

Example Research Proposal
Project Theme: Can a theory-based behaviour change intervention increase engagement with exercise in obese populations?
Name of Applicant: Anonymous
Project Title: `I like to move it, move it; I like to move app, move app`: Using a mobile phone app to promote exercise in children using the construct of subjective norm.
Background Obesity is measured consistently throughout the UK using the Body Mass Index (BMI), which is defined as weight divided by the square of height (kg/m²). A person is classified as obese if their BMI is 30 or higher. Estimated costs of obesity to the NHS reach a figure of roughly eight million by 2025 (Foresight Report, 2007). Whilst older adults are most likely to be overweight, the increase in figures for childhood obesity make disconcerting reading, given that they are the future adult generation. Recent statistics for Wales report that 12% of children aged 4-5 are obese, and a further 15% are overweight. In both England and Wales, deprivation is a predictor of obesity. 14% of children are obese in the most deprived areas compared with 9% in the least, however the figures for Wales are slightly higher (Child Measurement Programme for Wales). Various public health programmes have targeted diet and exercise in the Welsh adult population; one example is the Change4Life campaign. However, apart from the ten week MEND programme, there are few initiatives aimed at young children. The All Wales Obesity Pathway (2011) identifies four levels of need amongst the Welsh population, from level 1: early intervention and self-care, to level 4: specialist one to one care. This proposed study is aimed at level 1, specifically to encourage children to engage in physical activity and become less likely to gain excess weight. Mobile applications (apps) are increasingly attractive to children and may be an affordable means to facilitate engaging in health improving behaviour (Boushey, Kerr, Wright, Lutes, Ebert and Delp, 2009). Research suggests that 73% of children in the UK own a smartphone by the age of ten; a figure that is on the increase, and already there is a rise in the availability of health intervention apps targeting adults for smoking cessation and weight loss (Abroms, Padmanabhan, Thaweethai, and Phillips, 2011; Breton, Fuemmeler and Abroms, 2011). However, in a review of 57 apps designed to target weight loss, healthy eating and physical activity in children, only three were based on expert recommendations or models of behavioural change (Schoffman, Turner-McGrievy, Jones and Wilcox, 2013). In a literature review exploring the predictive capacity of the TPB to engage in exercise, Blue (1995) reported one study demonstrating a significant relationship between subjective norm (SN) and exercise intention in children, but non-significant beta weights. Conversely, she reported a further study displaying a significant beta weight but a non-significant relationship. She concluded that children's vulnerability to be influenced by others, coupled with these results, warrant further investigation. Rhodes and Corneya (2003) also demonstrated that SN was of optimal predictive value for undergraduates' intention to engage in exercise. Moreover, in a systematic review of health behaviour change (Webb, Joseph, Yardley and Michie, 2010) concluded that the use of the TPB to inform intervention was substantially more effective than the alternatives; thus supporting the assumption that providing children with an `exercise buddy` as a form of SN, will increase their (1) intention to engage in exercise and (2) exercise behaviour itself.

Proposed methodology:

The intervention

The intervention consists of a fitness app designed to appeal to children, with functions that allow for (1) the selection of various exercise activities and (2) a personal performance index. Based on a previous study using a similar app (Lu and Welton, 2012), the app was created to provide a choice of ten exercise movements, including star-jumps and running. In addition, the performance function measures the child's activity and produced an aggregate score on completion of a series of movements. There are two versions of this app; the control version is described above and the intervention version is described as follows: Based on the construct of subjective norm, the intervention app enables children to be able to add multiple 'virtual friends' to exercise with or compete against. Thus for function (1) exercise selection, the virtual friend/s will exercise with them or compete against them. For function (2) the performance of the virtual friend/s can be mapped against the child's performance according to a pre-set randomised order. The intervention app also has an additional function (3). This is a feedback function, which provides encouragement in the form of pre-recorded randomised cheers and motivational statements from the virtual friend/s. The children will be randomly allocated to receive either the control app, or the intervention app. They will be instructed on how to use the app via a demonstration from the research team. They will also be issued with a set of instructions and a simple YouTube video. The children will be prompted to continue to use the app via a weekly software update message. The children will use the app for a total period of six months.

