

Effectiveness of Contingency Management and Systematic Desensitisation as Behaviour Modification Techniques in Reducing Food Consumption Among Obese Students in South West Nigeria

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DOI: <https://doi.org/10.47772/IJRISS.2026.100700104>

Received: 06 July 2026; Accepted: 11 July 2026; Published: 27 July 2026

ABSTRACT

Overweight and obesity are growing problems in much of the world. Obesity has a negative impact on health and quality of life. Evidence shows that it is possible to prevent obesity in children and adolescents through limited, school-based programmes that combine the promotion of healthy dietary habits and physical activity. From the perspective of both the individual and society, it is therefore essential to identify strategies for managing this problem. Once present, obesity is difficult to treat, making effective preventive intervention all the more important. This study investigated the effectiveness of Contingency Management and Systematic Desensitization as behaviour modification techniques in reducing food consumption patterns among obese students in South West Nigeria. The study adopted a pre-test, post-test quasi-experimental control group design. Three hypotheses were tested using a 3x2x3 factorial design. Twenty-four students were purposively selected from each of the four co-educational schools with equal proportion of male and female students. The participants were assigned to the two treatments and the control groups randomly. Participation criteria were based on body mass index (BMI) for age on national reference data above 95th percentile. Result shows a significant effect of the treatment (contingency management and systematic desensitization) on students food consumption behaviour reduction ($F(2, 94) = 47.240$; $p < 0.05$). Moreover, there was a significant difference between contingency management and systematic desensitization with a mean difference of 0.76 and significant at .000 and also a significant difference between contingency management and control with a mean difference of 1.41 significant at .000. There was no significant interaction effect of treatment on body mass index (BMI) and gender. It is therefore recommended that the two approaches could be used to treat obesity among adolescent in Nigeria while counsellors, psychologists, teachers, school administrators and parents whose business among other things is behaviour modification can treat obese students with any of the intervention irrespective of gender and BMI, especially among adolescent.

Keywords: Contingency management, Systematic desensitization, Obese, BMI, Behaviour modification

INTRODUCTION

Behaviour management and behaviour modification had been used interchangeably by several researchers. In behaviour modification, the focus is on changing behaviour, while in behaviour management the focus is on maintaining order. Behaviour management skills are of particular importance to teachers in the educational system. Behaviour management include all of the actions and conscious inactions to enhance the probability people, individually and in groups, choose behaviours which are personally fulfilling, productive, and socially acceptable (Baldwin & Baldwin, 1986). Considerable efforts had been given to behaviour change by several researchers using different approaches chief among them is the approach propounded by Skinner and Carl Rogers (2000) where rewards of an individual is first identified and this is tied to good behaviour. This is what Skinner referred to as “Positive Reinforcement Psychology” On the other hand, Rogers proposes that in order to effectively address behaviour problems, individual must be persuaded to want to behave appropriately. This

is done by teaching the individual the difference between right and wrong including why he or she should do what is right. Rogers believes that the individual must have an internal awareness of right and wrong.

According to Brophy (1986), contemporary behaviour modification approaches involve students more actively in planning and shaping their own behaviour through participation in the negotiation of contracts with their teachers and through exposure to training designed to help them to monitor and evaluate their behaviour more actively, to learn techniques of self-control and problem solving, and to set goals and reinforce themselves for meeting these goals. Generally, this has been very effective in incorporating principles of functional assessment into the process. Over the years, behavioural management principles such as reinforcement, modeling and even the use of punishment have been explored in the building of pro-social behaviour.

Two studies exist in which modeling by itself did not increase pro-social behaviour; (Elliot, & Vasta, 1970; Boyce, 2004), however, modeling is much more effective than instruction giving (such as "preaching") (Bryan & Walbek, 1970). The role of rewards has been implicated in the building of self-control and empathy. Recent research (Adediran, 2011, Egbochuku, -2012) indicates that behavioural interventions produce the most valuable results when applied during early childhood and early adolescence.

