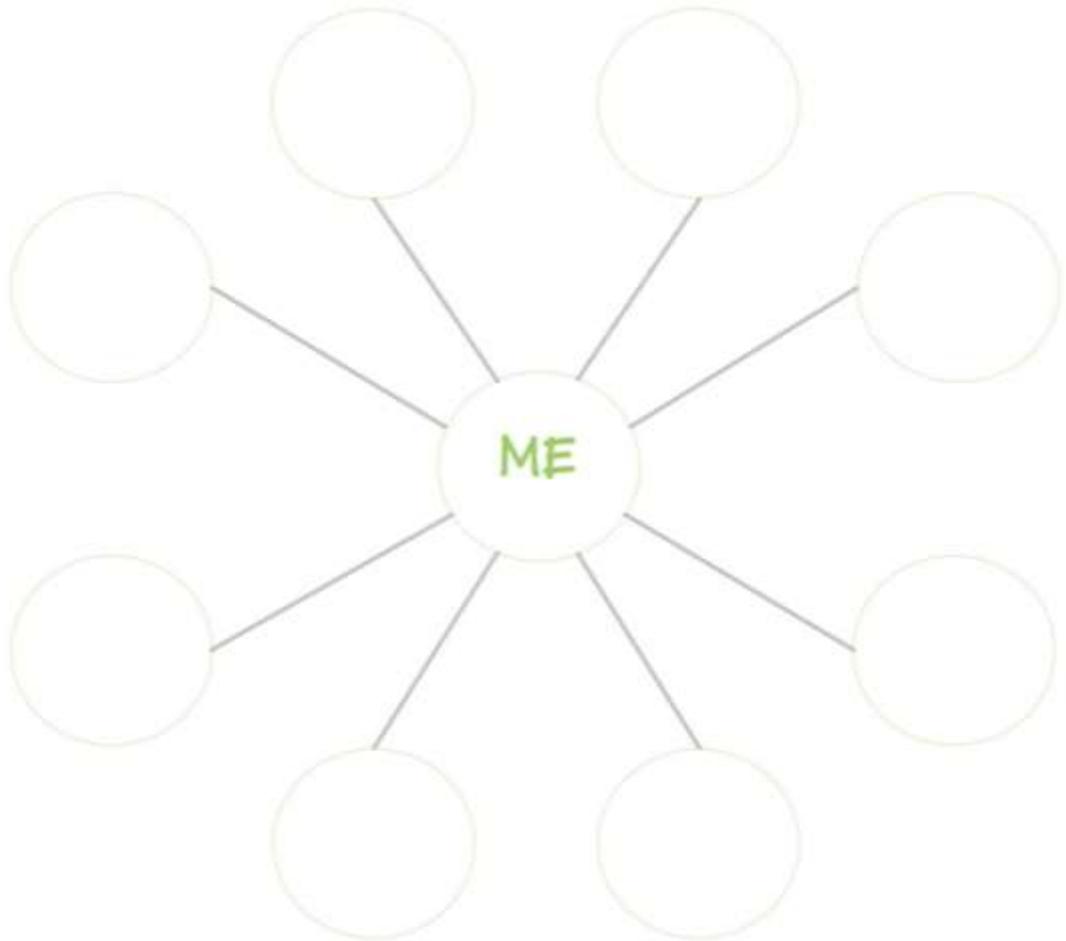
I don't know but I could ask my school counsellor, Miss C! I'm sure she can help! I'll get back to you as soon as possible with any information Miss C gives me.



Thanks Chrissy!

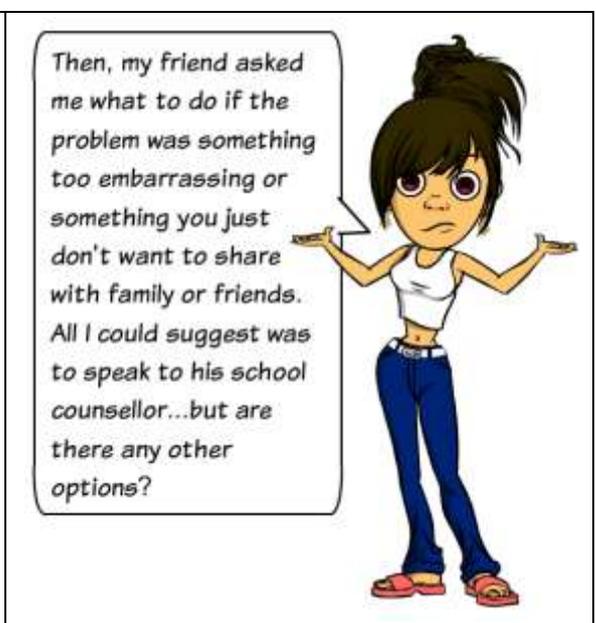
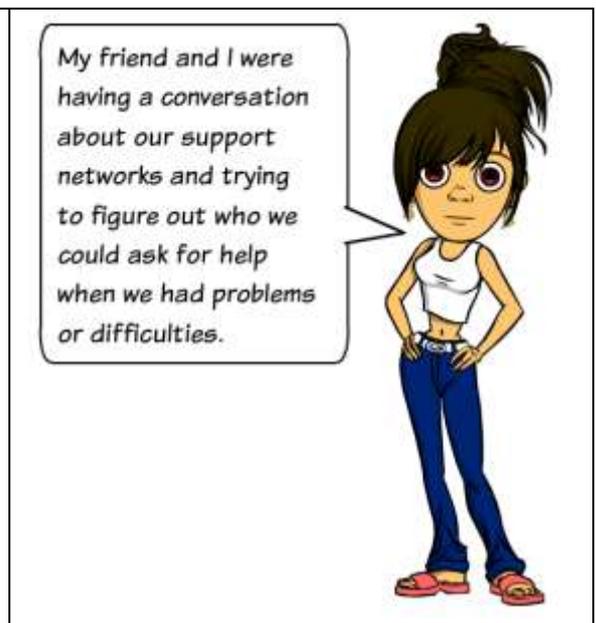


My Social Support Network



Part 2 - Chrissy in...Help from a Pro!







Your friend can turn to a number of different professionals depending on what the problem is. A professional is someone whose job is to help other people with problems or issues.



He could speak to a doctor, teacher, or a psychologist...and keep in mind that professionals such as psychologists will keep your information confidential, which means that they won't tell anyone, such as your parents, about what you have told them unless you ask them to or unless your difficulties raise significant concerns about your health and safety.

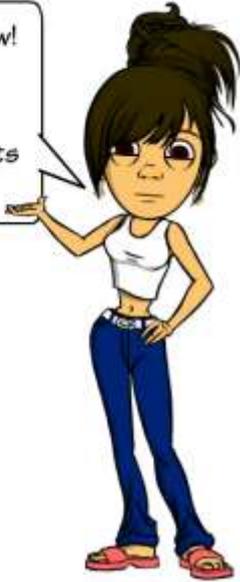


Yes, Chrissy. If your friend has a problem with his thoughts or feelings he could turn to a doctor for help. If the doctor can't help with the problem directly, then he or she would be able to point your friend in the right direction. The doctor would be able to suggest where to go for help.



A doctor?! Can my friend speak to a doctor even if he is not feeling sick?

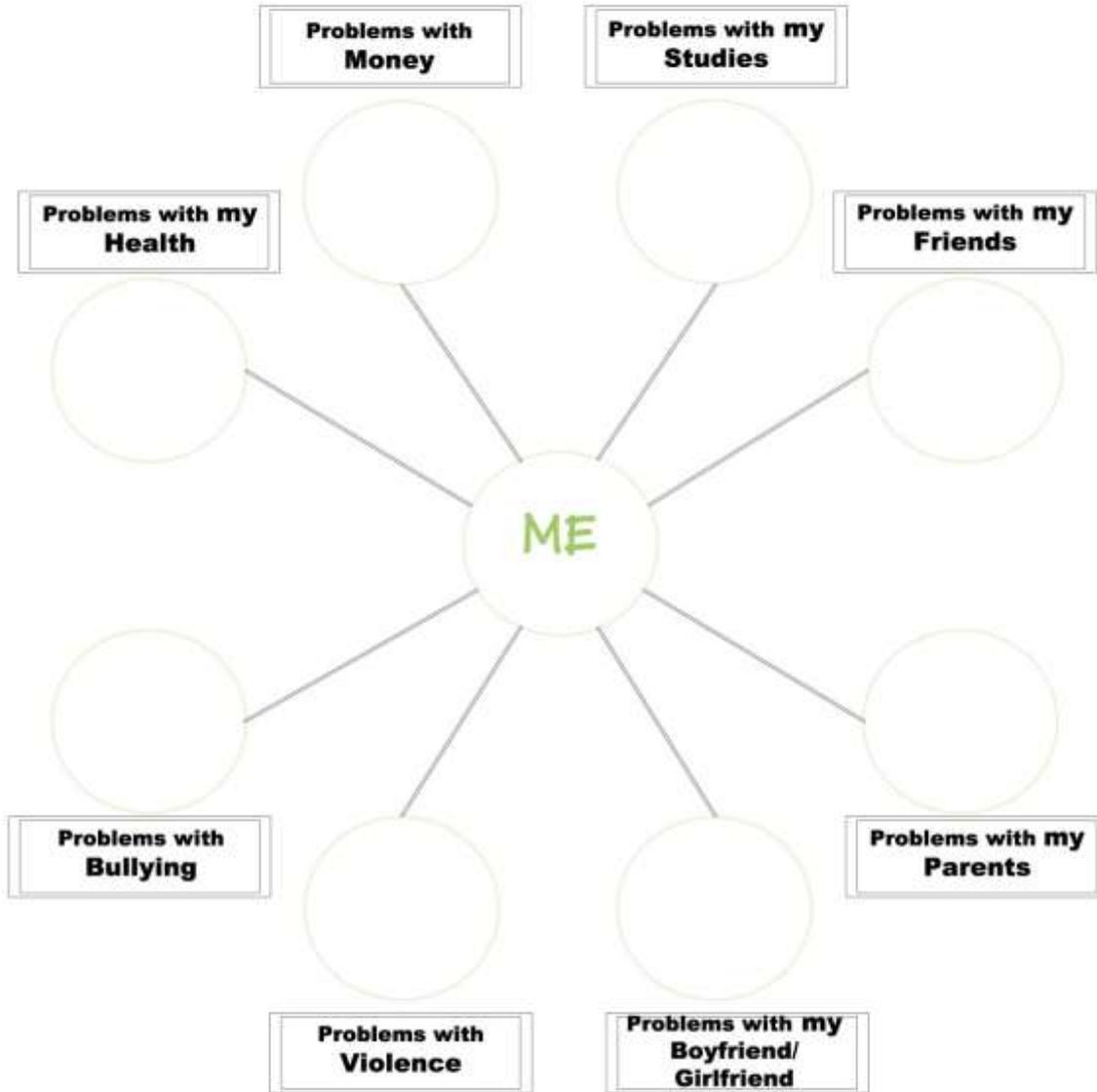
Oh, ok! Good to know! You also mentioned psychologists? How can psychologists help?



Psychologists can help you manage and deal with any worries or concerns. They help you talk things through, relax, and plan what actions you need to take to cope with or overcome your problems. His teacher, school counsellor or doctor would be able to help your friend find a psychologist if he ever needed one.



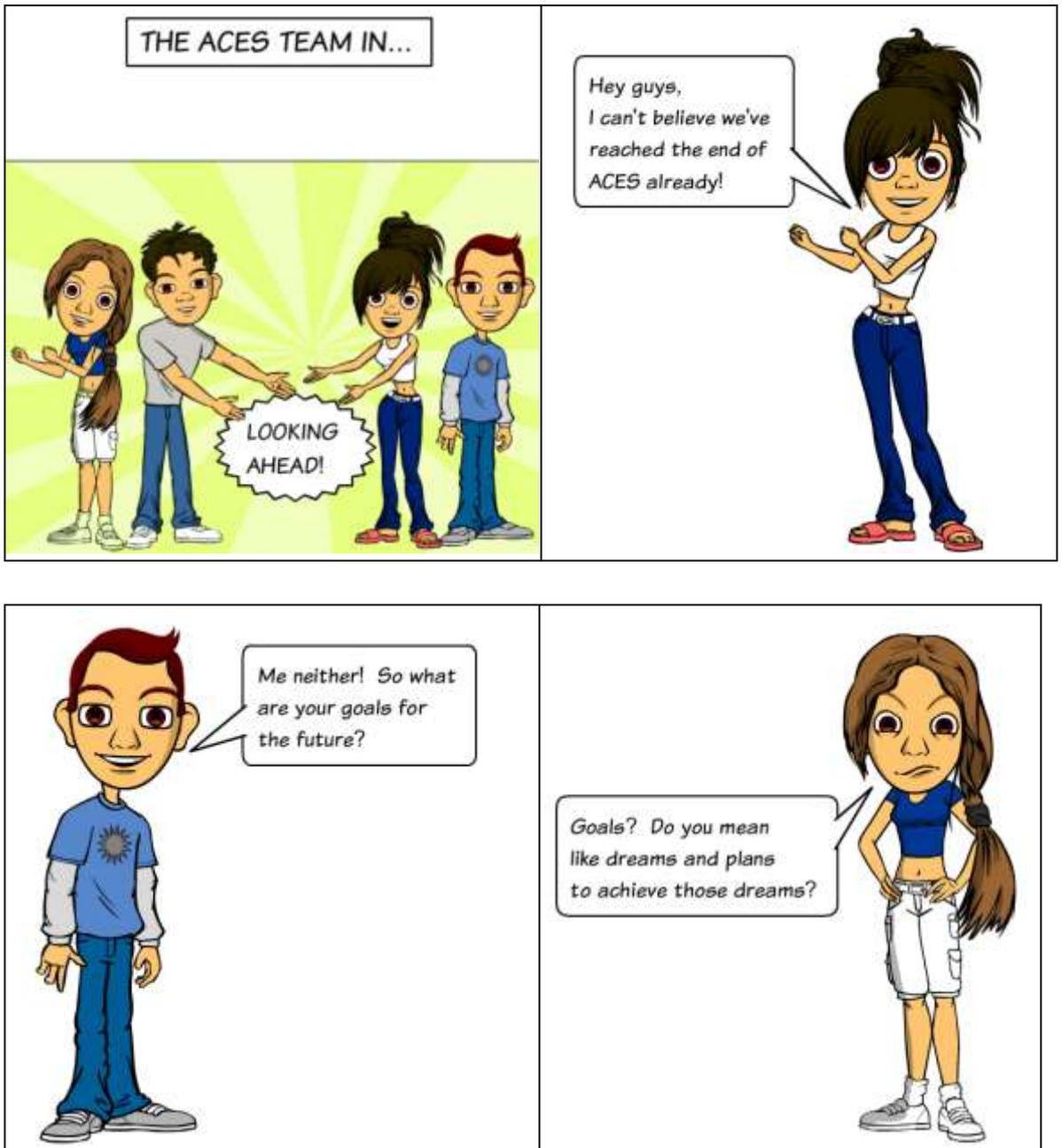
Who can help?

