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Psychological interventions for overweight or obesity (Review)

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Psychological interventions for overweight or obesity (Review)

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This record should be cited as:

This version first published online: 20 April 2005 in Issue 2, 2005.
Date of most recent substantive amendment: 23 February 2005

ABSTRACT

Background
Overweight and obesity are global health problems which are increasing throughout the industrialised world. If left unchecked, they will continue to contribute to the ever increasing noncommunicable disease burden.

Objectives
To assess the effects of psychological interventions for overweight or obesity as a means of achieving sustained weight loss.

Search strategy
Studies were obtained from searches of multiple electronic bibliographic databases. The date of the latest search was June 2003.

Selection criteria
Trials were included if they fulfilled the following criteria: 1) they were randomised controlled clinical trials of a psychological intervention versus a comparison intervention, 2) one of the outcome measures of the study was weight change measured by any method, 3) participants were followed for at least three months, 4) the study participants were adults (18 years or older) who were overweight or obese (BMI > 25 kg/m²) at baseline.

Data collection and analysis
Two people independently applied the inclusion criteria to the studies identified and assessed study quality. Disagreement was resolved by discussion or by intervention of a third party. Meta-analyses were performed using a fixed effect model.

Main results
A total of 36 studies met the inclusion criteria and were included in the review. Overall, 3495 participants were evaluated. The majority of studies assessed behavioural and cognitive-behavioural weight reduction strategies. Cognitive therapy, psychotherapy, relaxation therapy and hypnotherapy were assessed in a small number of studies. Behaviour therapy was found to result in significantly greater weight reductions than placebo when assessed as a stand-alone weight loss strategy (WMD -2.5 kg; 95% CI -1.7 to -3.3). When behaviour therapy was combined with a diet / exercise approach and compared with diet / exercise alone, the combined intervention resulted in a greater weight reduction. Studies were heterogeneous however the majority of studies favoured combining behaviour therapy with dietary and exercise interventions to improve weight loss. Increasing the intensity of the behavioural intervention significantly increased the weight reduction (WMD -2.3 kg; 95% CI -1.4 to -3.3). Cognitive-behaviour therapy, when combined with a diet / exercise intervention, was found to increase weight loss compared with diet / exercise alone (WMD -4.9 kg; 95% CI -7.3 to -2.4). No data on mortality, morbidity or quality of life were found.

Authors’ conclusions
People who are overweight or obese benefit from psychological interventions, particularly behavioural and cognitive-behavioural strategies, to enhance weight reduction. They are predominantly useful when combined with dietary and exercise strategies. The bulk of the evidence supports the use of behavioural and cognitive-behavioural strategies. Other psychological interventions are less rigorously evaluated for their efficacy as weight loss treatments.
PLAIN LANGUAGE SUMMARY

Cognitive behaviour therapy and behaviour therapy improve weight loss in people who are overweight or obese

Several psychological methods are used to try and help people who are overweight or obese to lose weight. This review found that cognitive behaviour therapy and behaviour therapy significantly improved the success of weight loss for these people. Cognitive therapy was not effective as a weight loss treatment. There was not enough evidence to reach a conclusion about other psychological forms of therapy, such as relaxation therapy and hypnotherapy, however the evidence that is available suggests that these therapies may also be successful in improving weight loss. No data on mortality, morbidity or quality of life were found.

BACKGROUND

OBESITY

Obesity is a condition of excess body fat (NHMRC 1997). It has been variously defined. Using body mass index (BMI = weight (kg) / height (m)²) as a measure of adiposity, in most countries obesity is defined as a BMI more than 30, and overweight as a BMI of 25 to 30. However, measures of obesity and overweight do vary according to country and ethnic group (NHMRC 1997). The prevalence of obesity continues to increase in Western countries where approximately half of the population is currently overweight (Birmingham 1999). Both environmental and biological factors have been identified which predispose individuals to becoming obese.

OBESITY AND THE ENVIRONMENT

There is no doubt that obesity is strongly influenced by environmental factors. The prevalence of obesity has increased rapidly in Western countries - too rapidly for this to be due to biological factors alone (WHO 1998). Environmental factors which influence development of overweight and obesity are both macro-environmental (affecting the whole population) and micro-environmental (affecting the individual). Social and cultural factors also play a part. Anthropological studies have identified numerous changing factors which affect the prevalence of obesity in different cultures. Throughout history humans have been active in the process of survival - hunter gathering, farming food, collecting fuel and participating in manufacture and commerce. The technology of today has reduced much of the need for human movement. These changes have occurred gradually and have occurred as the prevalence of obesity has increased worldwide (DHAC 2001).

Population activity levels have been affected by social policy and government (NHS 1993). As a result of increased use of motor vehicles, pedestrian safety has been compromised, reducing the use of walking and cycling as alternative forms of transportation (NHS 1993). Fewer ‘green’ areas (e.g. parks and fields) within high density urban populations reduces the available facilities for recreational activities such as walking, ball games, skating, and cycling (WHO 1998). Modernisation has resulted in a proliferation of our food supply as well as changing our levels of physical activity. Food supply, storage, availability, and price all determine the eating patterns of populations (Lester 1994). The industrialization of food production, improvements in food preservation techniques and the development of supermarkets, snack and ready-to-eat foods and fast foods, have altered and expanded the range of foods available in many countries. There has also been an increase in supply of foods that are high in fat (Lester 1994). High fat food consumption has increased dramatically as these foods are often cheaper and more readily available than healthier alternatives. Similarly, high fat ‘junk’ foods are supplied in a wider variety of settings e.g. school canteens and workplaces, increasing levels of consumption compared to nutritious low-fat alternatives (NHS 1993).

Socio-cultural factors affect food consumption. Advertising of processed, higher fat foods is more common than advertising for nutritious foods. This negative health message encourages the consumption of unhealthy foods thereby negatively influencing population eating habits (Dietz 1985). Customs particular to different cultures also affect eating habits. Celebrations often centre around the consumption of excess quantities of high-calorie, low nutritional value foods (Egger 1997). Easter tide, thanksgiving, birthday parties, weddings and Christmas celebrations are examples of such celebrations involving food in many countries. Social trends towards families where parents are in the workplace rather than in the home have resulted in a reduction in time available for meal preparation with a corresponding increased consumption of convenience food and take-away food (Bryce 2001; Schneider 1997).

BIOLOGICAL DETERMINANTS OF OBESITY

In contrast to the environmental determinants of obesity, the biological determinants of obesity are still incompletely understood. The pattern of inheritance of obesity strongly suggests it is a polygenic condition, with many different genes making a small difference in effect on weight (Ravussin 2000). As a phenotype obesity is heterogeneous, with two distinct but overlapping subtypes: general obesity and abdominal obesity, each with different physiological, clinical and prognostic implications. Abdominal obesity is associated with greater health risk than general obesity (Sørensen 2001). Gender also influences development of obesity. In the majority of prevalence studies obesity is found to be more common in women than in men. There are numerous social and biological theories as to why this is the case. Men have higher metabolic rates and larger ratios of lean body mass, which is more metabolically
active, than women. Also, males are more likely to be physically active than women. This means that men burn more calories per kilogram than women, reducing their rate of weight gain if they overeat. Binge eating and compulsive overeating, both of which contribute to the development of obesity in certain individuals, are more common in women than in men (French 1994). The age at which excess bodyweight develops also influences the pattern of obesity throughout the life of the individual. If obesity develops in childhood, the risk of obesity into adulthood is increased compared to people of normal weight. Social and cultural norms regarding dietary restraint and attitudes towards overweight, acquired in childhood, influence adult behaviours and contribute to development of obesity (Tower 2000). Also, because of the relative increase in the number of fat cells that occurs when weight is gained in childhood compared to adulthood, the obese child is predisposed to continuing obesity throughout life. In contrast, when weight is gained in adulthood the first adaptive change in fat cells is increase in cell lipid stores as opposed to increases in cell numbers. However, as weight continues to increase, cell numbers will increase as well as cell size (Brownell 1986b).

**HEALTH EFFECTS OF OBESITY**

Obesity contributes to the development of a number of diseases, including hypertension, hyperlipidemia, diabetes mellitus, osteoarthritis, and psychological problems (Karlsson 1997; Narbro 1997). There is also an increase in all-cause mortality in obese people. The relationship between excess mortality and obesity is not straightforward. It varies with factors such as age (smaller excess mortality with increasing age) (Bender 1999), gender (smaller excess mortality in women than men) (Bender 1999) and level of physical fitness (Lee 1999). A number of large longitudinal studies have examined the relationship between obesity, disease and mortality. In 1979, Lew and Garfinkel published the American Cancer Society study (Lew 1979). This study followed 340,000 men and 420,000 women aged between 38 and 89 years for an average of 13 years. Mortality ratios (MR) were calculated for a number of conditions. Mortality ratios for obese people compared to people of normal weight were demonstrated to be increased for diabetes (MR 25.0), coronary disease (MR 4.0), cerebrovascular disease (MR 5.0), colon cancer (MR 1.7), prostate cancer (MR 1.3), gall bladder cancer (MR 3.6), breast cancer (MR 1.5), cervical cancer (MR 2.4), endometrial cancer (MR 5.4) and ovarian cancer (MR 1.6). In the Framingham study, obesity was demonstrated to be related to increased mortality and morbidity even after controlling for diabetes, hypertension, and lipids (Hubert 1983). Hoffmans and colleagues demonstrated a U-shaped relationship between mortality and body mass index in their Finnish study of 23,000 men aged over 25 years followed for 12 years. Smoking was controlled for in this study. The all-cause mortality ratio in obese people compared to controls was 1.5 (Rissanen 1989). Manson and colleagues reported on 116,000 United States nurses followed for eight years. The endpoints in this study were myocardial infarction and fatal coronary events. The mortality ratio among obese women was 2.5 without controlling for smoking, and 3.5 after adjusting for smoking (Manson 1990). Perhaps the largest study of the relationship between obesity and mortality was the Norwegian Experience. This was a compulsory x-ray examination of all of the citizens of Norway over 15 years of age. The study, conducted between 1967 and 1975 was designed to detect tuberculosis in citizens, but weight and height were also registered. All counties except for two in Norway were examined. Approximately 85% of the countries population were included, a sample of 816,000 men and 902,000 women. People were followed for 10 years. During this time there were 177,000 deaths. Results demonstrated an exponential increase in all-cause mortality as body mass index increased. All-cause mortality was doubled in people aged 40-50 years with a body mass index of 34 (male) and 38 (female) compared to normal weight controls (Waaler 1984).

**WEIGHT LOSS IN OBSE費 PEOPLE**

Diet, exercise and psychological strategies are potentially effective weight loss interventions in adults (NHLBI 1998). Weight loss studies generally demonstrate short term weight loss (several months) only with these strategies, with most of the weight initially lost regained within a few years. The benefits of weight loss in obese people have been demonstrated in short-term studies, which show reduction in cardiovascular risk factors and improved psychological outcomes (Garrow 1988). Modest weight loss of about 10% results in improvement in blood glucose and triglycerides as well as improved physical performance and well-being. Greater loss of weight gives greater benefit (Wilding 1997). Evidence suggests that weight loss reduces blood pressure in both overweight hypertensive and normotensive individuals, reduces serum triglycerides and increases high-density lipoprotein (HDL)-cholesterol, and produces some reduction in total serum cholesterol and low-density lipoprotein (LDL)-cholesterol. Weight loss reduces blood glucose levels in overweight and obese persons with and without diabetes (Despres 1994). In obese people regular physical activity reduces rates of coronary heart disease, hypertension, non-insulin dependent diabetes mellitus even if no weight is lost (Powell 1996). Controlled studies assessing the effect of sustained weight loss on mortality are lacking. However, some indicative information is available. Analysis of insurance data regarding individuals who had initially received sub-standard insurance because of obesity but who subsequently issued policies when they had reduced weight demonstrates a mortality of weight-reduced people approaching the standard risk (Marks 1960; Metropolitan 1980). Although there have been no prospective trials to show changes in mortality with weight loss in obese patients, reductions in risk fac-
tors may imply that development of type 2 diabetes mellitus and cardiovascular disease would be reduced with weight loss. From risk factor changes induced by spontaneous weight reductions in the Framingham study, it has been estimated that a 10% reduction in body weight would correspond to a 20% reduction in the risk of developing coronary artery disease (Ashley 1974).

**PSYCHOLOGICAL ASPECTS OF OBESITY**

There has been considerable effort to find personality variables associated with obesity; however, there is no evidence that obese people differ psychologically from non-obese people. There is no difference between obese and non-obese people in the following characteristics: degree of depression (Stewart 1983), the incidence of psychopathology (Friedman 1995; Stunkard 1992), social adjustment (Sallade 1973), ‘traits’ of masculinity-femininity, locus of control, assertiveness and self-consciousness (Klesges 1984) and personality type (Blackmeyer 1990). However, obese people in general do not find their state desirable. For example, in a sample of formerly obese people who had undergone gastric surgery, Rand and MacGregor (Rand 1991) found that all of the 47 participants who were interviewed would rather be deaf, dyslexic, diabetic, or suffer bad heart disease or acne than return to being morbidly overweight. Forty-two percent preferred blindness to obesity, and 43 participants would rather have a leg amputated. This dislike of obesity felt by sufferers may reflect stigmatisation by others in the population. Diverse groups hold negative stereotypes of obese people. Boys between six and ten years old rate silhouettes of obese boys as someone who would fight, cheat, get teased and lie, and who was lazy, sloppy, naughty, mean, ugly, dirty and stupid (Staffieri 1967). Studies of adult attitudes similarly demonstrate negative attitudes. Adult hospital outpatients rate silhouettes of an overweight child as less likeable than a child with a deformed leg, with a missing hand, with a facial deformity, or who was confined to a wheelchair (Maddox 1968). Similarly, doctors and medical students hold negative views of people who are obese. Medical students rate overweight women as less likeable, more emotional, and less likely to benefit from treatment. Doctors rate overweight patients as weak-willed, ugly and awkward (Bretyspraak 1977; Maddox 1969). Job prospects are also affected. Larkin and Pines (Larkin 1979) showed that overweight candidates were less likely to be hired, even though equally competent on job-related tests. Given these negative attitudes, it is surprising that obese people are not more likely to be depressed or to have psychopathology. Because studies comparing obese and non-obese persons have generally failed to find differences in global aspects of psychological functioning, the resulting conclusion has been that obesity is not a risk factor for psychological problems. This is at odds with clinical impression, reports from overweight people, and a consistent literature showing strong cultural bias and negative attitudes toward obese people (Friedman 1995). It is clear that obesity confers negative consequences on both the physical and psychosocial aspects of quality of life, especially among the severely obese. Therefore the lack of evidence supporting the existence of psychological mor-

**PSYCHOLOGICAL INTERVENTIONS**

A variety of individual and group psychological therapies have been used in weight loss treatments. These are briefly outlined below. Behavioural and cognitive behavioral therapies are the most commonly used psychological therapies for weight loss. Attitude and relationship techniques are also often utilized in designing comprehensive psychological interventions for individualized weight loss programs. Psychotherapy is less commonly used (Brownell 1984).

Behaviour therapy and cognitive behaviour therapy appear to be the psychological treatments of choice inasmuch as they have been demonstrated to facilitate better maintenance of weight loss than other therapies. Behavioural treatments appear to work primarily by enhancing dietary restraint by providing adaptive dietary strategies and by discouraging maladaptive dietary practices, and by increasing motivation to be more physically active. Therapy aims to provide the individual with coping skills to handle various cues to overeat and to manage lapses in diet and physical activity when they occur. Treatment also provides motivation essential to maintain adherence to a healthier lifestyle once the initial enthusiasm for the program has waned (Wing 1994). Therapeutic techniques derived from behavioural psychology include stimulus control, goal setting, and self-monitoring. They have been used for some time as adjuncts to the treatment of weight problems.

When cognitive techniques are added to behaviour therapy they appear to improve program success and reduce weight regain (Cooper 2001). These strategies are aimed at identifying and modifying aversive thinking patterns and mood states to facilitate weight loss (Wilson 1999). Interest in using cognitive behaviour therapy to achieve more modest and sustainable weight loss and improved psychological well-being is increasing.

Psychodynamic therapies (therapies based on the idea that problems stem from hidden inner conflicts, e.g. psychoanalysis), humanistic therapies (therapies that focus on helping clients to find meaning in their lives and live in ways consistent with their own values and traits, e.g. person-centred therapy) and group therapies have also been trialled in obesity management with mixed success (Baron 1998).

Group treatments for obesity combine therapy and education. They are widely used in commercial programmes and in self-help programs. Group treatments do not generally promote deep exploration of psychological issues. Instead they utilize social sup-
port, problem solving, and imparting information and encouragement to facilitate weight loss (Hayaki 1996). There has been limited research into group processes and testing whether group interventions are more or less effective than individual treatment (Hayaki 1996).

There are a limited number of systematic reviews examining the effectiveness of psychological interventions for overweight or obesity. Four systematic review examining the effectiveness of behaviour therapy have demonstrated that behaviour therapy techniques, in combination with other weight loss approaches (diet and / or exercise) improve weight loss (Douketis 1999, NHMRC 2003; NIH 1998; NHS CRD 1997). Systematic reviews of other forms of psychological interventions are lacking.

AIMS OF THIS REVIEW
Psychological interventions ideally should be used in the context of a multi-component weight loss programme to gain their maximum benefit. Diet and exercise combined with psychological interventions comprise an intuitively powerful weight loss program (NHLBI 1998). However, in spite of the increased comprehensiveness of weight loss programs and improvements in patient education, understanding of the role of diet and exercise in weight loss, psychological interventions, and improved pharmacotherapies for weight reduction, results of weight loss trials have continued to remain disappointing (Liao 2000). There are still major gaps in our understanding of the roles of diet, exercise, and psychological therapies in weight reduction. Also, achieving long-term modification of food intake and food type by the obese individual without creating decreases in energy expenditure associated with dieting, and dealing with relapse to pre-intervention diet and exercise behaviours are ongoing challenges (Brownell 1986a). This review aimed to clarify some of these issues, using high quality criteria to assess and summarise the evidence.

OBJECTIVES
To assess the effects of psychological interventions for overweight or obesity as a means of achieving sustained weight loss.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies
All randomised controlled clinical trials of psychological interventions for weight loss in overweight or obese people were considered for inclusion. Quasi-randomised trials were also considered.

With psychological interventions it makes more sense to define duration in terms of minimum number of sessions rather than number of months. However, most studies report duration in terms of months. Therefore we defined trial duration according to the number of months over which they have been conducted and only included trials with interventions that lasted longer than three months (including follow-up). Trials with a drop-out rate of greater than 15% were excluded.