Target population and participant recruitment strategy

In order to capture a representative sample of welsh children, a computer generated random sample consisting of three primary schools and two secondary schools from each county in Wales will be obtained, resulting in a total of 55 schools. The schools will be contacted, sent an information pack and invited to participate. If interested, a meeting will be set up with a member of the research team to discuss the process. Parental consent and information packs will be provided for the school to administer. Approximately 3-6 weeks later, each school will be visited by the research team and the app introduced to those children who have received parental permission to participate. Identity codes will be allocated to each child to facilitate randomisation to either the control or intervention group. Only those children classified as healthy, overweight or obese by children's BMI measures, and with access to a smartphone will be included. Children with conditions known to influence obesity will be excluded. Additionally, those with an underweight BMI, or following an existing weight loss programme or taking prescription medication will not be invited to participate. A conservative estimate of two schools per county, with a total of 30 children per school result in an estimated sample size of 760 participants. Based on a frequency of four school visits per week, the recruitment process is estimated to have a duration of 12 weeks from initial contact to completion.

Data collection and evaluation method

Baseline data collection (time 1) will consist of participant demographics: age, gender, ethnicity and locale. Measures of BMI, a self-report diet and exercise questionnaire, the Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet and Farley, 1988); both modified for use with children, and a self-administered questionnaire assessing intention to exercise and the theoretical constructs of attitudes and subjective norm. This questionnaire was derived from the ALPHA Trial (Aparicio, Farris, Courneya, Schiller and Friedenreich, 2015) and modified to be suitable for use with children. At time 2 (after one month), and time 3 (one month later), measures will consist of BMI and frequency

data, downloaded from the apps via a computer software package. The frequency data will be downloaded monthly thereafter until the completion of the study.

Time 4 represents completion of the study, some two months later. Final measures will consist of the frequency data, measures of BMI, the self-report diet and exercise questionnaire and the self-administered questionnaire assessing intentions, attitudes and subjective norm. At this point, children will be invited to participate in small school based focus groups in order to discuss their experience of using the app. This qualitative data will form part of the evaluation process. Data collection is estimated to have a duration of eight months from baseline data collection to completion of the focus groups.

Primary and secondary outcome measures

The primary outcome of the study is the measurement of intervention efficacy and health behaviour change. This will be measured by BMI, at time 1, 2, 3, and 4 and by the self-report diet and exercise questionnaire at time 1 and four. The predictive ability of the TPB, the role of social support and demographic variables will be measured at time 1 (baseline data collection). Secondary outcome measures will be obtained through the demographic information and focus groups, in order to explore both the demographic profiles of the children most likely to benefit from intervention, their satisfaction ratings, potential barriers to intervention and reasons for participant attrition. The frequency data will be analysed to exclude those children who fall below a usage cut-off point.

Planned analyses

A three way mixed Analysis of Variance will examine the difference in BMI measures between the two groups for intervention efficacy across all four time periods and the difference in scores on the diet and exercise questionnaire between groups on time 1 and 4. Regression analyses will explore the predictive potential of TPB constructs, social support and demographic variables (using dummy variables where necessary). Thematic analysis will extract key themes from the focus groups to evaluate the perceived intervention efficacy, usefulness and potential for wider use.

Main Ethical considerations

Ethical guidelines published by the British Psychological Society (BPS) will be adhered to at all stages of the study. Of particular importance is the participants age; young people are a vulnerable population and there is a risk that they may not be fully aware of the extent of the research.

As a result, parents and children will be provided with a full and comprehensive information pack, with details of the study, aims and expected outcomes, de-briefing sheets and a helpline presented in multiple age-appropriate formats. Both parents and children will be provided with enough information to know exactly what to expect from the process, who to contact and how to withdraw at any time. Before agreeing to take part in the research, parents and their children will be required to read and convey understanding of the information pack and provide their written informed consent. The right to withdraw will be explained to both children and parents, with the children being shown how to cancel the app from their phone. At each subsequent measurement time, children will be reminded that they can withdraw at any time if they wish. At data collection point 4, there will be the opportunity for children to participate in the follow-up focus groups. Only children who express an interest will be invited to participate, with the same understanding that they may withdraw at any subsequent time.

Both parents and their children will be informed that data collection is entirely anonymous, with each child being assigned an arbitrary code. There will be no identifying link to any of the children and all data obtained from the study will be stored online in a password protected secure file. The recordings of the

focus groups will be transcribed within 24 hours and the original recordings deleted. The transcripts will be stored in the password protected secure file. On completion of the study, parents and children will be presented with a de-briefing document, thanking them for their time and reminding them of the right to withdraw. If any issues arise at this point, a contact number will be provided.