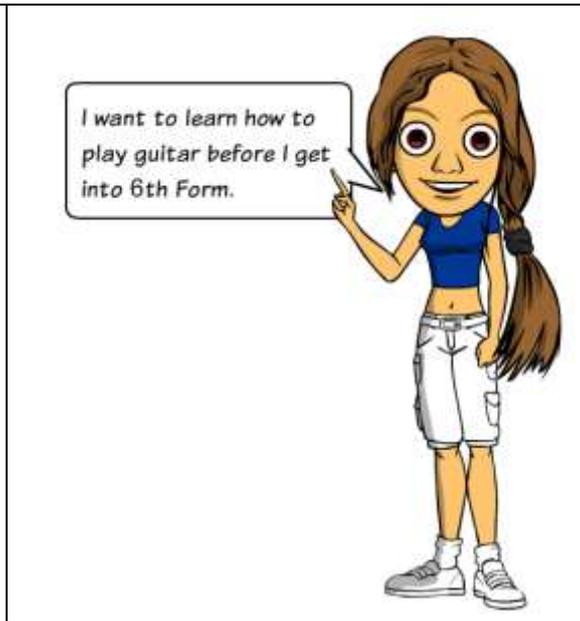


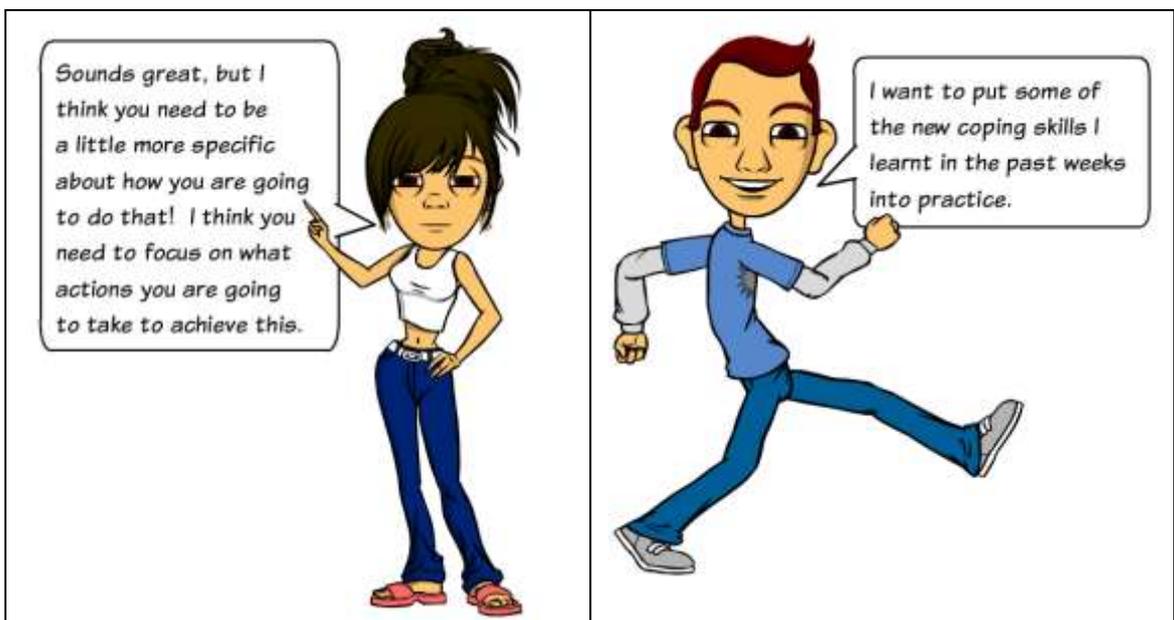
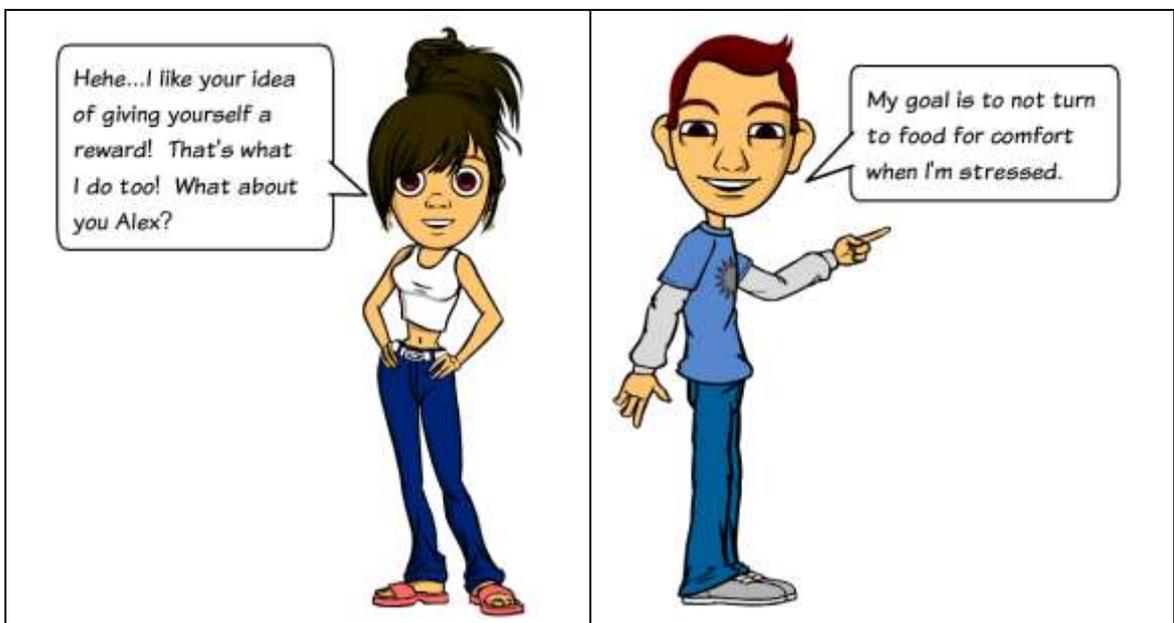
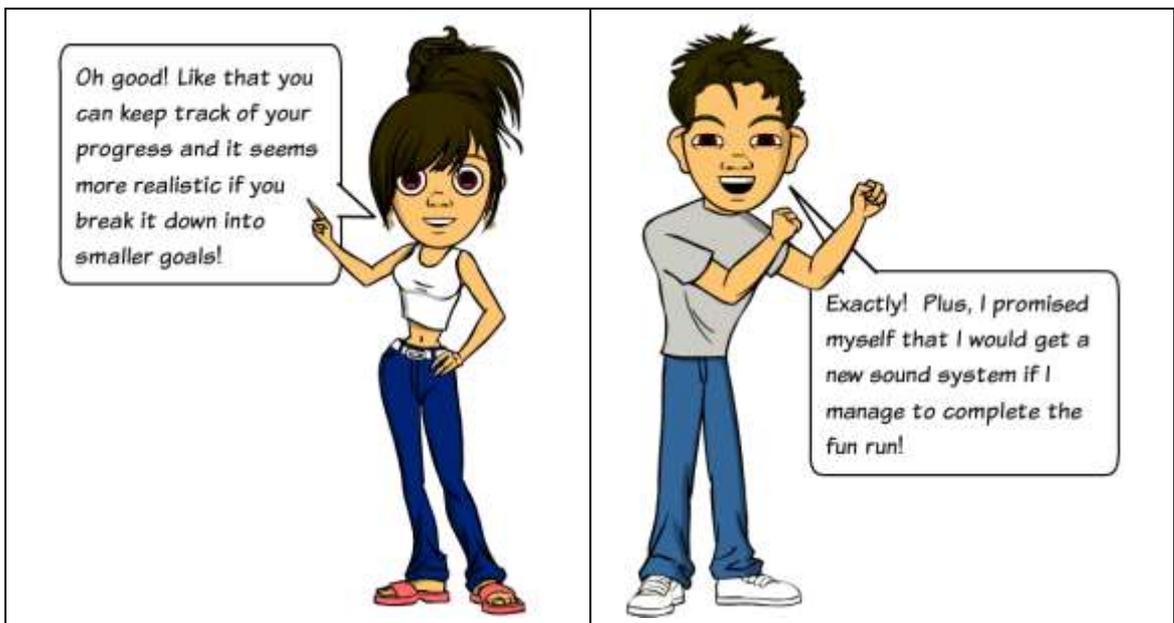
THE ACES TEAM

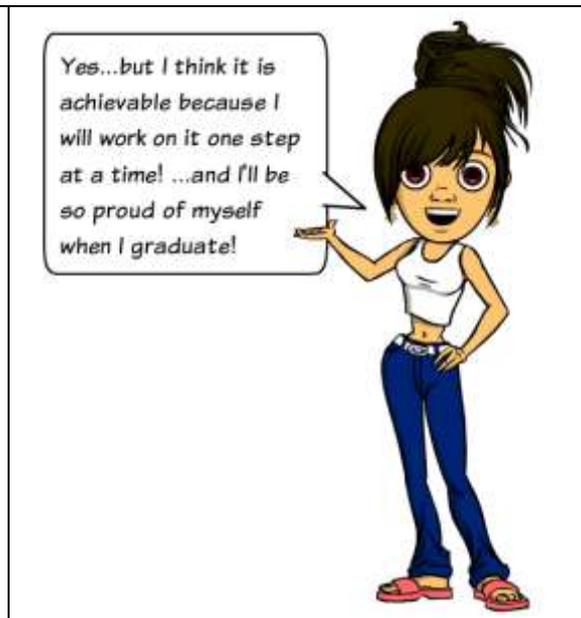
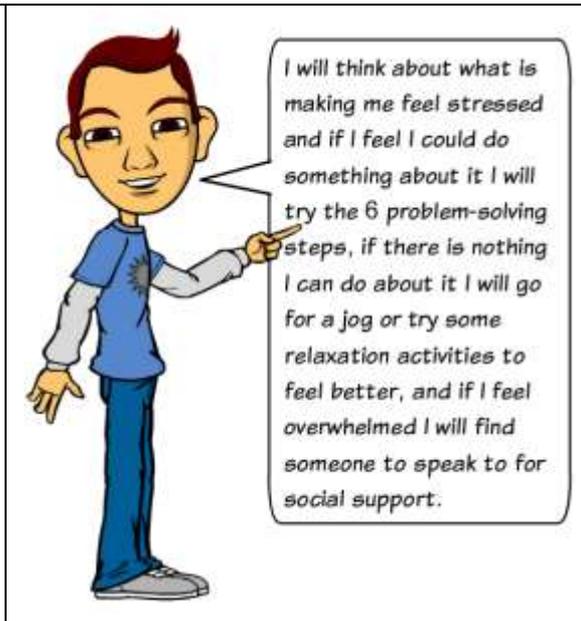
G.5 Module 5 - Goal Setting

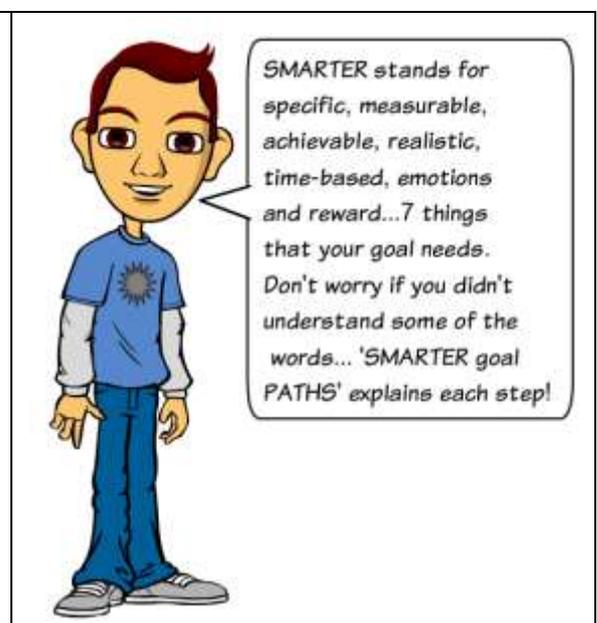
Part 1 - The ACES Team in...Looking Ahead!











Activity 1 - SMARTER goal PATHS

← SMARTER goal PATHS

SMARTER goal PATHS

Let's set a goal

Enter your name:

Enter today's date:

Next

← SMARTER goal PATHS

What area in your life will this goal tackle? Choose one of these PATHS:

P	A	T	H	S
Personal Development	Active Living & Healthy Eating	Time-management	Hobbies & Fun	School & Future Career

Next

← SMARTER goal PATHS

We will now set a SMARTER goal. SMARTER stands for:

- Specific
- Measurable
- Achievable
- Realistic
- Time-based
- Emotions
- Reward

If the goals that we set are SMARTER, we give ourselves a greater chance of achieving those goals.

Next

← SMARTER goal PATHS

Smarter: Specific & Measurable

Your goal should be clear about what you want to happen. Your goal can't be vague. For example, 'I want to get fitter' is a vague goal, whereas 'I want to get fitter by running' is a more specific goal.

Write down your specific goal here:

Next

← SMARTER goal PATHS

smArter: Achievable

Your goal needs to be achievable and you need to know what you need to do to achieve it. Using our example, 'I will get fitter by running for twenty minutes, 4 times a week', what do you need to be able to achieve this goal? E.g. have a pair of running shoes, find a friend or a family member who wants to run with me, find twenty minutes to spare 4 times a week, etc.

What do you need to achieve your goal?

To achieve this goal I will need (enter text)

Achieving a goal is easier if there is someone helping you keep on track or giving you motivation. Who will you discuss and share this goal with?

I agree to discuss the experience involved in achieving this goal with (enter text)

Next

← SMARTER goal PATHS

smArter: Realistic

Your goal needs to be realistic...it needs to be doable. Using our example, 'I will get fitter by running for twenty minutes, 4 times a week', do you have twenty minutes to spare for running 4 times a week?

Is your goal realistic? Yes No

If no, you need to go back and modify your goal. You might need to break down your goal into smaller steps and tackle one step at a time.

Next

← SMARTER goal PATHS

SmarTer: Time-based

Your goal needs a time limit (a deadline). By when will you achieve this goal?

I want to achieve my goal by (enter date)

Next

← SMARTER goal PATHS

smartEr: Emotions

Let's keep your motivation levels up and imagine what it will be like once you achieve this goal! How do you think you will feel when you achieve this goal (e.g. proud of myself, excited, happy)?

If I achieve this goal I will feel (enter text)

Next



SMARTER goal PATHS

smarteR: Reward

Achieving a goal is a great experience but sometimes promising ourselves that we will get a reward, if we achieve a goal, helps us work hard and not give up. The reward could be doing something we enjoy, telling someone about our accomplishment, or getting something we really want (e.g. buying a music CD).

What reward will you give yourself if you achieve your goal?

If I achieve my goal I will reward myself by (enter text)

Next



SMARTER goal PATHS

I, Daniela, want to achieve a goal related to my Active Living & Healthy Eating.

My goal is I will get fitter by walking for half an hour, 5 times a week .

To achieve this goal I will need a pair of walking shoes.

I agree to discuss the experience involved in achieving this goal with John.

I want to achieve my goal by 21/06/2012.

I believe that this goal is realistic. I want to achieve it and I'm willing to work hard for it.

If I achieve this goal I will feel fitter and proud of myself.

If I achieve my goal I will reward myself by buying myself a new dress.

Name: Daniela

Date: 05/06/2012

Print

I'm done, take me to the next step

Printout:

I, Daniela, want to achieve a goal related to my Active Living & Healthy Eating.

My goal is I will get fitter by walking for half an hour, 5 times a week .

To achieve this goal I will need a pair of walking shoes.

I agree to discuss the experience involved in achieving this goal with John.

I want to achieve my goal by 21/06/2012.

I believe that this goal is realistic. I want to achieve it and I'm willing to work hard for it.

If I achieve this goal I will feel fitter and proud of myself.

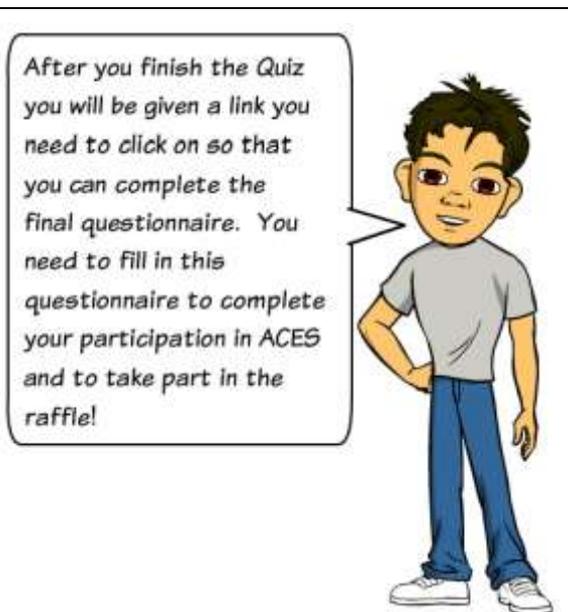
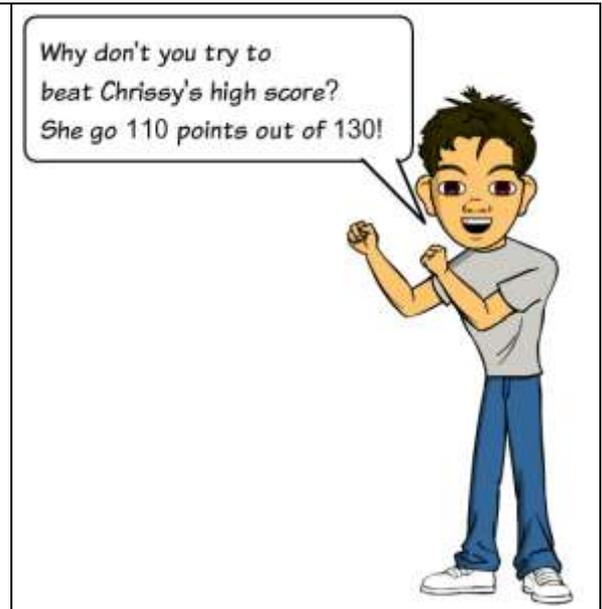
If I achieve my goal I will reward myself by buying myself a new dress.