Types of participants
Studies were limited to adult participants only (aged over 18 years). Studies included adults with overweight or obesity at study baseline according to any parameter (e.g. body mass index, waist measurement, waist-to-hip ratio). Over the years, the diagnostic criteria and classification of obesity have changed several times (NHMRC 1997). To be consistent with changes in classification and diagnostic criteria of obesity through the years, the diagnosis needed to have been established using the standard criteria valid at the time of the beginning of the trial. Changes in diagnostic criteria were considered for exploration in sensitivity analyses.

Types of intervention
Studies that stated they included a psychological intervention were not included within the analyses unless the type of psychological intervention was able to be identified. Individual and group therapies were included. All types of psychological interventions were considered for inclusion.

It is common for psychological interventions to be prescribed in conjunction with dietary and exercise interventions. The analysis included the following subcategories:

1. Psychological intervention versus no treatment;
2. Psychological intervention versus different type of psychological intervention;
3. Psychological intervention plus diet and / or exercise versus control plus diet and/ or exercise.

Studies which combined a pharmacological intervention with a psychological intervention were excluded from analysis as the effect of the pharmacological intervention on weight could outweigh the effect of the psychological intervention.

Types of outcome measures

MAIN OUTCOME MEASURES
1. Weight or another indicator of body mass (e.g. body mass index, waist measurement, waist-to-hip ratio);
2. Morbidity (e.g. diabetes, cardiovascular disease, osteoarthritis) and mortality (e.g. death from myocardial infarction, stroke);
3. Well-being and quality of life measures (ideally, measured using a validated instrument, e.g. SF36 Quality of Life Measure).

ADDITIONAL OUTCOME MEASURES
1. Cost of implementing the psychological intervention;
2. Measured psychological functioning (ideally, measured using a validated instrument e.g. Hamilton Depression Rating Scale);
3. Fasting plasma glucose and HbA1c;
4. Plasma triglycerides, high-density lipoprotein, low-density lipoprotein and very-low-density lipoprotein;
5. Adverse effects.
SPECIFIC EFFECT MODIFIERS

1. Compliance.

TIMING OF OUTCOME ASSESSMENT

Weight loss or change in an outcome measure of weight was assessed in studies less than 12 months duration and studies greater than 12 months duration.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: Cochrane Metabolic and Endocrine Disorders Group methods used in reviews.

1. The following electronic databases were searched: The Cochrane Library - Issue 1 2003 (including the Cochrane Controlled Trials Register (CCTR)), MEDLINE (June 2003), PsychInfo (June 2003), PsychLit (June 2003) and Embase (June 2003).

2. Databases of ongoing trials were searched, including Current Controlled Trials (www.controlled-trials.com) and The National Research Register (www.update-software.com/National/nrr-frame.html).

3. The reference list of review articles and of all included studies were searched in order to find other potentially eligible studies.

4. Potential missing and unpublished studies were planned to be sought by contacting experts in the field. This was not necessary.

5. Publications in all languages were sought.

Please see under 'Additional tables' for a detailed search strategy (Table 01).

Additional key words of relevance were sought during the electronic or other searches. None were identified.

METHODS OF THE REVIEW

TRIALS SELECTION

Assessment of quality and results data were undertaken by three reviewers (KS, POR and JK). Full articles were retrieved for further assessment if the information given suggested that the study: 1. Included people who were overweight or obese; 2. Compared a psychological intervention with placebo or another psychological intervention; 3. Assessed one or more relevant clinical outcome measures;

4. Used random allocation to the comparison groups. When a title / abstract could not be rejected with certainty, the full text of the article was obtained for further evaluation. Interrater agreement for study selection was measured using the kappa statistic (Cohen 1960). Where differences in opinion existed, these were resolved by a third party (CDM).

QUALITY ASSESSMENT OF TRIALS

The quality of reporting each trial was be assessed based largely on the quality criteria specified by Schulz and by Jadad (Jadad 1996; Schulz 1995). In particular, the following factors was studied:

1. Minimisation of selection bias - a) was the randomisation procedure adequate? b) was the allocation concealment adequate?

2. Minimisation of attrition bias - a) were withdrawals and dropouts completely described? b) was analysis by intention-to-treat?

3. Minimisation of detection bias - were outcome assessors blind to the intervention?

Based on these criteria, studies were subdivided into the following three categories (see Cochrane Handbook):

A - all quality criteria met: low risk of bias.

B - one or more of the quality criteria only partly met: moderate risk of bias.

C - one or more criteria not met: high risk of bias.

This classification was planned to be used as the basis of a sensitivity analysis.

Each trial was assessed for quality assessment independently by two reviewers (KS, JK). Interrater agreement was calculated using the kappa statistic.

DATA EXTRACTION

Data extracted included the following:

1. General information: Published/unpublished, title, authors, source, contact address, country, language of publication, year of publication, duplicate publications.

2. Trial characteristics: Design, duration, randomisation (and method), allocation concealment (and method), blinding (outcome assessors), check of blinding.


4. Patients: Sampling (random/convenience), exclusion criteria, total number and number in comparison groups, gender, age, diagnostic criteria of overweight/obesity, similarity of groups at baseline, assessment of compliance/relapse, withdrawals/losses to follow-up (reasons/description), subgroups.

5. Outcomes: Outcomes specified above, what was the main outcome assessed in the study, other events, length of follow-up.

6. Results: For outcomes and times of assessment, intention-to-treat analysis.

A template data extraction form was developed and sent to the Metabolic and Endocrine Disorders Group Editorial Base for approval. Study authors were not contacted for further information.

DATA ANALYSIS

Data were entered into the Cochrane Review Manager (RevMan) software. Both random and fixed effects models were used to pool data. Effect sizes are presented as weighted mean differences with 95% confidence intervals. We had planned to express results of dichotomous variables as Mantel Haenszel odds ratios (OR)
with 95% confidence intervals. The chi-square method was used to assess heterogeneity with the significance set at \( p < 0.1 \). Quantification of the effect of heterogeneity was assessed by means of \( I^2 \), ranging from 0 to 100% including its 95% confidence interval (Higgins 2002). \( I^2 \) demonstrates the percentage of total variation across studies due to heterogeneity and is used to judge the consistency of evidence.

**SUBGROUP ANALYSES**

Subgroup analyses were planned if the results of at least one of the main outcomes were significant, in order to explore effect size differences. Analyses planned were:

1. Type, intensity and duration of the psychological intervention;
2. Age (18-39 years, 40-69 years, 70 years and older);
3. Gender;
4. Smoking status;
5. Different comparison interventions;
6. Comorbidity (patients with diabetes, hypertension or other conditions).

**SENSITIVITY ANALYSES**

Planned sensitivity analyses (to assess the influence of the following factors on effect size) were as follows:

1. Repeating the analysis excluding unpublished studies (if there were any).
2. Repeating the analysis taking account of study quality, as specified above.
3. Repeating the analysis excluding any very long or large studies to establish how much they dominate the results.
4. Repeating the analysis excluding studies using the following filters: diagnostic criteria, language of publication, source of funding (industry versus other), country.

Testing of the robustness of the results by repeating the analysis using different measures of effects size (risk difference, odds ratio etc.) and different statistic models (fixed and random effects models) was planned.

**DESCRIPTION OF STUDIES**

**TRIALS IDENTIFIED**

The search strategy identified 3607 abstracts for perusal. On review of the abstracts, 454 articles were retrieved for perusal. Of these, 56 potentially relevant trials were located. Three further trials were found through handsearching of reference lists, yielding 59 potentially relevant trials (Figure 01).

**EXCLUDED STUDIES**

Following an evaluation of the methods section of the trials, 23 trials were excluded from the review. These studies and their reasons for exclusion are presented in the table: 'Characteristics of Excluded Studies'.

**INCLUDED STUDIES**

A total of 36 studies met the inclusion criteria and were included in the review. The kappa statistic for trial selection was 0.75; confidence bounds 0.63 to 0.88. The details of these studies are described in the table: 'Characteristics of Included Studies'. A number of trials did not present results in a manner that enabled variance data for change in outcome measures to be extracted. However, the studies met all of the inclusion criteria outlined above. Therefore these studies, identified in the 'Notes' section of the 'Characteristics of Included Studies' table, are included in the results but are reported narratively (Agras 1995; Block 1980; Calle-Pascual 1992; Castro 1983; Chapman 1978; Foreyt 1973; Goodrick 1998; Hagen 1974; Jeffery 1983; Kirschenbaum 1985; Stuart 1971; Wollersheim 1970). The data from this group of studies are not included in the analyses.

The trials were conducted between 1970 and 2001 and varied in size from 6 to 1191 participants. Overall, 3495 participants were evaluated. The trials varied in length (including follow-up) from 12 weeks to 156 weeks. Thirty of the 36 trials were longer than 16 weeks duration.

**STUDIES**

All included studies were randomized controlled trials. Two studies were factorial in design (Burnett 1985; Jeffery 1983), and the remaining 34 were parallel. Randomization was from stratified blocks, mainly according to percentage overweight, in 13 studies.

**PARTICIPANTS AND SETTINGS**

There were a total of 3495 participants in the 36 trials. All trials were conducted in adults. The weighted mean age of participants was 43.1 years for the 18 trials that reported age as a mean value. The remaining 18 trials, which reported age as a range, included participants aged between 16 and 75 years. Two trials included men only, 14 included women only, and 20 included both men and women. Across these 20 trials, 25% of participants were male.

Twenty-nine studies were conducted in the United States of America, and one was conducted in The Netherlands (Nauta 2000), Canada (Cochrane 1985), Spain (Calle-Pascual 1992), Colombia (Castro 1983), the United Kingdom (Oldroyd 2001), Sweden (Lindahl 1999) and Switzerland (Painot 2001) respectively. All studies were outpatient community studies except for one study which was an inpatient hospital study (Lindahl 1999). The range of outpatient settings in which trials were conducted included general medical clinics, hospital obesity outpatient clinics, primary care, university campuses and workplace settings. Most participants were recruited by local news media (e.g. local newspaper, radio announcements, bulletin boards) and physician referrals. One study recruited their sample from a database of participants rejected from participating in a cohort study (Jeffery 1983), one from a group of US Navy personnel deployed on a combatant ship of the US Navy (Dennis 1999), and one from a database of respondents to a community survey questionnaire (Lindahl 1999).
The psychological interventions that were evaluated are listed below and discussed in more detail in the results section. Twenty-five trials evaluated multiple psychological interventions within their design, and 11 trials evaluated a single psychological intervention. Thirty studies evaluated a behavioral intervention, four evaluated a cognitive behavioral intervention, four evaluated a relaxation intervention, two evaluated a cognitive intervention, one evaluated a psychotherapeutic intervention, and one evaluated a hypnotherapy intervention.

Studies did differ in the types of interventions evaluated:

- Ten trials evaluated behavior therapy compared with no treatment for weight loss (Foreyt 1973; Goodrick 1998; Hagen 1974; Israel 1979; Jeffery 1995; Oldroyd 2001; Rozensky 1976; Saccone 1978; Stevens 2001; Wollersheim 1970),
- Eight trials compared behavior therapy in combination with diet / exercise with diet / exercise alone (Black 1984; Calle-Pascual 1992; Gormally 1981; Jeffery 1985; Lindahl 1999; Stuart 1971; Wing 1984; Wing 1985),
- Three trials compared behavior therapy with cognitive therapy (Goodrick 1998; Nauta 2000; Wollersheim 1970),
- Two trials compared cognitive behavior therapy + diet / exercise with diet / exercise alone (Block 1980; Dennis 1999), and
- One trial each compared:
  - hypnotherapy with no treatment (Cochrane 1985);
  - relaxation therapy with no treatment (Block 1980);
  - cognitive behavior therapy with no treatment (Agras 1995), and behavior therapy (Shrocco 1999);
  - cognitive therapy with no treatment (Goodrick 1998);
  - cognitive behavior therapy and diet / exercise with diet / exercise (Painot 2001) respectively.

OUTCOME MEASURES
The degree of overweight in the patient groups and the types of outcome measures reported did not differ markedly between groups. Most reported weight change as kilograms or pounds lost. Studies also reported weight loss according to change in BMI, change in waist circumference or waist-hip ratio, or change in percentage overweight.

Weight entry criteria for most studies included participants who were overweight as well as participants with obesity. Four studies specified weight entry criteria according to BMI (in excess of 27 for three studies and BMI more than 30 for one study). Nineteen studies specified weight entry criteria according to percentage overweight according to Metropolitan Life Insurance Tables. The weighted mean % overweight of participants in these studies was 43.3% (range 27 to 75%). Six studies specified weight entry according to pounds / kilograms overweight. The weighted mean kilograms overweight of participants in these studies was 11.6 kg (range = 11.4 to 18.8 kg). Six studies did not specify weight entry criteria but did specify baseline weight data for participants.

Two trials were weight loss interventions in participants with non-insulin dependent diabetes mellitus (Calle-Pascual 1992; Wing 1985), two trials were interventions in participants with impaired glucose tolerance (Lindahl 1999; Oldroyd 2001), two were interventions in participants with binge eating disorder (Agras 1995; Goodrick 1998), one was an intervention in US Naval personnel on deployment (Dennis 1999), and one was an intervention in participants with mild hypertension (Stevens 2001).

Frequency of sessions ranged from daily to monthly. The duration of the interventions ranged from four weeks to 12 months. The median duration of the interventions was 12 weeks. Follow-up time post intervention ranged from three months to 36 months. The weighted mean total trial length was 18.6 months (range 3 to 36 months).

Secondary outcome measures recorded included haematological measures e.g. serum glucose, lipids, HbA1c, blood pressure and measures of dietary intake and exercise performance.

None of the trials included the main outcomes of mortality (total or specific), morbidity, quality of life measures, well-being or the additional outcome costs of implementing the intervention.

METHODOLOGICAL QUALITY
The methodological quality of included studies is described in the included studies table. The kappa statistic and confidence intervals for methodological quality of included studies was 0.88 (0.80 to 0.95). All 36 of the reported studies had some methodological weaknesses according to the quality criteria applied. Only two studies (Black 1983; Oldroyd 2001) reported the method of randomization. For the remaining 34 studies it was not possible to tell whether allocation to groups was concealed. All included studies had a loss to follow-up of 15% or less, as specified in the inclusion criteria for the review. In all but one study (Oldroyd 2001), blinding of investigators to outcomes was not clear or not done. The duration of all included studies, including follow-up, was three months or more, as specified in the inclusion criteria for the review. Six of the 36 trials were 16 weeks or less in duration.

The results of three studies could not be extrapolated to other populations due to substantial selection bias (Dennis 1999, Jeffery 1983, Lindahl 1999).

Many studies had small sample sizes, meaning that it would have been difficult to detect small but potentially significant differences.
across groups. Three studies were analysed by intention to treat (Nauta 2000; Oldroyd 2001; Stuart 1971). All other studies were analysed by treatment received.

One study was categorised as ‘A’, indicating that all criteria were met (Oldroyd 2001). All other studies were categorised as ‘B’, indicating that one or more criteria were not met. All studies had a drop-out rate of 15% or less, as specified in the inclusion criteria for study selection.

**RESULTS**

The studies included in this review evaluate a number of psychological interventions in participants with overweight and obesity. The only outcome measured and used in the analyses was weight. BMI, blood pressure, serum cholesterol, serum triglycerides, fasting serum glucose and serum high density lipoprotein cholesterol (HDL) data were insufficient for analyses to be performed. Quantification of the effect of heterogeneity was assessed by means of $I^2$, ranging from 0 to 100% including its 95% confidence interval (Higgins 2002). I squared demonstrates the percentage of total variation across studies due to heterogeneity and is used to judge the consistency of evidence.

**Comparison 1: Behaviour therapy versus no treatment control**

Ten studies contained groups that compared behaviour therapy to control as a weight loss intervention in participants with overweight and obesity (Foreyt 1973; Goodrick 1998; Hagen 1974; Israel 1979; Jeffery 1995; Oldroyd 2001; Rozensky 1976; Saccone 1978; Stevens 2001; Wollersheim 1970). Behavioral therapies evaluated included self-control and therapist-controlled contingencies (Israel 1979; Jeffery 1995; Rozensky 1976), stimulus control (Goodrick 1998, Israel 1979; Saccone 1978; Stevens 2001), reinforcement (Israel 1979; Saccone 1978), stages of change model of behaviour therapy (Oldroyd 2001), self-monitoring (Goodrick 1998; Jeffery 1995), problem solving and goal setting (Goodrick 1998), covert sensitization (Foreyt 1973) and behaviour modification (Hagen 1974; Wollersheim 1970). The frequency of clinical contact ranged from weekly to monthly sessions lasting 15 to 90 minutes. The median frequency of clinical contact was fortnightly sessions lasting 60 minutes. The duration of intervention ranged from 7 to 78 weeks. Median duration of intervention was 12 weeks.

**Category 1: Weight change in kilograms**

Four studies included data comparing behaviour therapy with control for weight loss that were not suitable for meta-analysis (Foreyt 1973; Goodrick 1998; Hagen 1974; Wollersheim 1970). These studies reported weight loss before versus after psychological intervention. Mean weight losses were reported for each study however no variance data were available for these studies. The range of weight change in participants who participated in behavioral interventions was -0.6 kg to -5.5 kg after the behavioral intervention. The range in participants who acted as no treatment controls was 2.8 kg to 1.8 kg. In all studies, participants who participated in the behavioral intervention lost more weight than no treatment controls.

Six studies, involving 1458 participants, included data regarding weight loss that were suitable for meta-analysis (Israel 1979; Jeffery 1995; Oldroyd 2001; Rozensky 1976; Saccone 1978; Stevens 2001). Data were analysed according to two time frames, studies with a duration of 12 months or less and studies with a duration of more than 12 months.

Five studies included data for duration of less than 12 months. All studies favoured behaviour therapy against no treatment control for weight loss. Significant heterogeneity between studies was present (p < 0.00001). When heterogeneity was re-assessed excluding data from Stevens 2001, which had much smaller variance than the other studies, the results of the Chi-squared test were p > 0.06. Participants who participated in behavioral weight loss programmes lost 2.5 kg (95% confidence interval 1.7 to 3.3) more weight than no treatment controls (p < 0.01).

Two studies included data for duration of greater than 12 months (Jeffery 1995; Stevens 2001). Data from Jeffery, 1995 were collected at 30 months and data from Stevens, 2001 were collected at 36 months. Both studies favoured behaviour therapy against no treatment control for weight loss. Studies were homogeneous for the outcome of interest (p = 0.81). Participants who participated in behavioral weight loss programs lost 2 kg (95% confidence interval 2.7 to 1.3) more than no treatment controls (p < 0.01).

**Category 2: Additional outcome measures**

Two studies (Oldroyd 2001; Stevens 2001) reported change in blood pressure data at conclusion of the study. Data were unable to be compared statistically therefore analysis was not performed. Both studies demonstrated a fall in systolic and diastolic blood pressure with weight loss. The study by Oldroyd 2001 found no significant change in fasting serum glucose or fasting serum cholesterol between intervention and control groups however fasting serum insulin was improved in the intervention compared with control group.

