

Using financial incentives to increase physical activity, weight loss and well being: a randomized control trial

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Abstract

Objective: To compare the effects of implementation intention prompts and financial incentives, on promoting physical activity in individuals who are relatively inactive. A secondary objective was to determine the effect of physical activity on psychological well-being.

Method: 98 participants were recruited, with a total of 66 participants (22 males, 44 females, mean age= 26.39 (SD= 5.00)) completing the intervention. Participants were randomly assigned to one of three groups; Financial Incentive (FI) group, Implementation Intention Prompt (IIP) group or a Control group. Weight, self-reported physical activity (International Physical Activity Questionnaire (IPAQ)) and psychological well-being (General Health Questionnaire-12 (GHQ-12)) were completed pre and post a six week intervention. Both the control group and FI group had no contact with researchers throughout the intervention period. The FI group received a discounted price (33% off) for a fitness and exercise program. The IIP group did not receive a discount, but received an initial group consultation, educating them on the use of implementation intention prompts, goal setting and two additional individual physical activity consultations, in which activity plans were reviewed and modified in line with physical activity health guidelines. All participants took part in a fitness and exercise program during the intervention. The program was administered by professional fitness trainers in Dublin, Ireland. A total of 10 classes were held each week, participants were encouraged to attend a minimum of 2 each week.

Results: Self-reported physical activity increased across both intervention groups, when compared to the control group. There were significant increases in mean weight loss for the FI group (6.4kg, SD=1.4kg) and IIP group (6.3kg, SD=1kg) compared to the control group (1.6kg, SD=2.2kg). A small positive correlation ($r=0.28$) was found between increased physical activity and improved mental health.

Conclusion: FI and IIP are equally effective methods of increasing physical activity levels and weight loss in previously inactive individuals. These findings have implications for health promoters and the fitness industry.

Introduction

According to the World Health Organization (WHO) more than 1.4 billion people across the world are overweight (WHO, 2008). The etiology of obesity has been widely discussed, detailing that it is due in part, to increasing levels of physical inactivity, caused by a growing number of sedentary forms of work and changing modes of transportation (WHO, 2008). The WHO states that overweight and obesity are preventable through healthier food choices and regular physical activity (WHO, 2008).

The National Guidelines on Physical Activity for Ireland, recommend that in order to achieve health benefits, an individual should accumulate a total of 150 minutes of physical activity a week (Get Ireland Active, 2008). This can be achieved through a combination of moderate and vigorous intensity activities. A common method for the public to increase physical activity and obtain a healthier lifestyle is to participate in a commercial fitness or weight loss programs (Tsai & Wadden, 2005). Examples include Weight Watchers, Jenny Craig, OPTIFAST, CrossFit or attending commercial fitness and exercise classes, with all having a common goal of reducing body fat and promoting a healthier lifestyle. These programs are based on guidelines provided by the National Heart, Lung and Blood Institute (1998) or the National Institute of Health and Care Excellence (NICE, 2006).

The reasons for a globally increasing number of obese and overweight people, even with weight loss and fitness programs being widely available, can be

partly attributed to a lack of participant motivation and adequate behavior modification (Biddle & Mutrie, 2008). For many individuals, the intention to become more physically active is present, but they lack the motivation to act on this intention.

The Theory of Planned Behavior (TPB) (Ajzen, 1985) provides a theoretical framework for understanding the states an individual experiences when progressing from a state of intention to actual performance of a behavior. According to the TPB, the intentions initiate the action and once motivation to achieve the intended goal is maintained, the likelihood for the action to be completed and sustained is increased. The initial act of setting a goal details the individuals' desired outcome (e.g. "I want to lose weight" or "I want to quit

Key words:

Motivation, exercise, behavior change, goal intentions, theory of planned behavior

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smoking”) but does not place reference to the time frame they wish to achieve it in or the actions they will carry out to produce this outcome (Gollwitzer, 1993; Webb & Sheeran, 2005). Sheeran (2002) suggests that goal intention can account for 28% of the variance in future behavior which shows that more research is required to investigate the processes that motivate and sustain us to achieving our intended goals. Gollwitzer (1993) detailed, along with the components of the TPB, an additional phase consisting of the formation of specific plans to support the performance of the intended behavior. These specific plans outlined where, when and how the intended behavior would occur (ie. “I plan to do X at time Y in location Z”) and are known as “Implementation Intentions” (Gollwitzer, 1999).