Name: Daniela

Date: 05/06/2012

I'm done, take me to the next step

Part 2 - The ACES Team in...Good Luck!



Final Quiz - *Who wants to be Stress Free?*

Sample quiz questions:

← Quiz: Who wants to be Stress Free?



Stress affects our mind, body, feelings and behaviours. Which of these is not the result of stress?

- Making more mistakes than usual
- Feeling focused and determined
- Anxiety or feelings of panic
- All of the above

Next

← Quiz: Who wants to be Stress Free?

← Quiz: Who wants to be Stress Free?



When planning my time I should:

- List all the tasks I need to do
- Set priorities depending on how urgent or important each task is
- Write down how long I think each task should take me
- All of the above

Next

← Quiz: Who wants to be Stress Free?

G.6 Additional Resources

ACES online Change font size: T T T

Home Resources Modules Discussions Logout Prizes Contact us

Additional Resources

Here you will find other topics that we think you might find helpful. There are different comics you can read through and handouts that you can print.

Time Management

- Comic: Alex and Chrissy in...Time Management HELP!
- Time Management - To Do List Handout
- Time Management - Timetable Handout

Positive Thinking

- Comic: Emma and Sam in...Positive vs. Negative
- Positive Thinking - Handout

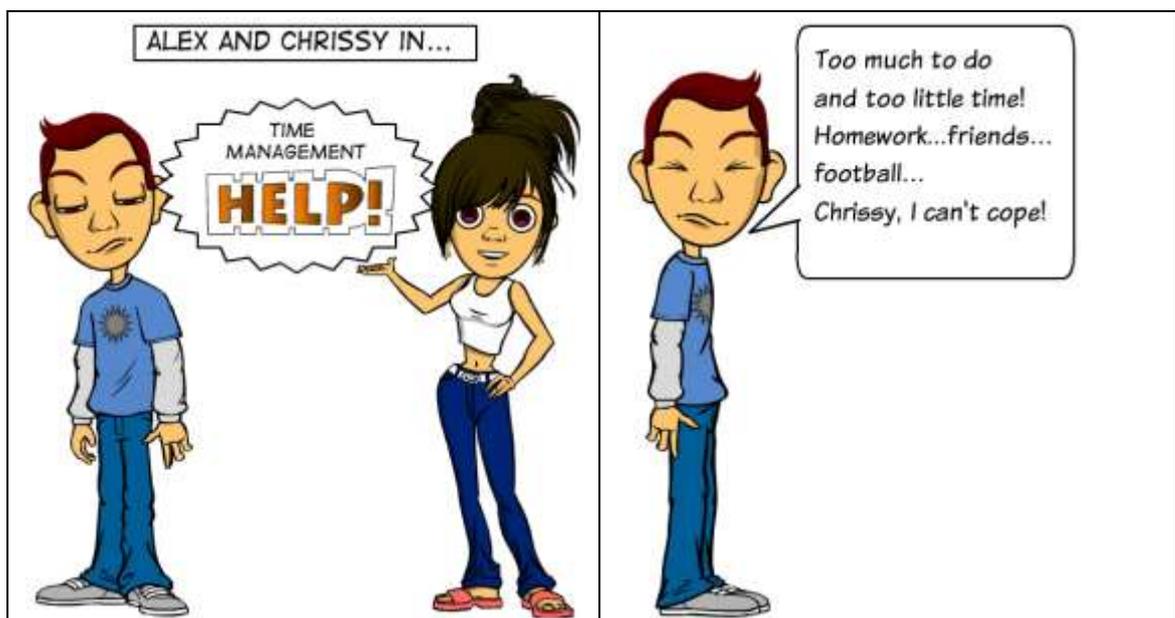
Relaxation and Physical Exercise

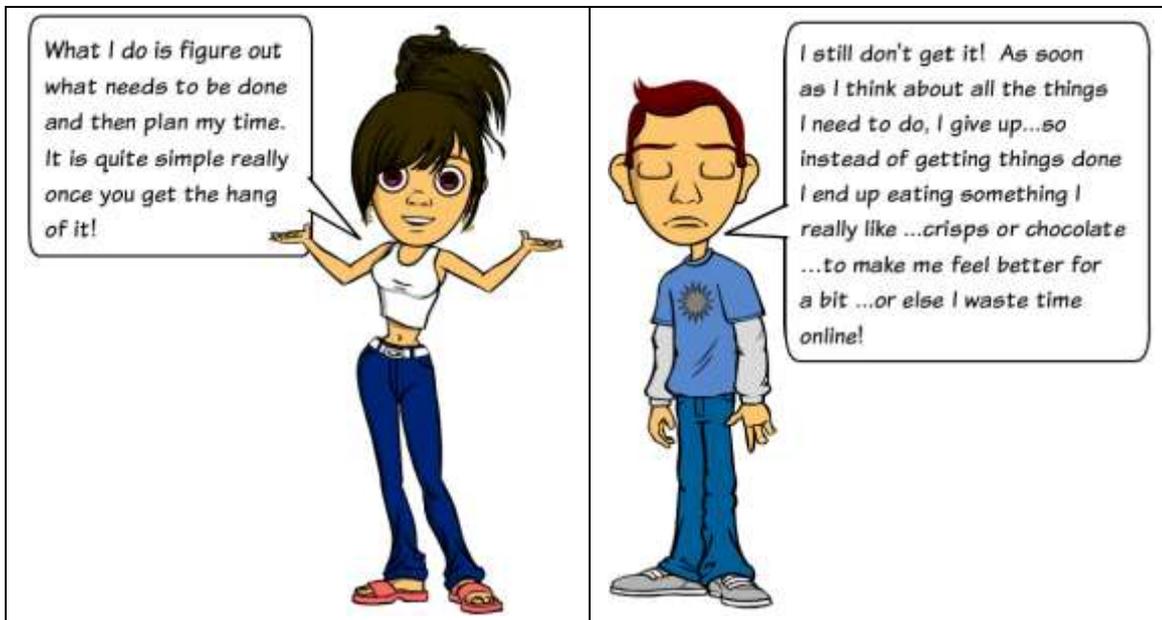
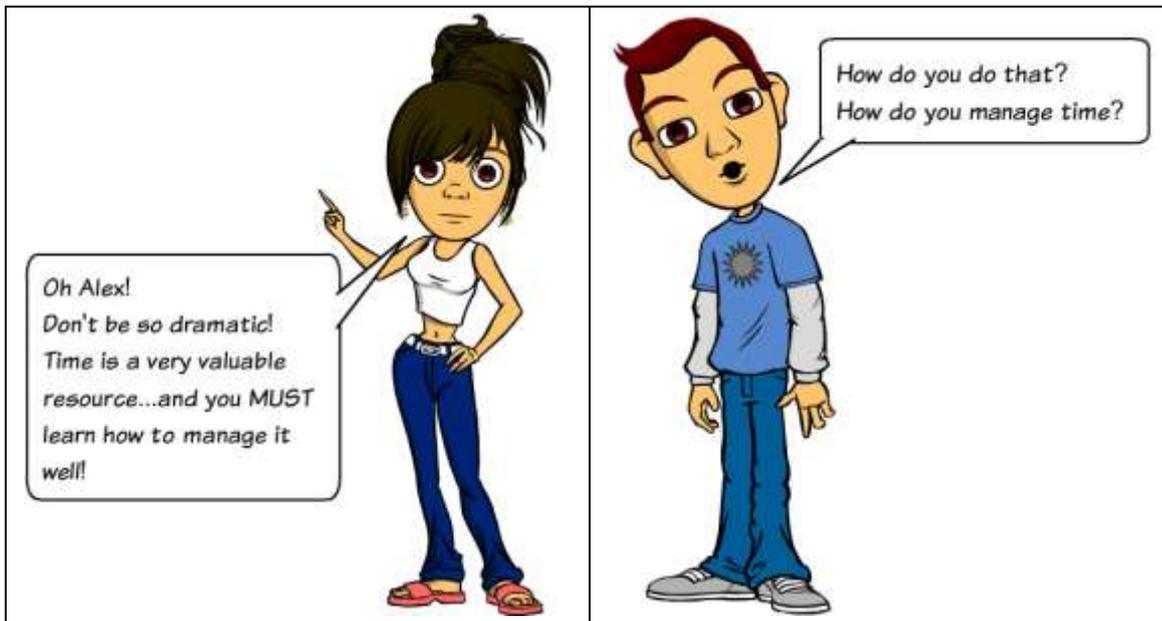
- Comic: The ACES team in...Some Rest and Relaxation
- Relaxation and Physical Exercise - Handout

RESEARCH WITH PLYMOUTH UNIVERSITY
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Website design and development by PreeoSTUDIOS

Time Management

Comic - Alex and Chrissy in...Time Management HELP!





I mark my tasks using the letters A, B, C and D -
 A = Attention required immediately!
 B = Better do it today but could wait till tomorrow!
 C = Can wait!
 D = Do ask for help! Someone else can give me a hand with this ...or do this for me.



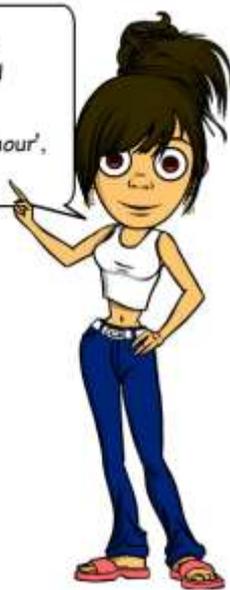
OK...so you list what you need to do and then write A, B, C and D depending on how soon each task needs to be done...



Exactly! I then focus on planning time for the most important tasks...those I have marked with an A or B.



So, my next step is writing how much time I think I need to complete each task... such as 'English Essay - 1 hour', 'Maths - 30 minutes'...



I then prepare a timetable. In the first column, I list the time I have in chunks of half an hour ...such as 15:00 to 15:30...and in the second column I write down what I am going to do in that time.

TIME	TASK
15:00 - 15:30	ENGLISH
15:30 - 16:00	ENGLISH
16:00 - 16:30	MATHS
16:30 - 17:00	PHYSICS
17:00 - 17:30	PIANO
17:30 - 18:00	PIANO
18:00 - 18:30	DINNER



Oh! So in the case of tasks that take longer than half an hour, you just list them again in the next half an hour slot on your timetable...



TIME	TASK
15:00 - 15:30	ENGLISH
15:30 - 16:00	ENGLISH
16:00 - 16:30	MATHS
16:30 - 17:00	PHYSICS
17:00 - 17:30	PIANO
17:30 - 18:00	PIANO
18:00 - 18:30	DINNER

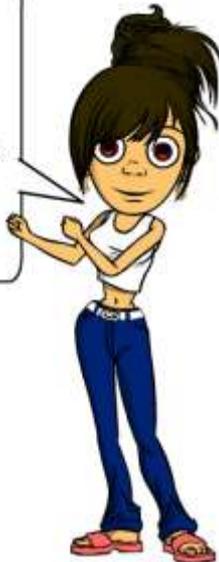
That's right! I also try to reward myself with short breaks...it helps me work better!



So what do you do?



During each half an hour slot on my timetable, I try to really work hard for 25 minutes without getting distracted...and then I treat myself to a 5 minute break! ...not more than 5 minutes though! ;)



Cool! Working for 25 minutes and then having a break doesn't sound bad at all!

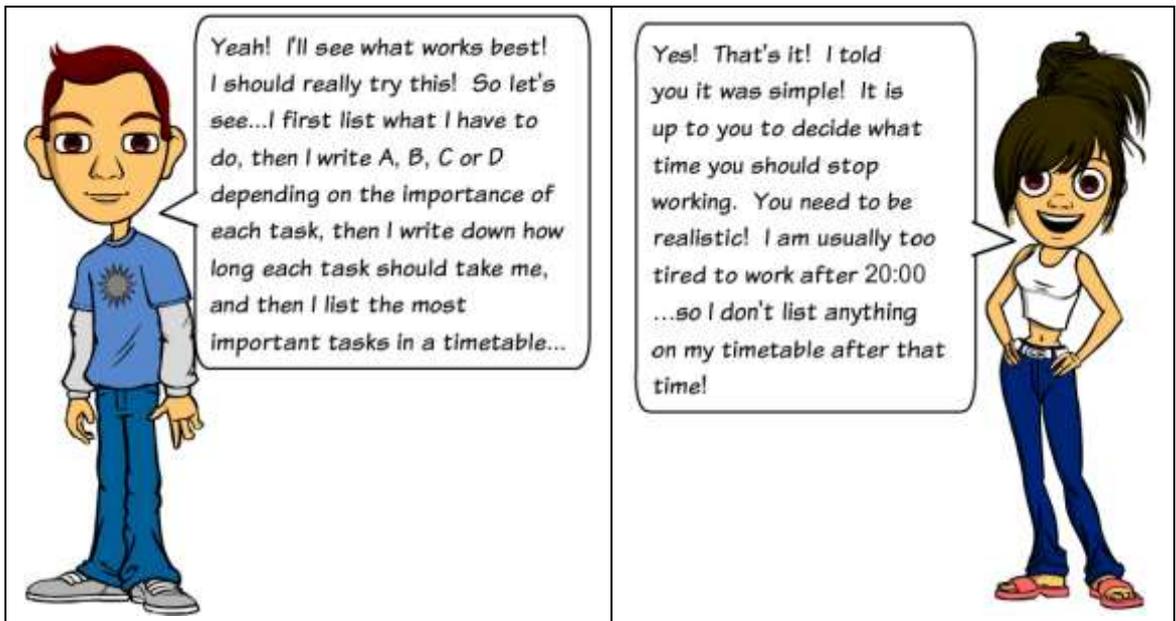


It works for me! In those 5 minutes I try to get away from my desk... dance around my room, sing my favourite song, grab a glass of water, or give my dog some attention!