**Comparison 2: Behaviour therapy with diet / exercise versus diet / exercise**

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1984; Gormally 1981), problem solving and goal setting (Gormally 1981; Jeffery 1985; Lindahl 1999), and behaviour modification (Calle-Pascual 1992; Gormally 1981). The frequency of clinical contact ranged from second daily to monthly sessions lasting 40 to 180 minutes. The median frequency of clinical contact was fortnightly sessions lasting 60 minutes. The duration of intervention ranged from 1 to 26 weeks. Median duration of intervention was 12 weeks. The concomitant interventions were low calorie diet (Calle-Pascual 1992; Gormally 1981; Jeffery 1985; Lindahl 1999; Stuart 1971; Wing 1984; Wing 1985), nutritious balanced diet (Black 1984), instructions to gradually increase levels of physical activity (Black 1984; Gormally 1981; Jeffery 1985), daily low to moderate physical activity for 2.5 hours (Lindahl 1999), and individualised aerobics exercise programme based upon walking further during daily activities (Stuart 1971).

Category 1: Weight change in kilograms

Two studies included data comparing behaviour therapy in combination with diet / exercise with diet / exercise alone for weight loss that were not suitable for meta-analysis (Calle-Pascual 1992; Stuart 1971). These studies reported weight loss before versus after psychological intervention. Mean weight loss was reported however no variance data were available for the studies. The mean weight change in participants who participated in the behavioral intervention was a loss of 10 kg after the behavioral intervention. The change in participants who acted as no treatment controls was a mean gain of 0.5 kg.

Six studies, involving 467 participants, included data regarding weight loss that were suitable for meta-analysis (Black 1984; Gormally 1981; Jeffery 1985; Lindahl 1999; Wing 1984; Wing 1985). Data were analysed according to time frame. No study included data with a duration of more than 12 months.

Five studies favoured behaviour therapy in combination with diet and exercise and one study favoured diet and exercise alone for weight loss. Significant heterogeneity between studies was present (p < 0.01). These data come from multiple studies and different populations which may be the factors contributing to the significant statistical heterogeneity present, and limit the reliability of the results.

Category 2: Additional outcome measures

The study by Lindahl 1999 reported change in blood pressure data at conclusion of the study. Results demonstrated a fall in systolic and diastolic blood pressure with weight loss in both intervention and control groups. Total serum cholesterol, triglycerides and fasting plasma glucose also fell in both intervention and control groups. In the study by Wing 1985, participants in both the intervention and control groups experienced non-significant improvements in fasting blood sugar, serum triglycerides, serum cholesterol, and systolic blood pressure, and significant improvement in HDL cholesterol. The study by Calle-Pascual 1992 demonstrated a significant improvement in fasting serum glucose, systolic blood pressure, diastolic blood pressure, serum triglyceride level, and HDL cholesterol level in the intervention group compared with the control group.

Comparison 3: More intensive versus less intensive behaviour therapy

Seventeen studies contained groups that compared more intensive with less intensive behaviour therapies as a weight loss intervention in participants with overweight or obesity (Black 1983; Black 1984; Brownell 1978a; Burnett 1985; Carroll 1981; Castro 1983; Chapman 1978; Hagen 1974; Israel 1979; Jeffery 1983; Jeffery 1995; Johnson 1979; Kirschenbaum 1985; Rozen- sky 1976; Saccone 1978; Wing 1991; Wing 1996). Behavioral therapies evaluated included attention prompting (Kirschenbaum 1985), self-control and therapist-controlled contingencies (Black 1984; Chapman 1978; Castro 1983; Jeffery 1983; Jeffery 1995; Kirschenbaum 1985), stimulus control (Black 1983; Black 1984; Brownell 1978a; Carroll 1981; Castro 1983; Chapman 1978; Israel 1979; Johnson 1979; Rozen'sky 1976; Saccone 1978; Wing 1991; Wing 1996), reinforcement and social support (Black 1983; Brownell 1978a; Burnett 1985; Israel 1979; Johnson 1979; Rozen'sky 1976; Saccone 1978; Wing 1991; Wing 1996), self-monitoring (Black 1983; Black 1984; Brownell 1978a; Burnett 1985; Chapman 1978; Johnson 1979; Saccone 1978; Wing 1991; Wing 1996), problem solving and goal setting (Black 1983; Burnett 1985; Jeffery 1995; Wing 1991; Wing 1996), and behaviour modification (Hagen 1974; Jeffery 1995; Wing 1991; Wing 1996). The frequency of clinical contact ranged from weekly to monthly sessions lasting 60 to 150 minutes. The median frequency of clinical contact was weekly and the median session duration was 60 minutes. The duration of intervention ranged from 6 to 78 weeks. Median duration of intervention was 10 weeks.

Category 1: Weight change in kilograms

Six studies included data comparing high versus low intensity behaviour therapies for weight loss that were not suitable for meta-analysis (Castro 1983; Chapman 1978; Hagen 1974; Israel 1979; Jeffery 1983; Kirschenbaum 1985). These studies reported weight loss before versus after psychological intervention. Mean weight losses were reported however no variance data were available for the studies. The weight loss in participants who participated in the high intensity behavioral intervention was between 1.4 kg and 8.4 kg after intervention. The low intensity behavioral intervention resulted in weight loss between 0.9 kg and 10.5 kg. In four studies, high intensity behavioral intervention resulted in greater weight loss and in two studies low intensity behavioral intervention resulted in greater weight loss. In all studies in both high and low intensity groups, participants lost weight overall.

Eleven studies included data regarding weight loss that were suitable for meta-analysis (Black 1983; Black 1984; Brownell 1978a; Burnett 1985; Carroll 1981; Jeffery 1995; Johnson 1979; Rozen'sky 1976; Saccone 1978; Wing 1991; Wing 1996). Data were analysed according to two time frames, studies with a duration of
12 months or less and studies with a duration of more than 12 months.

Ten studies, involving 306 participants, included data for duration of less than 12 months. Eight studies favoured more intensive behaviour therapy and two studies favoured less intensive behaviour therapy for weight loss. Studies were homogeneous for the outcome of interest \((p = 0.18)\). Participants participating in the more intensive intervention lost 2.3 kg more weight than those participating in the less intensive intervention (95% confidence interval 1.4 - 3.3).

One study, involving 58 participants, included data for study duration of greater than 12 months (Jeffery 1995). Participants were followed for 36 months. Participants in the more intensive intervention lost 1.6 kg and those in the less intensive intervention lost 1.4 kg \((p = 0.45)\).

**Category 2: Additional outcome measures**
The study by Wing 1991 demonstrated a significant improvement in glycosylated haemoglobin and fasting blood sugar as a result of both interventions.

**Comparison 4: Cognitive behaviour therapy with diet / exercise versus diet / exercise**
Two studies contained groups that compared cognitive behavior therapy with diet / exercise versus diet / exercise alone in participants with overweight or obesity (Block 1980; Dennis 1999).

**Category 1: Weight change in kilograms**
The two studies, involving 63 participants, included data regarding weight loss that were suitable for meta-analysis (Block 1980; Dennis 1999). Studies were homogeneous for the outcome of interest \((p = 0.09)\). Participants in both groups lost weight overall. Participants in the cognitive behaviour therapy group lost 4.9 kg more than participants in the comparison group (95% confidence interval 7.3 to 2.4).

**Category 2: Additional Outcome Measures**
The study by Dennis 1999 recorded changes in serum triglycerides for both groups. Triglycerides decreased significantly more in the treatment group compared to the control group \((p < 0.05)\).

**Comparison 5: Cognitive behaviour therapy versus placebo**
One study contained groups that compared cognitive therapy with placebo as a weight loss intervention in participants with overweight or obesity (Agras 1995).

**Category 1: Weight change in kilograms**
This study included data comparing cognitive behaviour therapy with placebo for weight loss that were not suitable for meta-analysis. Mean weight loss was reported however no variance data were available for the study. In the Agras 1995 study of 50 participants in the cognitive behaviour therapy group lost 0.6 kg compared to participants in the placebo group who gained 4.1 kg by six months.

**Comparison 6: Cognitive behaviour therapy versus behaviour therapy**
One study contained groups that compared cognitive behaviour therapy with behaviour therapy as a weight loss intervention in participants with overweight or obesity (Sbrocco 1999).

**Category 1: Weight change in kilograms**
This study included data comparing cognitive behaviour therapy with placebo for weight loss (Sbrocco 1999). In this study of 24 participants, participants in the cognitive behaviour therapy group lost 7 kg by six months (SD 1.96 kg) and 10 kg by 12 months (SD 3.4 kg), compared to participants in the behaviour therapy group who lost 4.5 kg by six months (SD 2.6 kg) and 4.3 kg by 12 months (SD 2.5 kg) \((p < 0.01)\).

**Comparison 7: Cognitive behaviour therapy with diet / exercise versus cognitive behaviour therapy**
One study contained groups that compared cognitive behaviour therapy with diet / exercise versus cognitive behaviour therapy as a weight loss intervention in participants with overweight or obesity (Painot 2001).

**Category 1: Weight change in kilograms**
The study by Painot 2001 included data that were suitable for meta-analysis. In this study of 70 participants, subjects in the cognitive behaviour therapy and diet / exercise lost 1.9 kg (SD 0.6 kg) compared with participants in the cognitive behaviour therapy alone group who gained 0.5 kg (SD 0.6 kg) by three months follow-up.

**Comparison 8: Cognitive therapy versus placebo**
One study contained groups that compared cognitive therapy with placebo as a weight loss intervention in participants with overweight or obesity (Goodrick 1998).

**Category 1: Weight change in kilograms**
One study included data comparing cognitive therapy with placebo for weight loss that was not suitable for meta-analysis (Goodrick 1998). Mean weight loss was reported, however, no variance data were available for the study. In this study of 120 participants the cognitive therapy group gained 1.35 kg compared to participants in the placebo group who gained 0.6 kg by six months.

**Comparison 9: Cognitive therapy versus behaviour therapy**
Three studies contained groups that compared cognitive with behaviour therapies as a weight loss intervention in participants with overweight or obesity (Goodrick 1998; Nauta 2000; Wollersheim 1970).

**Category 1: Weight change in kilograms**
One study included data suitable for meta-analysis (Nauta 2000) and two studies included data that were not suitable for meta-analysis (mean weight loss was reported however no variance data were available for the studies) (Goodrick 1998; Wollersheim 1970). In all three studies, participants in the behaviour therapy group
lost more weight than participants in the cognitive therapy group. The Nauta study included 74 participants. Participants in the behaviour therapy group lost 5.5 kg compared with participants in the cognitive therapy group who lost 0.8 kg (p<0.01). In the Goodrick study of 127 participants, participants in the behaviour therapy group lost 0.6 kg compared to participants in the cognitive therapy group who gained 1.4 kg by six months. In the Woolf-Cohen study of 36 participants, participants in the behaviour therapy group lost 4.1 kg by three months, compared to participants in the cognitive therapy group who lost 0.5 kg.

**Comparison 10: Relaxation therapy versus placebo**

One study contained groups that compared relaxation therapy with placebo as a weight loss intervention in participants with overweight or obesity (Block 1980).

**Category 1: Weight change in kilograms**

This study included data comparing relaxation therapy with placebo for weight loss that was not suitable for meta-analysis. Mean weight loss was reported however no variance data were available for the study. In this study of 24 participants in the relaxation therapy group lost 2.1 kg compared to participants in the placebo group who lost 0.2 kg by five months.

**Comparison 11: Hypnotherapy versus placebo**

One study contained groups that compared hypnotherapy with placebo as a weight loss intervention in participants with overweight or obesity (Cochrane 1985).

**Category 1: Weight change in kilograms**

This study included data comparing hypnotherapy with placebo that were not suitable for meta-analysis. Mean weight loss was reported however no variance data were available for the study. In this study of 54 participants in the hypnotherapy group lost 7.9 kg compared with participants in the placebo group who lost 0.2 kg by six months follow-up.

**DISCUSSION**

**SUMMARY OF FINDINGS**

The studies identified for this review were heterogeneous in terms of participants, interventions, outcomes, and settings. A broad number of psychological interventions were evaluated in a range of settings. Most studies had methodological shortcomings, however, loss to follow-up of participants was 15% or less across studies, and study duration was in excess of three months for all studies. The majority of studies assessed behavioural interventions. However, two studies assessing cognitive and four studies assessing cognitive-behavioural therapy were also located.

The behavioural treatments evaluated generally included a combination of different strategies. Strategies evaluated commonly included components of stimulus control, reinforcement, self-monitoring, problem solving and goal setting.

Studies comparing behaviour therapy with no treatment demonstrated a beneficial effect of behavioural strategies in inducing weight loss. There was a highly variable range of frequency of clinical contact, duration of clinical contact at each session, and duration of intervention across studies. In spite of this variation, behavioural interventions resulted in reduction in body weight in all studies identified for meta-analysis. This result was apparent for studies less than 12 months duration and for studies greater than 12 months duration (outlined in the comparisons 1 to 3 in the comparisons and data tables section).

Studies combining behavioural interventions with dietary and exercise interventions generally demonstrated that behavioural interventions were helpful. Studies were heterogeneous, however the majority of studies favoured combining behaviour therapy with dietary and exercise interventions to improve weight loss. There were no studies of greater than 12 months duration.

The intensity of the behavioural intervention significantly altered the effects of the intervention. When the behaviour therapy utilized more behavioural strategies, more frequent clinical contact, or a longer duration of intervention, the effectiveness of the intervention was increased. There was one study of greater than 12 months duration. This study demonstrated that a more intensive behavioural treatment resulted in only a marginal improvement in long-term weight loss.

Cognitive-behavioural treatments were also assessed in a number of studies. The pool of studies included was smaller than for behavioural therapies. The only study assessing the effectiveness of cognitive-behaviour therapy against placebo demonstrated that participants treated with cognitive-behaviour therapy lost more weight than participants who were not. However, the magnitude of this weight loss was small.

Two studies, involving 63 participants, assessed whether cognitive-behaviour therapy, combined with diet and exercise, was more effective than diet and exercise alone as a weight loss strategy. Weight loss was enhanced significantly by the addition of the cognitive-behavioural component to the intervention.

One study, involving 24 participants, assessed whether cognitive-behaviour therapy was more effective than behaviour therapy as a weight loss strategy. This study found that weight loss was enhanced by the addition of the cognitive component. Another study involving 70 participants compared cognitive-behaviour therapy combined with diet and exercise with cognitive-behaviour therapy without diet or exercise. This study found that participants who received cognitive-behaviour therapy alone gained weight.

Cognitive treatments were assessed in a small number of studies. The results of these studies were disappointing. One study, assessing cognitive therapy compared with no treatment in 120 participants found that participants in both groups gained weight. Participants in the cognitive therapy group gained more weight than...
participants in the no treatment group. Three studies compared cognitive therapy with behaviour therapy. In all studies, participants using behavioural strategies lost more weight than participants using cognitive strategies.

Only one study assessed relaxation therapy as a stand-alone weight loss therapy. This study, involving 24 participants, found that participants in the relaxation therapy group lost more weight than those in the no treatment group. One study assessed hypnotherapy as a stand-alone weight loss therapy in 54 participants. This study found that participants in the hypnotherapy group lost significantly more weight than participants in the no treatment group.

The effects of psychological interventions on secondary outcome measures were reported for a small number of studies. Reported measures included systolic and diastolic blood pressure, serum cholesterol, triglycerides and high-density lipoproteins (HDL), and fasting serum glucose. Results were inconsistent across studies, and were not reported in a manner that allowed quantitative comparisons to be made. However, reductions in systolic and diastolic blood pressure, serum cholesterol, triglycerides, and fasting plasma glucose were found to be associated with weight loss in a number of studies. Quality of life and well-being were not reported in studies, hence were not evaluated in this review.

**LIMITATIONS OF THE REVIEW**

A problem associated with the assessment of psychological interventions in people who are overweight or obese is the paucity of long-term studies. Most people lose weight initially and then regain it over time. Thus, without longer term studies, the true effect of psychological interventions on weight is difficult to determine. Also, without long-term studies, the effects of psychological interventions on mortality are difficult to determine. If psychological interventions result in sustained long-term weight loss they may also have a positive impact on mortality.

A large number of studies were excluded from analysis due to the relatively large losses to follow-up. This was done because if studies with large losses to follow-up were included in the analyses, valid conclusions about the relative effects of psychological interventions could not be drawn. Although this is a valid justification to exclude studies with large losses to follow-up, the negative effect of doing so is to reduce the power of the meta-analysis.

This review suggests that behavioural and cognitive-behavioural strategies are effective weight loss therapies. Cognitive therapies do not appear to be as effective, however a much smaller body of evidence exists for these strategies. When even modest weight loss results from a psychological intervention, a number of disease measures might also improve. The clinical relevance of these improvements and effects on mortality cannot be established from this group of studies as the length of follow-up of participants was too short.

**AUTHORS’ CONCLUSIONS**

**Implications for practice**

People who are overweight or obese benefit from psychological interventions, particularly behavioural and cognitive-behavioural strategies, to enhance weight reduction. They are predominantly useful when combined with dietary and exercise strategies. The bulk of the evidence supports the use of behavioural and cognitive-behavioural strategies. Other psychological interventions are less rigorously evaluated for their efficacy as weight loss treatments.

**Implications for research**

A large body of research has been undertaken to assess the effects of psychological interventions on weight loss in people who are overweight or obese. Strategies that have been studied are predominantly behavioural and cognitive-behavioural in nature. Cognitive strategies alone appear to be less effective, however the body of evidence assessing efficacy is small.

Every effort should be made to maintain high retention rates in studies, and reasons for withdrawal should be ascertained so that factors affecting program adherence can be further explored. Studies with longer duration of follow-up would provide further information regarding the efficacy of psychological interventions in maintaining positive lifestyle changes in people who are overweight or obese.

**POTENTIAL CONFLICT OF INTEREST**

None known.

**ACKNOWLEDGEMENTS**

We also acknowledge the advice of Ms Sandi Pirozzo and Professor Paul Glaziou regarding the methods of this review.