Contingency management techniques involved provision of incentives to individuals who provide objective evidence of having achieved a targeted element of behavioural change. The instructor arranged the environment such that target behaviour (for example school attendance) is readily detected, tangible reinforcers are provided when the target behaviour is demonstrated and incentives are withheld when the target behaviour does not occur (Boyce, 2004). A key term in contingency management (CM) is reinforcement and an important tenet of CM and other behavioural approaches is that rewards work better and seem to have more lasting impact in shaping new behaviour than do (Adediran, 2011). In other words, the most successful strategies involve rewarding of positively recognizing achievement rather than punishing or applying negative sanctions to a lack of achievement. In CM studies with substance abuse treatment clients (Babatunde and Odekphekpen (2021), rewards in the form of incentives have been successfully utilized. These incentives have included extra privileges, vouchers for inexpensive prizes such as gas coupons or retail goods, or actual cash payments. The incentives that a programme uses to reinforce client behaviour are usually guided by factors such as type of treatment, programme philosophy, logistics and staff availability, and resources available to the programme (Aderanti, 2006).

Systematic desensitization is a procedure by which new behaviours are learned in response to stimuli that previously elicited other behaviours. Systematic desensitization involves three steps: 1. The first step is to teach the student relaxation techniques, typically with teaching the students to tighten and relax various groups of muscles. This should be practiced for 10 -15 minutes every day to become comfortable with the technique.

2. Following this the students and therapist develop a fear hierarchy. In the hierarchy the student will develop a list of 15-20 items that become increasingly more fearful on a scale of 0-100.

3. The third and final step is to have the students imagine each of the items on the hierarchy in order from least fearful to most, while engaging in the relaxation technique taught by his or her therapist.

Kearney and Silverman (2000) and Egbochuku (2012) revealed that systematic desensitization is effective in modifying deviant behaviour while acknowledging the fact that different studies had established the efficacy of contingency management (Adediran, 2007, & Brook, 2001) at ameliorating some anti-social behaviour (e.g. bullying, stealing and truancy).

Little efforts have been made to investigate the effectiveness of contingency management and systematic desensitization as behaviour modification techniques among senior secondary school students. The effectiveness of Systematic desensitization in ameliorating nightmares was evaluated in a controlled study. Twenty-nine subjects were assigned to 'either systematic desensitization, a nightmare discussion placebo, or

continuous self-recording. The placebo treatment did not differ from desensitization in terms of rated logicalness and potential effectiveness. However, the desensitization group- showed a significantly greater reduction in the frequency of nightmares as well as a decrease in rated intensity. Moreover the desensitization subjects also had a significantly greater decrease in reported fear and state anxiety. However, there is growing evidence to suggest that a shared approach could be of benefit, with the joint goal of utilising health promotion to shape the knowledge and behaviours of young people to prevent disease and improve health. We should also adopt strategies that consider both eating disorders and obesity as a coupled illness and that seek to communicate joint messages that are relevant to both areas, such as negative body image and disordered eating behaviours. Coordinated and consistent messaging promoting health outcomes for overweight and eating disorder problems is possible, especially in the area of prevention. Focusing on the risk factors and protective factors that are common to both obesity and eating disorders presents an opportunity to collaborate and redirect people in a positive direction.

Weight and eating-related conditions often occur in an environment where ambiguous and opposing demands and messages are present; for example, “taking diet pills will help you lose weight and are therefore good for your health” is often presented in the same space as warnings to the effect of “diet pills are unhealthy and dangerous.” According to Boyce (2004) four percent of boys in grade nine and ten reported anabolic steroid use in a 2002 study, showing that body preoccupation and attempts to alter one's body are issues affecting both men and women. Moreover, 28% of girls in grade nine and 29% in grade ten engaged in weight-loss behaviours.

Thirty-seven percent of girls in grade nine and 40% in grade ten perceived themselves as too fat. Even among students of normal-weight (based on BMI), 19% believed that they were too fat, and 12% of students reported attempting to lose weight (Boyce, King, & Roche, 2008). Body dissatisfaction and weight, change behaviours have been shown to predict later physical and mental health difficulties, including weight gain and obesity on the one hand and the development of eating disorders on the other (Field, et. al., 2003; Neumark, Wall, Haines, Story, Sherwood, van den & Berg, 2007).