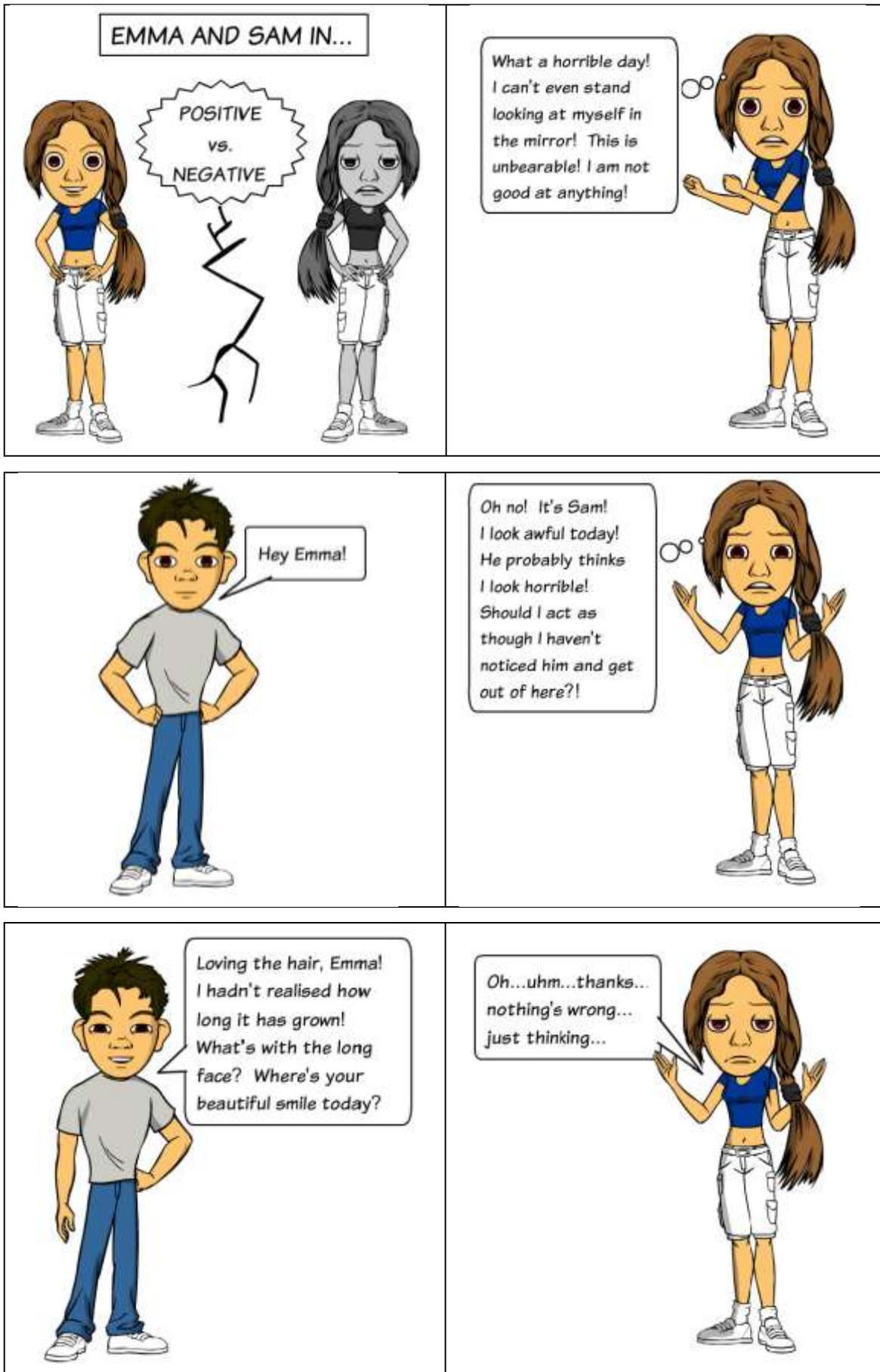
After my 5 minutes are up I feel refreshed and ready to take on another 25 minutes of work! ...You could decide that you prefer working for 50 minutes and then taking a 10 minute break!

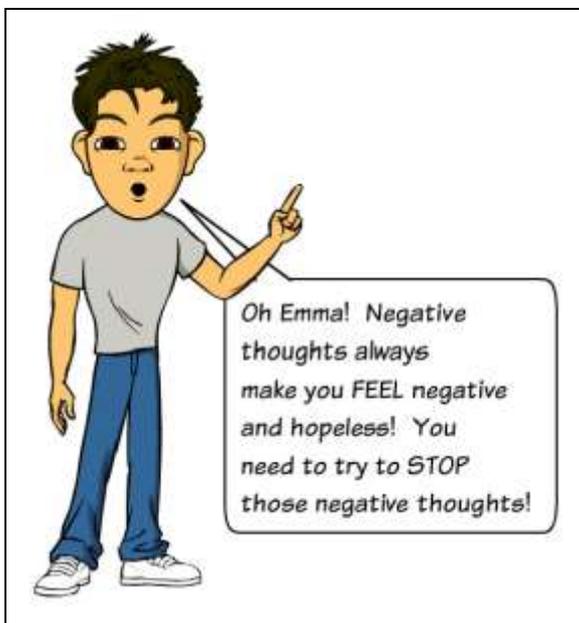


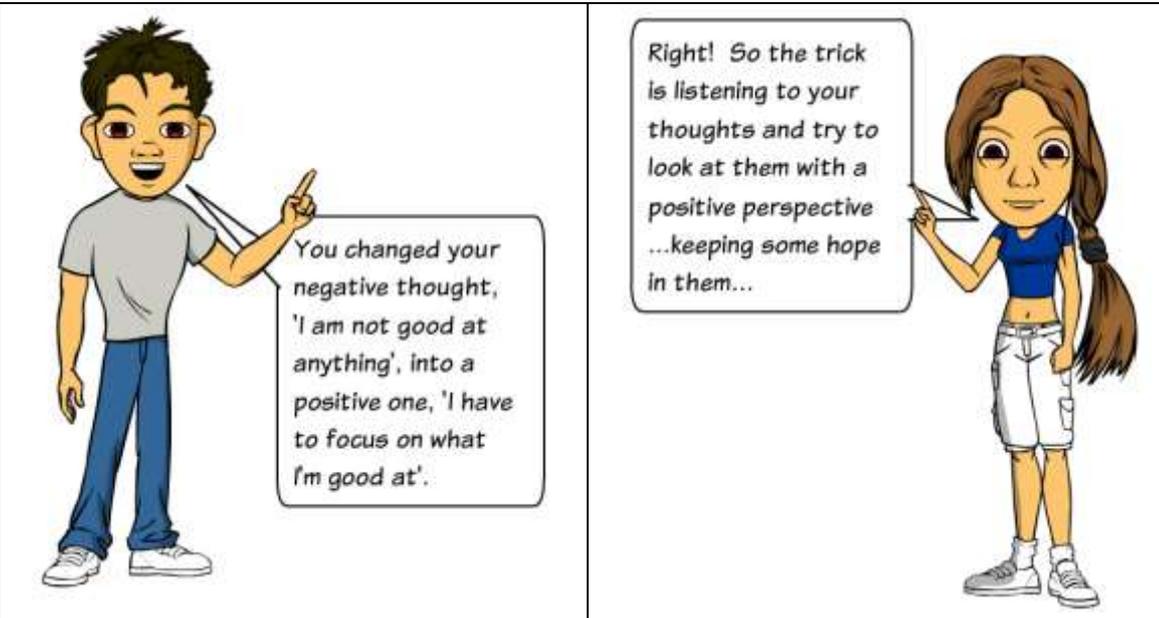
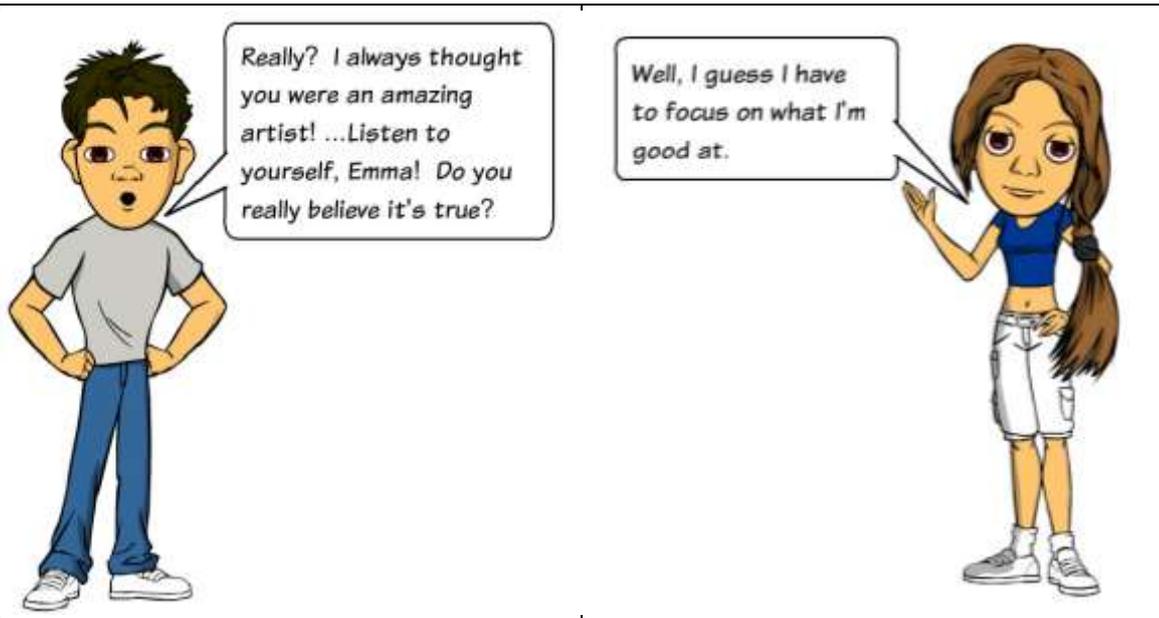


Positive Thinking

Comic - Emma and Sam in...Positive vs. Negative









The Brighter Side

Hi! My name is _____

AND I'M AWESOME!

e.g. dancing, drawing,
cooking, telling jokes, acting

What I'm really good at:

e.g. my eyes, my hair,
my nose, my long eyelashes,
my muscles

What I like most about the way I look:

What I like most about my character:

e.g. honest, funny, smart,
cool, courageous

e.g. drawing, taking photos,
going out with friends,
listening to music,
playing football

My favourite hobby is:

What other people say they like about me:

e.g. simply indispensable,
great friend, funny,
good student, great athlete



Relaxation and Physical Exercise

Comic - *The ACES team in...Some Rest and Relaxation*

THE ACES TEAM IN...



Hey guys, what are we doing on Sunday?

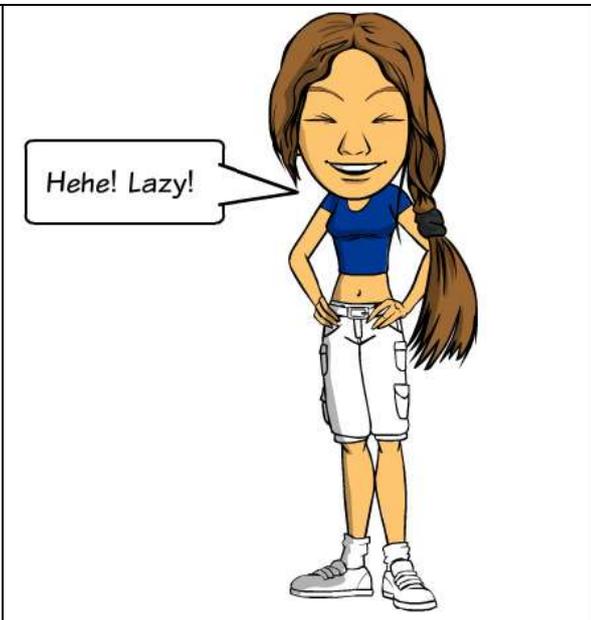


It has been a really tiring week...I just feel like some rest and relaxation!



Oh yes! Me too! I need to relax and recharge my batteries for next week!





I once read that exercise makes our body produce chemicals called 'endorphins'. These chemicals make us feel better, improve our mood and decrease our stress levels. So exercise doesn't only keep us physically fit and healthy.



Chrissy, what about you? How do you like relaxing?



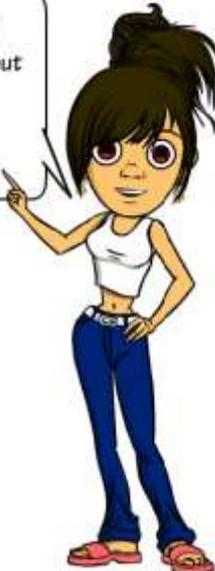
I either dance or else find a quiet spot at home and do two things my aunt taught me...deep breathing and something known as progressive muscle relaxation.



Deep breathing and progressive muscle relaxation?!...it all sounds so complicated!



They aren't complicated! My aunt gave me a handout with instructions and I managed to figure out what I had to do.



What's progressive muscle relaxation?



Well...what you do is lie down or sit down comfortably, focus on one area of your body at a time from your toes to your forehead and tense that muscle for a few seconds and then relax that muscle.



I'd love to try this! What about deep breathing...how do you do that?



I put my hand on my tummy and breathe in deeply so that I can feel the air expanding in my tummy and pushing my hand. Then I breathe the air out with a sigh. I try to find a comfortable rhythm for my breathing and while I'm breathing out I usually imagine all the tension and stress flowing out of my body.



I think you should show us how to do these, Chrissy!

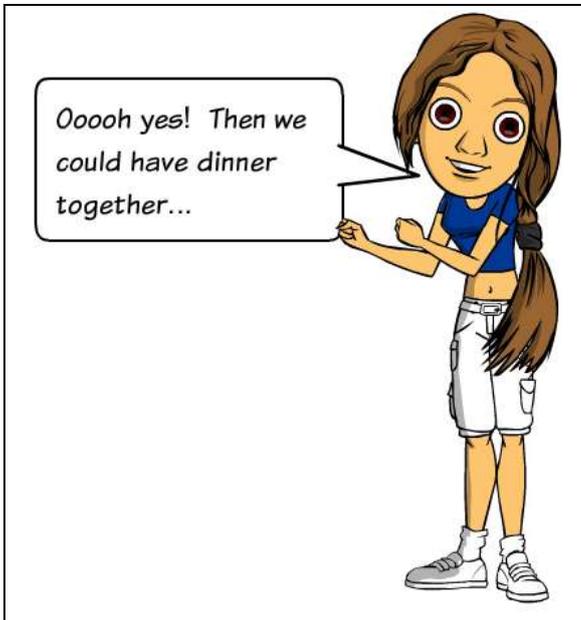


OK...so for Sunday, we could meet up at 2pm so we can all sleep till whatever time we want to... then go for a walk or a jog if you are up to it...



Yes! Then we could all go to my house and watch a funny movie and after the movie we could try out the deep breathing and progressive muscle relaxation with Chrissy...





Progressive Muscle Relaxation

1. Find a quiet spot. If you want you can dim the lights, light up some candles and play some relaxing music in the background.
2. Sit down comfortably or lie down.
3. Close your eyes. Do not squeeze them tightly.
4. Put your hand on your tummy and take a deep breath. Feel your tummy push your hand out as you breathe in.
5. Breathe out slowly and sigh while you are breathing out.
6. Continue breathing deeply at a regular pace (e.g. you can try slowly counting up to 3 as you breathe in and then counting again up to 3 as you breathe out)
7. Once you feel comfortable you can begin relaxing the muscles in your body.
8. Start with your toes and feet. Curl your toes and tense your feet as you breathe in. Hold this for a few seconds and then stretch your feet out and spread your toes as you breathe out. Feel them relax.
9. Tense your legs and thighs as you breathe in. (If you are finding this hard, you can try raising one leg at a time and pulling your toes back towards you.) Hold this for a few seconds and relax your legs and thighs as you breathe out.
10. Tense your stomach by pushing it out as you breathe in. (If you are finding this hard, you can pull your tummy muscles tightly in instead.) Hold this for a few seconds and then breathe out and relax.
11. Focus on your chest. Feel your chest rise as you breathe in. Hold this for a few seconds and then relax as you breathe out.
12. Tense your back as you breathe in. (If you are finding this hard you can try pushing your shoulders back.) Hold this for a few seconds and then relax as you breathe out.
13. Now focus on tensing your shoulders by lifting them up towards your ears as you breathe in. Hold this for a few seconds and then breathe out and relax.
14. Now focus on your hands and arms. Clench your fists tightly as you breathe in. (You can imagine that you are squeezing a lemon with all your might.) Hold this for a few seconds and then relax as you breathe out.
15. Now focus on your face and head. Clench your teeth as you breathe in. Hold this for a few seconds and then relax your mouth as you breathe out.
16. Open your mouth as widely as possible as you breathe in. (If you are finding is hard, you can try to yawn.) Hold this and then relax your mouth as you breathe out.
17. Wrinkle your nose and squeeze your eyes tightly as you breathe in. Hold this for a few seconds and then relax as you breathe out.
18. Raise your eyebrows as though you are trying to wrinkle your forehead as you breathe in. Hold this for a few seconds and then relax as you breathe out.
19. Notice how relaxed all your body feels. Now just enjoy this feeling.
20. Remain seated for a few more minutes just focusing on breathing deeply.



Appendix H - ACES web development software

The website was developed using PHP (CakePHP framework), a MySQL database, standard compliant XHTML/CSS , Javascript and the jQuery framework. No flash driven content was used on the website. It was hosted on an Apache web server at the web developers' US-Based dedicated Linux server.

The website was based on the web developers' content management system (PreeoCMS). This content management system (CMS) was modified and tailored specifically for ACES' requirements. The CMS is user-friendly and enables the modification of the content of the website without the need of relying on the web developers.

Appendix I - Baseline and follow-up questionnaire (online data collection tool)

Kindly note that the participants will answer these questions online.

Perceived Stress Scale (Cohen, Kamarck et al. 1983)

The following questions ask you about your feelings and thoughts during the last month.