**SOURCES OF SUPPORT**

**External sources of support**

- National Health and Medical Research Council AUSTRALIA

**Internal sources of support**

- Royal Australian College of General Practitioners AUSTRALIA
References to studies included in this review

Agras 1995 [published data only]

Black 1983 [published data only]

Black 1984 [published data only]

Block 1980 [published data only]

Brownell 1978a [published data only]

Burnett 1985 [published data only]

Calles-Pascual 1992 [published data only]

Carroll 1981 [published data only]

Castro 1983 [published data only]

Chapman 1978 [published data only]

Cochrane 1985 [published data only]

Dennis 1999 [published data only]

Forest 1973 [published data only]

Goodrick 1998 [published data only]

Gormally 1981 [published data only]

Hagen 1974 [published data only]

Israel 1979 [published data only]

Jeffery 1983 [published data only]

Jeffery 1985 [published data only]

Jeffery 1995 [published data only]

Johnson 1979 [published data only]

Kirschenbaum 1985 [published data only]

Lindahl 1999 [published data only]

Nauta 2000 [published data only]

Oldroyd 2001 [published data only]
References to studies excluded from this review

Aldarondo 1998

Alexy 1985

Ashby 1977

Boehm 1993

Brownell 1978b

Brownell 1981

DeLucia 1989

DeLucia 1990

Fisher 1986

French 1994

Jeffery 1974

Jeffery 1993

Mahoney 1974

Miura 1989

Pekkarinen 1996

Penick 1971
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Additional references

Ashley 1974

Baron 1998

Brownell 1984

Brownell 1986

Brownell 1994

Brownell 1998

Cooper 2001

Despres 1994

DHAC 2001

Dietz 1985

Dietz 1994

Douketis 1999

Egger 1997

French 1994

Friedman 1995

Garrow 1988

Rabkin 1980

Raeburn 1986

Rapport 2000

TOHP 1992

Wyllersheim 1977
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Rissanen 1989

Sallade 1973

Schneider 1997

Schulz 1995

Staffieri 1967

Stewart 1983

Stunkard 1992

Sørensen 2001

Waaler 1984

WHO 1998

Wilding 1997

Wilson 1999

Wing 1994

*Indicates the major publication for the study

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**Tables**

**Characteristics of included studies**

<table>
<thead>
<tr>
<th>Study</th>
<th>Agras 1995</th>
</tr>
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<tbody>
<tr>
<td>Methods</td>
<td>DESIGN: Parallel; Randomisation method not stated</td>
</tr>
<tr>
<td></td>
<td>BLINDING:</td>
</tr>
<tr>
<td></td>
<td>patients - not stated</td>
</tr>
<tr>
<td></td>
<td>caregivers - not stated</td>
</tr>
<tr>
<td></td>
<td>outcome assessors - not stated</td>
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<td></td>
<td>DURATION OF INTERVENTION: 12 weeks</td>
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<tr>
<td></td>
<td>DROPOUTS: 14%</td>
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<tr>
<td></td>
<td>Analysis by treatment received</td>
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<tr>
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<tr>
<td></td>
<td>N: 50</td>
</tr>
<tr>
<td></td>
<td>AGE: N=47.6 years</td>
</tr>
<tr>
<td></td>
<td>MALES=7</td>
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<tr>
<td></td>
<td>WEIGHT ENTRY CRITERIA: BMI &gt; 27</td>
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<tr>
<td></td>
<td>EXCLUSION CRITERIA: concurrent participation in another weight loss program, concurrent use of weight loss medications, alcohol or drug abuse, major psychiatric condition such as a psychosis, history of purging in the previous 6 months</td>
</tr>
<tr>
<td>Interventions</td>
<td>INTERVENTION 1 (n=39): CBT + written information regarding low fat diet and exercise</td>
</tr>
<tr>
<td></td>
<td>CONTROL (n=11): waiting list</td>
</tr>
</tbody>
</table>

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### Characteristics of included studies (Continued)

| Outcomes | FOLLOW-UP: 6 months  
|-----------|-------------------|
| BODY MEASURES: weight loss (kg)  
| OTHER: binge eating scale, Beck depression inventory, self-esteem measures, hunger measures  
| Notes: All had binge eating disorder  
| Allocation concealment B - Unclear  

### Study - Black 1983

| Methods | DESIGN: Parallel; Randomisation method - coin toss  
|-----------|-------------------|
| BLINDING:  
| patients - not stated  
| caregivers - not stated  
| outcome assessors - not stated  
| DURATION OF INTERVENTION: 7 weeks  
| DROPOUTS: none  
| Analysis by treatment received  

| Participants | COUNTRY: USA  
|---------------|-------------------|
| N: 14  
| AGE: N=43 years  
| MALES=2  
| WEIGHT ENTRY CRITERIA: at least 25% overweight - measure not stated  
| EXCLUSION CRITERIA: concurrent participation in another weight loss program, concurrent use of weight loss medications, medical problems prohibiting weight loss  

| Interventions | INTERVENTION 1 (n=7): fixed sequence behaviour therapy  
|---------------|-------------------|
| INTERVENTION 2 (n=7): problem solving and motivational techniques  
| BOTH GROUPS: monetary contingency, dietary advice, encouragement to increase physical activity  
| FOLLOW-UP: 3 months and 6 months  

| Outcomes | BODY MEASURES: weight loss (lb)  
| Notes:  
| Allocation concealment B - Unclear  

### Study - Black 1984

| Methods | DESIGN: Stratified according to percentage overweight; Randomisation method - not stated  
|-----------|-------------------|
| BLINDING:  
| patients - not stated  
| caregivers - not stated  
| outcome assessors - not stated  
| DURATION OF INTERVENTION: 10 weeks  
| DROPOUTS: 15%  
| Analysis by treatment received  

| Participants | COUNTRY: USA  
|---------------|-------------------|
| N: 66  
| AGE: 18-52 years  
| MALES=19.7%  
| WEIGHT ENTRY CRITERIA: > 20% overweight according to Metropolitan Life Insurance Tables  
| EXCLUSION CRITERIA: not stated  

| Interventions | INTERVENTION 1 (n=22): minimal intervention (patients told to eat a nutritious diet, increase levels of physical activity and lose weight slowly) INTERVENTION 2 (n=22): group reliance behaviour therapy INTERVENTION 3 (n=22): self-reliance behaviour therapy  
| FOLLOW-UP: 6 months  

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*Psychological interventions for overweight or obesity (Review)  
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### Characteristics of included studies (Continued)

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>BODY MEASURES: weight loss (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>B – Unclear</td>
</tr>
</tbody>
</table>

#### Study Details

**Study** | **Block 1980** |
--- | --- |
**Methods** | DESIGN: Stratified according to percentage overweight; Randomisation method not stated  
BLINDING: patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 10 weeks  
DROPOUTS: none  
Analysis by treatment received |
**Participants** | COUNTRY: USA  
N: 40  
AGE: N=37.7 years  
MALES=12  
WEIGHT ENTRY CRITERIA: at least 15 pounds overweight by Metropolitan Life Insurance Tables  
EXCLUSION CRITERIA: concurrent participation in another weight loss program, medical problems prohibiting weight loss |
**Interventions** | INTERVENTION 1 (n=16): rational emotive therapy  
INTERVENTION 2 (n=16): relaxation training and group discussion  
CONTROL (n=8): waiting list  
ALL GROUPS: written low calorie diet information  
FOLLOW-UP: 4.5 months |
**Outcomes** | BODY MEASURES: weight loss (lb) |
**Notes** |  |
| Allocation concealment | B – Unclear |

#### Study Details

**Study** | **Brownell 1978a** |
--- | --- |
**Methods** | DESIGN: Parallel; Randomisation method not stated  
BLINDING: patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 6 months  
DROPOUTS: none  
Analysis by treatment received |
**Participants** | COUNTRY: USA  
N: 29  
AGE: N=45.3 years  
MALES=10  
WEIGHT ENTRY CRITERIA: at least 15% overweight by Metropolitan Life Insurance Tables  
EXCLUSION CRITERIA: concurrent participation in another weight loss program or concurrent use of weight loss medications, medical problems prohibiting weight loss |
**Interventions** | INTERVENTION 1 (n=9): couples therapy with co-operative spouse  
INTERVENTION 2 (n=9): therapy with subject alone, spouse co-operative  
INTERVENTION 3 (n=11): therapy with subject alone, spouse unco-operative  
BOTH GROUPS: behaviour therapy and low fat diet and advice regarding need for exercise |
### Characteristics of included studies (Continued)

**FOLLOW-UP**: 3 months and 6 months

**Outcomes**  
BODY MEASURES: weight loss (lb), weight reduction quotient, mean percentage change in body weight

OTHER: daily log of behaviour change, assessment of behavioral weight control knowledge

**Notes**

**Allocation concealment**  
B – Unclear

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**Study**  
Burnett 1985

**Methods**  
DESIGN: Factorial; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 10 weeks  
DROPOUTS: none  
Analysis by treatment received

**Participants**  
COUNTRY: USA  
N: 12  
AGE: 30-50 years  
MALE: none  
WEIGHT ENTRY CRITERIA: >35% overweight (measure not stated)  
EXCLUSION CRITERIA: not stated

**Interventions**  
INTERVENTION 1 (n=6): computer administered behaviour therapy  
INTERVENTION 2 (n=6): therapist administered behaviour therapy  
FOLLOW-UP: 6 months and 10 months

**Outcomes**  
BODY MEASURES: weight loss (kg)  
OTHER: self-reported calorie intake, self reported physical activity levels, measure of treatment acceptability

**Notes**

**Allocation concealment**  
B – Unclear

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**Study**  
Calle-Pascual 1992

**Methods**  
DESIGN: Parallel; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 55 weeks  
DROPOUTS: none  
Analysis by treatment received

**Participants**  
COUNTRY: Spain  
N: 74  
AGE: N=54 years  
MALE: 17  
WEIGHT ENTRY CRITERIA: BMI > 30  
EXCLUSION CRITERIA: not stated

**Interventions**  
INTERVENTION 1 (n=46): Behaviour therapy  
INTERVENTION 2 (n=28): no behaviour therapy  
BOTH GROUPS: low calorie diet and information regarding physical activity  
FOLLOW-UP: 35 weeks and 12 months

**Outcomes**  
BODY MEASURES: weight loss (kg), BMI change
### Characteristics of included studies (Continued)

OTHER: fasting serum glucose, 2 hour oral glucose tolerance test, systolic and diastolic blood pressure, fasting triglycerides and cholesterol (HDL and total)

<table>
<thead>
<tr>
<th>Notes</th>
<th>All patients had non insulin dependent diabetes mellitus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation concealment</td>
<td>B – Unclear</td>
</tr>
</tbody>
</table>

#### Study  
**Carroll 1981**

**Methods**  
DESIGN: Parallel; Randomisation method not described  
BLINDING: patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 2.5 months  
DROPOUTS: <15%  
Analysis by treatment received

| Participants | COUNTRY: USA  
N: 24  
AGE: 19-34  
MALES: 0  
WEIGHT ENTRY CRITERIA: 14-60% by Metropolitan Life Insurance Tables  
EXCLUSION CRITERIA: Not stated |
|---|---|

| Interventions | INTERVENTION 1 (n=12): Behaviour therapy  
INTERVENTION 2 (n=12): Behaviour therapy and stimulus control  
BOTH GROUPS: general dietary and exercise advice  
FOLLOW-UP: 8 months |
|---|---|

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>BODY MEASURES: weight loss (kg) and weight reduction index</th>
</tr>
</thead>
</table>

**Study  
**Castro 1983**

**Methods**  
DESIGN: Stratified according to percentage overweight; Randomisation method not described;  
BLINDING: patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 3 months  
DROPOUTS <15%  
Analysis by treatment received

| Participants | COUNTRY: South America  
N: 40  
AGE: 18 - 48 years.  
MALE: 5  
WEIGHT ENTRY CRITERIA: At least 15% overweight by Fogarty International Table  
EXCLUSION CRITERIA: Taking medications for weight loss, having physical condition resulting in weight changes, participating in other weight loss programs |
|---|---|

| Interventions | INTERVENTION 1 (n=13): Positive monetary reinforcement of weight loss  
INTERVENTION 2 (n=14): negative monetary reinforcement  
CONTROL (n=13): no monetary reinforcement. Both groups also received low calorie diet information, stimulus control information and general behavioral advice |
|---|---|
### Characteristics of included studies (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Chapman 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes</strong></td>
<td>BODY MEASURES: weight loss (lb)</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>Variance data unable to be extracted from results. Results reported narratively.</td>
</tr>
<tr>
<td><strong>Allocation concealment</strong></td>
<td>B – Unclear</td>
</tr>
</tbody>
</table>

#### Chapman 1978

**Methods**
- DESIGN: Stratified according to percentage overweight; Randomisation method not stated
- BLINDING: patients - not stated
caregivers - not stated
- outcome assessors - not stated
- DURATION OF INTERVENTION: 2 months
- DROPOUTS: <15%
- Analysis by treatment received

**Participants**
- COUNTRY: USA
- N: 57
- AGE: 17-65
- MALES: 0
- WEIGHT ENTRY CRITERIA: 17-85% above ideal body weight on insurance tables
- EXCLUSION CRITERIA: Not stated

**Interventions**
- INTERVENTION 1 (n=19): Situational management of environmental stimuli to overeating
- INTERVENTION 2 (n=18): Self-standard setting for goal changes in weight and eating behaviours
- INTERVENTION 3 (n=17): Self reward contingent on successful weight loss
- ALL GROUPS: Monetary rewards for improvement + general dietary and exercise advice
- FOLLOW-UP: 4 months

**Outcomes**
- BODY MEASURES: weight loss (kg and lb)

**Notes**
- Variance data unable to be extracted from results. Results reported narratively.

#### Cochrane 1985

**Methods**
- DESIGN: Parallel; Randomisation method not described
- BLINDING:
  - patients - not stated
caregivers - not stated
outcome assessors - not stated
- DURATION OF INTERVENTION: 4 weeks
- DROPOUTS: 10%
- Analysis by treatment received

**Participants**
- COUNTRY: Canada
- N: 54
- AGE: 20-65
- MALES: 0
- WEIGHT ENTRY CRITERIA: >20% overweight by Metropolitan Life Insurance Tables
- EXCLUSION CRITERIA: medical problems contraindicating weight loss, enrolment in another weight loss program simultaneously

**Interventions**
- INTERVENTION 1 (n=17): Hypnotherapy using audiotape
- INTERVENTION 2 (n=17): Hypnotherapy using voice
- CONTROL (n=20): Waiting list
- FOLLOW-UP: 6 months
### Characteristics of included studies (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Dennis 1999</th>
</tr>
</thead>
</table>
| **Methods** | DESIGN: Parallel; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 4 months  
DROPOUTS: 15%  
Analysis by treatment received |
| **Participants** | COUNTRY: USA  
N: 39  
AGE: N=31  
MALES: All  
WEIGHT ENTRY CRITERIA: Overweight according to US Navy Physical Readiness testing  
EXCLUSION CRITERIA: not stated |
| **Interventions** | INTERVENTION (N=21): Low calorie diet advice + exercise advice + CBT  
CONTROL (n=18): exercise and low calorie diet advice  
FOLLOW-UP: 6 months |
| **Outcomes** | BODY MEASURES: weight loss (lb), BMI, WHR  
OTHER: fasting serum glucose and lipoprotein levels, mood questionnaire, diet questionnaire |
| **Notes** | All subjects Naval personnel on deployment |
| **Allocation concealment** | B – Unclear |

<table>
<thead>
<tr>
<th>Study</th>
<th>Foreyt 1973</th>
</tr>
</thead>
</table>
| **Methods** | DESIGN: Stratified according to percentage overweight; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 9 weeks  
DROPOUTS: 13%  
Analysis by treatment received |
| **Participants** | COUNTRY: USA  
N: 39  
AGE: 18-24  
MALES: None  
WEIGHT ENTRY CRITERIA: > 10% overweight according to Metropolitan Life Insurance Tables  
EXCLUSION CRITERIA: not stated |
| **Interventions** | INTERVENTION 1 (N=12): Relaxation training + covert sensitization  
INTERVENTION 2 (n=13): Relaxation training + aversive conditioning  
CONTROL (n=13): waiting list  
FOLLOW-UP: 4.5 months |
| **Outcomes** | BODY MEASURES: weight loss (lb), % overweight  
OTHER: food palatability scoring |
| **Notes** | |
| **Allocation concealment** | B – Unclear |
Characteristics of included studies *(Continued)*

<table>
<thead>
<tr>
<th>Study</th>
<th>Goodrick 1998</th>
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</thead>
<tbody>
<tr>
<td>Methods</td>
<td>DESIGN: Parallel; Randomisation method not stated</td>
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<tr>
<td></td>
<td>BLINDING:</td>
</tr>
<tr>
<td></td>
<td>patients - not stated</td>
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<tr>
<td></td>
<td>caregivers - not stated</td>
</tr>
<tr>
<td></td>
<td>outcome assessors - not stated</td>
</tr>
<tr>
<td></td>
<td>DURATION OF INTERVENTION: 6 months</td>
</tr>
<tr>
<td></td>
<td>DROPOUTS: 15%</td>
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<tr>
<td></td>
<td>Analysis by treatment received</td>
</tr>
<tr>
<td>Participants</td>
<td>COUNTRY: USA</td>
</tr>
<tr>
<td></td>
<td>N: 219</td>
</tr>
<tr>
<td></td>
<td>AGE: N=40 years</td>
</tr>
<tr>
<td></td>
<td>MALES: None</td>
</tr>
<tr>
<td></td>
<td>WEIGHT ENTRY CRITERIA: 14-41 kg overweight according to Metropolitan Life Insurance Tables</td>
</tr>
<tr>
<td></td>
<td>EXCLUSION CRITERIA: medical history of diabetes, cardiovascular or gastrointestinal disease, purging behavior in the previous 6 months, pregnancy, unable to exercise, enrolled in another weight program, smokers</td>
</tr>
<tr>
<td>Interventions</td>
<td>INTERVENTION 1 (N=79): Low-fat diet + behavior therapy</td>
</tr>
<tr>
<td></td>
<td>INTERVENTION 2 (n=78): psychotherapy</td>
</tr>
<tr>
<td></td>
<td>CONTROL (n=62): waiting list</td>
</tr>
<tr>
<td></td>
<td>FOLLOW-UP: 6 months</td>
</tr>
<tr>
<td>Outcomes</td>
<td>BODY MEASURES: weight loss (kg), BMI</td>
</tr>
<tr>
<td></td>
<td>OTHER: binge eating scale, exercise estimate, class attendance</td>
</tr>
<tr>
<td>Notes</td>
<td>Subjects in active treatment continued to 18 months however control data is to 6 months only; all subjects had binge-eating disorder</td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>B – Unclear</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Study</th>
<th>Gormally 1981</th>
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<tbody>
<tr>
<td>Methods</td>
<td>DESIGN: Parallel; Randomisation method not stated</td>
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<tr>
<td></td>
<td>BLINDING:</td>
</tr>
<tr>
<td></td>
<td>patients - not stated</td>
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<tr>
<td></td>
<td>caregivers - not stated</td>
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<tr>
<td></td>
<td>outcome assessors - not stated</td>
</tr>
<tr>
<td></td>
<td>DURATION OF INTERVENTION: 16 weeks</td>
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<tr>
<td></td>
<td>DROPOUTS: 11%</td>
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<tr>
<td></td>
<td>Analysis by treatment received</td>
</tr>
<tr>
<td>Participants</td>
<td>COUNTRY: USA</td>
</tr>
<tr>
<td></td>
<td>N: 100</td>
</tr>
<tr>
<td></td>
<td>AGE: N=39.4 years</td>
</tr>
<tr>
<td></td>
<td>MALES: None</td>
</tr>
<tr>
<td></td>
<td>WEIGHT ENTRY CRITERIA: at least 9.1 kg overweight and not weighing more than 100.1 kg</td>
</tr>
<tr>
<td></td>
<td>EXCLUSION CRITERIA: not between 25 and 55 years old, taking medications that affect body weight, involved in other weight loss treatments</td>
</tr>
<tr>
<td>Interventions</td>
<td>INTERVENTION 1 (N=53): nutritional advice + behaviour therapy manual (Learning to Eat) teaching self monitoring, stimulus control, self reinforcement, increasing activity levels and pre planning meals</td>
</tr>
<tr>
<td></td>
<td>INTERVENTION 2 (n=46): nutritional advice + calorie counting</td>
</tr>
<tr>
<td></td>
<td>FOLLOW-UP: 30 weeks</td>
</tr>
<tr>
<td>Study</td>
<td>Hagen 1974</td>
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<tr>
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</tr>
<tr>
<td>Outcomes</td>
<td>BODY MEASURES: weight loss (lb)</td>
</tr>
<tr>
<td></td>
<td>OTHER: calorie intake, activity level, ratings of treatment</td>
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<tr>
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<tr>
<td>Notes</td>
<td>Allocation concealment B – Unclear</td>
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<tr>
<td></td>
<td>Analysis by treatment received</td>
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<tr>
<td></td>
<td>Analysis by treatment received</td>
</tr>
<tr>
<td>Study Methods</td>
<td>DESIGN: Stratified according to percentage overweight; Randomisation method not stated</td>
</tr>
<tr>
<td></td>
<td>BLINDING: patients - not stated caregivers - not stated outcome assessors - not stated DURATION OF INTERVENTION: 10 weeks DROPOUTS: 1%</td>
</tr>
<tr>
<td>Participants</td>
<td>COUNTRY: USA N: 90 AGE: 17-22 years MALES: None WEIGHT ENTRY CRITERIA: &gt; 10% overweight according to Metropolitan Life Insurance Tables EXCLUSION CRITERIA: not stated</td>
</tr>
<tr>
<td>Interventions</td>
<td>INTERVENTION 1 (N=18): Group behavior therapy based on learning principles + relaxation training INTERVENTION 2 (n=18): Behavior therapy based on learning theory delivered by manual + group behavior therapy INTERVENTION 3 (n=18): Behavior therapy based on learning theory delivered by manual only CONTROL (n=35): waiting list FOLLOW-UP: 4 months</td>
</tr>
<tr>
<td>Outcomes</td>
<td>BODY MEASURES: weight loss (lb)</td>
</tr>
<tr>
<td>Notes</td>
<td>Allocation concealment B – Unclear</td>
</tr>
</tbody>
</table>
### Characteristics of included studies (Continued)