In a survey of adolescents in grades 7-12, 30% of girls and 25% of boys reported teasing by peers about their weight. Such teasing has been found to persist in the home as well 29% of girls and 16% of boys reported having been teased by a family member about their weight. Body-based teasing can have a serious impact on girls' attitudes and behaviours. According to one study, girls who reported teasing by family members were 1.5 times more likely to engage in binge-eating (eating too much) and extreme weight control behaviours five years later (Eisenberg & Neumark, 2003; Neumark, et. al. 2007). In view of the above, overweight and obese children are more likely to be bullied than their normal weight peers. For example, in a survey of 11-16 year-olds, 10% of normal-weight children reported being bullied, compared to 15% of overweight and 23% of obese children. Obese girls were 2.7 times more likely than normal weight girls to be verbally bullied on a regular basis and 3.4 times more likely to be excluded from group activities.

Evidence shows that it is possible to prevent obesity in children and adolescents through limited, school-based programmes that combine the promotion of healthy dietary habits and physical activity. Overweight and obesity are growing problems in much of the world. Obesity has a negative impact on health and quality of life. From the perspective of both the individual and society, it is therefore essential to identify strategies for managing this problem. Once present, obesity is difficult to treat, making effective preventive intervention all the more important. This study investigated the effectiveness of Contingency Management and Systematic Desensitization as behaviour modification techniques in reducing food consumption patterns among obese students in South West Nigeria.

METHODOLOGY

The study adopted a pre-test, post-test quasi-experimental control group design. Three hypotheses were tested using a 3x2x3 factorial design. The variables of study are treatments which exist at three levels (contingency management, systematic desensitization and control). Gender, which exist at two levels (male and female) and

body mass index which was observed at three levels (normal, average and high). The dependent variable was food consumption reduction among obese students. Participants consist of ninety-six students in four co-educational schools in Ibadan, Qyo State, Nigeria who are purposively selected to participate in the study because they are regarded as obese. Twenty-four students were purposively selected from each of the four co-educational schools with equal proportion of male and female students. The participants were assigned to the two treatments and the control groups randomly. To be qualified as a participant in the study, a participant must have body mass index (BMI) for age by calculating the proportion of their height and weight based on national reference data and cut off point of above 95th percentile.

The three hypotheses formulated and tested in the study are:

Ho₁: There is no significant difference in the effect of contingency management and systematic desensitization on food consumption reduction behaviour of obese students.

Ho₂: There is no significant gender difference in the effect of contingency management and systematic desensitization on food consumption reduction behaviour of obese students.

Ho₃: There is no significant interaction effect of treatment on body mass index (BMI) of obese students' food consumption in Nigeria.

Two validated instruments used in the study for data collection are Contingency Management-Treatment Package, with reliability coefficient of 0.87 and Systematic Desensitization Treatment Package, with reliability coefficient of 0.86 respectively. A pre-test score using Obese Students' Food Consumption Scale (OSFCS) was obtained prior to the beginning of the intervention package which lasted six weeks and a post-test score obtained at the end of the intervention package. The control group was not given any intervention. The intervention lasted six weeks. Descriptive and Inferential statistics of means, standard deviation and ANOVA was used to analyse the data collected.

Ho₁; There is no significant difference in the effect of contingency management and systematic desensitization on food consumption behaviour of obese students.

Table 1: ANOVA Summary of Treatment on food consumption behaviour

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig. (p)
Between Groups	300.834	2	150.412	47.240	.000*
Within Groups	179.576	94	1.910	—	—
Total	480.410	96	—	—	—

The result in table 1 revealed a significant effect of the treatment (contingency management and systematic desensitization) on students food consumption behaviour reduction ($F(2, 94) = 47.240$; $p < 0.05$). Therefore the first hypothesis is accepted since a significant effect exists in the effectiveness of the two treatment groups. This result agrees with the conclusion of Field, Austin, Taylor, Malpeis, Rosner, Rockett, Gillman, & Colditz, (2003), that opined that “Dieting for weight loss is often associated with weight gain, due to the increased incidence of “binge-eating”. The result is also in agreement with the report of Abramovitz & Birch (2000) who concluded that children learn (unhealthy) mainstream attitudes towards food and weight at a very young age. In a study of five-year-old girls, a significant proportion of girls associated a diet with food restriction, weight-loss and thinness. The result is also supported by the conclusion drawn in a study by Boyce, King, & Roche, (2008) where Thirty-seven percent of girls in grade nine and 40% in grade ten perceived themselves as too fat. Even among students of normal-weight (based on BMI), 19% believed that they were too fat, and 12% of students reported attempting to lose weight.