Implementation Intentions Prompts (IIP) are cues that enable the individual to consistently review their action plans and revise their intentions overtime to coincide with a varying environment (Luszczynska, Sobczyk & Abraham, 2007). IIP’s are regarded as a useful tool in assisting individuals to perform a desired behavior (Armitage, 2004; Luszczynska, Sobczyk & Abraham, 2007; Milne, Orbell, & Sheeran, 2002), however the use of IIP’s in the context of promoting physical activity has not been widely investigated. The current study compares the effectiveness of IIP’s in promoting physical activity and weight loss with a more commonly used behavior modification technique, financial incentives (FI). Research has shown that behavioral changes can be produced by introducing a FI (Charness & Gneezy, 2009), however additional research has also suggested that once the incentive is removed the behavior ceases (John, Loewenstein, Troxel, Norton, Fassbender & Volpp, 2011). Research into FI as motivation to increase physical activity primarily utilizes the incentive as a monetary reward that is offered to the participant once the behavior is complete. However, this is an uncommon practice in the commercial fitness and exercise industry and applying these methods of incentives may be inapplicable and not commercially viable. The primary format of motivation through FI in the industry is to offer discounts on payment packages (e.g. reduced cost on fitness classes, or discounted membership packages for students, etc.) and therefore these forms of FI should be investigated further.

The aims of the current study are to

examine effects of different motivational techniques (IIP and FI) on physical activity, weight loss and psychological well-being. The intervention was targeted at individuals who currently participated in low levels of physical activity in their leisure time, but had intentions to increase their physical activity levels. Specifically four hypotheses were tested; 1) Participants receiving an IIP intervention will have significantly higher levels of physical activity and weight loss at follow up, when compared to a control group. 2) Participants receiving the FI intervention will have significantly higher levels of weight loss and physical activity at follow up when compared to the control group. 3) Participants in both the IIP and FI intervention groups will display an equal increase in weight loss and physical activity at follow up, when compared to each other, and finally, 4) There will be a positive correlation between physical activity levels and psychological well-being.

Methods

Participants

Ethical approval was granted by the leading institutions Research Ethics Filter Committee. Participants were invited to take part in the program via email or face to face contact on the fitness gym premises. Of the 98 individuals that were approached, 80 participants volunteered to take part and provided written consent for inclusion in the study. The 18 individuals who declined to take part in the study did so for personal reasons or simply did not want to be involved in the study. As the study progressed, 14 participants dropped out due to personal choice and all information and data collected regarding these individuals was discarded and removed from analysis and reporting. A final sample of 66 (22 male and 44 female) participants, with a mean age of 26.39 (SD= 5.00) and a mean BMI of 27.77 (SD= 2.95) completed the study. The study lasted 10 weeks in total. Weeks 1-2 involved signing up to the exercise program, consenting to participate in the study and gathering of baseline intervention measurements (Weight, IPAQ, and GHQ-12). Weeks 3-8 included participation in the exercise program. In weeks 9-10 the same post intervention measurements were collected.

Design

A 3x2 mixed factors design was implemented, with Group as the

between groups factor with three levels; a control group, an IIP group and a financial incentive group. The within groups factors was time, with two levels, baseline and post intervention.

A discount of €5 off each class (33%) was offered to the first 40 individuals who signed up to the fitness and exercise program. Participants that were offered the reduced rate and agreed to partake in the study were assigned to the FI group (n=25, M age = 27.3, SD = 5.8)

The remaining participants who were not offered the reduced cost and agreed to take part in the study, were randomly assigned to the IIP Group (n= 21, M age= 24.7, SD= 4) or Control Group (n= 20, M age= 26.9, SD= 4.6).