INTERVENTION 5 (n=7): behavior therapy + reinforcement of weight loss by significant other
INTERVENTION 6 (n=6): behavior therapy + reinforcement of behavior therapy by significant other
CONTROL (n=7): waiting list
FOLLOW-UP: 3 and 12 months

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>BODY MEASURES: weight loss (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTHER</td>
<td>none</td>
</tr>
</tbody>
</table>

**Study Jeffery 1983**

**Methods**
- DESIGN: Factorial; Randomisation method not stated
- BLINDING:
  - patients - not stated
  - caregivers - not stated
  - outcome assessors - not stated
- DURATION OF INTERVENTION: 15 weeks
- DROPOUTS: 0%
- Analysis by treatment received

**Participants**
- COUNTRY: USA
- N: 89
- AGE: 35-57
- MALES: all
- WEIGHT ENTRY CRITERIA: > 30 lb overweight according to Metropolitan Life Insurance criteria
- EXCLUSION CRITERIA: uncontrolled diabetes or heart disease, concurrent dietary or psychological treatment, greater than 6 alcoholic drinks per day

**Interventions**
- INTERVENTION 1 (n=16): individual contingency contracting $30
- INTERVENTION 2 (n=15): individual contingency contracting $150
- INTERVENTION 3 (n=14): individual contingency contracting $300
- INTERVENTION 4 (n=17): group contingency contracting $30
- INTERVENTION 5 (n=14): group contingency contracting $150
- INTERVENTION 6 (n=13): group contingency contracting $300
- ALL GROUPS: written material explaining self-monitoring, diet and exercise, self-motivation, crisis management and maintenance
- FOLLOW-UP: 12 months

**Outcomes**
- BODY MEASURES: weight loss (lb)
- OTHER: knowledge of calorie content of foods, eating habits, feelings of well-being, weight history

**Notes**
- Variance data unable to be extracted from results. Results reported narratively.

**Allocation concealment**
- B – Unclear

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**Study Jeffery 1985**

**Methods**
- DESIGN: Parallel; Randomisation method not stated
- BLINDING:
  - patients - not stated
  - caregivers - not stated
  - outcome assessors - not stated
- DURATION OF INTERVENTION: 6 months
- DROPOUTS: 6%
- Analysis by treatment received
### Characteristics of included studies (Continued)

| Participants | COUNTRY: USA  
N: 36  
AGE: N=42.4  
MALES: 14%  
WEIGHT ENTRY CRITERIA: not stated  
EXCLUSION CRITERIA: not stated |
|--------------|---------------------------------------------------------------|
| Interventions | INTERVENTION 1 (n=16): low calorie diet + exercise + monetary incentive to lose weight  
INTERVENTION 2 (n=15): low calorie diet + exercise  
FOLLOW-UP: 6 months |
| Outcomes | BODY MEASURES: weight loss (lb)  
OTHER: none |
| Notes | Allocation concealment B – Unclear |

#### Study: Jeffery 1995

| Methods | DESIGN: Randomised according to gender and geographical location; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 5 months  
DROPOUTS: 12%  
Analysis by treatment received |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Participants | COUNTRY: USA  
N: 177  
AGE: N=25-45 years  
MALES: 50%  
WEIGHT ENTRY CRITERIA: 14 to 32 kg overweight (Metropolitan Life Insurance Company)  
EXCLUSION CRITERIA: smokers, excess alcohol consumption, already on diet, taking prescription medications, presence of serious medical problems |
| Interventions | INTERVENTION 1 (n=24): standard behavior therapy  
INTERVENTION 2 (n=34): standard behavior therapy + provision of food  
INTERVENTION 3 (n=34): standard behavior therapy + financial incentive to lose weight  
INTERVENTION 4 (n=34): standard behavior therapy + provision of food + financial incentive to lose weight  
CONTROL (n=27): no intervention  
FOLLOW-UP: 30 months |
| Outcomes | BODY MEASURES: weight loss (kg)  
OTHER: none |
| Notes | Allocation concealment B – Unclear |

#### Study: Johnson 1979

| Methods | DESIGN: Stratified according to percentage overweight and levels of baseline exercise; Randomisation method not stated  
BLINDING:  
patients - not stated  
caregivers - not stated  
outcome assessors - not stated  
DURATION OF INTERVENTION: 10 weeks |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Participants | COUNTRY: USA  
N: 177  
AGE: N=25-45 years  
MALES: 50%  
WEIGHT ENTRY CRITERIA: 14 to 32 kg overweight (Metropolitan Life Insurance Company)  
EXCLUSION CRITERIA: smokers, excess alcohol consumption, already on diet, taking prescription medications, presence of serious medical problems |
| Interventions | INTERVENTION 1 (n=24): standard behavior therapy  
INTERVENTION 2 (n=34): standard behavior therapy + provision of food  
INTERVENTION 3 (n=34): standard behavior therapy + financial incentive to lose weight  
INTERVENTION 4 (n=34): standard behavior therapy + provision of food + financial incentive to lose weight  
CONTROL (n=27): no intervention  
FOLLOW-UP: 30 months |
| Outcomes | BODY MEASURES: weight loss (kg)  
OTHER: none |
| Notes | Allocation concealment B – Unclear |
### Characteristics of included studies (Continued)

#### Dropout: 2%

Analysis by treatment received

| Participants | Country: USA  
N: 44  
Age: not stated  
Males: 7  
Weight entry criteria: >40% overweight (measure not stated)  
Exclusion criteria: not stated |
|---|---|
| Interventions | Intervention 1 (n=12): training in stimulus control  
Intervention 2 (n=9): training in stimulus control + exercise  
Intervention 3 (n=12): training in stimulus control + contingency management  
Intervention 4 (n=10): training in stimulus control + contingency management + exercise  
Follow-up: 3 and 12 months |
| Outcomes | Body measures: weight loss (kg)  
Other: none |
| Notes | Allocation concealment: B – Unclear |

#### Study: Kirschenbaum 1985

| Methods | Design: Stratified according to gender and percentage overweight; Randomisation method not stated  
Blinding: patients - not stated  
Caregivers - not stated  
Outcome assessors - not stated  
Duration of intervention: 12 weeks  
Dropouts: 9.5%  
Analysis by treatment received |
|---|---|
| Participants | Country: USA  
N: 65  
Age: N=38.2  
Males: 7  
Weight entry criteria: >15% overweight (Metropolitan Life Insurance Criteria)  
Exclusion criteria: not stated |
| Interventions | Intervention 1 (n=16): diet + exercise + regular weigh-in + weekly nutrition lecture + attention prompting  
Intervention 2 (n=16): behavior therapy  
Intervention 3 (n=16): behavior therapy + pretherapy induction  
Control (n=17): diet + exercise + weigh in + weekly nutrition lecture  
Follow-up: 6 and 24 months |
| Outcomes | Body measures: change in percentage overweight  
Other: eating habits, expectancy ratings and therapist assessments |
| Notes | Data presented subgrouped according to the therapist conducting the sessions (A and B)  
Allocation concealment: B – Unclear |

#### Study: Lindahl 1999

| Methods | Design: Parallel; Randomisation method not stated  
Blinding: patients - not stated  
Caregivers - not stated |
|---|---|
### Characteristics of included studies (Continued)

**Participants**  
- **Country:** Sweden  
- **N:** 186  
- **Age:** N=55 years  
- **Males:** 69  
- **Weight entry criteria:** BMI in excess of 27  
- **Exclusion criteria:** participation in an alternative wellness program, too physically ill to participate

**Interventions**  
- **Intervention 1 (n=93):** behavior therapy  
- **Control (n=93):** usual care (single counseling session with trained nurse)  
- **Both groups:** general lifestyle advice  
- **Follow-up:** 12 months

**Outcomes**  
- **Body measures:** weight loss (kg), BMI, waist hip ratio  
- **Other:** blood pressure, cholesterol and triglycerides, serum glucose, serum insulin, serum fibrinogen, physical fitness, oxygen consumption

**Notes**  
- All subjects had impaired glucose tolerance

### Study: Nauta 2000

**Methods**  
- **Design:** Parallel; Randomisation method not stated  
- **Blinding:** patients - not stated  
- **Outcome assessors:** not stated  
- **Duration of intervention:** 15 weeks  
- **Dropouts:** 13.5%  
- **Analysis by intention to treat**

**Participants**  
- **Country:** The Netherlands  
- **N:** 74  
- **Age:** 21-49 years  
- **Males:** 0  
- **Weight entry criteria:** BMI in excess of 27  
- **Exclusion criteria:** participation in a concurrent weight loss program, physical dependence on alcohol or drugs, psychosis, pregnancy

**Interventions**  
- **Intervention 1 (n=37):** behavior therapy in binge and non-binge eaters  
- **Intervention 2 (n=37):** cognitive therapy in binge and non-binge eaters  
- **Follow-up:** 6 months

**Outcomes**  
- **Body measures:** weight loss (kg)  
- **Other:** expectations of treatment, cognitive and behavioral checklists, eating pathology questionnaires, depression measures, self-esteem measures

**Notes**

**Allocation concealment:** B – Unclear

### Study: Oldroyd 2001

**Methods**  
- **Design:** Parallel; Randomisation by random number table  
- **Blinding:**

---

**Copyright © 2006 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd**
### Characteristics of included studies (Continued)

<table>
<thead>
<tr>
<th>Participants</th>
<th>COUNTRY: UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 67</td>
<td>AGE: 24-75 years</td>
</tr>
<tr>
<td>MALES: 38</td>
<td>WEIGHT ENTRY CRITERIA: not stated</td>
</tr>
<tr>
<td>EXCLUSION CRITERIA: not stated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interventions</th>
<th>INTERVENTION 1 (n=39): low fat diet and exercise advice + behavior therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL (n=39): no intervention FOLLOW-UP: 6 months</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>BODY MEASURES: weight loss (kg), change in BMI / waist circumference / waist hip ratio OTHER: blood pressure, fasting glucose, HbA1c, fasting and 2 hour insulin levels, cholesterol, triglycerides and apolipoprotein levels, fibrinogen levels, resting pulse, lifestyle activity levels, daily energy and nutrient intake</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
<th>All subjects had impaired glucose tolerance</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Allocation concealment</th>
<th>A – Adequate</th>
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### Study | Painot 2001

<table>
<thead>
<tr>
<th>Methods</th>
<th>DESIGN: Parallel; Randomisation method not stated</th>
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</thead>
<tbody>
<tr>
<td>BLINDING:</td>
<td>patients - not stated</td>
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<tr>
<td>caregivers - not stated</td>
<td></td>
</tr>
<tr>
<td>outcome assessors - not stated</td>
<td></td>
</tr>
<tr>
<td>DURATION OF INTERVENTION: 12 weeks</td>
<td></td>
</tr>
<tr>
<td>DROPOUTS: 5%</td>
<td></td>
</tr>
<tr>
<td>Analysis by treatment received</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
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<th>Participants</th>
<th>COUNTRY: Switzerland</th>
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</thead>
<tbody>
<tr>
<td>N: 62</td>
<td>AGE: N=42 years</td>
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<tr>
<td>MALES: 0</td>
<td>WEIGHT ENTRY CRITERIA: not stated</td>
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<tr>
<td>EXCLUSION CRITERIA: not stated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interventions</th>
<th>INTERVENTION 1 (n=35): cognitive behavior therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERVENTION 2 (n=25): cognitive behavior therapy + dietary fat restriction FOLLOW-UP: 3 months</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>BODY MEASURES: weight loss (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTHER: Beck Depression Inventory, Hospital Anxiety Depression Scale, Eating Disorders Inventory</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
<th></th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Allocation concealment</th>
<th>B – Unclear</th>
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### Study | Rozensky 1976

<table>
<thead>
<tr>
<th>Methods</th>
<th>DESIGN: Stratified according to level of self reinforcement; Randomisation method not stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLINDING:</td>
<td>patients - not stated</td>
</tr>
<tr>
<td>caregivers - not stated</td>
<td></td>
</tr>
<tr>
<td>outcome assessors - not stated</td>
<td></td>
</tr>
</tbody>
</table>

---

*Psychological interventions for overweight or obesity (Review)*

Copyright © 2006 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd
### Characteristics of included studies (Continued)

**Participants**
- COUNTRY: USA  
- N: 37  
- AGE: N=35.7 years  
- MALES: 5  
- WEIGHT ENTRY CRITERIA: not stated  
- EXCLUSION CRITERIA: not stated

**Interventions**
- INTERVENTION 1 (n=14): behavior therapy focusing on self-control  
- INTERVENTION 2 (n=15): therapist-driven monetary contingency for weight loss  
- CONTROL (n=11): minimal contact  
- FOLLOW-UP: 3.5 months

**Outcomes**
- BODY MEASURES: weight loss (lb), percentage body weight change
- OTHER:

**Notes**
- Allocation concealment: B – Unclear

---

### Study

**Methods**
- DESIGN: Stratified according to percentage overweight; Randomisation method not stated  
- BLINDING:  
  - patients - not stated  
  - caregivers - not stated  
  - outcome assessors - not stated  
- DURATION OF INTERVENTION: 9 weeks  
- DROPOUTS: 6%  
- Analysis by treatment received

**Participants**
- COUNTRY: USA  
- N: 49  
- AGE: 16-56 years  
- MALES: 1  
- WEIGHT ENTRY CRITERIA: >15% overweight according to Fogarty Conference on Obesity Recommended Weight in Relation to Height (1975)  
- EXCLUSION CRITERIA: no significant other available daily in the client’s home, additional treatment for weight reduction being administered, inability to provide monetary deposit for the study

**Interventions**
- INTERVENTION 1 (n=6): weight monitoring  
- INTERVENTION 2 (n=8): behavioral monitoring  
- INTERVENTION 3 (n=8): reinforcement of weight loss by therapist  
- INTERVENTION 4 (n=8): reinforcement of weight loss by significant other  
- INTERVENTION 5 (n=7): reinforcement of behavior change by therapist  
- INTERVENTION 6 (n=7): reinforcement of behavior change by significant other  
- CONTROL (n=8): waiting list  
- ALL ACTIVE TREATMENT GROUPS: behavior modification program  
- FOLLOW-UP: 12 months

**Outcomes**
- BODY MEASURES: weight loss (lb)  
- OTHER: none

**Notes**
- Allocation concealment: B – Unclear

---

### Study

**Methods**
- DESIGN: Parallel; Randomisation method not stated

---

*Psychological interventions for overweight or obesity (Review)*

Copyright © 2006 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd
Characteristics of included studies (Continued)

BLINDING:
patients - not stated
caregivers - not stated
outcome assessors - not stated
DURATION OF INTERVENTION: 12 weeks
DROPOUTS: 12.5%
Analysis by treatment received

Participants
COUNTRY: USA
N: 24
AGE: 18-55 years
MALES: none
WEIGHT ENTRY CRITERIA: 30-60 % overweight according to Metropolitan Life Insurance Tables
EXCLUSION CRITERIA: smokers, poor physical health, weight loss of more the 10 lb in the past month or 20 lb in the past 6 months

Interventions
INTERVENTION 1 (n=12): traditional behaviour therapy
INTERVENTION 2 (n=12): behavioral choice treatment ALL ACTIVE TREATMENT GROUPS: low fat diet
FOLLOW-UP: 26 and 52 weeks

Outcomes
BODY MEASURES: weight loss (kg)
OTHER: eating inventory, drive for thinness subscale, body dissatisfaction subscale, bulimia subscale, self-esteem scale, Beck depression inventory

Notes
Allocation concealment B – Unclear

Study
Stevens 2001

Methods
DESIGN: Parallel; Randomisation method not stated
BLINDING:
patients - not stated
caregivers - not stated
outcome assessors - not stated
DURATION OF INTERVENTION: 18 months
DROPOUTS: 7.5%
Analysis by treatment received

Participants
COUNTRY: USA
N: 1191
AGE: N=43.4 years
MALES: 66%
WEIGHT ENTRY CRITERIA: 110% to 165% above ideal weight at baseline
EXCLUSION CRITERIA: current treatment with medications for blood pressure, clinical or laboratory evidence of cardiovascular disease, diabetes mellitus, renal insufficiency and current / planned pregnancy

Interventions
INTERVENTION 1 (n=547): behavior therapy + low calorie diet /encouragement to exercise CONTROL (n=554): usual blood pressure care
FOLLOW-UP: 6, 18 and 36 months

Outcomes
BODY MEASURES: weight loss (kg), BMI
OTHER: blood pressure, exercise frequency, energy intake

Notes
Primary focus of study to test efficacy of lifestyle interventions for reducing blood pressure

Allocation concealment B – Unclear

Study
Stuart 1971

Methods
DESIGN: Parallel; Randomisation method not stated
Characteristics of included studies (Continued)

**BLINDING:**
- patients - not stated
- caregivers - not stated
- outcome assessors - not stated

**DURATION OF INTERVENTION:** 15 weeks

**DROPOUTS:** none

Analysis by intention to treat

### Participants

- **COUNTRY:** USA
- **N:** 6
- **AGE:** 27-41 years
- **MALES:** 0
- **WEIGHT ENTRY CRITERIA:** not stated
- **EXCLUSION CRITERIA:** not stated

### Interventions

**INTERVENTION 1 (n=3):** behavior therapy + written diet and exercise information

**INTERVENTION 2 (n=3):** written diet and exercise information

**FOLLOW-UP:** 5, 10 and 12 months

### Outcomes

**BODY MEASURES:** weight loss (lb)

**OTHER:** none

### Notes

Variance data unable to be extracted from results. Results reported narratively.