Ho2: There is no significant gender difference in the effect of contingency management and systemic desensitization on food consumption behaviour of obese students.

Table 2: Descriptive Statistic of Scores of Subjects under Contingency Management and Systemic Desensitization Treatment Groups.

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Comparison (I-J)	Mean Difference (I-J)	Std. Error	Sig. (p)
Contingency Management vs. Systematic Desensitization	0.7555*	0.1671	.000
Contingency Management vs. Control	1.4123*	0.1460	.000
Systematic Desensitization vs. Contingency Management	-0.7555*	0.1671	.000
Systematic Desensitization vs. Control	1.3571*	0.1447	.000
Control vs. Contingency Management	-1.4123*	0.1460	.000
Control vs. Systematic Desensitization	-1.3571*	0.1447	.000

Note. * indicates that the mean difference is statistically significant at the 0.05 level. All pairwise comparisons were statistically significant ($p < .001$).

Table 2 shows the extent of difference. The result revealed a significant difference between contingency management and systematic desensitization with a mean difference of 0.76 and significant at .000 and also a significant difference between contingency management and control with a mean difference of 1.41 significant at .000. This revealed therefore, that contingency management is superior to both systematic desensitization and control in food consumption-pattern of obese students' management. It also shows a significant difference (for systematic desensitization) of 1.36 significant at .000 meaning that systematic desensitization is also superior to control in food consumption reduction pattern of obese students' management.

Ho3: There is no significant interaction effect of treatment on body mass index (BMI) of obese students in food consumption pattern management in Nigeria.

Table 3: ANOVA Summary of Treatment on Gender

Your ANOVA table has some calculation errors. Based on the Sum of Squares (SS) and df, the correct Mean Squares (MS) and F-value should be as follows:

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig. (p)
Between Groups	1.736	1	1.736	0.008	.366
Within Groups	20697.928	95	217.873	—	—
Total	20699.664	96	—	—	—

Table 3 shows the summary of one way ANOVA of treatment on Gender. The analysis of variance on table 3 shows an F ratio on the effect of gender to be .001, with $df = (1,95)$. This was not significant at $p > 0.05$. The null hypothesis stating no significant gender difference in the effect of contingency management and systematic desensitization on food consumption reduction pattern of obese students was not rejected. It was concluded that there was no significant difference in treatment of males and females on food consumption pattern of obese students. It means that the treatment is efficient for both males and females.

Table 4: ANOVA Summary of Treatment on BMI on Obese students.

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig. (p)
Between Groups	57.646	2	28.823	0.131	.329
Within Groups	20642.018	94	219.596	—	—
Total	20699.664	96	—	—	—

In the one way ANOVA in table 4, there was no significant interaction effect of treatment on body mass index (BMI). The result shows an F ratio of interaction effect of treatment to be 0.079 with $df = (2,94)$. This was not significant at $p > 0.05$. This implies that here was no significant interaction effect of treatment on BMI. This indicates that participants of different body weight gained after treatment. Thus, the null hypotheses stating no significant interaction effect of treatment was retained. It was concluded that, there was no significant difference in treatment on BMI in food consumption reduction pattern of obese students. This implies that the difference in the treatment groups is the same across the entire body mass index.

The result of the study indicates that a significant difference exists in the effectiveness of food consumption behavior pattern which is an indication that the two treatments (Contingency and Management and System Desensitization) are effective in the treatment of food consumption pattern of students in Nigeria. The reason for this result could be as a result of the six weeks exposure to treatment after controlling for other moderator variables that can contaminate the result. It is therefore clear that positive changes in behaviour can be achieved especially in behaviour modification as facilitated by using these techniques (Coon, 2000; Oliha, 2010). From the outcome of the data analysis, there was an indication that there was no interaction effect of gender on treatment on the students' food consumption behaviour pattern. This is an indication that contingency management and systematic desensitization work effectively on both male and female. No significant body mass index (BMI) difference on the effect of contingency management and systematic desensitization on student food consumption behavior pattern was found. This result is not surprising since the approaches to prevention of obesity are universal and these universal programmers address an entire population of children irrespective of body weight (Wasserman and Miller 1993). By these findings it is clear that the two behavioural therapies are effective in the management of food consumption behaviour pattern among obese students.