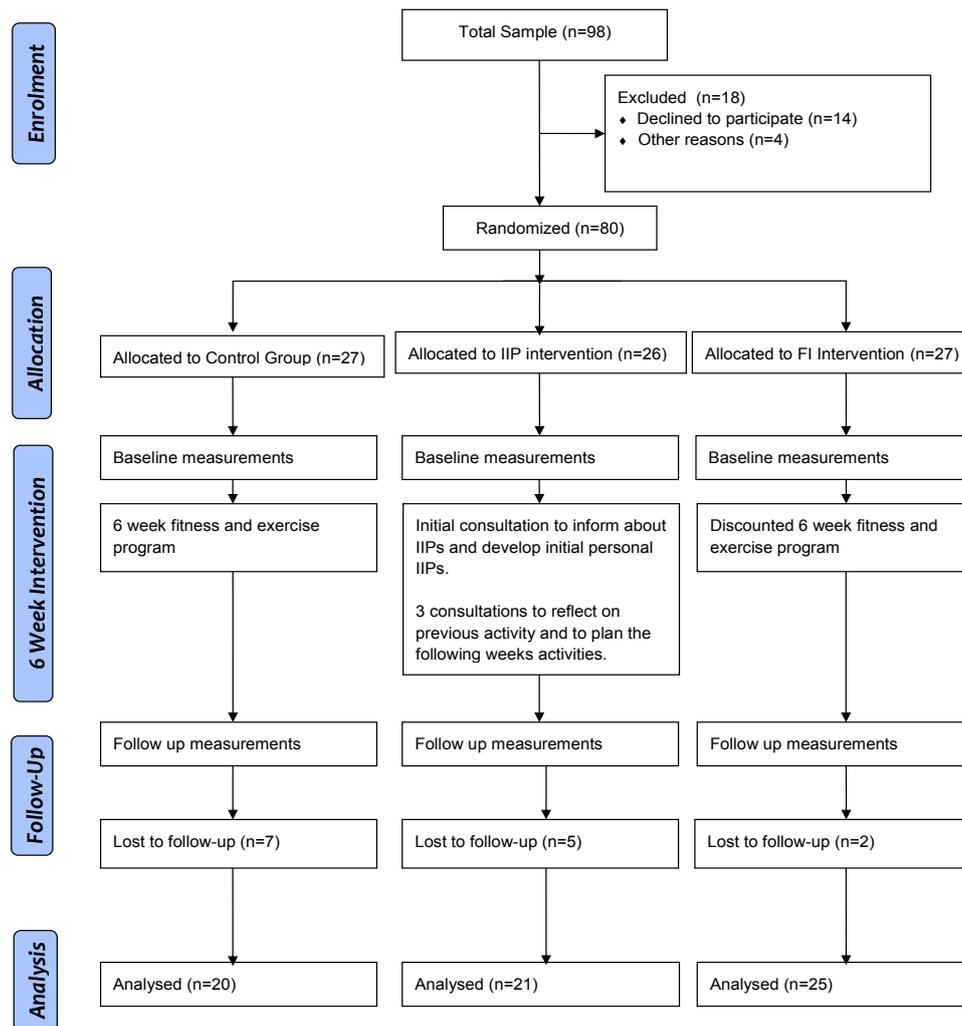
Procedure

All participants were recruited upon signing up to the fitness and exercise program over a 2 week period. Individuals that agreed to take part in the study were initially asked to complete a Physical Activity Readiness Questionnaire (PAR-Q) to ensure they met the criterion for inclusion in the study. Participants that met the requirements were then informed that they will be included in the study and were asked to complete consent forms prior to the commencement of the study. Once consent was provided, all participants were allocated personalized codes so that anonymity and confidentiality was ensured throughout the study. All participants were informed that the study would investigate the effects of motivational techniques for physical exercise on weight loss, physical activity levels and psychological well being. Participants were also informed that they will be required to complete questionnaires and provide weight measurements at two time points; baseline and follow up.

During the intervention period all participants took part in the fitness and exercise program consisting of aerobic and kettle bell classes conducted at a moderate to vigorous intensity and lasted 30 minutes each. 10 classes were held each week to ensure that all participants could partake in the suggested amount of 3 classes a week. Participants in the FI and Control groups received no further information from the researchers.

Participants in the IIP group attended the same fitness and exercise program as the Control and FI groups, but in addition they received an IIP Intervention.

Consort Flow Diagram of participation



Implementation Intention Prompt Intervention

The IIP intervention was conducted with the IIP group only, and carried out over a 6 week period (weeks 3 – 8). Four initial group consultation meetings were held during weeks 1 and 2 of the study to ensure all participants in the IIP group could attend. Participants were only required to attend one of the initial group meetings. In the initial group meetings, participants were informed of the benefits of physical activity to their health and wellbeing and also the current recommended physical activity levels for adults in Ireland. Participants were educated on the use and benefits of Implementation Intention Plans and were provided with Weekly Physical Activity Planners (WPAP). Participants, in consultation with the researcher, were asked to develop an initial WPAP for the following two weeks and were advised that individual consultations will be held to review and reflect upon their initial