In each case, please indicate by circling one of the numbers, how often you felt or thought a certain way. For example if your reply to the first item is 'almost never', you would circle 2:

1	②	3	4	5
never	almost never	sometimes	fairly often	very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

3. In the last month, how often have you felt nervous and 'stressed'?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

5. In the last month, how often have you felt that things were going your way?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

7. In the last month, how often have you been able to control irritations in your life?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

8. In the last month, how often have you felt that you were on top of things?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

9. In the last month, how often have you been angered because of things that were outside of your control?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

1	2	3	4	5
never	almost never	sometimes	fairly often	very often

Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien 2002)

[obtained permission to put questionnaire online]

The following questions relate to how you may react around food and what you would do in situations related to food.

In each case, please indicate by circling one of the numbers, how often you felt or thought a certain way. For example if your reply to the first item is 'rarely', you would circle 2:

1	②	3	4	5
never	rarely	sometimes	often	very often

1. Do you have the desire to eat when you are irritated?

1	2	3	4	5
never	rarely	sometimes	often	very often

2. Do you have a desire to eat when you have nothing to do?

1	2	3	4	5
never	rarely	sometimes	often	very often

3. Do you have a desire to eat when you are depressed or discouraged?

1	2	3	4	5
never	rarely	sometimes	often	very often

4. Do you have a desire to eat when you are feeling lonely?

1	2	3	4	5
never	rarely	sometimes	often	very often

5. Do you have a desire to eat when somebody lets you down?

1	2	3	4	5
never	rarely	sometimes	often	very often

6. Do you have a desire to eat when you are cross?

1	2	3	4	5
never	rarely	sometimes	often	very often

7. Do you have a desire to eat when you are approaching something unpleasant to happen?

1	2	3	4	5
never	rarely	sometimes	often	very often

8. Do you get the desire to eat when you are anxious, worried or tense?

1	2	3	4	5
never	rarely	sometimes	often	very often

9. Do you have a desire to eat when things are going against you or when things have gone wrong?

1	2	3	4	5
never	rarely	sometimes	often	very often

10. Do you have the desire to eat when you are emotionally upset?

1	2	3	4	5
never	rarely	sometimes	often	very often

11. Do you have a desire to eat when you are bored or restless?

1	2	3	4	5
never	rarely	sometimes	often	very often

12. Do you have a desire to eat when you are frightened?

1	2	3	4	5
never	rarely	sometimes	often	very often

13. Do you have a desire to eat when you are disappointed?

1	2	3	4	5
never	rarely	sometimes	often	very often

Adapted version of the Motivational Stages of Change for Adolescents recovering from an Eating disorder (MSCARED; Gusella, Bird, & Butler, 2003)

The term 'emotional eating' refers to eating in response to negative emotions such as stress.

Where are you in this process? (Tick the stage that best describes you)

Precontemplation: Other people think I engage in emotional eating, but I don't;

Contemplation: I realize I engage in emotional eating but I'm not sure I'm ready to change;

Preparation: I'm planning to "take action" against my emotional eating in the next 1 to 6 months;

Action: I have taken definite actions against my emotional eating within the past 6 months;

Maintenance: I am working to maintain the changes I have made to "take action" against my emotional eating

Demographic Questionnaire

The following questions relate to your personal background and will help the researcher classify your answers. Remember that all the answers you give are confidential – No one will see your answers apart from the researcher.

Unless otherwise specified, please indicate your answer by ticking the relevant box

1. **Age:** 14 15 16 17

2. **Current Email Address (please specify):** _____

3. **Gender:** Male Female

4. **Please weigh yourself without clothes.**

What is your weight in kilograms? (please specify) _____

5. **Please measure your height without shoes.**

What is your height in centimetres? (please specify) _____

Evaluation Questionnaire (for Follow-up Questionnaire only)

Open-ended questions about:

- satisfaction with overall presentation
 - Were you satisfied with the overall look and the content/material presented in ACES? Do you have any suggestions about how it could be improved?
- ease of navigation
 - Did you have any difficulties finding your way around the ACES website? If yes, what could be improved?
- language and tone
 - Did you find the language and tone used in ACES appropriate? Do you feel it was easy to understand or was it hard?
- visual appeal
 - Did you like the way the ACES website looks? What did you like about the way it looks? What didn't you like about the way it looks?
- trustworthiness
 - Do you believe you could trust the information presented in the ACES website? Why?
- perceived relevance
 - Did you find the material presented in ACES relevant to you? Was the information presented what you needed or did you feel that the information was not suitable for you? Explain.
- level of interest of content
 - Did you find the material presented in ACES interesting?
 - Which part of ACES did you find to be the most interesting?
 - Which part of ACES did you find to be the least interesting?
- perceived gain in knowledge
 - Do you feel that you know more about how to manage your stress levels after taking part in ACES?
- whether participants would recommend the intervention to friends or other adolescents
 - Would you recommend ACES to your friends or to other adolescents? Why?

- whether participants believe that their stress levels have decreased
 - Do you believe/feel that you are less stressed after taking part in ACES?
- whether participants believe that their emotional eating has decreased
 - Do you believe/feel that you engage in emotional eating less after taking part in ACES?
- perceived usefulness in decreasing emotional eating and whether there were any external factors that may have affected their stress and emotional eating levels during the intervention period (e.g. examinations).
 - Do you think that ACES is useful in decreasing emotional eating? Why?
 - Where there any external factors (other things you may have experienced in your life such as examinations) that may have affected your stress levels during your 8-week participation in ACES? If yes, what were these external factors?
 - Where there any external factors (other things you may have experienced in your life such as examinations) that may have affected your emotional eating levels during your 8-week participation in ACES? If yes, what were these external factors?
 - Did you complete all the 5 modules presented in ACES? Why?

Appendix J - Permissions to carry out Phase 2 Study

J.1 Ethics approval for Phase 2



12 June 2012

CONFIDENTIAL

Ms Daniela Cassola
c/o Professor Anne E de Looy
School of Health Professions
Faculty of Health, Education and Society
University of Plymouth
Peninsula Allied Health Centre
Derriford Road
Plymouth PL6 8BH

Dear Daniela

Application for Approval by Faculty Research Ethics Committee

Application Title: Feasibility study of an online intervention for stress and emotional eating in Maltese adolescents

I am pleased to inform you that the Committee has granted approval to you to conduct this research.

Please note that this approval is for three years, after which you will be required to seek extension of existing approval.

Please note that should any MAJOR changes to your research design occur which effect the ethics of procedures involved you must inform the Committee. Please contact Claire Butcher on (01752) 585337 or by email claire.butcher@plymouth.ac.uk

Yours sincerely

Professor Michael Sheppard, PhD, AcSS,
Chair, Health Research Ethics Committee
Faculty of Health, Education and Society
Plymouth University

Faculty of Health, Education and Society
Plymouth University
Drake Circus
Plymouth PL4 8AA

T+44 (0)1752 585337
F+44 (0)1752 585328
E claire.butcher@plymouth.ac.uk
W www.plymouth.ac.uk

Professor Michael Sheppard
CQSW BSc MA PhD AcSS
Chair of Health Research Ethics
Committee

J.2 Phase 2 approval from the Maltese Episcopal Conference - Secretariat for Catholic Education



MALTESE EPISCOPAL CONFERENCE
Secretariat for Catholic Education

The Head
Archbishop's Seminary
St Joseph
Our Lady Immaculate
St Albert the Great College
St Augustine's College
St Dorothy's School
St. Francis
ST Michael School
St Monica (B'Kara)
St Paul's Missionary College
Stella Maris College (Gzira)

7th May, 2012

Ms Daniela Cassola, currently reading a PhD in Health Studies (Nutrition, Dietetic & E-Health) at the University of Plymouth, hereby requests permission to conduct questionnaires with parents of students in Forms 3,4 and 5.

The Secretariat for Catholic Education finds no objection for Ms Daniela Cassola to carry out the stated exercise subject to adhering to the policies and directives of the school concerned.



Fr Charles Mallia
Archbishop's Delegate for Church Schools

J.3 Phase 2 permission to carry out research in State Schools

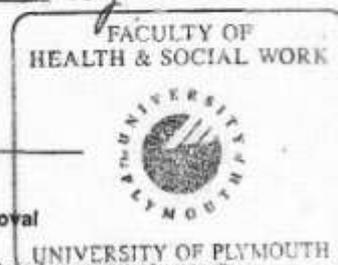
B. Tutor's Approval (where applicable)

The above research work is being carried out under my supervision.

Tutor's Name: Prof Anwe deLooy Signature: Anwe deLooy

Faculty: HEALTH, EDUCATION & SOCIETY

Faculty Stamp: _____



C. Directorate for Quality and Standards in Education - Official Approval

The above request for permission to carry out research in State Schools is hereby approved according to the official rules and regulations, subject to approval from the University of Malta Ethics Committee.

Raymond Camilleri
Director
(Research and Development Department)

Date: 25/06/2012

Official Stamp



Conditions for the approval of a request by a student to carry out research work in State Schools

Permission for research in State Schools is subject to the following conditions:

1. The official request form is to be accompanied by a copy of the questionnaire and / or any relevant material intended for use in schools during research work.
2. The original request form, showing the relevant signatures and approval, must be presented to the Head of School.
3. All research work is carried out at the discretion of the relative Head of School and subject to their conditions.
4. Researchers are to observe strict confidentiality at all times.
5. The Directorate for Quality and Standards in Education reserves the right to withdraw permission to carry out research in State Schools at any time and without prior notice.
6. Students are expected to restrict their research to a minimum of students / teachers / administrators / schools, and to avoid any waste of time during their visits to schools.
7. As soon as the research in question is completed, the Directorate for Quality and Standards in Education assumes the right to a full copy (in print/on C.D.) of the research work carried out in State Schools. **Researchers are to forward the copies to the Assistant Director, International Research, Directorate for Quality and Standards in Education.**
8. Researchers are to hand a copy of their Research in print or on C.D. to the relative School/s.
9. In the case of video recordings, researchers have to obtain prior permission from the Head of School and the teacher of the class concerned. Any adults recognisable in the video are to give their explicit consent. Parents of students recognisable in the video are also to be requested to approve that their siblings may be video-recorded. Two copies of the consent forms are necessary, one copy is to be deposited with the Head of School, and the other copy is to accompany the Request Form for Research in State Schools. Once the video recording is completed, one copy of the videotape is to be forwarded to the Head of School. The Directorate for Quality and Standards in Education reserves the right to request another copy.
10. The video recording's use is to be limited to this sole research and may not be used for other research without the full consent of interested parties including the Directorate for Quality and Standards in Education.

Appendix K - Phase 2 invitation letters and information leaflet

K.1 Invitation letter for first recruitment period

RESEARCH
WITH
PLYMOUTH
UNIVERSITY



Adolescents Coping with Emotional Eating and Stress

Dear Parent/Guardian,

I would like to invite your son/daughter to participate voluntarily in a research study. This research study is called ACES: Adolescents Coping with Emotional Eating and Stress and is supported by the Health Promotion and Disease Prevention Directorate (Malta) and University of Plymouth (United Kingdom).

Why are we doing this research study?

The purpose of this research study is to find out whether we could develop an Internet-based stress management intervention that helps Maltese adolescents decrease their stress levels.

ACES is a 5-week online program that aims to help young people learn the skills that are needed to manage their stress levels and which sometimes can lead to emotional eating (eating in response to/or to cope with emotions such as feeling stressed, upset or anxious).

Is your son/daughter eligible to join the study?

If your son/daughter is between the ages of 14 and 16, and has access to the Internet, then he/she may join the study.

What will we ask your son/daughter to do in the study?

The following is a summary and further information is attached to this letter:

- Your son/daughter will be asked to complete an online questionnaire at the start of the study (baseline questionnaire).
- Your son/daughter will then be asked to complete five online modules about how to manage stress.
- Your son/daughter will be asked to complete a questionnaire at the end of the study (follow-up questionnaire)

What will your son/daughter get out of this?

Young people increasingly suffer from stress and this online intervention is designed to help young people, decrease their stress levels and improve their coping skills. There may be no direct benefit to your son/daughter; but there are also no foreseeable risks to participate in this study. Any information obtained will help develop an effective online intervention for young people who suffer from stress which may lead to emotional eating.

Can your son/daughter drop out of the study?

Yes, your son/daughter is free to stop taking part at any time during the study without giving a reason. Participation in this study is voluntary and is not associated with your son/daughter's class grade.

What about confidentiality?

All data from this project are confidential and will only be used for the purposes of this research and destroyed within ten (10) years of completion of the study (See further information attached).

Has this study been approved by all the right ‘authorities’?

Yes, this study has been reviewed and approved by the Health Research Ethics Committee, University of Plymouth.

Who can you contact if you have more questions?

If you have any questions about the study now or during the study, please feel free to contact me by email on daniela.cassola@plymouth.ac.uk or by phone on 79728988. If you would like to see the outcomes of the study please email me.

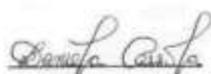
What should you do now?

If you give permission for your son/daughter to take part, please pass the attached login details for www.aces.org.mt to your son/daughter.

Once he/she accesses the study website he/she will be able to complete the baseline questionnaire, participate in the 5 modules (one module per week), and complete the follow-up questionnaire at the end of the study.

We hope you are able to help us with the study!

Yours faithfully,



Daniela Cassola

Contact Details:

<p>Daniela Cassola Ph.D. (Health Studies) Student School of Health Professions Faculty of Health University of Plymouth Mobile: 79728988 Email: daniela.cassola@plymouth.ac.uk</p>	<p>Professor A. de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth United Kingdom</p>	<p>Professor R. Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth United Kingdom</p>
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Further information

1. The baseline questionnaire

- This questionnaire should take about 15 minutes to complete and will include questions about perceived stress, emotional eating and readiness to change.
- It will also contain a background questionnaire with questions about current height (in cm) and weight (in kg), gender and age. Your son/daughter will not be asked for their name. They will, however, be asked for their email address so that they can be contacted by email during the study. The emails that will be sent during the study will act as reminders to complete the online modules and to keep the participants' motivation levels up.

2. The on-line programme

- Your son/daughter will have to complete one module per week over a five week period. Each module takes about 1 hour to complete. The modules aim to increase your son/daughter's knowledge about stress and coping and teach your son/daughter specific ways how to cope and manage his/her stress levels such as seeking social support, relaxation and problem-solving.

3. The follow-up questionnaire

- This questionnaire should take about 30 minutes to complete. The first part of this questionnaire will be the same as the questionnaire at the start of the study. The second part of the questionnaire will ask your son/daughter questions that aim to improve ACES such as questions about how satisfied your son/daughter was with the overall program, how easy it was to navigate through the modules and whether the content presented in the modules was interesting to him/her.

Confidentiality

During the study we do not ask participants for their names. Neither we nor the other participants will know who your son or daughter is. When we present the results of this pilot study we may wish to use quotes from what participants have said, but it would not be possible to identify who said them.

Għażiż ġenitur/kustodju,

Nixtieq nistieden lit-tifel/tifla tiegħek biex jieħdu sehem bħala voluntiera fi studju ta' riċerka. Dan l-istudju jismu "ACES: Adolescents Coping with Emotional Eating and Stress". L-istudju għandu l-appoġġ tad-Direttorat għall-Promozzjoni tas-Saħħa u Prevenzjoni tal-Mard (Malta) u tal-Universita' ta' Plymouth (L-Ingilterra).

Għalfejn qed isir dan l-istudju?

L-iskop ta' din ir-riċerka hu li niskopru jekk nistgħux niżviluppaw għajjnuna permezz tal-Internet għall-kontroll tal-istress biex l-adolesxenti Maltin ikunu jistgħu jnaqqsu l-livelli tal-istress. L-ACES huwa programm online ta' hames ġimgħat bil-għan li jgħin liż-żgħażaġh jiksbu l-hiliet neċessarji biex jikkontrollaw il-livelli tal-istress, li, xi drabi, jistgħu jwassluhom biex jieklu żżejjed minħabba l-emozzjoniet (pereżempju l-istress, id-dwejjajq jew l-anzejtja').

Ibnek/bintek jistgħu jieħdu sehem f'dan l-istudju?