### Allocation concealment

B – Unclear

---

**Study** Wing 1984

### Methods

**DESIGN:** Parallel; Randomisation method not stated

**BLINDING:**
- patients - not stated
- caregivers - not stated
- outcome assessors - not stated

**DURATION OF INTERVENTION:** 10 weeks

**DROPOUTS:** 5%

Analysis by intention to treat

### Participants

- **COUNTRY:** USA
- **N:** 48
- **AGE:** N=44.8 years
- **MALES:** 6
- **WEIGHT ENTRY CRITERIA:** >20% overweight according to Metropolitan Life Insurance Tables
- **EXCLUSION CRITERIA:** involved in concurrent weight loss program, unwillingness to participate for 15 months, unable to supply monetary deposit

### Interventions

**INTERVENTION 1 (n=23):** low calorie diet

**INTERVENTION 2 (n=21):** standard behavior therapy

**FOLLOW-UP:** 6 months

### Outcomes

**BODY MEASURES:** weight loss (lb)

**OTHER:** diet diary, eating behavior inventory, cupboard survey

### Notes

### Allocation concealment

B – Unclear

---

**Study** Wing 1985

### Methods

**DESIGN:** Parallel; Randomisation method not stated

**BLINDING:**
- patients - not stated
Characteristics of included studies (Continued)

caregivers - not stated
outcome assessors - not stated
DURATION OF INTERVENTION: 16 weeks
DROPOUTS: 6%
Analysis by treatment received

Participants
COUNTRY: USA
N: 53
AGE: N=55 years
MALES: 20
WEIGHT ENTRY CRITERIA: >20% overweight according to Metropolitan Life Insurance Tables
EXCLUSION CRITERIA: non-diabetic subjects excluded

Interventions
INTERVENTION 1 (n=18): diet + exercise + contingency contracts + changing the environment and act of eating + changing cognitions
INTERVENTION 2 (n=18): diet + exercise + contingency contracts + nutrition education
INTERVENTION 3 (n=17): diet + exercise + contingency contracting
FOLLOW-UP: 4 and 16 months

Outcomes
BODY MEASURES: weight loss (kg)
OTHER: HbA1c, blood sugar, insulin, triglycerides and cholesterol, blood pressure

Notes
All subjects had type II diabetes mellitus

Allocation concealment
B – Unclear

Study Wing 1991

Methods
DESIGN: Parallel; Randomisation method not stated
BLINDING:
patients - not stated
caregivers - not stated
outcome assessors - not stated
DURATION OF INTERVENTION: 20 weeks
DROPOUTS: 13%
Analysis by treatment received

Participants
COUNTRY: USA
N: 49
AGE: N=52 years
MALES: 42%
WEIGHT ENTRY CRITERIA: >20% overweight according to Metropolitan Life Insurance Tables
EXCLUSION CRITERIA: non-diabetic subjects excluded, spouse not > 15% above ideal weight and aged between 30-70 years

Interventions
INTERVENTION 1 (n=23): behaviour therapy without spouse involvement + contingency contracting
INTERVENTION 2 (n=20): group behaviour therapy with spouse involved + contingency contracting
FOLLOW-UP: 52 weeks

Outcomes
BODY MEASURES: weight loss (lb)
OTHER: HbA1c, blood sugar, insulin, % overweight, BMI, calorie intake, eating behavior inventory, exercise levels

Notes
All subjects had type II diabetes mellitus

Allocation concealment
B – Unclear

Study Wing 1996

Methods
DESIGN: Parallel; Randomisation method not stated
BLINDING:
### Characteristics of included studies (Continued)

- **Patients**: not stated
- **Caregivers**: not stated
- **Outcome assessors**: not stated
- **Duration of intervention**: 26 weeks
- **Dropouts**: 9%

**Analysis by treatment received**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Country: USA</th>
<th>N: 163</th>
<th>Age: N=41.2 years</th>
<th>Males: none</th>
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<tbody>
<tr>
<td><strong>Weight entry criteria</strong>:</td>
<td>30 - 70 lb overweight according to Metropolitan Life Insurance Tables</td>
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<tr>
<td><strong>Exclusion criteria</strong>:</td>
<td>Pregnancy, planning pregnancy in the next 18 months, medical illnesses that would preclude participation in a diet / exercise program</td>
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</table>

<table>
<thead>
<tr>
<th>Interventions</th>
<th><strong>Intervention 1</strong> (n=40): standard behaviour therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Intervention 2</strong> (n=41): standard behaviour therapy + written meal plans</td>
</tr>
<tr>
<td></td>
<td><strong>Intervention 3</strong> (n=41): standard behaviour therapy + written meal plans + food provision</td>
</tr>
<tr>
<td></td>
<td><strong>Intervention 4</strong> (n=41): standard behaviour therapy + written meal plans + food provision for free</td>
</tr>
</tbody>
</table>

**Follow-up**: 26 weeks

<table>
<thead>
<tr>
<th>Outcomes</th>
<th><strong>Body measures</strong>: weight loss (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Other</strong>: BMI, barriers to adherence, dietary intake, food stored in home, eating patterns, knowledge, physical activity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
<th><strong>Allocation concealment</strong>: B – Unclear</th>
</tr>
</thead>
</table>

---

### Study: Wollersheim 1970

**Methods**

- **Design**: Stratified according to percentage overweight; Randomisation method not stated
- **Blinding**: patients - not stated
caregivers - not stated
outcome assessors - not stated
- **Duration of intervention**: 12 weeks
- **Dropouts**: 4%

**Analysis by treatment received**

<table>
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<tr>
<th>Participants</th>
<th>Country: USA</th>
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<th>Age: 18-36 years</th>
<th>Males: 0</th>
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<tbody>
<tr>
<td><strong>Weight entry criteria</strong>:</td>
<td>&gt;10% overweight according to Metropolitan Life Insurance Tables</td>
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<td></td>
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<tr>
<td><strong>Exclusion criteria</strong>:</td>
<td>not stated</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Interventions</th>
<th><strong>Intervention 1</strong> (n=20): positive expectation and social pressure therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Intervention 2</strong> (n=20): group discussion and relaxation therapy</td>
</tr>
<tr>
<td></td>
<td><strong>Intervention 3</strong> (n=20): focal learned behavior therapy</td>
</tr>
<tr>
<td></td>
<td><strong>Control</strong> (n=19): waiting list</td>
</tr>
</tbody>
</table>

**Follow-up**: 3 months

<table>
<thead>
<tr>
<th>Outcomes</th>
<th><strong>Body measures</strong>: weight loss (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Other</strong>: eating patterns questionnaire, physical activity scale, introversion - extroversion scale, anxiety scale, therapist competence and likability ratings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
<th><strong>Duplication found</strong>: Wollersheim 1977</th>
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</table>

<table>
<thead>
<tr>
<th>Allocation concealment</th>
<th>B – Unclear</th>
</tr>
</thead>
</table>

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**Psychological interventions for overweight or obesity (Review)**

Copyright © 2006 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd
Characteristics of excluded studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldarondo 1998</td>
<td>There was no clear difference in intervention between the active treatment group and the control group.</td>
</tr>
<tr>
<td>Alexy 1985</td>
<td>Insufficient description of behavioral intervention.</td>
</tr>
<tr>
<td>Ashby 1977</td>
<td>Behavioral treatment aimed at weight maintenance, not loss.</td>
</tr>
<tr>
<td>Boehm 1993</td>
<td>Medication compliance, not weight loss, the goal of the behavioral intervention.</td>
</tr>
<tr>
<td>Brownell 1978b</td>
<td>No post-treatment control group data supplied. Loss to follow-up data not reported.</td>
</tr>
<tr>
<td>Brownell 1981</td>
<td>Unable to extract results of psychological intervention independent of medication effect.</td>
</tr>
<tr>
<td>DeLucia 1989</td>
<td>All participants received the same psychological intervention.</td>
</tr>
<tr>
<td>DeLucia 1990</td>
<td>Loss to follow-up not reported.</td>
</tr>
<tr>
<td>Fisher 1986</td>
<td>Exercise the dependent variable under investigation.</td>
</tr>
<tr>
<td>French 1994</td>
<td>Comparison data of intervention versus control not supplied.</td>
</tr>
<tr>
<td>Jefferey 1974</td>
<td>Loss to follow-up not reported.</td>
</tr>
<tr>
<td>Jefferey 1993</td>
<td>Raw mean data not supplied.</td>
</tr>
<tr>
<td>Mahoney 1974</td>
<td>Median weight loss data only supplied.</td>
</tr>
<tr>
<td>Miura 1989</td>
<td>Method of randomisation / treatment allocation not reported.</td>
</tr>
<tr>
<td>Pekkarinen 1996</td>
<td>Method of randomisation / treatment allocation not reported.</td>
</tr>
<tr>
<td>Penick 1971</td>
<td>Raw mean data not supplied.</td>
</tr>
<tr>
<td>Rabkin 1983</td>
<td>Weight loss not the goal of the behavioral intervention.</td>
</tr>
<tr>
<td>Raeburn 1986</td>
<td>Loss to follow-up 50% in the no treatment control group.</td>
</tr>
<tr>
<td>Rapoport 2000</td>
<td>&gt; 15% of subjects dropped out of the study.</td>
</tr>
<tr>
<td>TOHP 1992</td>
<td>Unable to extract weight loss data for overweight participants from normal weight participants.</td>
</tr>
<tr>
<td>Wing 1990</td>
<td>No control group / comparison group.</td>
</tr>
<tr>
<td>Wing 2001</td>
<td>No data regarding variance / standard deviations supplied. High losses to follow-up in control group and one of the three intervention groups.</td>
</tr>
<tr>
<td>Wollersheim 1977</td>
<td>Duplicate publication of previously published results (Wollersheim 1970)</td>
</tr>
</tbody>
</table>

Additional tables

Table 01. Search strategy

The following Medline search strategy was used and adapted for use with the other databases.

NOTES: unless stated otherwise, search terms are free text terms; MeSH: Medical subject heading (Medline medical index term); an asterisk (*) stands for ‘any character(s)’, a question mark stands for ‘one or no character’.

OBESITY OR WEIGHT LOSS
1. Obesity/ [MeSH term, all subtrees and subheadings included]
2. Bulimia/ [MeSH term, all subheadings included]
3. Hyperphagia/ [MeSH term, all subheadings included]
4. Anti-Obesity-Agents/ [MeSH term, all subheadings included]
Table 01. Search strategy  (Continued)

1. (Pickwick\* syndrom\* or Prader willi syndrom\*) [in abstract or title]
2. (obes\* or adipos\* or overweight\* or over weight\*) [in abstract or title]
3. (overeat\*, over eat\*, over feed\* or overfeed\*) [in abstract or title]
4. (binge eating disorder\* or fat overload syndrom\*) [in abstract or title]
5. Weight-gain/ [MeSH term, all subheadings included]
6. Weight-loss/ [MeSH term, all subheadings included]
7. Body-Mass-Index/ [MeSH term]
8. weight gain [in abstract or title]
9. weight cycling [in abstract or title]
10. (weight adj (reduce\* or loss losing or maint\* or decreas\* or watch\* or diet\* or control\*)) [in abstract or title]
11. PSYCHOLOGICAL THERAPIES
12. PSYCHOTHERAPY [MeSH term, all subheadings and subtrees included]
13. MOOD-DISORDERS [MeSH term, all subheadings and subtrees included]
14. psycho* [in title or abstract]
15. counsel* [in title or abstract]
16. (depression or depressiv\*) [in title or abstract]
17. (interpersonal near therap\*) [in title or abstract]
18. art therap\* [in title or abstract]
19. aversion therap\* [in title or abstract]
20. balint [in title or abstract]
21. behavio?r therap\* [in title or abstract]
22. behavior\* modifi* [in title or abstract]
23. color\* therap\* [in title or abstract]
24. (cognitiv\* near therap\*) [in title or abstract]
25. crisis intervention\* [in title or abstract]
26. dance therap\* [in title or abstract]
27. gestalt therap\* [in title or abstract]
28. music therap\* [in title or abstract]
29. milieu therap\* [in title or abstract]
30. (assert\* near training) [in title or abstract]
31. (nondirectiv\* therap\* or non directiv\* therap\*) [in title or abstract]
32. ((problem solving or problemsolving) near therap\*) [in title or abstract]
33. ((self control or selfcontrol) near therap\*) [in title or abstract]
34. (person cent\*) [in title or abstract]
35. (client cent\*) [in title or abstract]
36. (psychodrama* or psycho drama*) [in title or abstract]
37. paradox* techni* [in title or abstract]
38. play therap\* [in title or abstract]
39. rational emoti* [in title or abstract]
40. reality therap\* [in title or abstract]
41. role play\* [in title or abstract]
42. (relax\* near train\*) [in title or abstract]
43. (sociotherap* or socio therap*) [in title or abstract]
44. (socioenvironment* or socio environment*) [in title or abstract]
45. (supportiv* therap*) [in title or abstract]
46. transactional [in title or abstract]
47. OR/1-35
This was combined with the following two search strategies:

RANDOMISED CONTROLLED TRIALS
Table 01. Search strategy  (Continued)

1. RANDOMIZED-CONTROLLED-TRIAL in PT
2. "RANDOMIZED-CONTROLLED-TRIALS"/ all subheadings
3. "RANDOM-ALLOCATION" in MIME, MJME
4. random* or alloc* or assign*
5. (#4 in TI) or (#4 in AB)
6. #1 or #2 or #3 or #5
7. CONTROLLED-CLINICAL-TRIAL in PT
8. CLINICAL-TRIAL in PT
9. explode "CLINICAL-TRIALS"/ all subheadings
10. (CLIN* near TRIAL*)
11. (#10 in TI) or (#10 in AB)
12. "CROSS-OVER-STUDIES" in MIME, MJME
13. cross-over near (stud* or trial* or design*)
14. crossover near (stud* or trial* or design*)
15. #7 or #8 or #9 or #11 or #12 or #13 or 14
16. "DOUBLE-BLIND-METHOD" in MIME, MJME
17. "SINGLE-BLIND-METHOD" in MIME, MJME
18. (singl* or doubl* or trebl* or tripl*) near (blind* or mask*)
19. (#18 in TI) or (#18 in AB)
20. #16 or #17 or #19
21. "PLACEBOS"/ all subheadings
22. placebo* in TI
23. placebo* in AB
24. #21 or #22 or #23
25. explode "RESEARCH-DESIGN"/ all subheadings
26. TG=COMPARATIVE-STUDY
27. explode "EV ALUA TION-STUDIES"/ all subheadings
28. "FOLLOW-UP-STUDIES" in MIME, MJME
29. "PROSPECTIVE-STUDIES" in MIME, MJME
30. control* or prospectiv* or volunteer*
31. (#30 in TI) or (#30 in AB)
32. #25 or #26 or #27 or #28 or #29 or #31
33. #6 or #15 or #20 or #24 or #32
34. (TG=ANIMAL) not ((TG=HUMAN) and (TG=ANIMAL))
35. #33 not #34

SYSTEMATIC REVIEWS AND META-ANALYSES
1. "META-ANALYSIS" in MIME,MJME
2. explode "REVIEW-LITERATURE"/ all subheadings
3. META-ANALYSIS in PT
4. REVIEW in PT
5. REVIEW-ACADEMIC in PT
6. REVIEW-LITERATURE in PT
7. REVIEW-TUTORIAL in PT
8. GUIDELINE in PT
9. PRACTICE-GUIDELINE in PT
10. #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9
11. REVIEW-OF-REPORTED-CASES in PT
12. REVIEW-MULTICASE in PT
13. LETTER in PT
14. COMMENT in PT

Psychological interventions for overweight or obesity (Review)

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**Table 01. Search strategy (Continued)**

15. EDITORIAL in PT
16. HISTORICAL-ARTICLE in PT
17. #11 or #12 or #13 or #14 or #15 or #16
18. #10 not #17
19. ((systematic* or quantitativ* or methodologic*) near (review* or overview*)) in TI,AB
20. (meta anal* or metaanal*) in TI,AB
21. (integrativ* research review* or research integration) in TI,AB
22. (quantitativ* synthes*) in TLAB
23. (pooling* or (pooled analys*) or (mantel* haenszel*)) in TI,AB
24. (peto* or der simonian* or dersimonian* or fixed effect* or random effect*) in TI,AB
25. #19 or #20 or #21 or #22 or #23 or #24
26. #18 or #25
27. (TG=ANIMAL) not ((TG=HUMAN) and (TG=ANIMAL))
28. #26 not #27
Table 02. Original data for all main outcomes