physical activity intentions. In the WPAP, participants were required to detail the types and duration of activities they intend on completing over the coming weeks. Participants were also informed of the S.M.A.R.T. goal setting process and advised to set short term goals (goals they wished to achieve over the 2 week interval) and longer term goals (goals they wish to achieve by the end of the 6 week intervention period). During the intervention period, each participant in the IIP Group received 3 personalized one-to-one consultations (roughly two weeks apart depending on availability). These personalized consultations were held either face to face or via email (face-to-face was the primary method for consultation, but email was used as an alternative if the participant was not available). Within the individual consultations, the individual's level of physical activity over the previous two weeks was discussed and their previous activity plans were reviewed. Each individual

activity was discussed and reflected upon to investigate if there were any changes or alterations that could have been made to ensure that each participant is getting the maximum benefit from the activity. Suggestions to overcome any barriers to physical activities that may have been highlighted in the review were provided by the researcher. The short term goals that were previously set were reviewed and reflected upon and if required were modified and altered for the following two weeks. Opportunities for extra physical activities were highlighted, discussed and implemented into the new WPAP. Participants were also advised to consider additional physical activity not associated with the fitness and exercise program and to include these additional activities into their WPAP.

Outcome Measures

Participant's self-reported physical activity levels were determined using the International Physical Activity Ques-

	Weight Pre	Weight Post	Weight Loss	IPAQ Pre	IPAQ Post	IPAQ Increase	GHQ-12 Pre	GHQ-12 Post	GHQ Diff
Control	74.75kg	73.2kg	1.55kg	1.30	1.45	0.15	6.65	4.85	1.8
IIP	78.52kg	72.24kg	6.29kg	1.29	1.90	0.61	6.71	3.19	3.52
FI	74.08kg	67.64kg	6.44kg	1.44	1.88	0.44	6.8	3.44	3.36
TOTAL	75.7kg	70.79kg	4.91kg	1.35	1.74	0.39	6.73	3.79	2.94

Table 1: Means values for weight, IPAQ and the GHQ

tionnaire (IPAQ, 2005). Physical activity levels are scored based on the individual's current activity levels (1- low physical activity, 2- moderate physical activity, 3- high physical activity)

Weight (kilograms) was recorded using standard scales (SECA, Hamburg, Germany) with the participants wearing indoor clothes but having emptied pockets and removed shoes, jewelry and bulky clothing.

Psychological wellbeing was measured using the General Health Questionnaire -12 (GHQ-12; Adapted from the GHQ-60; Goldberg & Williams, 1988). A Likert scale was used for the GHQ-12, with possible scores for each question ranging from 0 – 3 and a maximum score of 36. A lower score indicates a higher level of psychological well-being.

Statistical Analysis

Separate 3x2 mixed factor analyses of variance (ANOVA) were used to test for differences between the two intervention groups and the control group, and to compare baseline and follow up measurements.

As participant's levels of weight, physical activity and psychological well-being had slight variations at baseline, the delta scores (i.e., the differences between the baseline and follow up scores) were calculated for each measure and separate one way ANOVAs were used to test for differences between the three groups on their levels of change in each measurement. The difference between baseline and follow up GHQ-12 measurements are reverse scored, so that a greater difference signifies a greater improvement in psychological well-being. Tukey Post Hoc test were also calculated to determine the differences between the three groups on each of the three factors. Finally separate Pearson's Product Moment correlations were used to examine the relationship between physical activity levels and weight loss and physical activity and mental health. All analyses were calculated using the Statistical Package for the Social Sciences

(SPSS) version 20.

Results

Physical Activity

See Table 1 for mean average scores for each group at baseline and follow up. There was no significant difference between the groups IPAQ scores at baseline. The average increase in physical activity for each of the groups was compared (F(2,63) = 3.496; p=0.036). The IIP and FI group demonstrated increases of 47% (0.61 ±0.68) and 31% (0.44 ±0.71) respectively, and the control group exhibited an increase of 12% (0.15 ±.37). A Tukey post hoc test revealed a significant difference in the physical activity increases of both the FI group (p=0.042) and IIP group (p=0.023) when compared to the control group, yet the FI and IIP groups were not significantly different to each other. These findings suggest that participants in the FI group and IIP group had increased their physical activity significantly more than the control group at follow up.