Jekk ibnek/bintek għandhom bejn l-14 u s-16-il sena, u għandhom aċċess għall-Internet, jistgħu jieħdu sehem fl-istudju.

X'ser nitolbuhom jagħmlu f'dan l-istudju? (Din li ġejja hija lista fil-qosor. Hemm aktar dettalji fl-ittra mehmuża)

Ibnek/bintek:

- Jintalbu jimlew kwestjonarju online fil-bidu tal-istudju (il-kwestjonarju "baseline")
- Imbagħad jintalbu jagħmlu hames sessjonijiet online dwar il-kontroll tal-istress
- U wara jintalbu jimlew kwestjonarju fl-aħħar tal-istudju (il-kwestjonarju "follow-up")

Kif ser jibbenefikaw ibnek/bintek mis-sehem tagħhom f'dan l-istudju?

Iż-żgħażaġh qiegħdin aktar u aktar ibatu mill-istress u dan il-programm online huwa maħsub biex jgħinohom inaqqsu l-livelli tal-istress u jitgħallmu kif jikkontrollawh aħjar. Jista' jkun li ibnek/bintek ma jibbenefikawx direttament, imma m'hemm ebda riskju prevedibbli għalihom jekk jieħdu sehem fl-istudju. Kull tagħrif li jingabar ser jgħin biex niżviluppaw programm online effettiv għaż-żgħażaġh li jbatu mill-istress u li jistgħu jkunu qed jieklu żżejjed b'riżultat ta' dan l-istress.

Ibnek/bintek jistgħu jieqfu jieħdu sehem qabel ma l-istudju jispicċa?

Iva, ibnek/bintek huma hielsa li jwaqqfu s-sehem tagħhom meta jridu waqt l-istudju bla ma jagħtu raġuni. Il-partecipazzjoni tagħhom fl-istudju hija fuq bażi volontarja u mhux marbuta mar-riżultati li jġibu fl-iskola.

L-informazzjoni li tingabar tibqa' kunfidenzjali (sigrieta)?

Kull informazzjoni mogħtija tinżamm kunfidenzjali u tintuża biss għall-finijiet tar-riċerka u tinqered wara għaxar (10) snin minn meta l-istudju jintemm (Ara d-dettalji oħra mehmuża).

Dan l-istudju gie approvat mill-awtoritajiet kompetenti?

Iva, dan l-istudju għadda minn taħt il-“Health Research Ethics Committee” ta’ l-Universita’ ta’ Plymouth.

Lil min tista’ ssaqsi jekk għandek xi mistoqsijiet?

Jekk għandek xi mistoqsijiet dwar l-istudju, jew issa jew waqt li jkun għaddej, tista’ tibghat email lil Daniela fuq daniela.cassola@plymouth.ac.uk jew iċċempel fuq 79728988. Jekk tkun tixtieq tara r-rizultati tal-istudju tista’ tibgħatilna email.

X’għandek tagħmel issa?

Jekk inti tagħti l-permess biex ibnek/bintek jiehdu sehem fl-istudju, għandek tghaddi l-karta bil-‘login details’ meħmuża ma din l-ittra lil ibnek/bintek. Ladarba jidhlu fil-website ikunu jistgħu jimlew il-kwestjonarju “baseline”, jagħmlu l-ħames sessjonijiet (wahda fil-ġimgħa), u jimlew il-kwestjonarju “follow-up” fl-aħħar tal-istudju.

Nittamaw li tkun tista’ tghinna f’dan l-istudju.

Dejjem tiegħek,



Daniela Cassola

Kif tikkuntattjana:

Daniela Cassola Ph.D. (Health Studies) Student School of Health Professions Faculty of Health University of Plymouth Mobile: 79728988 Email: daniela.cassola@plymouth.ac.uk	Professor A. de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth United Kingdom	Professor R. Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth United Kingdom
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Aktar informazzjoni:

1. Il-kwestjonarju “baseline” –
 - Dan il-kwestjonarju jieħu madwar 15-il minuta biex jimtela u jkun fih mistoqsijiet dwar kif jipperċepixxu l-istress, jekk jinklud iżżejjed minħabba l-emozzjoniet u kemm huma lesti biex jinbidlu.
 - Ikun fih ukoll mistoqsijiet ġenerali dwar it-tul (f'ċentimetri), l-piż (f'kilogrammi), u s-sess (maskil/femminil) u l-età' tagħhom. Ma jintalbu jagħtu isimhom, imma jintalbu jagħtu l-indirizz tal-email tagħhom biex inkunu nistgħu nikkuntattjawhom waqt l-istudju. L-emails li jintbagħtulhom waqt l-istudju jservu biex ifakkruhom jagħmlu s-sessjonijiet online u biex iżommulhom il-motivazzjoni għolja.

2. Is-sessjonijiet online –
 - Ibnek/bintek ikunu jridu jlestu sessjoni waħda fil-ġimgħa għal hames ġimgħat. Kull sessjoni tieħu madwar siegħa u għandha l-għan li żżid it-tagħrif ta' ibnek/bintek dwar l-istress u tghallimhom metodi partikolari kif jikkontrollaw il-livelli tal-istress tagħhom, pereżempju billi jifittxu s-sapport ta' nies li jafdaw, billi jtgħalmu kif jirrilassaw u kif jsovvu l-problemi.

3. Il-kwestjonarju “follow-up” –
 - Dan il-kwestjonarju jieħu madwar 30 minuta biex jimtela. L-ewwel parti tiegħu tkun bħal dik tal-kwestjonarju “baseline”. Fit-tieni parti tiegħu, ibnek/bintek jintalbu jwieġbu mistoqsijiet li għandhom l-għan li jtejbu l-ACES, pereżempju kemm kienu sodisfatti bil-programm b'mod ġenerali, kemm sabuha faċli jnavigaw fis-sessjonijiet online, u jekk sabux il-kontenut tas-sessjonijiet ta' interess għalihom.

Kunfidenzjalita'

F'dan l-istudju l-parteciċipanti ma jintalbu jagħtu isimhom. La aħna u lanqas il-parteciċipanti l-oħrajn ma jkunu jafu l-identita' ta' ibnek/bintek. Meta nipprezentaw ir-riżultati tal-istudju jista' jkollna bżonn nikkwotaw xi frazjiet minn dak li qalulna l-parteciċipanti, imma ma jkun possibli għal hadd li jidentifika min qal xiex.

K.2 Amended invitation letter for second recruitment period



Dear Parent/Guardian,

I am a Ph.D. student at the University of Plymouth and would like to invite your son/daughter to participate voluntarily in a research study called *ACES: Adolescents Coping with Emotional Eating and Stress*. This study is supported by the **Health Promotion and Disease Prevention Directorate (Malta)** and **University of Plymouth (United Kingdom)**.

Why are we doing this research study?

The purpose of this study is to test the usefulness of ACES (www.aces.org.mt) in helping Maltese adolescents decrease their stress levels.

This 4-week online program aims to help young people learn the skills needed to manage their stress levels which sometimes can lead to emotional eating (eating in response to/or to cope with emotions such as feeling stressed, upset or anxious). Emotional eating may, in turn, lead to weight gain and obesity. ACES aims to equip adolescents with a number of skills needed to cope including problem-solving, seeking social support, goal setting, time management, positive thinking as well as relaxation and physical activity.

Has anyone tried this before? What did they think?

Previous participants have told us that they have better coping skills, feel less stressed and have less problems with emotional eating after taking part in ACES. This is what they had to say:

- "It was very interesting and fun to take part in 😊"
- "I was impressed by all the information and this really helped me think more about how to cope with stress"
- "There is a lot of information regarding how to tackle emotional eating"
- "When I felt stressed I didn't really know how to deal with it – ACES has given me some useful tips and information"
- "I will definitely recommend ACES because I found it useful and so it can help others."

Is your son/daughter eligible to join the study?

If your son/daughter is between the ages of 14 and 16, and has access to the Internet, then he/she may join the study.

What will we ask your son/daughter to do in the study?

The following is a summary of what your son/daughter will be asked to complete in the study. Further information is attached to this letter:

- an online questionnaire at the start of the study (baseline questionnaire).
- five online modules about how to manage stress.
- a questionnaire at the end of the study (follow-up questionnaire)

What will your son/daughter get out of this?

We are really hopeful that your son/daughter will find ACES helpful just as previous participants have. There may be no direct benefit to your son/daughter; but there are also no foreseeable risks to participate in this study. Any information obtained will help improve ACES.

Can your son/daughter drop out of the study?

Yes, your son/daughter is free to stop taking part at any time during the study without giving a reason. Participation is voluntary and is not associated with your son/daughter's class grade.

What about confidentiality?

All data from this project are confidential and will only be used for the purposes of this research and destroyed within ten years of completion of the study (See further information attached).

Has this study been approved by all the right 'authorities'?

Yes, this study has been reviewed and approved by the Health Research Ethics Committee, University of Plymouth.

Who can you contact if you have more questions?

If you have any questions about the study now or during the study, please feel free to contact me by email on daniela.cassola@plymouth.ac.uk or by phone on 79728988. If you would like to see the outcomes of the study please email me.

What should you do now?

If you give permission for your son/daughter to take part, please pass the enclosed leaflet that includes login details for www.aces.org.mt as well as instructions on how to take part to your son/daughter.

We hope you are able to help us with the study!

Yours faithfully,



Daniela Cassola

Contact Details:

<p>Daniela Cassola Ph.D. (Health Studies) Student School of Health Professions Faculty of Health University of Plymouth Mobile: 79728988 Email: daniela.cassola@plymouth.ac.uk</p>	<p>Professor A. de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth United Kingdom</p>	<p>Professor R. Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth United Kingdom</p>
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Further information

1. The baseline questionnaire

- This questionnaire should take about 15 minutes to complete and will include questions about perceived stress, emotional eating and readiness to change.
- It will also contain a background questionnaire with questions about current height (in cm) and weight (in kg), gender and age. Your son/daughter will not be asked for their name. They will, however, be asked for their email address so that they can be contacted by email during the study. The emails that will be sent during the study will act as reminders to complete the online modules and to keep motivation levels up.

2. The on-line programme

- Your son/daughter will be asked to complete two modules in the first week then one module per week for three weeks. Each module takes less than 30 minutes to complete. The modules aim to increase your son/daughter's knowledge about stress and coping and teach your son/daughter specific ways how to cope and manage his/her stress levels such as seeking social support, relaxation and problem-solving.

If you would like to have a look at all the modules prior to giving your son/ daughter consent, you may request 'Test' login details (you will find all the modules unlocked) by sending an email to daniela.cassola@plymouth.ac.uk

3. The follow-up questionnaire

This questionnaire should take about 30 minutes to complete. The first part of this questionnaire will be the same as the questionnaire at the start of the study. The second part of the questionnaire will ask your son/daughter questions that aim to improve ACES such as questions about how satisfied your son/daughter was with the overall program, how easy it was to navigate through the modules and whether the content presented in the modules was interesting to him/her.

4. Confidentiality

During the study we do not ask participants for their names. Neither we nor the other participants will know who your son or daughter is. When we present the results of this pilot study we may wish to use quotes from what participants have said, but it would not be possible to identify who said them.

Għażiż ġenitur/kustodju,

Jien qed nagħmel dottorat fl- Università ta' Plymouth u nixtieq nistieden lit-tifel/tifla tiegħek biex jieħdu sehem bħala voluntiera fi studju ta' riċerka. Dan l-istudju jismu "ACES: Adolescents Coping with Emotional Eating and Stress" u għandu l-appoġġ tad-**Direttorat għall-Promozzjoni tas-Saħħa u Prevenzjoni tal-Mard** (Malta) u tal-**Università ta' Plymouth** (L-Ingilterra).

Għalfejn qed isir dan l-istudju?

L-iskop ta' din ir-riċerka hu li nsiru nafu jekk ACES huwiex programm utli għall-kontroll tal-istress biex l-adolesxenti Maltin ikunu jistgħu jnaqqsu l-livelli tal-istress.

Dan il-programm online ta' 4 ġimgħat għandu l-għan li jgħin liż-żgħażaġh jiksbu l-hiliet neċessarji biex jikkontrollaw il-livelli tal-istress, li, xi drabi, jistgħu jwassluhom biex jieklu żżejjed minhabba l-emozzjoniet (pereżempju l-istress, id-dwejjaq jew l-anzejta'). Dan jissejjah 'emotional eating' u jista' jwassal għal żieda fil-piż u obeżita'. L-għan ta' ACEA huwa li jgħin liż-żgħażaġh jiksbu numru ta' hiliet meħtieġa biex jimmaniġġjaw l-istress bħal 'problem-solving' (kif isolvu xi problema), 'seeking social support' (kif ifittxu l-għajnuna), 'time management' (kif iqassmu l-ħin), 'positive thinking' (kif jaħsbu b'mod pożittiv), kif ukoll rilassament u l-attività fiżika.

Dan il-programm qatt ippruvawh żgħażaġh oħra? X'dehrilhom?

Parteċipanti oħra qalulna li permiss ta' ACES tgħallmu kif jimmaniġġjaw l-istress, iħossuhom inqas stressjati u għandhom inqas problem ta' 'emotional eating':

- "Kien ferm interessanti u hadt pjaċir!"
- "Kont impressjonat bl-informazzjoni kollha li sibt u dan kien verament ta' għajnuna biex nahseb iktar dwar kif innaqqas l-istress"
- "Hemm ħafna informazzjoni dwar kif nindirizza l-'emotional eating'"
- "Meta kont inħossni stressjat ma tantx kont naf x'għandi nagħmel - ACES tani pariri u informazzjoni siewja"
- Żgur ser nirrakkomanda ACES għaliex jien sibtu utli u jista' jgħin lil haddiehor"

Ibnek/bintek jistgħu jieħdu sehem f'dan l-istudju?

Jekk ibnek/bintek għandhom bejn l-14 u s-16-il sena, u ndhom aċċess għall-Internet, jistgħu jieħdu sehem fl-istudju.

X'ser nitolbuhom jagħmlu f'dan l-istudju? (Din li ġejja hija lista fil-qosor. Hemm aktar dettalji fl-ittra mehmuża)

Ibnek/bintek:

- Jintalbu jimlew kwestjonarju online fil-bidu tal-istudju (il-kwestjonarju "baseline")
- Imbagħad jintalbu jagħmlu ħames sessjonijiet online dwar il-kontroll tal-istress
- U wara jintalbu jimlew kwestjonarju fl-aħħar tal-istudju (il-kwestjonarju "follow-up")

Kif ser jibbenefikaw ibnek/bintek mis-sehem tagħhom f'dan l-istudju?

Nittamaw li ACES jkun ta' għajnuna għal ibnek/bintek bħal ma kien għal parteċipanti oħra. Jista' jkun li ibnek/bintek ma jibbenefikawx direttament, imma m'hemm ebda riskju prevedibbli għalihom jekk

jieħdu sehem fl-istudju. Kull tagħrif li jingabar ser jgħin biex niżviluppaw programm online effettiv għaž-żgħažgħ li jbatu mill-istress u li jistgħu jkunu qed jieklu żżejjed b'riżultat ta' dan l-istress.

Ibnek/bintek jistgħu jieqfu jieħdu sehem qabel ma l-istudju jispiċċa?

Iva, ibnek/bintek huma ħielsa li jwaqqfu s-sehem tagħhom meta jridu waqt l-istudju bla ma jagħtu raġuni. Il-partecipazzjoni tagħhom fl-istudju hija fuq bażi volontarja u mhux marbuta mar-riżultati li jgħibu fl-iskola.

L-informazzjoni li tingabar tibqa' kunfidenzjali (sigrieta)?

Kull informazzjoni mogħtija tinzamm kunfidenzjali u tintuża biss għall-finijiet tar-riċerka u tinqered wara għaxar (10) snin minn meta l-istudju jintemm (Ara d-dettalji oħra mehmuża).

Dan l-istudju għe approvat mill-awtoritajiet kompetenti?

Iva, dan l-istudju għadda minn taħt il-"Health Research Ethics Committee" ta' l-Universita' ta' Plymouth.

Lil min tista' ssaqsi jekk għandek xi mistoqsijiet?

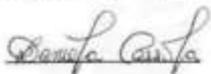
Jekk għandek xi mistoqsijiet dwar l-istudju, jew issa jew waqt li jkun għaddej, tista' tibgħat email lil Daniela fuq daniela.cassola@plymouth.ac.uk jew iċċempel fuq 79728988. Jekk tkun tixtieq tara r-riżultati tal-istudju tista' tibgħatilna email.

