

Scenarios 1.03, 1.05

Taken from

"A meta-analysis of the past 25 years of weight loss research using diet, exercise or diet plus exercise intervention." WC Miller, DM Kocaja and EJ Hamilton. International Journal of Obesity (1997) 21, 941-947

OBJECTIVE: The therapeutic effectiveness of diet, exercise, and diet plus exercise for weight loss in obesity was determined.

DATA SOURCES: All human research reported in English, published in peer-reviewed scientific journals within the past 25 y was reviewed.

STUDY SELECTION: Acceptance criteria (n=493 from >700 studies) were that a therapeutic intervention of diet, exercise or diet plus exercise was employed, specifically for weight reduction in obese adult humans and that weight change was reported numerically. Only aerobic exercise studies were included, while drug, hormone and surgical treatments were excluded.

RESULTS

Table 1 Subject demographics and program lengths.

Variable	Diet ^a	Exercise ^a	Diet + exercise ^a
Age	40.0 ± 0.5 (171)	36.5 ± 1.4* (63)	39.5 ± 0.7 (90)
Initial weight (kg)	96.4 ± 1.1 (196)	82.9 ± 2.4* (75)	96.3 ± 1.9 (114)
Initial BMI	34.9 ± 0.6 (87)	26.4 ± 1.5* (27)	34.8 ± 1.0 (56)
Initial percentage body fat	38.5 ± 0.9 (56)	28.5 ± 1.2* (55)	36.6 ± 1.0 (42)
Program length (weeks)	15.1 ± 0.8 (224)	20.9 ± 1.8* (76)	13.4 ± 0.7 (119)

BMI = Body mass index. Data are means ± s.e.m. *Significantly different from other program types (ANOVA). ^aNumber in parenthesis represents the number of studies reporting data for that particular variable.

Table 3 Effect sizes (ES) for body composition changes in obese adults following diet, exercise or diet plus exercise intervention^a.

Variable	Diet (D) ^b	Exercise (E) ^b	Diet + exercise (DE) ^b
ES kg lost	5.1 ± 0.5*,** (141)	2.1 ± 0.5*** (34)	5.5 ± 0.7*,** (68)
ES kg fat lost	5.5 ± 1.2 (29)	2.1 ± 0.7 (16)	7.9 ± 1.6* (16)
ES percentage body fat decrease	4.8 ± 0.8** (20)	3.0 ± 1.1**** (16)	7.4 ± 2.5*,**,**** (15)
ES BMI decrease	2.2 ± 0.5 (8)	0.7 ± 0.9 (7)	3.7 ± 2.0 (10)

BMI = Body mass index. Data are means ± s.e.m. *Significantly different from E when ANOVA was run without covariates. **Significantly different from E when analysis was run with initial body weight as a covariate. ***Significantly different from other groups when analysis was run with initial BMI as a covariate. ****Significantly different from D when analysis was run with initial body weight as a covariate. ^aNumbers were too small for ES analyses for percentage of initial weight lost and weight loss maintained at one year. ^bNumber in parenthesis represents the number of studies reporting data for that particular variable. (This number may have varied for the covariate analyses if a study did not report data for the covariate in question.)

1) "Conceptually, meta-analysis converts the findings of a given study into data points called effect sizes (ES)."
Define Effect Size and explain why it is useful in meta-analysis. (4 marks)

2) Why is it important to define acceptance (incorporation, inclusion or exclusion) criteria in meta-analysis? (3 marks)

3) Using the data in table 3, which type of programs (D, E or DE) was least effective in producing body compositional changes? (1 mark)

4) Using the data in table 3, why might the data for changes in BMI be considered unreliable? (1 mark)

5) What can you deduce about weight loss research conducted between 1972 and 1997 and in particular the subjects of this research? (4 marks)