<table>
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<tr>
<th>Study ID</th>
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<tr>
<td>Agras 1995</td>
<td>Weight (pre and post intervention) (kg) at 6 months: Intervention: pre = 108 (+/- 26.7) kg, post = 107.4 (+/- 28) kg; comparison group: pre = 106.1 (+/- 20.3) kg, post = 110.2 (+/- 22.8) kg</td>
<td>Binge Eating Scale (pre and post intervention) at 6 months: Intervention group: pre = 29.4 (+/- 6.7), post = 17.7 (+/- 7.1); comparison group: pre = 25.2 (+/- 7.9), post = 24.9 (+/- 10.4)</td>
<td>Inventory of Interpersonal Problems (pre and post intervention) at 6 months: Intervention group: pre = 1.5 (+/- 0.6), post = 1.2 (+/- 0.6); comparison group: pre = 1.5 (+/- 0.5), post = 1.3 (+/- 0.6)</td>
<td>Symptom Checklist - 90 (pre and post intervention) at 6 months: Intervention group: pre = 0.9 (+/- 0.7), post = 0.6 (+/- 0.4); comparison group: pre = 0.8 (+/- 0.5), post = 0.7 (+/- 0.7)</td>
<td>Beck Depression Inventory (pre and post intervention) at 6 months: Intervention group: pre = 14.6 (+/- 9.7), post = 11.0 (+/- 8.3)</td>
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<td>Black 1983</td>
<td>Weight change (lb) at 6 months: Intervention group = -15.7 (+/- 6.0) lb; comparison group = -6.5 (+/- 4.5) lb</td>
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<td>Black 1984</td>
<td>Study 1: Weight change (lb) at 7 months: Behaviour therapy and cognitive restructuring = -6.3 (SD 9.38); Behaviour therapy and stimulus control = -6.45 (SD 12.86); Behaviour therapy = -7.83 (SD 8.18); Minimal intervention = -11.07 (SD 13.21)</td>
<td>Study 2: Weight change (lb) at 6 months: Self-reliance = -11.05 (SD 9.83); Group reliance = -8.11 (7.3); Minimal intervention = -5.52 (SD 9.58)</td>
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<td>Brownell 1978a</td>
<td>Rational Emotive Therapy group = -19.2 (SD 4.5) lb; Relaxation - discussion placebo group = -4.5 (4.6) lb; No treatment control = -0.4 (SD 6.3) lb</td>
<td>Weight change (lb) at 6 months: couples training, co-operative spouse = -29.6 (SD 14.6); co-operative spouse, subject alone = -19.4 (SD 10.2); Non-cooperative spouse = -15.1 (SD 12.2)</td>
<td>Burnett 1985</td>
<td>Weight change (kg) at 10 months: Intervention group = -8.0 (SD 5.3) kg, Comparison group = -1.0 (SD 3.3) kg</td>
<td>Self-reported calorie intake change (intervention versus comparison group): 1942 cal (pre) to 1142 cal (post) versus 2076 cal (pre) to 1462 cal (post)</td>
<td>Self-reported physical activity change (intervention versus comparison group): 172 (pre) to 372 (post) activity units per day versus 77 (pre) versus 206 (post) activity units per day</td>
<td>Calle-Pascual 1992</td>
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<td>Intervention group = -9.3 (range -0.5 to -17.5) kg; comparison group = 0.1 kg</td>
<td>at 12 months: Intervention group = 7.9 +/- 0.4 to 6.1 +/- 0.5 mM; comparison group = 7.8 +/- 0.7 to 7.75 +/- 0.5 mM</td>
<td>at 12 months: Intervention group = 145.7 +/- 3.0 to 126.4 +/- 5.1 mmHg; comparison group = 148.0 +/- 3.7 to 145.4 +/- 3.4 mmHg</td>
<td>Intervention group = 83.5 +/- 2.5 to 65 +/- 2.6 mmHg; Comparison group = 85.4 +/- 2.1 to 86.1 +/- 2.0 mmHg</td>
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<td>Carrol 1981</td>
<td>Weight change (kg) at 8 months: Behaviour therapy without stimulus control training = -3.2 (SD 3.9) kg; Behavioral therapy with stimulus control training = -4.5 (SD 5.4) kg</td>
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<td>Castro 1983</td>
<td>Weight change (lb) at 4 months: Behavioral intervention = -10 lb, Comparison behavioral</td>
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<td>Chapman 1978</td>
<td>Weight change (kg &amp; lb) at 4 months: Situation management = - 2.33 kg, self-standard setting = - 4.28 kg, self-reward = - 2.8 kg</td>
<td>Intervention = - 10.5 lb, control group = - 15 lb</td>
<td>Chapman 1978 Weight change (kg &amp; lb) at 4 months: Situation management = - 2.33 kg, self-standard setting = - 4.28 kg, self-reward = - 2.8 kg</td>
<td>Cochrane 1985 Weight change (lb) at 6 months: Hypnosis + audiotapes = -17.8 (SD 2.7), hypnosis = -17.1 (SD 2.5), control = -0.5 (SD 2.5)</td>
<td>Barber Suggestibility Scale at 6 months: Hypnosis + audiotapes = 44.3 (SD 12.6), hypnosis = 51.1 (SD 11.4), control = 48.6 (SD 12.8)</td>
<td>Cochrane 1985 Weight change (lb) at 6 months: Hypnosis + audiotapes = -17.8 (SD 2.7), hypnosis = -17.1 (SD 2.5), control = -0.5 (SD 2.5)</td>
<td>Cochrane 1985 Weight change (lb) at 6 months: Hypnosis + audiotapes = -17.8 (SD 2.7), hypnosis = -17.1 (SD 2.5), control = -0.5 (SD 2.5)</td>
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<td>Cochrane 1985</td>
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<td>Cochrane 1985 Weight change (lb) at 6 months: Hypnosis + audiotapes = -17.8 (SD 2.7), hypnosis = -17.1 (SD 2.5), control = -0.5 (SD 2.5)</td>
<td>Cochrane 1985 Weight change (lb) at 6 months: Hypnosis + audiotapes = -17.8 (SD 2.7), hypnosis = -17.1 (SD 2.5), control = -0.5 (SD 2.5)</td>
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<td>Dennis 1999</td>
<td>Weight change (kg) at 6 months: Cognitive behavior therapy + exercise = - 8.6 (+/- 5) kg, exercise control = - 5.0 (+/- 4.1) kg</td>
<td>% body fat (CBT/ exercise versus exercise alone): 32.7 (+/- 3.2) % (pre) to 25.9 (+/- 3.9) % (post) versus 33.5 (+/- 4.7) % (pre) to 28.6 (+/- 4.7) % (post)</td>
<td>Serum triglycerides (CBT/exercise versus exercise) = 145 mg/dL (pre) to 109 mg/dL (post) versus 146 mg/dL (pre) to 145 mg/dL (post)</td>
<td>Serum cholesterol (CBT/exercise versus exercise) = 190 mg/dL (pre) to 194 mg/dL (post) versus 180 mg/dL (pre) to 195 mg/dL (post) (p&lt;0.05)</td>
<td>Tennessee Self Concept Self Concept Scale at 6 months: Hypnosis + audiotapes = 322.0 (SD 38.6), hypnosis = 325.5 (SD 34.3), control = 356.0 (SD 39.5)</td>
<td>Tennessee Self Concept Self Concept Scale at 6 months: Hypnosis + audiotapes = 322.0 (SD 38.6), hypnosis = 325.5 (SD 34.3), control = 356.0 (SD 39.5)</td>
<td>Tennessee Self Concept Self Concept Scale at 6 months: Hypnosis + audiotapes = 322.0 (SD 38.6), hypnosis = 325.5 (SD 34.3), control = 356.0 (SD 39.5)</td>
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<td>Foreyt 1973</td>
<td>Weight (pre and post intervention)</td>
<td>Rating of program likability and</td>
<td>Covert sensitization</td>
<td>Binge eating scale (pre and post</td>
<td>Exercise (pre and post intervention)</td>
<td>Binge eating scale (pre and post intervention)</td>
<td>Covert sensitization</td>
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<td>to 4 1/2 months: Covert sensitization: pre = 161.7 (SD 26.1) lb, post = 160.5 (SD 24.0) lb; placebo control (suggestion) group - pre = 159.5 (SD 24.7) lb, post = 152.4 (SD 25.2) lb; no treatment control group - pre = 158.3 (SD 29.8) lb, post = 152.2 (SD 28.0) lb</td>
<td>4.12, covert sensitization</td>
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<td>Goodrick 1998</td>
<td>Weight change (pre and post</td>
<td>Binge eating scale (pre and post</td>
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<td>group = 89.0 (SD 10.2) to 90.5 (SD 6.1) to 15.5 (SD 34.8 (SD 2.7)</td>
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<td>12.4)</td>
<td>Comparison intervention group = 87.7 (SD 9.6) to 89.1 (SD 10.6) kg; Control group = 86.5 (SD 9.8) to 87.1 (SD 10.6) kg</td>
<td>7.5)</td>
<td>Comparison intervention group = 27.6 (SD 5.1) to 17.3 (SD 7.8) kg; Control group = 27.9 (SD 5.3) to 24.2 (SD 8.6) kg</td>
<td>kcal/kg/day; Comparison intervention group = 34.3 (SD 2.2) kcal/kg/day to 34.9 (SD 2.8) kcal/kg/day; Control group = 34.3 (SD 2.7) kcal/kg/day to 35.6 (SD 5.7) kcal/kg/day</td>
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Gormally 1981
Weight change (lb) at 7 months: Behavioral = -12.05 (SD 14.11); Nutrition = -6.72 (SD 11.68)
Caloric intake: Behavioral = 1129.6 calories (SD 247.1); Nutrition = 1254.1 calories (SD 215.5)
Physical activity self-report (Behavioral): Daily miles walked - pre = 2.8 (SD 1.2), post = 3.5 (SD 1.3); Weekly miles jogged - pre = 0.3 (SD 1.6), post = 1.1 (SD 2.9); Weekly calisthenics - pre = 14.6 (SD 29.2), post = 49.2 (SD 63.5); Weekly participation in sports - pre = 0.2 (SD 0.6), post = 0.5 (SD 0.8); Physical activity self-report (Nutrition): Daily miles walked - pre = 3.1 (SD 1.2), post = 3.2 (SD 1.3)
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<tr>
<td>Hagen 1974</td>
<td>Weight (pre and post intervention) to 3 1/2 months: Group contact = 153.94 (SD 21.20) lb to 141.67 (SD 21.42) lb; manual and group contact = 153.06 (SD 21.42) lb to 139.72 (SD 18.72) lb; manual only = 152.83 (SD 17.97) to 142.33 (SD 18.36) lb; no treatment control = 153.20 (SD 20.38) to 153.09 (SD 21.66) lb</td>
<td>Weekly miles jogged - pre = 0.5 (SD 2.8), post = 1.0 (SD 2.8); Weekly calisthenics - pre = 26.4 (SD 47.1), post = 62.3 (SD 81.4); weekly participation in sports - pre = 0.4 (SD 0.8), post = 0.4 (SD 1.0)</td>
<td>Weight change (pre and post intervention) at 12 months (lb):</td>
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<td>Jeffery 1983</td>
<td>Significant other - behavior therapy group = 175.4 (SD 26.7) to 165.0 (SD 32.5) lb; Significant other - weight loss reinforcement group = 180.8 (SD 28.3) to 182.5 (SD 39.1) lb; Therapist - behavior therapy group = 170.9 (SD 24.3) to 162.9 (SD 22.2) lb; Therapist - weight loss reinforcement group = 174.4 (SD 29.7) to 188.0 (SD 21.8) lb; Program - behavior therapy group = 185.6 (SD 29.1) to 184.3 (SD 28.6) lb; Therapist - weight loss reinforcement group = 162.5 (SD 26.7) to 160.0 (SD 32.6) lb</td>
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<td>Weight change (lb) at 12 months: Individual contingency contracting - $30 = -11.8 lb</td>
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<td>Jeffery 1985</td>
<td>Weight change (lb) at 6 months: treatment group = 8.1 (SD 14), no treatment group = 17 (SD 11.7)</td>
<td>$150 = -16.3 lb, $300 = -13.8 lb; Group contingency contracting - $30 = - 18.8 lb, $150 = - 22.1 lb, $300 = - 14.6 lb</td>
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<td>Jeffery 1995</td>
<td>Weight change (kg) at 30 months: standard behavior therapy (SBT) = -1.4 (SD 7.2) kg; SBT + food group = -2.2 (SD 6.6) kg; SBT + incentives = -1.6 (SD 5.5) kg; SBT + food + incentives = -1.6 (SD 6.3) kg; control = 0.6 (SD 5.3) kg</td>
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<td>Johnson 1979</td>
<td>Weight change (kg) at 12 months: stimulus control = -2.4 kg, stimulus control and contingency management = 49</td>
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Table 02. Original data for all main outcomes  

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<td>Kirschenbaum 1985</td>
<td>-5.2 kg, stimulus control and exercise = -7.4 kg, stimulus control, exercise and contingency management = -5.9 kg</td>
<td>Weight (pre and post intervention) to 24 months: Behavior therapy induction - (Therapist A): pre = 45.9 (SD 27.8)%, post = 32.5 (SD 16.7)%; - (Therapist B) pre = 45.7 (SD 27.8)%, post = 37.3 (SD 26.9)%; Behavior therapy - (Therapist A): pre = 44.3 (SD 28.8)%, post = 36.9 (SD 26.6)%; - (Therapist B) pre = 57.5 (SD 36.2)%, post = 58.6 (SD 37.4)%; Nonspecific and attention prompting - (Therapist A): pre = 42.7 (SD 14.3)%, post =</td>
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### Table 02. Original data for all main outcomes (Continued)

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<td>34.4 (SD 19.4)%; - (Therapist B)</td>
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<td>pre = 63.5 (SD 43.6)%; post = 59.7 (SD 40.3)%; Nonspecific - (Therapist A):</td>
<td>pre = 54.3 (SD 25.2)%; post = 43.8 (SD 26.8)%;</td>
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<td>pre = 59.5 (SD 23.2)%; post = 54.6 (SD 20.0)%</td>
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<td>Lindahl 1999</td>
<td>Weight change (kg) at 12 months:</td>
<td>Oxygen consumption at 12 months: treatment</td>
<td>PAI-1 activity at 12 months: treatment</td>
<td>tPA antigen at 12 months: treatment</td>
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<td>treatment group = -5.4 (-6.5 to -4.4) kg, control group = -0.5 (-1.1 to 0.2) kg</td>
<td>group = 0.21 (0.03 to 0.39) L/min, control group = -0.02 (-0.15 to 0.10) L/min</td>
<td>group = -10.1 (-15.3 to -4.8) U/mL, control group = -3.0 (-8.0 to 2.0) U/mL</td>
<td>group = -1.65 (-2.15 to -1.16) micrograms/L, control group = -0.69 (-1.13 to -0.25) micrograms/L</td>
<td></td>
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</tr>
<tr>
<td>Nauta 2000</td>
<td>Weight change (kg) at 6 months:</td>
<td>Beck Depression Inventory at 6 months (Subjects</td>
<td>Rosenberg Self-Esteem Scale at 6 months (Subjects</td>
<td>-</td>
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<tr>
<td></td>
<td>(Subjects with Binge Eating Disorder):</td>
<td>with Binge Eating Disorder):</td>
<td>with Binge Eating Disorder):</td>
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<tr>
<td></td>
<td>Behaviour therapy</td>
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<tr>
<td></td>
<td>- pre = 96.6 (+/- 16.4), post = 94.6 (+/- 16.8); Cognitive therapy</td>
<td>- pre = 19.3 (+/- 8.5), post = 9.0 (+/- 5.4); Cognitive therapy</td>
<td>- pre = 19.2 (+/- 6.5), post = 10.9 (+/- 11.0);</td>
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### Table 02. Original data for all main outcomes  (Continued)

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<th>Outcome 3</th>
<th>Outcome 4</th>
<th>Outcome 5</th>
<th>Outcome 6</th>
<th>Outcome 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(+/- 16.7); Weight change (kg) at 6 months (Subjects with no Binge Eating Disorder): Behaviour therapy - pre = 92.6 (+/- 9.7), post = 89.8 (+/- 9.4); Cognitive therapy - pre = 88.8 (+/- 11.1), post = 89.1 (+/- 13.1)</td>
<td>Beck Depression Inventory at 6 months (Subjects with no Binge Eating Disorder): Behaviour therapy - pre = 8.4 (+/- 5.0), post = 9.2 (+/- 8.5); Cognitive therapy - pre = 7.3 (+/- 5.1), post = 5.6 (+/- 5.4)</td>
<td>Rosenberg Self-Esteem Scale at 6 months (Subjects with no Binge Eating Disorder): Behaviour therapy - pre = 20.3 (+/- 5.4), post = 20.2 (+/- 6.8); Cognitive therapy - pre = 20.9 (+/- 4.7), post = 17.4 (+/- 5.4)</td>
<td>Total cholesterol: Behavioral = -0.16 (SD 0.55) mmol/L, Control = -0.18 (SD 0.59) mmol/L; HDL-C: Behavioral = -0.04 (SD 0.2) mmol/L, Control = 0.06 (SD 0.3) mmol/L; LDL-C: Behavioral = -0.1 (SD 0.5) mmol/L, Control = -0.2 (SD 0.6) mmol/L; Triglycerides: Behavioral = -0.2 (SD 0.8) mmol/L, Control = -0.01 (SD 0.7) mmol/L; Apolipoprotein A-1: Behavioral = 0.05 (SD 0.2) g/L,</td>
<td>Change in Energy Intake: Behavioral = -832 (SD 2563) kJ, Control = 30 (SD 1994) kJ; Change in Total Fat Intake: Behavioral = -16.8 (SD 34.6) g, Control = 5.1 (SD 29.8) g; Change in sucrose intake: Behavioral = 0.9 (SD 6.1) g, Control = 1.5 (SD 4.8) g; Change in Fibre Intake: Behavioral = 0.2 (SD 6.0) g, Control = -0.8 (SD 5.7) g</td>
<td>Resting pulse: Behavioral = -1.8 (SD 8.1) beats/min, Control = 1.8 (SD 5.7) beats/min; Distance walked: Behavioral = 57 (SD 89) m, Control = 47 (SD 69) m; Recovery pulse: Behavioral = 7.2 (SD 17.1) beats/min, Control = 12.3 (SD 1.1) beats/min; Vigorous activity: Behavioral = 26.9 % (n), Control = -3.2 % (n)</td>
<td></td>
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</table>
Table 02. Original data for all main outcomes  
(Continued)