X'għandek tagħmel issa?

Jekk inti tagħti l-permess biex ibnek/bintek jieħdu sehem fl-istudju, għandek tgħaddi l-karta (leaflet) bil-'login details' u istruzzjonijiet għal www.aces.org.mt mehmuża ma din l-ittra lil ibnek/bintek.

Nittamaw li tkun tista' tgħinna f'dan l-istudju.

Dejjem tiegħek,



Daniela Cassola

Kif tikkuntattjana:

<p>Daniela Cassola Ph.D. (Health Studies) Student School of Health Professions Faculty of Health University of Plymouth Mobile: 79728988 Email: daniela.cassola@plymouth.ac.uk</p>	<p>Professor A. de Looy Professor of Dietetics School of Health Professions Faculty of Health University of Plymouth United Kingdom</p>	<p>Professor R. Jones Professor of Health Informatics School of Nursing and Midwifery Faculty of Health University of Plymouth United Kingdom</p>
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Aktar informazzjoni:

1. Il-kwestjonarju "baseline" –

- Dan il-kwestjonarju jiehu madwar 15-il minuta biex jimtela u jkun fih mistoqsijiet dwar kif jipperċepixxu l-istress, jekk jiklux iżżejjed minhabba l-emozzjoniet u kemm huma lesti biex jinbidlu.
- Ikun fih ukoll mistoqsijiet ġenerali dwar it-tul (f'centimetri), l-piż (f'kilogrammi), u s-sess (maskil/femminil) u l-eta' tagħhom. Ma jintalbu jagħtu isimhom, imma jintalbu jagħtu l-indirizz tal-email tagħhom biex inkunu nistgħu nikkuntattjawhom waqt l-istudju. L-emails li jintbagħtulhom waqt l-istudju jservu biex ifakkruhom jagħmlu s-sessjonijiet online u biex iżommuhom il-motivazzjoni għolja.

2. Is-sessjonijiet online –

- Ibnek/bintek ikunu jridu jlestu żewġ sessjonijiet fl-ewwel ġimgħa, imbagħad sessjoni fil-ġimgħa għal tlett ġimgħat.. Kull sessjoni tiegħu inqas minn nofs siegħa u għandha l-għan li żżid it-tagħrif ta' ibnek/bintek dwar l-istress u tghallimhom metodi partikolari kif jikkontrollaw il-livelli tal-istress tagħhom, pereżempju billi jifittxu s-sapport ta' nies li jafdaw, billi jitgħalmu kif jirrilassaw u kif jsolvu l-problemi.

Jekk tixtieq tagħti harsa lejn is-sessjonijiet qabel ma tagħti l-permess biex ibnek/bintek jieħdu sehem fl-istudju, tista' titlob "Test" login details (tkun tista' tara il-ħames sessjonijiet) billi tibgħat email fuq daniela.cassola@plymouth.ac.uk

3. Il-kwestjonarju "follow-up" –

- Dan il-kwestjonarju jiehu madwar 30 minuta biex jimtela. L-ewwel parti tiegħu tkun bħal dik tal-kwestjonarju "baseline". Fit-tieni parti tiegħu, ibnek/bintek jintalbu jwieġbu mistoqsijiet li għandhom l-għan li jtejbu l-ACES, pereżempju kemm kienu sodisfatti bil-programm b'mod ġenerali, kemm sabuha faċli jinnavigaw fis-sessjonijiet online, u jekk sabux il-kontenut tas-sessjonijiet ta' interess għalihom.

Kunfidenzjalita'

F'dan l-istudju l-partecipanti ma jintalbu jagħtu isimhom. La aħna u lanqas il-partecipanti l-oħrajn ma jkunu jafu l-identita' ta' ibnek/bintek. Meta nipprezentaw ir-riżultati tal-istudju jista' jkollna bżonn nikkwotaw xi frazjiet minn dak li qalulna l-partecipanti, imma ma jkun possibli għal hadd li jidentifika min qal xiex.

K.3 Phase 2 information leaflet

Outer side of leaflet:

The leaflet features a central graphic with four overlapping circles in orange, purple, green, and blue. The word "STRESSED?" is written in white capital letters across the orange circle. To the left of this graphic, the text "ACES.org.mt" is written in blue, with "we can cope" in smaller black text below it. To the right, the text "ACES.org.mt" is written in blue, with "we can cope" in smaller black text below it. Below the central graphic, there are two paragraphs of text: "Thank you for showing interest in the ACES research study!" and "If you misplace any of your login details or have any questions or difficulties send an email to daniela.cassola@plymouth.ac.uk". At the bottom right, the logo for "RESEARCH WITH PLYMOUTH UNIVERSITY" is displayed in green and black. On the left side, there are five speech bubbles containing participant feedback. At the top right, there are four cartoon avatars of diverse people.

Here's what previous participants had to say about **ACES**:

It was very interesting and fun to take part in 😊

I was impressed by all the information and this really helped me think more about how to cope with stress

I will definitely recommend ACES because I found it useful and so it can help others

When I felt stressed I didn't really know how to deal with it - ACES has given me some useful tips and information

There is a lot of information regarding how to tackle emotional eating

ACES.org.mt
we can cope

ACES.org.mt
we can cope

Thank you for showing interest in the **ACES** research study!

If you misplace any of your login details or have any questions or difficulties send an email to daniela.cassola@plymouth.ac.uk

RESEARCH WITH PLYMOUTH UNIVERSITY

Inner side of leaflet:

<p>What is ACES?</p> <p>ACES is a fun and interactive 4-week online program that helps young people like you learn how to cope with stress.</p> <p>Sometimes when we are stressed, upset or anxious we may turn to food for comfort to try to cope. This is known as emotional eating. ACES also helps decrease emotional eating.</p> <p>ACES has received very positive feedback so far but we really need your help to make it better! You can help by taking part in this research study.</p>	<p>What can I win?</p> <p>If you take part in ACES, and complete the 5 modules and the 2 questionnaires, you could win a prize!</p> <p>We have a growing list of Raffle Prizes, so here's a sneak peek!</p> <ul style="list-style-type: none"> • 15 ICE Watches • €30 One4All Gift Voucher redeemable from a large number of retail outlets • 3 USB Hubman • ...and more to come! 	<p>How can I take part?</p> <p>If you would like to be a part of ACES, this is what you need to do:</p> <ol style="list-style-type: none"> 1. Visit www.aces.org.mt 2. Click on the Questionnaire button on the right of the screen and enter your password (token) to complete the initial questionnaire. At the end of this questionnaire you will be given a four digit PIN which you will need to access the ACES modules. 3. Access the modules by clicking the My modules button on the right of the screen (or Login in the toolbar at the top of the screen).
<p>What will I be doing if I take part?</p> <p>You will complete 2 questionnaires (one at the beginning and one at the end of the study) and 5 modules about stress, how to solve your problems, how to set goals, etc. These modules do not take long and are made up of comics and activities.</p> <p>You can also take part in a discussion forum and look at other interesting resources about time management, positive thinking as well as relaxation and physical exercise.</p>	<p>All the instructions can be found on the Home page.</p> <p>Your personal, unique login details are:</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<p>All the instructions can be found on the Home page.</p> <p>Your personal, unique login details are:</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
		
<p>Want to know more?</p> <p>You can read more about ACES by visiting www.aces.org.mt and clicking on About ACES. Please keep your details safe and do not share them with anyone else!</p>		

Appendix L - Phase 2 recruitment advertisements

L.1 Print Advertisements



Monday, June 25, 2012, 02:12 by Juan Ameen

Stress linked to teenage obesity

With Malta ranking among the countries with the highest incidence of teenage obesity, a Maltese nutritionist has set out to give them the skills to avoid trying to eat their way out of stress.

Nearly 70 per cent of Maltese adolescents could be classified as high emotional eaters, according to a PhD study carried out by registered nutritionist and occupational therapist Daniela Cassola.

The study, which was done at the University of Plymouth, looked into the relationship between stress, coping and eating behaviours in Maltese adolescents.

Emotional eating is eating in response to, or to cope with, emotions such as stress or anxiety and may lead to weight gain and obesity, said Mrs Cassola, 31.

“There is already a very high prevalence of overweight and obesity in Maltese adolescents, with more than one fourth of Maltese teens being overweight or obese,” she pointed out.

If nothing is done to help reduce emotional eating in teens, this could worsen the already bad obesity problem, she said.

As part of her PhD study, Mrs Cassola has created an online programme for Maltese teenagers that gives them advice on how to manage their stress levels and emotional eating by learning coping skills.

Called Aces - Adolescents Coping with Emotional Eating and Stress - the five-week programme caters for those aged between 14 and 16.

It includes topics such as problem-solving, seeking social support, goal-setting and time management, dealt with in an interactive manner.

Mrs Cassola invited parents to contact her by emailing daniela.cassola@plymouth.ac.uk with any further questions they might have concerning the study and to learn how their children can take part in the programme. www.aces.org.mt.

Testing an Online Intervention for Stress and Emotional Eating in Maltese Adolescents

Sunday, 01 July 2012, 00:00

Are you concerned about your teen's ability to cope with stress? Parents of 14 to 16-year-old adolescents are being invited to find out how their teens can take part in a Ph.D. research study testing out a new five-week online stress-management program - www.aces.org.mt.

This program is called ACES which stands for Adolescents Coping with Emotional Eating and Stress. It aims to help 14 to 16-year-old Maltese adolescents to learn to manage their stress levels as well as any emotional eating by acquiring adequate coping skills.

Emotional eating is eating in response to/or to cope with emotions such as feeling stressed, upset or anxious. There seems to be a very high rate of emotional eating in Maltese teens. A recent study about the relationship between stress, coping and eating behaviours in Maltese adolescents (University of Plymouth) found that almost 70% of participants can be classed as high emotional eaters. Emotional eating and inadequate coping skills have been linked to overeating and obesity.

ACES covers a number of different topics such as problem-solving, seeking social support, goal setting and time management in a fun and interactive manner. The material presented in ACES is based on the results of a previous research study carried out (Stress, coping and eating behaviours in Maltese adolescents: Developing a model for an effective online intervention for the reduction of stress and overeating - Daniela Cassola, Professor Anne de Looy, Professor Ray Jones, University of Plymouth). These results have been presented at the 5th DIETS/European Federation of the Associations of Dieticians Conference in Barcelona as well as at the 19th European Congress on Obesity in Lyon.

Parents of 14 to 16-year-old adolescents are invited to contact Daniela at daniela.cassola@plymouth.ac.uk with any further questions concerning the study and to get to know how their son/daughter can be a part of it.

The research is funded by the University of Plymouth (United Kingdom) and is supported by the Health Promotion and Disease Prevention Directorate (Malta). The researcher would also like to thank Fantasy Tours for kindly sponsoring part of the raffle associated with this research.

L.2 Online Advertisements

Figure 42 to Figure 44 illustrate screenshots of the paid advertisements which were posted on a social media website (Facebook). The screenshots also show the potential reach, actual reach, frequency and number of clicks for the respective advertisements.

Status ✔ Completed	Budget €2.50 Daily	Duration (Malta time) 21 June 2012 14:30 – 28 June 2012 21:30	Potential Reach? 50,000 people
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Name	Status ?	Advert Reach ?	Freq. ?	Clicks ?	Click-Through Rate ?
Stressed? Can't cope?	✔	23,740	34.8	138	0.017%

<p>Advert Preview Edit</p> <p>Stressed? Can't cope? Win aces.org.mt</p> <p>Try our free 5-week online program for 14-16-year-olds! Ask your parents to contact us!</p> <p>ACES.org.mt we can cope</p>	<p>Targeting</p> <p>This advert targets 50,000 people:</p> <ul style="list-style-type: none"> ▪ who live in Malta ▪ between the ages of 14 and 16 inclusive <p>Suggested bid: €0.01–0.02 EUR</p>
--	--

Figure 42 - Online advertisement running from 21 to 28 June 2012

Status ✔ Completed	Budget €2.85 Daily	Duration (Malta time) 2 July 2012 13:30 – 8 July 2012 23:59	Potential Reach? 110,000 people
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Name	Status ?	Advert Reach ?	Freq. ?	Clicks ?	Click-Through Rate ?
Teen stressed?Can't cope?	✔	24,120	19.9	33	0.007%

<p>Advert Preview Edit</p> <p>Teen stressed?Can't cope? aces.org.mt</p> <p>Research into 5-week online stress-management for 14-16 yr old teens. Parents contact us!</p> <p>ACES.org.mt we can cope</p> <p>34 people like this.</p>	<p>Targeting</p> <p>This advert targets 110,000 people:</p> <ul style="list-style-type: none"> ▪ who live in Malta ▪ between the ages of 33 and 50 inclusive <p>Suggested bid: €0.01–0.04 EUR</p>
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Figure 43 - Online advertisement running from 2 to 8 July 2012

Status ✔ Completed	Budget €25.00 Lifetime	Duration (Malta time) 16 July 2012 11:30 – 30 July 2012 23:59	Potential Reach? 50,000 people
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Name	Status ?	Advert Reach ?	Freq. ?	Clicks ?	Click-Through Rate ?
Participate & Win! . . .	✔	17,354	43.5	89	0.012%

<p>Advert Preview Edit</p> <p>Participate & Win! . . . aces.org.mt</p> <p>Flights to Corfu, ICE watches, Vouchers & More! Test our free online stress management program</p> <p>ACES.org.mt we can cope</p> <p>34 people like this.</p>	<p>Targeting</p> <p>This advert targets 50,000 people:</p> <ul style="list-style-type: none"> ▪ who live in Malta ▪ between the ages of 14 and 16 inclusive <p>Suggested bid: €0.01–0.02 EUR</p>
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Figure 44 - Online advertisement running from 16 to 30 July 2012

Appendix M - Sponsorship request

ACES.org.mt



2, Sammut Flats
Trejjoet il-Kulpara
Bugibba SPB 2430

Mobile: 77160481 / 79728988
E-mail: daniela.cassola@plymouth.ac.uk

17th May 2012

Sponsorship Request

Dear Sir/Madam,

I am a Ph.D. student and am currently conducting a feasibility study of an online intervention for stress and emotional eating in Maltese adolescents. This research study is called *ACES: Adolescents Coping with Emotional Eating and Stress* and is supported by the Health Promotion and Disease Prevention Directorate (Malta) and the University of Plymouth (United Kingdom).

The purpose of this research study is to find out whether we could develop an Internet-based stress management intervention that helps Maltese adolescents decrease their stress levels. ACES (www.aces.org.mt) is a 5-week online program that aims to help young people learn the coping skills that are needed to manage their stress levels which can, in turn, lead to emotional eating (eating in response to/or to cope with emotions such as feeling stressed, upset or anxious).

Approximately 500 students from various schools in Malta will be invited to participate in this research study. Their ages will range from 14 to 16 years.

In order to maximise the rates of completion of the 5-week online intervention, I would like to hold a prize draw for the adolescents taking part in this study. To this end, I was hoping that you might be willing to sponsor this research.

I have attached a selection of sponsorship opportunities that I would like you to consider, however, should you have any additional ideas to create a successful package for your company/organisation, I would be happy to discuss the possibility of having tailor-made sponsorship packages.

Should you have any questions associated with this sponsorship request or this research study please do not hesitate to contact me via e-mail or on the numbers listed above.

I would like to take this opportunity to thank you for considering this request and look forward to hearing from you.

Kind regards,

Handwritten signature of Daniela Cassola in black ink.