Weight Loss

The average weight loss for each of the groups was compared (F(2,63) = 64.041; p<0.001). The IIP and FI groups lost an average of 6.3kg ±1kg (8%) and 6.4kg ±1.4kg (9%) respectively while participants in the control group lost an average of 1.6kg ±2.2kg (2%).

A Tukey post hoc test showed that both the FI (p<0.001) and IIP (p<0.001) resulted in significantly greater weight loss, compared to the control group. There was no difference in weight loss between the two intervention groups.

Relationship between Physical Activity and Weight Loss

As physical activity levels increased, weight loss increased (r = 0.37, p < 0.01), suggesting that more active participants experienced greater weight loss, albeit the correlation was low to moderate.

Psychological Well-Being

There was no significant difference in the GHQ-12 scores between the

three groups at baseline. The average increases in psychological well-being between the three groups was compared (F(2,63)=5.011; p=0.01). The IIP and FI group displayed a 52% (3.52 ±1.94) and 49% (3.36 ±1.66) increase respectively, while the Control group displayed a 27% (1.8 ±1.36) improvement.

A further Tukey post hoc test showed that there was significant differences in the FI group (p=0.032) and IIP group (p=0.013) when compared to the control group, but there was no significant difference in the FI and IIP groups when compared to each other.

Relationship between Physical Activity and Psychological Well-Being

As physical activity increased, psychological well-being also increased across all participants in the study (r = 0.28, p < 0.05), suggesting that participants who conducted higher levels of physical activity, experienced higher improvements in their psychological well-being.

Discussion

These findings support the view that physical activity has beneficial effects on mental health and psychological well-being (Asztalos, De Bourdeaudhuij & Cardon, 2010; Janssen & LeBlanc, 2010; Pendo & Dahn, 2005) and provide support for the use of financial incentives and IIP's as motivational techniques in assisting individuals who join an exercise program to become more physically active. In the context of the TPB (Ajzen, 1991) both techniques can effectively aid an individual in progressing from a stage of having an intention to becoming active.

The use of financial incentives through discount pricing in commercial exercise programs is a common practice, however the use of IIP's is less so (Luszczynska et al., 2007). Through the use of physical activity consultations, planning, reflection/revision of plans and goal setting, this study demonstrates the effectiveness of IIP's as an addition or

replacement for financial incentives as a motivational technique for increasing physical activity levels in a gym or exercise program setting.

This study adds to the previous research into the use of financial incentives as motivators for increasing physical activity. This study supports the use of financial incentives as an effective method for increasing physical activity and achieving weight loss. Previous research into the effectiveness of financial motivation for increased physical activity and weight loss has been primarily based on a monetary incentive being awarded subsequent to the physical activity being carried out or an allocated amount of weight is lost (Charness & Gneezy, 2009), therefore this study attempted to replicate a more realistic and generalizable scenario for use by those who manage gyms. We argue that the percentage reduction in gym membership is a more applicable and practical method for assessing financial effects on motivating clients to be physically active.

This study has limitations that should be considered. As the intervention period was conducted over 6 weeks, the long term effects of both motivational techniques on physical activity, weight loss and psychological well-being were not examined. Whether the motivational effects can be maintained once the FI's are removed or the IIP consultations ceased is not clear. Would the levels of motivation begin to decline after a certain period of time, even if the FI's or IIP's were still present? Also, the study was conducted in a single geographical location. Weather conditions and season are known to influence an individual's level of physical activity (Tucker & Gilliland, 2007), the effect of the incentives may be different if conducted in a different location. A final limitation of the study is that participants in the IIP group had a larger amount of contact time with the researchers therefore we cannot rule out a Hawthorne effect, wherein the participants may have shown an increase in physical activity due to the presence of

the researcher. The average contact time with the researcher for each group is estimated at; IIP: 3 hours, FI: 30 minutes and Control: 30 minutes.

In conclusion, this study demonstrates the effectiveness of both financial incentives and implementation intention prompts on increasing motivation for physical activity and weight loss in a relatively inactive group of men and women. These motivational techniques assist the individuals in becoming more physically active, which results in higher levels of weight loss and improved psychological well-being. With levels of overweight and obesity continually increasing on a global scale, the importance of highlighting effective methods for increasing physical activity in order to impact public health is paramount. By examining motivational techniques that increase physical activity and produce levels of weight loss, the current study provides support to individuals wishing to lead a physically and mentally healthier life.

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