<table>
<thead>
<tr>
<th>Study ID</th>
<th>Outcome 1</th>
<th>Outcome 2</th>
<th>Outcome 3</th>
<th>Outcome 4</th>
<th>Outcome 5</th>
<th>Outcome 6</th>
<th>Outcome 7</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Control = 0.03 (SD 0.15) g/L; Apolipoprotein B: Behavioral = -0.03 (SD 0.2) g/L, Control = -0.05 (SD 0.16) g/L; Fibrinogen: Behavioral = 0.14 (SD 0.9) g/L, Control = 0.03 (SD 0.7) g/L</td>
<td></td>
<td></td>
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<tr>
<td>Painot 2001</td>
<td>Weight change (kg) at 3 months: NCB (nutrition-cognitive-behavioural) group = -1.9 (+/-0.6), CB (cognitive-behavioural) group = -0.5 (+/-0.6)</td>
<td>Beck Depression Inventory at 3 months: NCB = 17 +/- 2 before treatment and 14 +/- 2 after treatment; CB = 17 +/- 2 before treatment and 11 +/- 1 after treatment</td>
<td>Hospital Anxiety and Depression (Depression) Scale at 3 months: NCB = 6 +/- 1 before treatment and 5 +/- 1 after treatment; CB = 6 +/- 1 before treatment and 5 +/- 1 after treatment</td>
<td>Hospital Anxiety and Depression (Anxiety) Scale at 3 months: NCB = 11 +/- 1 before treatment and 10 +/- 1 after treatment; CB = 10 +/- 1 before treatment and 9 +/- 1 after treatment</td>
<td>Eating Disorder Inventory at 3 months: NCB = 79 +/- 6 before treatment and 66 +/- 7 after treatment; CB = 82 +/- 5 before treatment and 62 +/- 5 after treatment</td>
<td></td>
<td></td>
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<tr>
<td>Rozensky 1976</td>
<td>Weight change (lb) at 3 1/2 months: high self-reinforcement - self-control = -9.3 lb, external control = -1.81 lb; low self-reinforcement - self-control = -7.0 lb, external control = -5.4 lb; control = -3.9 lb</td>
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<tr>
<td>Study ID</td>
<td>Outcome 1</td>
<td>Outcome 2</td>
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<tr>
<td>Saccone 1978</td>
<td>Weight change (lb) at 12 months: Behavior program + weight monitoring = -5.1 (SD 2.9) lb; Behavior program + behavior monitoring = -3.7 (SD 7.4) lb; Therapist reinforcement + weight monitoring = -5.3 (SD 5.9) lb; Significant other reinforcement + behavior change = -7.6 (SD 6.2) lb; significant other reinforcement + monitor behavior change = -13.0 (SD 5.7) lb</td>
<td></td>
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<tr>
<td>Sbrocco 1999</td>
<td>Weight change (kg) at 12 months: Behavioral choice treatment = -10.0 (SD 3.4) kg; Behavioral choice treatment = 3.09 (SD 2.62) kg; Behavioral therapy = 7.88 (SD 6.17)</td>
<td>Beck Depression Inventory at 6 months: Behavioral choice treatment = 80.90 (SD 9.1); Behavioral therapy = 71.40 (SD 7.90)</td>
<td>State Self-Esteem Scale at 6 months: Behavioral choice treatment = 5.55 (SD 1.94); Behavioral therapy = 8.09 (SD 2.80)</td>
<td>Eating Inventory (restraint subscale) at 6 months: Behavioral choice treatment = 2.0 (SD 1.7); Behavioral therapy = 5.0 (SD 5.71)</td>
<td>Eating Disorders Inventory - 2 (drive for thinness) subscale at 6 months: Behavioral choice treatment = 12.70 (SD 8.65); Behavioral therapy = 16.81 (SD 9.98)</td>
<td>Eating Disorders Inventory - 2 (Body Dissatisfaction) subscale at 6 months: Behavioral choice treatment = 0.22 (SD 0.63); Behavioral therapy = 2.0 (SD 2.28)</td>
<td></td>
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<tr>
<td>Study ID</td>
<td>Outcome 1</td>
<td>Outcome 2</td>
<td>Outcome 3</td>
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<tr>
<td>Stevens 2001</td>
<td>Weight change (kg) at 36 months: treatment group = -0.2 kg (-0.7 to 0.3), control = 1.8 (1.3 to 2.2)</td>
<td>Blood pressure at 36 months: difference between treatment group and control = 2.7 mmHg (2 to 3.5)</td>
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<tr>
<td>Stuart 1971</td>
<td>Weight change (lb) at 12 months: Intervention group = - 35 lb; comparison group = - 21 lb</td>
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<tr>
<td>Wing 1984</td>
<td>Weight change (lb) at 6 months - massed, low calorie = -7.4 (+/- 5.7), spaced, low calorie = -4.4 (+/- 4.4), massed, behavioural = -3.7 (+/- 2.4), spaced behavior = -10.4 (+/- 5.2)</td>
<td>High versus low self-monitoring -18.1 lb lost vs 7.2 lb lost at week 10</td>
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<tr>
<td>Wing 1985</td>
<td>Weight change (kg) at 16 months = - 1.78 kg for behaviour modification, -3.03 kg for nutrition education and -3.42 kg for standard care</td>
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<tr>
<td>Wing 1991</td>
<td>Weight change (lb) at 12 months: HbA1c change at 12 months: Calories expended in exercise per Eating behavior inventory:</td>
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<td>Study ID</td>
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<tr>
<td></td>
<td>behavioral intervention =</td>
<td>behavioral intervention =</td>
<td>week: behavioral</td>
<td>behavioral intervention</td>
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<td></td>
<td>-7.0 (SD 11.7) lb</td>
<td>-0.1 (SD 1.9)%</td>
<td>intervention -</td>
<td>intervention -</td>
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<td></td>
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<td></td>
<td>pre = 743 (SD 694) cal,</td>
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<tr>
<td>Wing 1996</td>
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<td>post = 1148 (SD 752) cal;</td>
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<td>comparison intervention -</td>
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<td></td>
<td>pre = 682 (SD 641) cal,</td>
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<td>post = 1251 (SD 1275) cal</td>
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<tr>
<td>Wollersheim 1970</td>
<td>Weight change (kg) at 6 months:</td>
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<tr>
<td></td>
<td>Standard behavior therapy (SBT) =</td>
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<td>-8 (+/- 6.2) kg</td>
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<td></td>
<td>SBT + structured meal plan =</td>
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<td></td>
<td>-12 (+/- 7.2) kg</td>
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<tr>
<td></td>
<td>SBT + meal plans + food provision =</td>
<td>- 11.7 (+/- 5.4) kg; SBT + free food =</td>
<td>- 11.4 (+/- 6.5) kg</td>
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**ANALYSES**

**Comparison 01. Behaviour therapy versus control**

<table>
<thead>
<tr>
<th>Outcome title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
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<tbody>
<tr>
<td>Mean change in weight - studies 12 months or less duration</td>
<td>5</td>
<td>1305</td>
<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>-4.46 [-4.57, -4.34]</td>
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<td>Mean change in weight - studies &gt; 12 months duration</td>
<td>2</td>
<td>1254</td>
<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>-2.00 [-2.03, -1.97]</td>
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**Comparison 02. Behaviour therapy plus diet / exercise versus diet / exercise**

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<th>Outcome title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
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<tbody>
<tr>
<td>Mean change in weight - studies 12 months or less duration</td>
<td>6</td>
<td>467</td>
<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>-4.71 [-4.97, -4.45]</td>
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**Comparison 03. More intensive versus less intensive behaviour therapy**

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<th>Outcome title</th>
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<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
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<tr>
<td>Mean change in weight - studies with a duration of 12 months or less</td>
<td>10</td>
<td>306</td>
<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>-2.34 [-3.27, -1.41]</td>
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<tr>
<td>Mean change in weight - studies &gt; 12 months duration</td>
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<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>Totals not selected</td>
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**Comparison 04. Cognitive behaviour therapy plus diet / exercise versus diet / exercise**

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<th>Outcome title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
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<tbody>
<tr>
<td>Mean change in weight - studies 6 months duration or less</td>
<td>2</td>
<td>63</td>
<td>Weighted Mean Difference (Fixed) 95% CI</td>
<td>-4.85 [-7.31, -2.38]</td>
</tr>
</tbody>
</table>

**INDEX TERMS**

Medical Subject Headings (MeSH)

* Body Weight; Cognitive Therapy [*methods]; Obesity [psychology; *therapy]; Randomized Controlled Trials

MeSH check words

Adult; Humans

**COVER SHEET**

**Title**
Psychological interventions for overweight or obesity

**Authors**
Shaw K, O’Rourke P, Del Mar C, Kenardy J

**Contribution of author(s)**
KELLY SHAW: Protocol development, literature search, assessment of trials and data extraction. Will also be the principal reviewer to be performing the analysis and interpretation of data, as well as the development of the final review.
PETER O’ROURKE: Assessment of trials and data extraction. Assistance with analysis and interpretation of data and development of the final review.
CHRISTOPHER DEL MAR: Development of the final review.

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<th>Issue protocol first published</th>
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<td>2005/2</td>
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<tr>
<td>Date of most recent amendment</td>
<td>23 February 2005</td>
</tr>
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<td>Date of most recent SUBSTANTIVE amendment</td>
<td>23 February 2005</td>
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<td>What’s New</td>
<td>Information not supplied by author</td>
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<tr>
<td>Date new studies sought but none found</td>
<td>Information not supplied by author</td>
</tr>
<tr>
<td>Date new studies found but not yet included/excluded</td>
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<tr>
<td>Date new studies found and included/excluded</td>
<td>Information not supplied by author</td>
</tr>
<tr>
<td>Date authors’ conclusions section amended</td>
<td>Information not supplied by author</td>
</tr>
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**DOI**  
10.1002/14651858.CD003818.pub2

**Cochrane Library number**  
CD003818

**Editorial group**  
Cochrane Metabolic and Endocrine Disorders Group

**Editorial group code**  
HM-ENDOC
Figure 01. Study flow diagram

Review of reference lists: 3

Potentially relevant articles from electronic databases:
Total $\sum = 3,607$

Articles retrieved for more detailed evaluation:
Total $\sum = 454$

Titles or abstracts excluded because they did not fulfill inclusion criteria: $\sum = 3,153$

Full text articles excluded: 335

Studies that potentially met inclusion criteria: 59

RCTs included in meta-analysis: 36

RCTs with usable information, by outcome: 12
### Analysis 01.01. Comparison 01 Behaviour therapy versus control, Outcome 01 Mean change in weight - studies 12 months or less duration

**Review:** Psychological interventions for overweight or obesity  
**Comparison:** 01 Behaviour therapy versus control  
**Outcome:** 01 Mean change in weight - studies 12 months or less duration

<table>
<thead>
<tr>
<th>Study</th>
<th>Behaviour therapy</th>
<th>Control</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight (%)</th>
<th>Weighted Mean Difference (Fixed)</th>
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</thead>
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<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>95% CI</td>
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<tr>
<td>Israel 1979</td>
<td>36</td>
<td>-1.00 (2.20)</td>
<td>7</td>
<td>1.80 (2.20)</td>
<td>0.4</td>
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<td>Oldroyd 2001</td>
<td>39</td>
<td>-1.50 (2.60)</td>
<td>39</td>
<td>0.50 (2.20)</td>
<td>1.2</td>
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<tr>
<td>Rozensky 1976</td>
<td>14</td>
<td>-2.70 (3.20)</td>
<td>11</td>
<td>-1.80 (3.20)</td>
<td>0.2</td>
</tr>
<tr>
<td>Saccone 1978</td>
<td>50</td>
<td>-3.10 (2.60)</td>
<td>8</td>
<td>1.80 (2.90)</td>
<td>0.3</td>
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<tr>
<td>Stevens 2001</td>
<td>547</td>
<td>-4.40 (1.00)</td>
<td>554</td>
<td>0.10 (1.00)</td>
<td>97.9</td>
</tr>
</tbody>
</table>

**Total (95% CI):** 686 619 100.0 -2.46 [-2.57, -2.34]

Test for heterogeneity chi-square=31.91 df=4 p=<0.0001 I² = 87.5%

Test for overall effect z=74.74 p<0.00001

---

### Analysis 01.02. Comparison 01 Behaviour therapy versus control, Outcome 02 Mean change in weight - studies > 12 months duration

**Review:** Psychological interventions for overweight or obesity  
**Comparison:** 01 Behaviour therapy versus control  
**Outcome:** 02 Mean change in weight - studies > 12 months duration

<table>
<thead>
<tr>
<th>Study</th>
<th>Behaviour therapy</th>
<th>Control</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight (%)</th>
<th>Weighted Mean Difference (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Jeffery 1995</td>
<td>126</td>
<td>-1.70 (6.40)</td>
<td>27</td>
<td>0.60 (5.30)</td>
<td>0.0</td>
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<tr>
<td>Stevens 2001</td>
<td>547</td>
<td>-0.20 (0.11)</td>
<td>554</td>
<td>1.80 (0.30)</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Total (95% CI):** 673 581 100.0 -2.00 [-2.03, -1.97]

Test for heterogeneity chi-square=0.07 df=1 p=0.80 I² =0.0%

Test for overall effect z=147.22 p<0.00001

---
### Analysis 02.01. Comparison 02 Behaviour therapy plus diet / exercise versus diet / exercise, Outcome 01 Mean change in weight - studies 12 months or less duration

#### Review: Psychological interventions for overweight or obesity

#### Comparison: 02 Behaviour therapy plus diet / exercise versus diet / exercise

#### Outcome: 01 Mean change in weight - studies 12 months or less duration

<table>
<thead>
<tr>
<th>Study</th>
<th>Behaviour therapy +</th>
<th>Diet + / - exercise</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight (%)</th>
<th>Weighted Mean Difference (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>95% CI (%)</td>
</tr>
<tr>
<td>Black 1984</td>
<td>32</td>
<td>-4.40 (3.90)</td>
<td>17</td>
<td>-2.50 (4.35)</td>
<td>1.1</td>
</tr>
<tr>
<td>Gormally 1981</td>
<td>53</td>
<td>-5.50 (6.40)</td>
<td>46</td>
<td>-3.00 (5.30)</td>
<td>1.3</td>
</tr>
<tr>
<td>Jeffery 1985</td>
<td>18</td>
<td>-3.70 (6.40)</td>
<td>18</td>
<td>-7.70 (5.30)</td>
<td>0.5</td>
</tr>
<tr>
<td>Lindahl 1999</td>
<td>93</td>
<td>-5.40 (1.30)</td>
<td>93</td>
<td>-0.50 (0.30)</td>
<td>93.2</td>
</tr>
<tr>
<td>Wing 1984</td>
<td>21</td>
<td>-3.00 (7.50)</td>
<td>23</td>
<td>-2.70 (10.90)</td>
<td>0.2</td>
</tr>
<tr>
<td>Wing 1985</td>
<td>18</td>
<td>-6.30 (2.10)</td>
<td>35</td>
<td>-3.40 (2.90)</td>
<td>3.7</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>235</td>
<td></td>
<td>232</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Test for heterogeneity chi-square=39.39 df=5 p=<0.0001 I² = 87.3%

Test for overall effect z=35.26 p<0.00001

---

### Analysis 03.01. Comparison 03 More intensive versus less intensive behaviour therapy, Outcome 01 Mean change in weight - studies with a duration of 12 months or less

#### Review: Psychological interventions for overweight or obesity

#### Comparison: 03 More intensive versus less intensive behaviour therapy

#### Outcome: 01 Mean change in weight - studies with a duration of 12 months or less

<table>
<thead>
<tr>
<th>Study</th>
<th>More intensive group</th>
<th>Less intensive group</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight (%)</th>
<th>Weighted Mean Difference (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>95% CI (%)</td>
</tr>
<tr>
<td>Black 1983</td>
<td>7</td>
<td>-7.10 (2.70)</td>
<td>7</td>
<td>-3.00 (2.10)</td>
<td>13.4</td>
</tr>
<tr>
<td>Black 1984</td>
<td>12</td>
<td>-2.90 (5.80)</td>
<td>13</td>
<td>-3.30 (3.70)</td>
<td>5.8</td>
</tr>
<tr>
<td>Brownell 1978a</td>
<td>5</td>
<td>-13.40 (6.60)</td>
<td>11</td>
<td>-6.90 (5.50)</td>
<td>2.0</td>
</tr>
<tr>
<td>Burnett 1985</td>
<td>6</td>
<td>-8.00 (6.30)</td>
<td>6</td>
<td>-1.00 (3.30)</td>
<td>2.7</td>
</tr>
<tr>
<td>Carroll 1981</td>
<td>10</td>
<td>-4.50 (5.30)</td>
<td>11</td>
<td>-3.20 (3.80)</td>
<td>5.4</td>
</tr>
<tr>
<td>Johnson 1979</td>
<td>10</td>
<td>-5.90 (5.35)</td>
<td>12</td>
<td>-2.40 (5.35)</td>
<td>4.3</td>
</tr>
<tr>
<td>Rozensky 1976</td>
<td>14</td>
<td>-3.70 (3.20)</td>
<td>14</td>
<td>-1.60 (3.20)</td>
<td>15.3</td>
</tr>
<tr>
<td>Saccone 1978</td>
<td>30</td>
<td>-3.70 (2.70)</td>
<td>14</td>
<td>-1.90 (2.30)</td>
<td>36.1</td>
</tr>
<tr>
<td>Wing 1991</td>
<td>20</td>
<td>-3.20 (5.30)</td>
<td>23</td>
<td>-5.30 (10.40)</td>
<td>3.7</td>
</tr>
<tr>
<td>Wing 1996</td>
<td>41</td>
<td>-1.40 (6.50)</td>
<td>40</td>
<td>-8.00 (6.20)</td>
<td>11.3</td>
</tr>
</tbody>
</table>

---

(Continued...)

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Psychological interventions for overweight or obesity (Review)

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### Analysis 03.02. Comparison 03 More intensive versus less intensive behaviour therapy, Outcome 02 Mean change in weight - studies > 12 months duration

**Review:** Psychological interventions for overweight or obesity  
**Comparison:** 03 More intensive versus less intensive behaviour therapy  
**Outcome:** 02 Mean change in weight - studies > 12 months duration

<table>
<thead>
<tr>
<th>Study</th>
<th>More intensive group</th>
<th>Less intensive group</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight</th>
<th>Weighted Mean Difference (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>95% CI</td>
<td>(%)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>155 151</td>
<td></td>
<td></td>
<td>100.0</td>
<td>-2.34 [ -3.27, -1.41 ]</td>
</tr>
</tbody>
</table>

Test for heterogeneity chi-square=12.71 df=9 p=0.18 I² =29.2%
Test for overall effect z=4.94  p<0.00001

---

### Analysis 04.01. Comparison 04 Cognitive behaviour therapy plus diet / exercise versus diet / exercise, Outcome 01 Mean change in weight - studies 6 months duration or less

**Review:** Psychological interventions for overweight or obesity  
**Comparison:** 04 Cognitive behaviour therapy plus diet / exercise versus diet / exercise  
**Outcome:** 01 Mean change in weight - studies 6 months duration or less

<table>
<thead>
<tr>
<th>Study</th>
<th>Cognitive behaviour</th>
<th>Diet +/- exercise</th>
<th>Weighted Mean Difference (Fixed)</th>
<th>Weight</th>
<th>Weighted Mean Difference (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Mean(SD)</td>
<td>N Mean(SD)</td>
<td>95% CI</td>
<td>(%)</td>
<td>95% CI</td>
</tr>
<tr>
<td>Block 1980</td>
<td>16 -8.70 (4.50)</td>
<td>8 -0.20 (6.30)</td>
<td>25.4 -8.50 [ -13.39, -3.61 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dennis 1999</td>
<td>21 -8.60 (5.00)</td>
<td>18 -5.00 (4.10)</td>
<td>74.6 -3.60 [ -6.46, -0.74 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>37 26</td>
<td></td>
<td>100.0 -4.85 [ -7.31, -2.38 ]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test for heterogeneity chi-square=2.88 df=1 p=0.09 I² =65.2%
Test for overall effect z=3.85  p=0.0001