An important element to consider is the identification of those individuals who are overweight and the psychological impact that could ensue. It is for this reason that both children of healthy, overweight and obese categories are included within the study, so as to minimise the likelihood of psychological distress. In previously reported studies, no evidence exists of negative effects to those individuals of a healthy weight; thus it was deemed appropriate to include them in the current study. The exclusion of underweight individuals was a precautionary measure to avoid the potential for further weight loss. An additional consideration when using RCT's for intervention for health behaviour change, is the denial of intervention to the control group. However in this instance, both groups received an app with the scope to increase exercise by default. Therefore it is considered acceptable to implement this study as it has the potential to benefit all.

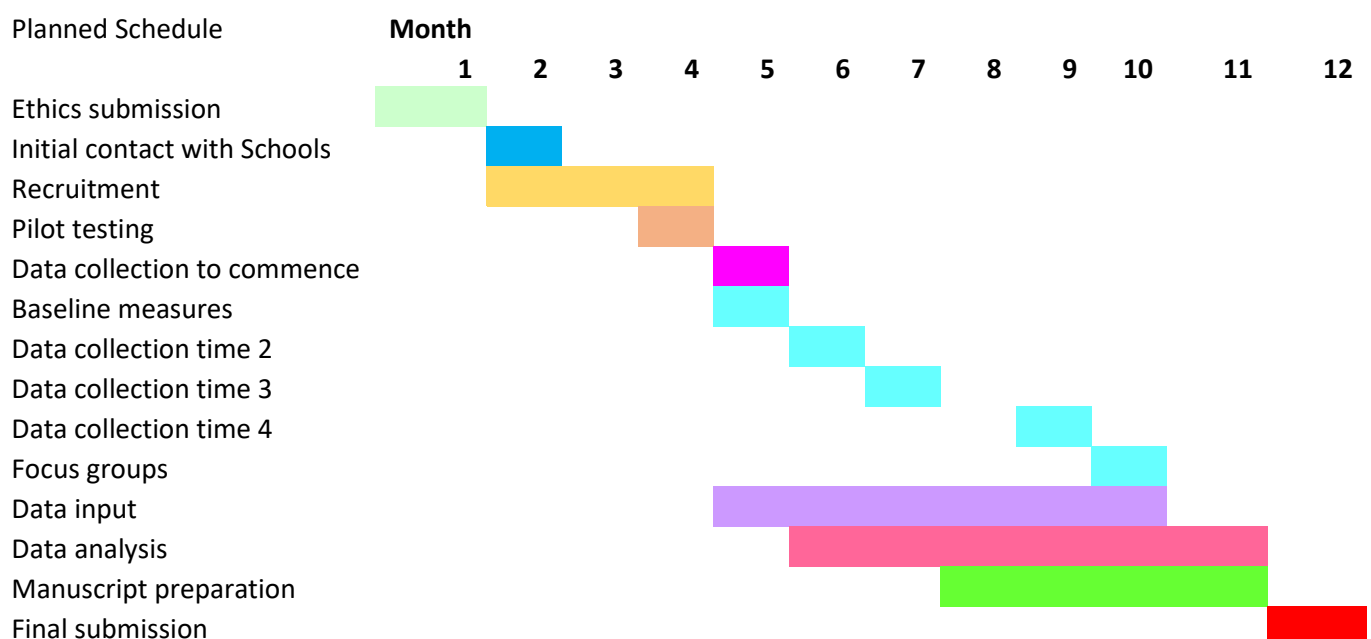
What are the expected outputs from this project?

It is hoped that the results of this study will contribute to the development of an economically viable mobile phone app targeting health behaviour change in children, with the potential to capture a wider audience. The app is designed to specifically target level 1 (intervention and self-care) of the All Wales Obesity Pathway Framework (2011) and if successful, the app may be made available to Health Authorities, organisations and governing bodies with an invested interest in public health care.

It may be disseminated to areas usually hard to reach and those individuals who may fall outside of the realm of mainstream healthcare. The potential benefit of this intervention is the ease of administration once the initial design of the app is complete. It may be shared with other countries and provide an effective intervention for exercise activity in a multitude of populace. If successful, there is scope for modification to be used in a variety of alternative intervention areas, such as smoking cessation or dietary control.

Timescales for project completion

Gantt Chart of proposed timescale: one year.



Up to ten key references

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