Daniela Cassola

*B.Sc. (Hons.), M.Sc. (Plymouth), P.Q.Dip. (Nutr. & Diet.), S.R.O.T., S.R.Nutr., F.R.S.P.H.
Ph.D. Health Studies (Nutrition, Dietetics & E-Health) Student – University of Plymouth*

ACES Sponsorship Opportunities

Item	Cost	Benefits and Additional Information
Major Sponsorship	€ 500 - € 1000	<ul style="list-style-type: none"> ✓ Acknowledgement of support as major sponsor on intervention website (www.aces.org.mt) – company logo will be included in the acknowledgement ✓ Full page colour company profile included with Invitation Letter that will be mailed to parents (approx. 500 letters to be sent) ✓ 1 additional A4 Invitation Letter insert (advertisement to be provided by company by end of May 2012) ✓ First choice of all other sponsorship opportunities ✓ Acknowledgement of support as major sponsor in any local press coverage (e.g. newspaper articles) related to the current study
Main Raffle Prize	1 gift /voucher (or monetary donation to purchase a prize to raffle) Value: € 101 - € 500	<ul style="list-style-type: none"> ✓ Company name will be listed next to raffle prize on all print and online material (including Invitation Letter that will be mailed to parents, intervention website, email reminders to participants) describing raffle (Format: [Name of Prize]kindly sponsored by [Name of Company]) ✓ Acknowledgement of support on intervention website (www.aces.org.mt) ✓ Acknowledgement of support in any local press coverage (e.g. newspaper articles) related to the current study
Additional Raffle Prize	1 gift /voucher (or monetary donation to purchase a prize to raffle) Value: € 5 - € 100	<ul style="list-style-type: none"> ✓ Company name will be listed next to raffle prize on all print and online material (including Invitation Letter that will be mailed to parents, intervention website, email reminders to participants) describing raffle (Format: [Name of Prize]kindly sponsored by [Name of Company]) ✓ Acknowledgement of support on intervention website (www.aces.org.mt) ✓ Acknowledgement of support in any local press coverage (e.g. newspaper articles) related to the current study
Gift/voucher to first 100 participants who complete ACES	100 gifts/ vouchers	<ul style="list-style-type: none"> ✓ Half page company profile and details of give-away included with Invitation Letter that will be mailed to parents (approx. 500 letters to be sent) ✓ Acknowledgement of support on intervention website (www.aces.org.mt) ✓ Acknowledgement of support in any local press coverage (e.g. newspaper articles) related to the current study
Invitation Letter Insert 1 page A4 (or smaller) insert	€ 50	<ul style="list-style-type: none"> ✓ Company information / advertisement inserted in every Invitation Letter that will be mailed to parents (approx. 500 letters to be sent) ✓ Company needs to provide insert (advertisement) by end of May 2012 ✓ Acknowledgement of support on intervention website (www.aces.org.mt) ✓ Acknowledgement of support in any local press coverage (e.g. newspaper articles) related to the current study

Appendix N - External factors that may have affected perceived stress and emotional eating scores in Phase 2

Frequencies

Statistics

		External factors that may have affected stress levels during participation in ACES	External factors that may have affected emotional eating levels during participation in ACES
N	Valid	46	46
	Missing	79	79

Frequency Table

External factors that may have affected stress levels during participation in ACES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	9.6	26.1	26.1
	No	34	27.2	73.9	100.0
	Total	46	36.8	100.0	
Missing	System	79	63.2		
Total		125	100.0		

External factors that may have affected emotional eating levels during participation in ACES

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	11	8.8	23.9	23.9
Valid No	35	28.0	76.1	100.0
Total	46	36.8	100.0	
Missing System	79	63.2		
Total	125	100.0		

External factors identified

External factor that may have affected stress	Number of participants
Examinations/tests	6
Family/ family illness	3
A lot to do	2
Friends	2
Choosing a school/sixth form	2
Physical appearance	1
Sport competition	1

External factor that may have affected emotional eating	Number of participants
Examinations/tests	4
Boredom	2
Friends	1
Waiting for examination results	1
Sadness	1
Meeting new people	1

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
External factors that may have affected emotional eating levels during participation in ACES * PSSEndCategory	46	36.8%	79	63.2%	125	100.0%
External factors that may have affected emotional eating levels during participation in ACES * EmoEnd2categories	46	36.8%	79	63.2%	125	100.0%
External factors that may have affected stress levels during participation in ACES * PSSEndCategory	46	36.8%	79	63.2%	125	100.0%
External factors that may have affected stress levels during participation in ACES * EmoEnd2categories	46	36.8%	79	63.2%	125	100.0%

External factors that may have affected emotional eating levels during participation in ACES * PSSEndCategory (change from baseline to follow-up)

Crosstabulation

Count

		PSSEndCategory		Total
		PSS score decreased	PSS score increased	
External factors that may have affected emotional eating levels during participation in ACES	Yes	11	0	11
	No	21	14	35
Total		32	14	46

External factors that may have affected emotional eating levels during participation in ACES * EmoEnd2categories (change from baseline to follow-up)

Crosstabulation

Count

		EmoEnd2categories		Total
		Emotional eating scale score decreased	Emotional eating scale score did not decrease	
External factors that may have affected emotional eating levels during participation in ACES	Yes	6	5	11
	No	23	12	35
Total		29	17	46

External factors that may have affected stress levels during participation in ACES

*** PSSEndCategory (change from baseline to follow-up) Crosstabulation**

Count

		PSSEndCategory		Total
		PSS score decreased	PSS score increased	
External factors that may have affected stress levels during participation in ACES	Yes	11	1	12
	No	21	13	34
Total		32	14	46

External factors that may have affected stress levels during participation in ACES

*** EmoEnd2categories (change from baseline to follow-up) Crosstabulation**

Count

		EmoEnd2categories		Total
		Emotional eating scale score decreased	Emotional eating scale score did not decrease	
External factors that may have affected stress levels during participation in ACES	Yes	8	4	12
	No	21	13	34
Total		29	17	46

Appendix O - ACES Discussion Board

The discussion forum was only used by 11 different participants (22 comments). The researcher posted using three different usernames to promote the discussion - as Daniela (name of researcher), and as Alex and Emzy (peers of participants) [Table 50]. None of the participants posted content which was deemed as inappropriate, indicated psychosocial distress, or requested assistance.

Section	Question	Total number of comments	Number of comments made by researcher (posting as Alex, Daniela and Emzy)	Number of comments make by participants (11 different participants)
Module 1	1	12	4	8
	2	6	2	4
	3	6	3	3
Module 2	1	1	1	0
	2	4	2	2
	3	3	1	2
Module 3	1	1	1	0
Module 4	1	0	0	0
	2	1	0	1
Module 5	1	1	1	0
	2	0	0	0
Other	1	0	0	0
	2	1	0	1
	3	2	1	1

Table 50: Number of comments posted in the Discussion Forum

0.1 Discussion Board screenshots

Main Page:

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Discussions

Have your say by clicking on the discussion questions/topics below!

Module 1 - Stress	Replies	Posted on
What effects does stress have on you? How does it feel when you are stressed?	12	21/05/2012 14:23pm
Which are the three coping strategies you use most?	6	21/05/2012 14:29pm
Which of the 23 coping strategies would you like to use more? Why?	6	21/05/2012 14:30pm
Module 2 - Coping	Replies	Posted on
Which non-productive strategies do you use?	1	21/05/2012 15:35pm
What types of foods do you eat for comfort when you feel stressed out?	3	21/05/2012 15:36pm
Can you think of an enjoyable activity that you could do instead of eating when you are stressed out?	4	21/05/2012 15:37pm
Module 3 - Problem-Solving	Replies	Posted on
Sam found a mobile phone on the pavement on his way home...	1	21/05/2012 16:16pm
Module 4 - Social Support	Replies	Posted on
Can you think of any advantages of asking a professional rather than a friend for help?	0	21/05/2012 22:08pm
Can you think of any reasons why someone your age may decide not to seek help?	1	21/05/2012 22:10pm
Module 5 - Goal Setting	Replies	Posted on
What is your biggest wish/dream?	1	21/05/2012 22:12pm
What reward would you give yourself for achieving a goal?	0	21/05/2012 22:14pm
Other Discussions	Replies	Posted on
Would you like to share some good information, idea, or helpful resource?	0	29/05/2012 15:20pm
What is your favourite part of ACES?	1	29/05/2012 15:18pm
What don't you like about ACES?	2	28/05/2012 17:30pm

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Website design and development by Preenstuckis

Discussion Topics Pages (pages with zero posts have been omitted):

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All our discussions / [What effects does stress have on you? How does it feel when you are stressed?](#)

Posted on Monday 21/05/2012 14:23pm	
ACES.org.mt	What effects does stress have on you? How does it feel when you are stressed? In Module 1 we got to know about how stress can affect our mind, body, feelings and behaviours. How does stress affect you?
Posted on Wednesday 23/05/2012 14:49pm delete	
Daniela	I feel very anxious . tense . irritable . edgy. I get tummy aches and my hands feel cold and clammy.
Posted on Wednesday 13/06/2012 18:33pm	
Alex	I feel really aggressive :(
Posted on Monday 02/07/2012 09:57am	
Yanica	I usually turn to food / if its about school I will get very edgy and if someone tells me something I cry easily
Posted on Tuesday 10/07/2012 16:00pm	
Emzy	I feel like everything is going wrong ...and I don't know what to do :(like I've lost control over my life :(...I do tend to pig out when I'm stressed and then I feel bad for stuffing my face because the problems don't go away
Posted on Tuesday 24/07/2012 14:24pm	
TheAthlete	Usually when i'm stressed I turn to food, and most of the time i end up wasting time. :p
Posted on Saturday 28/07/2012 18:56pm	
debbamic	When I am stressed I go and eat a lot of food and it makes my things just worse! It's a habit but instead of making things better it gets worse! When I'm stressed I feel like crying and feel very angry and really tensed.
Posted on Friday 10/08/2012 18:51pm	
Luke	When I am stressed my hands fell cold and numb and i also turn to food sometimes. During exam time i feel really tense and unsure of myself.
Posted on Monday 13/08/2012 15:29pm	
SeanP	Well if i feel stressed I used to turn to food. I didn't even know I would go to the fridge and eat. I overcame the problem and now i just lay in my bed and think how i can lower my stress level.
Posted on Friday 09/11/2012 17:47pm	
Alessia	When I feel stressed I used to eat many sweets. Now I just go out for a walk :)
Posted on Tuesday 13/11/2012 20:06pm delete	
Daniela	That sounds like a great thing to do to let off some steam Alessia :)
Posted on Monday 19/11/2012 21:26pm	
Maxinerc	I Feel that i'm not useful / Angry ...blaming people for nothing .
Posted on Monday 26/11/2012 18:07pm	
RALF	I feel really angry
Post comment	
Daniela	<input type="text"/>



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All our discussions / [Which are the three coping strategies you use most?](#)

Posted on Monday 21/05/2012 14:29pm

ACES.org.mt

[Which are the three coping strategies you use most?](#)

In Module 1 we covered 23 different coping strategies. Which 3 do you use mostly?

Posted on Wednesday 13/06/2012 18:36pm

Alex

I usually worry a lot. I eat to try to cope and there are times when I exercise to get my mind off things

Posted on Tuesday 10/07/2012 16:04pm

Emzy

...hmmm most of the time I try to ignore a problem, sometimes I try to be funny and joke around to let off some steam and at times I make a big effort to relax...I listen to music and dance

Posted on Tuesday 24/07/2012 14:25pm

TheAthlete

I talk to my closest friends and my sister about my problems...

Posted on Saturday 28/07/2012 18:58pm

debbsmic

I talk to my best friends to try to make things better, I worry a lot and I eat a lot especially when I am stressed with exams for example! Or when there are a lot of problems unsolved in my head.

Posted on Friday 10/08/2012 18:53pm

Luke

I usually talk to my best friends, sometimes I ignore the problem and I also listen to music to try and calm myself down.

Posted on Monday 13/08/2012 15:32pm

SeanP

Long thinking
Giving up... sometimes(Ending eating)
Talk to family/friends about my problem and try to help

Post comment

Daniela

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All our discussions / [Which of the 23 coping strategies would you like to use more? Why?](#)

Posted on Monday 21/05/2012 14:30pm

ACES.org.mt **Which of the 23 coping strategies would you like to use more? Why?**
 In Module 1 we covered 23 different coping strategies. Are there any strategies that you would like to use more than you currently do?

Posted on Wednesday 13/06/2012 18:37pm

Alex I'd like to focus on solving the problem more

Posted on Tuesday 10/07/2012 16:07pm

Emzy accept best efforts ... sometimes I feel I am not good enough and give myself a hard time like I am my own worst enemy ... it would be great if I could accept the fact that I try my best

Posted on Saturday 28/07/2012 18:59pm

debbsmic I want to try and solve the problem not ignore it because the problems can only get worse !

Posted on Monday 13/08/2012 15:35pm

SeanP Search for help (Friends/Family/Guidance) not after the situation is at the state that I have no other choice but to tell them about it.

Posted on Saturday 10/11/2012 15:02pm

gable I sometimes don't solve problems that I have and then more problems I would have so I really like to know more about my problems.

Posted on Tuesday 13/11/2012 15:05pm [delete](#)

Daniela Hey gable, I really hope you will find the module about problem solving helpful

Post comment

Daniela

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All our discussions / [Which non-productive strategies do you use?](#)

Posted on Monday 21/05/2012 15:35pm

ACES.org.mt **Which non-productive strategies do you use?**
 What could you try doing instead?

Posted on Tuesday 10/07/2012 16:07pm

Emzy I sometimes ignore a problem ... I think I should try to understand what the problem is and how I can solve it

Post comment

Daniela

Post



All our discussions / [What types of foods do you eat for comfort when you feel stressed out?](#)

Posted on Monday 21/05/2012 15:38pm

ACES.org.mt [What types of foods do you eat for comfort when you feel stressed out?](#)
Give examples of the foods you usually turn to when you feel stressed.

Posted on Tuesday 10/07/2012 16:09pm

Emzy chocolate, ice cream . sweets

Posted on Thursday 12/07/2012 14:25pm

Yanica Chocolate ; and anything sweet.

Posted on Friday 09/11/2012 17:48pm

Alessia Sweets, especially packets

Post comment

Daniela

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All our discussions / [Sam found a mobile phone on the pavement on his way home...](#)

Posted on Monday 21/05/2012 16:15pm

ACES.org.mt **Sam found a mobile phone on the pavement on his way home...**

This mobile is so much better than his. He would really like to keep it but thinks that it might be the wrong thing to do
 What possible solutions can you think about?
 What would be the pros and cons of each solution you've listed?
 If you were Sam, which solution would you choose? Why?

Posted on Tuesday 10/07/2012 16:12pm

Emzy check his contacts and phone someone on his list or take it to the police station
 pros: he would have done the right thing & the one who lost it gets his mobile back
 cons: Sam won't get to keep the mobile
 I'd probably just phone someone on his contact list and find a way to contact the owner .seems like less of a hassle

Post comment

Daniela

Post

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All our discussions / [Can you think of any reasons why someone your age may decide not to seek help?](#)

Posted on Monday 21/05/2012 22:10pm

ACES.org.mt **Can you think of any reasons why someone your age may decide not to seek help?**

What can act as a barrier to seeking social support?

Posted on Tuesday 24/07/2012 14:22pm

TheAthlete They may not know how to express themselves .meaning that the problems they have would be difficult to talk about.
 ;)

Post comment

Daniela

Post

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All our discussions / [What is your biggest wish/dream?](#)

Posted on Monday 21/05/2012 22:12pm

ACES.org.mt [What is your biggest wish/dream?](#)

Is there something you can do now to work towards achieving your biggest wish/dream?

Posted on Tuesday 10/07/2012 16:13pm

Emzy I want to swim with dolphins ...somewhere abroad

Post comment

Daniela

Post

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All our discussions / [What is your favourite part of ACES?](#)

Posted on Tuesday 29/05/2012 15:16pm

ACES.org.mt [What is your favourite part of ACES?](#)

What part (e.g. module, comic or activity) did you like best? Why?

Posted on Tuesday 24/07/2012 14:27pm

TheAthlete Helps me deal with stress much better.

Post comment

Daniela

Post



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All our discussions / [What don't you like about ACES?](#)

Posted on Monday 28/05/2012 17:30pm

ACES.org.mt

[What don't you like about ACES?](#)

Was there any module/comic/activity that you did not like? Why?

Posted on Tuesday 03/07/2012 16:45pm

Skeletru

What I don't like that much is that the way the teenagers talk is pretty artificial, and Chrissy's habits are a bit impractical, or strange.

Posted on Tuesday 10/07/2012 16:19pm [delete](#)

Daniela

Hi Skeletru - which of Chrissy's habits are you finding impractical/strange? Do you have any suggestions about how these can be improved? ...and with regards to the way the teenagers talk being 'pretty artificial' - what can be done to make it seem more realistic?

Post comment

Daniela

Post

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