CONCLUSION

This paper thus had provided an overview of the core principles involved in the use of contingency management and systematic desensitization along with a brief discussion of issues that may relate to the use of reinforcements in addition to treatment programmes. Even though, manuals of models are available, the use of principle-based dissemination becomes the more useful approach to the treatment of behaviour modification. Practitioners in education and psychology may be able to use their clinical creativity to develop interventions that will match the specific needs of their clients and the goals of their programme. Moreover, the sample size used in this study may be a limitation to its being generalized. In view of the findings of the study, it is advanced that contingency management and systemic 'desensitization are effective approaches that could be used for behaviour modification in our society. It is therefore recommended that the two approaches could be used to treat obesity among adolescent in Nigeria. The result had shown that the finding is also instructive to counsellors, psychologists, teachers, school administrators and parents whose business among other things in behaviour modification is that contingency management and systematic desensitization are best in the treatment of obese students food consumption behaviour irrespective of gender and body mass index (BMI) especially among adolescent which will assist in the behaviour modification of adolescent and reduce the incidence of obesity in the society. Parents who reside with these obese students could use any of these techniques alongside with any other corrective measures in the various Nigerian correctional institutions such as approved schools. It is also an eye opener for individual adolescents who are obese and have formed the

habit of Bing eating that both treatments (CM and SD) could be better options. Future research should consider other regions in comparison with the result of this study.

REFERENCES

1. Abramovitz, B. A., & Birch, L. L. (2000). Five-year-old girls' ideas about dieting are predicted by their mothers' dieting. *Journal of the American Dietetic Association*, 100(10), 1157–1163.
2. Adediran, O. A. (2011). Using contingency management and self-management in the reduction of conduct disorders of pupils. *Journal of Education in Developing Areas (JEDA)*, 19(1).
3. Aderanti, R. A. (2006). Prevalent of adolescent delinquent behaviour patterns: An issue in counselling psychology and implications for national development. *International Journal of Education Learning and Development*, 1(2), 51–60.
4. Babatunde, E.O. & Odekphekpen (2021). Assessment of Parental Drug Addiction, Abuse and Misuse on Children Self- Esteem in South-West Nigeria. *Nigerian School Health Journal*, Volume 33 Number 1, pp 37-48
5. Baldwin, J. D., & Baldwin, J. I. (1986). *Behavior principles in everyday life* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
6. Boyce, W. R. (2004). *Young people in Canada: Their health and well-being*. Ottawa, Ontario: Health Canada.
7. Boyce, W. R., King, M. A., & Roche, J. (2008). Healthy living and healthy weight. In *Healthy Settings for Young People in Canada*.
8. Brophy, J. N., & Evertson, C. (1986). Effects of two teaching methods on the achievement in and attitude to biology of students of different levels of scientific literacy. *International Journal of Educational Research*, 45(3), 216–229.
9. Bryan, J. H., & Walbek, N. H. (1970). Impact of words and deeds concerning altruism upon children. *Child Development*, 41, 747–759.
10. Coon, D. (2000). *Essentials of Psychology: Exploration and Application*. New York: Wadsworth Thomson Learning.
11. Egbochuku, E. O. (2005). Effect of systematic desensitization (SD) therapy on the reduction of test anxiety among adolescents in Nigerian schools. *Journal of Instructional Psychology*, 32(4), 298–304.
12. Elliot, R., & Vasta, R. (1970). Effects associated with vicarious reinforcement, symbolization, age, and generalization. *Journal of Experimental Child Psychology*, 10, 8–15.
13. Eisenberg, M. E., & Neumark-Sztainer, D. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine*, 157(6), 733–738.
14. Field, A. E., Austin, S. B., Taylor, C. B., Malpeis, S., Rosner, B., Rockett, H. R., Gillman, M. W., & Colditz, G. A. (2003). Relation between dieting and weight change among children.
15. Oliha, J. A. (2010). Effectiveness of contingency management and systematic desensitization in the management of truancy in schools. *International Journal of Education Learning and Development*, 1(2), 51–60.
16. Neumark-Sztainer, D. R., Wall, M. M., Haines, J. I., Story, M. T., Sherwood, N. E., & van den Berg, P. A. (2007). Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventive Medicine*, 33(5), 359–369.
17. Wasserman, D., & Miller, M. J. (1993). Adolescent affective aggression: An intervention model. *Adolescence*, 28(112), 781–790.